

# 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, from 2014 to 2022. To assess the effectiveness of the program, in-depth interviews were conducted with 26 officials and 100 individuals residing in 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 main factors that contributed to the successful implementation of the program: (1) clearly defined objectives, (2) the establishment of a stable rule system, (3) garnering support from local people, and (4) promoting associated activities. Given these positive outcomes, this model can be applied and scaled-up throughout Vietnam, particularly in areas where local communities coexist 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). In order to prioritize biodiversity conservation, the special-use forest system (SUF) 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 (SUF), which are for biodiversity conservation such as national parks, protected area, 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 SUF Management Boards. 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 exerted by local communities, inadequate budgetary allocations, and ineffective management

practices. Consequently, forest resources have been overexploited, 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 widespread 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, four strategies have been implemented, depending on the specific circumstances and available resources of each protected area. These strategies include the following: “wait and see,” “resettlement”; “zoning”; and “co-management or participatory conservation”. 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) distill 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.

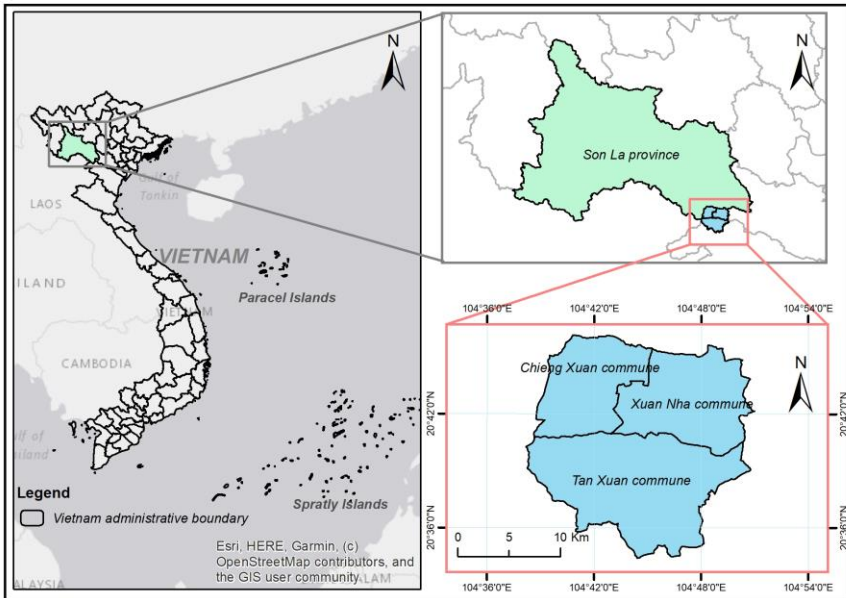
## 2. STUDY AREA

Xuan Nha Nature Reserve is situated in Moc Chau district, Son La province. Covering an area of 18,789 hectares, the Nature Reserve possesses a rich biodiversity, housing 1,074 species of vascular plants and 278 species of animals. 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 Natural Reserve is not among the prioritized biodiversity conservation areas in Vietnam. Consequently, conservation efforts face numerous challenges, including: (1) The significant population pressure exerted by local residents residing both inside and in close proximity to the nature reserve; (2) The 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 pertaining to forest exploitation.

As of 2014, there were 14 enclave villages encompassing an area of 3,978 hectares within the core zone of Xuan Nha Nature Reserve. Scattered hill farms were also observed deep within the forest, even within the strictly prohibited zones. The demarcation between cultivation land and SUF land had not been established in any form. Notably, the forest had experienced degradation, particularly in areas near human settlements. As mentioned earlier, Xuan Nha Nature Reserve was not prioritized for the implementation of alternative strategies, making co-management or community forest the only viable solution. However, this strategy also required 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 entered into contracts with eight villages, protecting a total area of 2,000 hectares from 2014 to 2020 at a rate of 100,000 VND/ha/year. The process began by identifying forest areas on maps, followed by on-site visits to physically delineate the assigned areas for the villagers. Additionally, the contracts 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, and plans were made to issue certificates of land use rights to households residing in the inner buffer zone in 2017.



**Figure 1.** Location of the study areas

**3. METHODS**

This management model was initiated in April 2014 and concluded in April 2022, focusing on three villages: Chieng Hin in Xuan Nha Commune, Kho Hong in Chieng Xuan Commune, and Ban Lay in Tan Xuan Commune (Figure 1). Initial data collection took place from April to August 2014, followed by the first supplementary fieldwork conducted from October to December 2018. The second round of data collection was carried out in November 2021, with data finalized in March 2022. The method for data collection is 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 staffs, 4 district staffs, 6 staffs from 3 communes, 6 staffs from 3 villages, 6 staffs from 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. These group discussions occurred in village community houses or the homes of individual villagers at various times during the project, spanning the years 2013, 2014, 2018, and 2021. 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 individuals residing in three villages were randomly selected for interview. These participants were interviewed twice. The first interview was conducted in 2015 as a baseline interview. The second one was conducted at the end of the project in 2021 to assess the impact of forest protection measures after six years of implementation. A t-test was used to determine the differences in forest usage activities between 2015 and 2021.

The questionnaire employed in this project was meticulously developed in close consultations with participants from Xuan Nha Nature Reserve, communes and villages. These consultations were instrumental in identifying specific forest encroachment activities necessitating evaluation. For the purpose of this article, only a subset of the questionnaire results has been used.

## **4. RESULTS AND DISCUSSION**

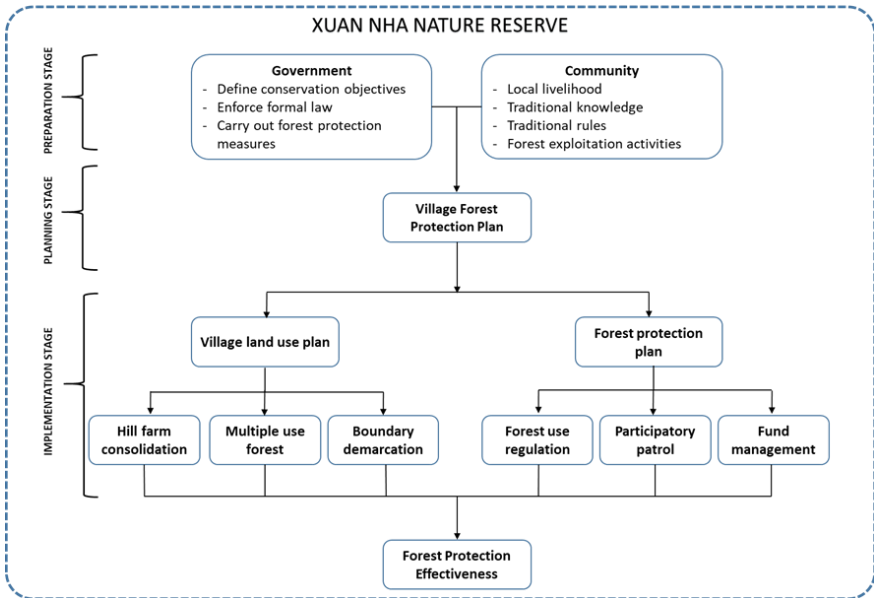
### **3.1 Model of community-based forest management in Xuan Nha Nature Reserve**

After five 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).

In the preparation stage, a working team was established encompassing members from relevant agencies, including the local communes, as they hold responsibility for various aspects of the community, such as livelihood, forest protection, and land management. Additionally, Xuan Nha Nature Reserve plays a vital role in safeguarding the forest, particularly within its jurisdiction, including the land where local residents reside. Furthermore, the district authorities are actively engaged in this collaborative effort. These agencies conducted an evaluation of the situation and prioritized their objectives. As discussed in the introduction, Xuan Nha Nature Reserve faced four key challenges in forest protection, including prolonged overexploitation and the absence of clear regulations and boundaries. In response, the Xuan Nha Nature Reserve management board prioritized establishing a legal framework for forest exploitation that would be voluntarily accepted by local communities. In a pivotal meeting held in 2013, the relevant agencies reinterpreted formal rules to suit the local context, aiming to blend formal and traditional law.

During the planning stage, formal law was integrated into traditional rules by actively involving local residents in the process of formulating their own new rules. The first and second village meetings were conducted with close consultation from the working team to ensure that the proposed rules did not conflict with formal regulations. In the initial meeting, the local community drafted a Village Forest Protection Plan (VFPP), encompassing a comprehensive plan for land use and forest protection within the villages. In the second meeting, after receiving the forest and signing the contract,

the local people finalized the VFPP and signed the consensus on forest protection regulations. The final VFPP was then approved by the management board of Xuan Nha Nature Reserve, as well as the district and commune authorities, to ensure its legal validity. A concise summary of the forest use regulations was prominently displayed on a board in the community house. Thanks to the participatory process, local residents gained a thorough understanding of these regulations and expressed high levels of support for their enforcement.



**Figure 2.** Diagram of program implementation

Implementation stage: The program's approach is primarily rooted in the needs of the local people while taking into account the forest's location and current conditions. As a result, Xuan Nha Nature Reserve assigns suitable areas (grazing areas, farmland, multiple-used areas) for villagers to fulfil their necessities, which also function as compensation for ceasing their further expansion to other areas. As previously stated, before 2013, there were 14 enclave villages encompassing 3,978 hectares within the core zone of Xuan Nha Nature Reserve. However, the boundaries between these enclave villages and the SUF's land had not been clearly demarcated, posing challenges for enforcing forest protection regulations. A three-step process was developed to address this issue and ensure clear recognition and acceptance of the boundaries. Firstly, the boundaries between the villages' land and the SUF's land were accurately mapped on official maps, and then local residents drew the boundaries on diagrams. Secondly, these boundaries were physically marked on trees, rocks, or pillars in the field through official agreements between the working team and farmers who shared cultivation land adjacent to Xuan Nha Nature Reserve. Finally, regulations and mechanisms for maintaining and managing the boundaries were integrated into the Village Forest Protection Plans (VFPP).

In 2013, the working team, in collaboration with the farmers, successfully installed 151 boundary markers to demarcate the farm areas (Table 2). Additionally, all 53 farmers having their farms within Xuan Nha Nature Reserve pledged not to expand their farms beyond the agreed-upon limits, although there were no specific consequences

outlined for non-compliance. Furthermore, the eight families who had farms located deep within the core zone willingly exchanged their land and relocated to newly allocated areas. As for Chieng Hin village, it is recommended that the land of three households, which is situated on steep slopes (35 degrees) to the west of the village, be transformed for reforestation purposes.

**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 (ha)	50.1 ha	41.2 ha	68.4 ha

With regard to the multiple-used forest areas, which serve as gathering sites for firewood and grazing grounds for cattle, the working team has designated two specific areas for Kho Hong village. The first area, spanning 32.8 hectares, is located near the village entrance and in close proximity to the bridge. The second area covers 17.3 hectares and is situated on the outskirts of the village, adjacent to Tan Xuan commune. Although the overall grazing and firewood collection area may seem relatively small, it adequately caters to the needs of the 134 cattle in Kho Hong village. In Chieng Hin village, the multiple-used forest area spans 41.2 hectares, located in the southwest region of the village, which is deemed more than sufficient to accommodate the 51 cattle presents. In Ban Lay village, three separate locations have been allocated for multiple-used purposes, encompassing a total area of 68.4 hectares (Table 2). Effective management of these multiple-used forest areas in all three villages has been attributed to the implementation of clear regulations by the respective village committees.

### 3.2 Forest management outcomes

The residents of all three villages have confirmed that the forests have been effectively safeguarded, with the quality of the forests deemed to have improved compared to its initial state. The evaluation focused on two key aspects: (1) the perceived changes in activities impacting 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.

**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	Encroachment	84	6	4	6
4	Grazing cattle (outside prescribed grazing areas)	84	13	0	3
5	Farming in non-permitted areas	96	4	0	0
6	Collecting firewood	62	14	4	20
7	Harvesting honey bee	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



According to local people, the frequency of activities impacting the forest, carried out by both local people and outsiders, has changed over time. Findings from interviews revealed a significant reduction in seven out of ten activities, including illegal timber logging, wild animal poaching, firewood collection, encroachment, cattle grazing, and farming outside regulated areas. Illegal timber logging, wild animal poaching, and bamboo stem cutting have notably decreased due to three primary reasons: (1) the depletion of valuable timber reserves and wild animals, making exploitation more difficult; (2) the availability of alternative job opportunities with higher incomes compared to those derived from illegal activities; and (3) stricter forest protection measures. Conversely, the allocation of specific areas for firewood collection, farming, and grazing, coupled with a strong commitment from the local people to adhere to forest protection regulations, contributed to the reduction in the remaining four activities.

Collecting firewood and Dong leaves (*Phyllodes placentaria* Lour) were found to have increased since they were not prohibited. Many respondents refrained from offering assessments on honey harvesting and animal hunting activities. This hesitance was mainly attributed to the remote forest locations where these activities occur, along with the stringent protective measures in place. In addition, individuals tend to earn better income working outside the area rather than exploiting forest resources.

These activities illustrate the impact of both local residents and outsiders on forest resources. By acknowledging that the project's initiatives, including awareness campaigns and compensation efforts, are designed to manage local forest exploitation. The participation of local people stands as the ultimate indicator of effective forest protection. Although the local people express support for conservation, their own exploitative practices still contribute to forest degradation. Survey results demonstrate that, compared to 2015, fewer individuals engage in forest exploitation. In 2021, only a small number of people continue to collect bamboo shoots, bamboo stems, and Dong leaves (*Phyllodes placentaria* Lour), as these activities are permitted. However, it is worth noting that despite the household interview results indicating a decline in animal hunting, discussions with the Local Management Board in Ban Lay village revealed an increase in the use of traps due to a rise in the wild pig population since 2015.

**Table 4.** Number of local people's involving in forest usage activities (N=100)

No	Activities	Number of people involved in 2015	Number of people involved in 2021	Mean	Std. Dev.	Std. Err. Mean	Sig. (2-tailed)
1	Grazing cattle (outside prescribed grazing areas)	32	26	0.28	0.451	0.045	0.000
2	Farming in non-permitted areas	24	0	0.28	0.451	0.045	0.000
3	Collecting firewood	31	0	0.32	0.421	0.043	0.000
4	Collecting bamboo shoots	32	35	- 0.060	0.708	0.071	0.399
5	Collecting Dong leaves	38	43	- 0.070	0.633	0.063	0.345
6	Cutting bamboo stems	68	72	- 0.040	0.371	0.037	0.109

The results of the paired t-tests indicated a significant reduction (Sig=0.000 <0.05) in three activities: cattle grazing outside designated areas, farming in non-permitted zones, and firewood collection outside permitted areas (Table 4). This decline can be



attributed to the collaborative efforts between the Xuan Nha Natural Reserve management board and local government since 2013, which involved participatory delineation of areas for cattle grazing, farming, and firewood collection. The local people have also shown strong support for forest protection regulations.

In 2021, the results of paired t-tests showed that the local people were less engaged in three other forest resource collection activities: bamboo shoots, Dong leaves (*Phyllodes placentaria* Lour), and bamboo stems, compared to 2015 (Sig >0.05 and mean <0). This shift can be attributed to the new agreement, which allows these activities at specific times and locations, making them easier to manage and minimizing harm to forest resources. These activities are permitted within certain timeframes to ensure conservation goals are met and to meet the demands of the local people. Although the number of individuals involved in these activities has increased, they are restricted to specific periods. 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 actively reports any 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 of 1.5 cubic meters and 8 cubic meters of Fokieni (*Fokienia hodginsii*), respectively. In 2017, Chieng Hin village apprehended four cases of bamboo shoot exploitation. These participatory activities have played a crucial role in conservation, aligning with similar research findings elsewhere (Andrade & Rhodes, 2012; Boissière, Sheil, Basuki, Wan, & Le, 2009; Usongo & Nkanje, 2004).

However, to sustain successful participation, certain skills and conditions are required. Xuan Nha Nature Reserve has implemented reasonable measures to reach agreements with the local people. Initially, during the first two village meetings on 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.

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

After five years of implementation, some key lessons have been derived 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 and accessible regulations for local compliance. Below are the lessons learned.

*Identify and establish clear objectives:* One of the significant contributors to the success of the model was the clear determination of priorities by the management board. They precisely identified what they could protect and what they had to prioritize at the expense of certain aspects. Recognizing that Xuan Nha Nature Reserve is not among the top-priority areas for biodiversity conservation and faced numerous challenges, such as the presence of people within the core zone, unclear forest exploitation rules for residents, high external pressures, and weak law enforcement, the nature reserve officers had to address three main considerations. Firstly, they defined their objectives or tasks. Secondly, they focused on the conservation issues or situations that required resolution. Lastly, they assessed the available resources to tackle these conservation challenges. Based on these considerations, the officers

determined that bringing forest usage under control necessitated (1) the establishment of clear forest regulations and (2) the planning of village land use and delineation of boundaries to facilitate residents' adherence.

*Work with communities to co-develop rules that align formal laws with traditional rules and practices:* The model effectively integrated formal rules with traditional rules and practices to develop community regulations, ensuring 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, or else local rules may diverge from legal requirements (Ostrom, 1990). Previous experiences, such as in the case of Lore Lindu National Park, have demonstrated that local community activities in resource extraction and management may not always align with formal rules, leading to failures in forest protection (Massiri et al., 2019). Conflicts between livelihood interests and conservation interests were observed within the National Park (Yusran et al., 2017). In similar fashion, officers in Lore Lindu National Park denied the rights of local communities, highlighting the need for Community Conservation Agreement rules to align with formal legal rules at the constitutional level (Massiri et al., 2019). Achieving conservation goals and meeting community needs often require appropriate institutional arrangements that tailor broad goals and rules to local contexts (Acheson, 2006).

In the case of Xuan Nha Nature Reserve, despite the complexity of the situation, the management board developed the Village Land Use Plan (VLUP) to propose the establishment of an inner buffer zone. In Vietnam, special use forests are managed by SUF Management Boards. According to legal documents, residents are strictly prohibited from exploiting forest products in designated restricted zones. Additionally, they are not allowed to salvage dead or fallen trees within the ecological restoration zone of special-use forests (Article 52, Vietnam Law on Forestry No.16/2017/QH14, 2017). However, 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 Nature Reserve, the local people had been residing here long before its designation. They had traditionally used the land for their livelihood activities, which contradicted formal rules. In light of this situation, 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 nature reserve also recognized that weak law enforcement and insufficient forest usage regulations were key factors contributing to forest overexploitation in Xuan Nha. Consequently, the nature reserve successfully achieved its objectives by combining traditional forest use with formal law to establish "community rules".

The process not only facilitated the establishment of community laws but also enhanced the local community's capacity for decision-making, making a significant contribution 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 ensures institutional sustainability (Massiri et al., 2019). Throughout the process of implementation, the management boards enhanced the capacity of local communities, which is crucial for the success of any participatory community project (Schlager & Ostrom, 1992). Moreover, the participatory approach involving all villagers made the rules more sustainable, as emphasized by Anderies and Janssen (2013), who found that sustainability is closely linked to collective action and collective decision-making processes (Anderies & Janssen, 2013). Clearly, through a comprehensive process, Xuan Nha Nature Reserve successfully aligned local rules with

formal regulations, which is a critical factor in community development and participatory forest protection.

*Gain local support:* Recognizing the significance of local support, the officers in Xuan Nha Nature Reserve prioritized building trust and obtaining the support of local people, who depend heavily on natural resources. They achieved this by undertaking a series of activities, including respecting local rules, improving livelihoods, and fostering trust.

Throughout the process, the management board of Xuan Nha Nature Reserve demonstrated their understanding of and respect for the local community. They made sincere efforts to improve the situation of local people and strike a balance between conservation and local livelihoods. As discussed in the results section, through agreements, the working team concentrated land designated for cultivation and utilization in suitable areas, providing local people with clearly defined land boundaries for their livelihoods. As a result, local people were more willing to adhere to the forest use regulations that they themselves proposed, based on legal documents.

The nature reserve successfully gained the trust of local people, which is a fundamental aspect of any successful participatory conservation program. They demonstrated respect for local people and their rules throughout the process of building the Village Forest Protection Plans, as described earlier. Additionally, 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 name of the village leader. Upon signing the contract, the full six-year payment was deposited into the village's account. On an annual basis, in accordance with the results of acceptance checks and the terms of the fund management agreements, villages were authorized to directly withdraw payments and the corresponding interest for that year. It is worth noting that at the time (2015), this was one of the first forestry programs in Son La province and one of the few programs in Vietnam that directly paid contracted villages through deposit accounts. Officials affirmed that this payment method would be applied to other programs, as it ensures transparency and maximizes benefits for the targeted people, while also reducing administrative efforts for the contracting party (Nature Reserve). By the end of 2019, most forest programs had adopted this payment method with improvements facilitated by advanced informatics technology. The gradual implementation of similar payment methods throughout the country validates their effectiveness (Document 7491/BNN-TCLN, 2018).

*Use participatory methods to establish boundaries and indicators that facilitate community-based monitoring and enforcement:* Past experiences have demonstrated that even though local residents may willingly comply with regulations, they might not have a strong awareness of the specific boundaries and criteria they should adhere to. In response to this challenge, during the formulation of new forest use rules, relevant agencies placed emphasis on establishing clear boundaries and regulations, clear assessment indicators, and a comprehensive reporting system.

Having clear boundaries and regulations is essential for affected individuals to adjust their activities accordingly. While local people may agree to and happily follow forest regulations, they may inadvertently engage in illegal activities if they are unable to identify the forbidden 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, the boundaries of land use 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 the following community meetings.

Additionally, the programs provided clear assessment indicators for relevant agencies to easily monitor and evaluate compliance. At the time of the program, the criteria for assessing forest protection in Vietnam were considered unclear for different forest types, including SUF (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, taking into account signs of infringement and the overall condition of the forest. Based on the initial assessment, surprise visits and acceptance checks were conducted to assess the effectiveness of forest protection.

Furthermore, a reporting system was established to support villagers in reporting cases of violations. Villagers were provided with easy means to contact forest protection officers and village forest protection teams to report any illegal activities. This reporting system enabled people to effectively report violations and seek assistance when needed.

## 5. CONCLUSIONS AND RECOMMENDATIONS

The experiences in Xuan Nha Nature Reserve over the course of five years have provided valuable lessons for the successful implementation of co-management in nature reserves. The first lesson highlights the importance of having 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 legal rules, thereby ensuring sustainable mechanisms for community forest protection. By integrating traditional rules with formal regulations, the model successfully developed community 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 associated activities, such as establishing clear boundaries and regulations, defining assessment indicators, and implementing a comprehensive reporting system to support effective rule compliance and ensure sustainable forest management. These lessons from Xuan Nha Nature Reserve provide valuable insights for future conservation efforts, emphasizing the need for clear objectives, stakeholder alignment, local support, and supportive activities to achieve successful implementation and participatory forest protection. It's important to note that while this study has shed valuable light on the effectiveness of the new conservation plan and rules in protecting the forests, it does not comprehensively assess their impact on the livelihoods of local communities. Although alternative livelihood strategies have been 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 does not delve into 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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## REFERENCES

- Acheson, J. M. (2006). Institutional failure in resource management. *Annual Review of Anthropology*, 35, 117-134. <https://doi.org/10.1146/annurev.anthro.35.081705.123238>
- Anderies, J. M., & Janssen, M. A. (2013). Robustness of social-ecological systems: implications for public policy. *Policy Studies Journal*, 41(3), 513-536. <https://doi.org/10.1111/psj.12027>
- Andrade, G. S., & Rhodes, J. R. (2012). Protected areas and local communities: an inevitable partnership toward successful conservation strategies? *Ecology and Society*, 17(4), 1-16. <http://dx.doi.org/10.5751/ES-05216-170414>
- Bartlett, A. (2018). Factors affecting the success of collaborative forestry research in Papua New Guinea. *Australian Forestry*, 81(2), 116-128. <https://doi.org/10.1080/00049158.2018.1462546>
- Baynes, J., Herbohn, J., Smith, C., Fisher, R., & Bray, D. (2015). Key factors which influence the success of community forestry in developing countries. *Global Environmental Change*, 35, 226-238. <https://doi.org/10.1016/j.gloenvcha.2015.09.011>
- Boissière, M., Sheil, D., Basuki, I., Wan, M., & Le, H. (2009). Can engaging local people's interests reduce forest degradation in Central Vietnam? *Biodiversity and conservation*, 18, 2743-2757. <https://doi.org/10.1007/s10531-009-9627-1>
- Bowler, D. E., Buyung-Ali, L. M., Healey, J. R., Jones, J. P., Knight, T. M., & Pullin, A. S. (2012). Does community forest management provide global environmental benefits and improve local welfare? *Frontiers in Ecology and the Environment*, 10(1), 29-36. <https://doi.org/10.1890/110040>
- Brockington, D., Duffy, R., & Igoe, J. (2008). *Nature unbound: conservation, capitalism and the future of protected areas*: Earthscan.
- Duguma, L. A., Atela, J., Ayana, A. N., Alemagi, D., Mpanda, M., Nyago, M., . . . Ntamag-Ndjobet, C. N. (2018). Community forestry frameworks in sub-Saharan Africa and the impact on sustainable development. *Ecology and society*, 23(4), 1-15. <http://dx.doi.org/10.5751/ES-10514-230421>
- Fedreheim, G. E., & Blanco, E. (2017). Co-management of protected areas to alleviate conservation conflicts: Experiences in Norway. *International Journal of the Commons*, 11(2), 754-773. <https://doi.org/10.18352/ijc.749>
- Griffin, C., & Meshack, D. (2002). Displacement and Forced Settlement: Gypsies in Tamilnadu. In D. Chatty & M. Colchester (Eds.), *Conservation and Mobile Indigenous Peoples: Displacement, Forced Settlement and Sustainable Development* (pp. 261-276). Berghahn Books. <https://doi.org/10.2307/j.ctt1btbx2j.21>

- Guignier, A., & Rieu-Clarke, A. (2012). Country report Vietnam: Payment for environmental services. *IUCN-Academy of Environmental Law e-Journal*, 1, 251-259.
- Kartodihardjo, H., Nagara, G., & Situmorang, A. W. (2015). Transaction cost of forest utilization licenses: institutional issues. *Jurnal Manajemen Hutan Tropika*, 21(3), 184-191. <http://dx.doi.org/10.7226/jtfm.21.3.184>
- MacKinnon, K. (2001). ICDPs: Imperfect solutions for imperiled forests in South-east Asia. *Parks*, 11, 50-59. <https://doi.org/10.3759/tropics.17.147>
- Massiri, S. D., Nugroho, B., Kartodihardjo, H., & Soekmadi, R. (2019). Institutional sustainability of a community conservation agreement in Lore Lindu National Park. *Forest and Society*, 3(1), 64-76. <https://doi.org/10.24259/fs.v3i1.5204>
- McElwee, P. (2002). Lost Worlds and Local People: Protected Areas Development in Viet Nam. In D. Chatty & M. Colchester (Eds.), *Conservation and Mobile Indigenous Peoples: Displacement, Forced Settlement and Sustainable Development* (pp. 296-312). Berghahn Books. <https://doi.org/10.2307/j.ctt1btbx2j.23>
- McElwee, P. D. (2003). *'Lost worlds' or 'lost causes'? Biodiversity conservation, forest management, and rural life in Vietnam*: Yale University.
- McLean, J., & Straede, S. (2003). Conservation, relocation, and the paradigms of park and people management--A case study of Padampur villages and the Royal Chitwan National Park, Nepal. *Society & Natural Resources*, 16(6), 509-526. <https://doi.org/10.1080/08941920309146>
- Nepal, S. K. (2002). Involving indigenous peoples in protected area management: Comparative perspectives from Nepal, Thailand, and China. *Environmental Management*, 30, 0748-0763. <https://doi.org/10.1007/s00267-002-2710-y>
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*: Cambridge university press.
- Ostrom, E., & Cox, M. (2010). Moving beyond panaceas: a multi-tiered diagnostic approach for social-ecological analysis. *Environmental Conservation*, 37(4), 451-463. <https://doi.org/10.1017/S0376892910000834>
- Pagdee, A., Kim, Y.-s., & Daugherty, P. J. (2006). What makes community forest management successful: a meta-study from community forests throughout the world. *Society and Natural Resources*, 19(1), 33-52. <https://doi.org/10.1080/08941920500323260>
- Pham, T. T., Wong, G., Le, D. N., & Brockhaus, M. (2016). *The distribution of payment for forest environmental services (PFES) in Vietnam: Research evidence to inform payment guidelines*. Center fo International Forestry Research (CIFOR). <https://doi.org/10.17528/cifor/006297>
- Salafsky, N., & Wollenberg, E. (2000). Linking livelihoods and conservation: a conceptual framework and scale for assessing the integration of human needs and biodiversity. *World Development*, 28(8), 1421-1438. [https://doi.org/10.1016/S0305-750X\(00\)00031-0](https://doi.org/10.1016/S0305-750X(00)00031-0)
- Sato, J., Chatty, D., & Colchester, M. (2002). Karen and the Land in Between: Public and Private Enclosure of Forests in Thailand. In D. Chatty & M. Colchester (Eds.), *Conservation and Mobile Indigenous Peoples: Displacement, Forced Settlement and Sustainable Development* (pp. 277-295). Berghahn Books. <https://doi.org/10.2307/j.ctt1btbx2j.22>
- Schaik, C. v., & Rijkssen, H. D. (2002). Integrated conservation and development projects: problems and potential. Terborgh, J., Schaik, C. von., Davenport, L., and Madhu, R. (Eds.), *Making parks work: Strategies for preserving tropical nature* (pp. 15-29). Island Press.

- Schlager, E., & Ostrom, E. (1992). Property-rights regimes and natural resources: a conceptual analysis. *Land Economics*, 249-262. <https://doi.org/10.2307/3146375>
- Schmidt-Soltan, K. (2003). Conservation-related resettlement in Central Africa: environmental and social risks. *Development and Change*, 34(3), 525-551. <https://doi.org/10.1111/1467-7660.00317>
- Sinabutar, P., Nugroho, B., Kartodihardjo, H., & Darusman, D. (2014). Analysis of rules in use the formation of committee boundary (PTB) state forest area in Indonesia. *Agriculture, Forestry and Fisheries*, 3(4), 299-306.
- Singh, V. S., Pandey, D. N., & Prakash, N. P. (2011). What determines the success of joint forest management? Science-based lessons on sustainable governance of forests in India. *Resources, Conservation and Recycling*, 56(1), 126-133. <https://doi.org/10.1016/j.resconrec.2011.09.015>
- Stoll-Kleemann, S., & Welp, M. (2008). Participatory and integrated management of biosphere reserves: Lessons from case studies and a global survey. *GAI/ Ecological Perspectives for Science and Society*, 17(1), 161-168. <https://doi.org/10.14512/gaia.17.S1.14>
- Sundberg, J. (1998). NGO landscapes in the Maya biosphere reserve, Guatemala. *Geographical Review*, 88(3), 388-412. <https://doi.org/10.1111/j.1931-0846.1998.tb00114.x>
- Tallis, H., Kareiva, P., Marvier, M., & Chang, A. (2008). An ecosystem services framework to support both practical conservation and economic development. *Proceedings of the National Academy of Sciences*, 105(28), 9457-9464. <https://doi.org/10.1073/pnas.0705797105>
- Thai, T. H. (2012). Diversity of plant resources in the Xuan Nha Nature Reserve, Son La province. *Academia Journal of Biology*, 34(1), 88-93. <https://doi.org/10.15625/0866-7160/v34n1.674>
- To, P. X., Dressler, W. H., Mahanty, S., Pham, T. T., & Zingerli, C. (2012). The prospects for payment for ecosystem services (PES) in Vietnam: a look at three payment schemes. *Human Ecology*, 40, 237-249. <https://doi.org/10.1007/s10745-012-9480-9>
- Tole, L. (2010). Reforms from the ground up: a review of community-based forest management in tropical developing countries. *Environmental management*, 45(6), 1312-1331. <https://doi.org/10.1007/s00267-010-9489-z>
- Usongo, L., & Nkanje, B. T. (2004). Participatory approaches towards forest conservation: the case of Lobéké National Park, south east Cameroon. *The International Journal of Sustainable Development & World Ecology*, 11(2), 119-127. <https://doi.org/10.1080/13504500409469816>
- Van Sang, N., Dang, N. X., & Truong, N. Q. (2010). Diversity of the herpotofauna of in Xuan Nha nature reserve, Son La province, northern Vietnam. *Academia Journal of Biology*, 32(4), 54-61. <https://doi.org/10.15625/0866-7160/v32n4.721>
- Yusran, Y., Sahide, M. A. K., Supratman, S., Sabar, A., Krott, M., & Giessen, L. (2017). The empirical visibility of land use conflicts: From latent to manifest conflict through law enforcement in a national park in Indonesia. *Land Use Policy*, 62, 302-315. <https://doi.org/10.1016/j.landusepol.2016.12.033>
- Znajda, S. K. (2014). What is 'successful development' in conservation and development projects? Insights from two Nicaraguan case studies. *Conservation and society*, 12(3), 318-328. <http://dx.doi.org/10.4103/0972-4923.145157>