Research Article

Community participation and harvesting of non-timber forest products in benefit-sharing pilot scheme in Bach Ma National Park, Central Vietnam

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Abstract

Benefit-sharing mechanisms between forest-based communities and governments are a way to meet conservation goals in developing countries, while still allowing forest-based income for local people. In Vietnam, the government implemented a pilot Benefit Sharing Mechanism (BSM) in Special Use Forests (SUFs), to develop a legal framework for sharing the benefits, rights, and responsibilities of forest conservation and management with local communities. One of the pilot areas is in Bach Ma National Park. We examined community involvement in the BSM pilot scheme in SUFs in the buffer zone of Bach Ma National Park located in Thuong Nhat commune, Nam Dong District. Sixty household surveys from two villages were undertaken in 2014. Most households agreed there were benefits, but some reported difficulties. Analysis of harvested non-timber forest products (NTFPs) showed a nearly 30% increase in average household income, based on regulated access to harvesting NTFPs by registered forest users. The difficulties experienced by those involved in the BSM pilot scheme included declining meeting attendance, infrequent meetings, harvested amounts of some NTFPs exceeding those allowed by the Benefit Sharing Arrangement, and forest protection teams failing to detect such irregularities. Finally, we suggest a number of improvements to BSM policies, such as incentives for forest protection team members to be more actively involved in harvest monitoring.

Keywords: benefit sharing mechanism, forest conservation, non-timber forest products, harvesting, community participation.

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Introduction

In many tropical developing countries, where biodiversity is high and local communities still rely on the natural environment for their livelihoods, the expansion of environmentally protected areas raises issues of equity for those dependent on the forests for their livelihood [1,2]. Simply setting aside protected areas fails to achieve the dual goals of conservation and preservation of local and indigenous people's traditional forest rights and practices [3,4]. Inability to manage both goals has led to conflicts and mistrust between managers of protected areas and local forest user communities, resulting in a failure to meet conservation goals of protected areas [5,6].

To resolve such conflicts, co-management involves local people in protected area management, especially in developing countries [2,7]. Community-based forest management in its various guises has markedly expanded in Asia [8]. Co-management as applied here is defined as "a situation, in which two or more social actors negotiate, define and guarantee amongst themselves a fair sharing of the management functions, entitlements and responsibilities for a given territory, area or set of natural resources" [9]. Co-management is also described as "the sharing of power and responsibility between government and local resource users"[10], and participatory, collaborative, or joint management [11].

A critical part of co-management is community participation, building empowerment, equity, trust, and learning among the actors involved. A comprehensive review by Reed [12] characterizes the conditions for stakeholder participation and identifies its salient features: starting early and continuing throughout the process, comprehensive stakeholder representation, clear objectives, skilled facilitation, and integration of local and scientific knowledge into government plans. The transfer of rights and power to local people has increased community participation in environmental decision-making processes for protected area management, and improved the quality of decisions being made and outcomes achieved [12].

Global experiences of co-management and benefit sharing mechanism

Partnerships between local communities and governments and/or development partners in community forestry are intended to improve nature conservation, reduce emissions from deforestation and forest degradation (REDD+), and increase income for rural people who depend on the forest for their livelihoods [13]. According to Mustalahti [14], examining four case studies in Tanzania, Mozambique, Laos, and Vietnam, benefit-sharing mechanisms (BSM) between forest-based communities and government are a promising way to preserve, develop, and sustainably use resources, as well as to generate forest-based income for poor or minority groups, but few of the examined case studies had been fully realized. Where there is a longer history of co-management in parts of Sub-Saharan Africa and India (27 States, notably West Bengal and Karnataka), it has reportedly had positive influences on biodiversity such as higher species richness and tree density than

in forest areas without cooperation between government and local communities [13,15]. Additionally, in Satchari National Park in the north-east hilly region of Bangladesh, local people were more aware of the importance of nature conservation in protected areas, and of their role in conservation of non-timber forest products (NTFPs), even initiating participation in forest protection [16,17]. Belcher [18] and de Beer and McDermott [19] define NTFPs as all biological materials other than timber which are extracted from forests for human use. Typically, NTFPs are extracted using simple technologies by people living in or near forests.

Despite the environmental benefits of co-management, there are still significant shortcomings in its implementation, often related to poor governance, such as inequality in distributing benefits among participants [20-23], limited community participation [24], and poor monitoring, leading to overexploitation of forest and forest resources [25]. In Chunoti wildlife sanctuary, Bangladesh, co-management initiatives were insufficient to address traditional forest use, which meant most benefits were captured by local elite and in societies with a patron-client relationship along caste lines [26]. Also, in Lawachara and Satchari National Park, Bangladesh, Hossain and Karim [27] found that participation by local villagers in co-management activities was restricted to the forest user group and community patrolling groups, used mainly to detect illegal logging. Through the forest user group a village fund was established, and members received access to alternative income generation support based on need. Lindhjem et al. [25] stated that the Cameroon government often failed to collect fines for illegal activities, and only partially achieved the goal of fully integrating the indigenous people into forest management, decision-making, and benefit sharing.

Brief history of the policy framework and benefit-sharing initiatives in Vietnam

Benefit-sharing mechanisms (BSMs), as used in Vietnam, are a form of co-management or participatory management, a partnership arrangement with all parties involved sharing responsibilities, rights, and benefits [28]. The BSM in the Bach Ma National Park was based on co-management principles to manage, protect, and sustainably develop the special use forests (SUFs), generate income, and improve the living standard of local people [29]. SUFs are defined as national forests that protect forest ecosystems, including biodiversity from the genetic to landscape levels, and provide resources for research and education as well as cultural and historical value [30]. Co-management and BSM are a potential way to reduce poverty amongst the estimated 450 million people who live in and around forests in Asia, including Vietnam.

After the reunification of Vietnam in 1975, natural forest resource management and use were placed under state forest enterprises established by the provincial government. In 1986, the Vietnamese government launched the “Doi Moi” policy, which led to recognition of non-state forest organizations’ contribution to forest management [31,32]. At the end of 1986, the government introduced new forest policies and programs for transferring forests to local communities to deal with the continuous decline in forest coverage [30]. One of the cornerstones of decentralization policies was the allocation of degraded forest and barren land targeted for restoration of trees, to individual households and communities for long-term use and management [33]. The 2003 Land Law and the 2004 Forest Protection and Development Law further defined local responsibilities and associated legal rights. Local communities were gradually recognized as legal recipients of land use rights [31].

Since mid-2008, several co-management project-level initiatives have been conducted across Vietnam to prepare for a new policy, which would allow the establishment of pilot BSMs between the management boards of SUFs and local communities [34]. Two studies in Vietnam, one in Tram Chim National Park (Dong Thap province) [35] and the other in a mangrove forest (Ca Mau province) [36] showed that local people could contribute to forest protection and management if they were given more rights and responsibilities over forest management. However, a study by Bechstedt [37] in Song Tranh Nature Reverse in Quang Nam province suggested that the BSM agreement needed to assure less powerful people (usually the poor or ethnic minority) that they would have equal opportunities to share in the benefits of co-management or benefit-sharing agreements. In Vietnam, Swan [38] concluded that no effective and sustainable system of co-management had yet been demonstrated in SUFs, largely due to a lack of supportive enabling environments and a near-total absence of forest resource monitoring. Most of the SUFs still suffer illegal logging and

overharvesting of NTFPs, leading to potential biodiversity loss and forest degradation. In practice, it seems difficult to stop local demand for timber and NTFPs by surrounding ethnic communities.

Study area description – Bach Ma National Park

Bach Ma National Park (BMNP) ($15^0$59'28'' to $16^0$16'02'' latitude, $107^0$37'22'' to $107^0$54'58'' longitude) was established, in 1991 to conserve the centre of the last corridor of forest stretching from the East Sea to the Annamite Mountain Range. The park runs along the border with the Laos People's Democratic Republic [34] (Fig. 1). Although this area is one of the highest biodiversity conservation priority areas in Vietnam, it still faces many threats. These include land use policy changes, population pressure, logging, and infrastructure development [39-41].

According to Decision No.126/QD of the Prime Minister issued on February 2nd, 2012, Bach Ma National Park (BMNP) was one of the two SUFs in Vietnam chosen as a pilot for the Benefit Sharing Mechanism (BSM) from 2012 to 2013. The BSM was developed to sustainably manage natural resources through cooperation between the BMNP management committee and the people of seven villages in Thuong Nhat commune, with the support of the Vietnam Conservation Fund (VCF) [37,42]. The Vietnam Conservation Fund (VCF) under the Forest Protection Department was established in 2004 as part of the World Bank Forest Sector Development Project, providing funds for improved management of Special-use Forests.

The Thuong Nhat commune is located in one of the buffer zones of Bach Ma National Park, in West Nam Dong district, Thua Thien Hue province (Fig. 1). The seven villages of the commune were selected for the pilot benefit-sharing project. The forest has a range of valuable NTFPs, but over-exploitation of these products for commercial purposes caused a significant decrease in the biodiversity values of the Park [29]. Nevertheless, the NTFPs are also an important resource for the livelihoods of local communities. These communities are made up of an ethnic minority called Ca Tu (also called as Co Tu or Katu), which accounts for 94% of the commune's population [29].

The study area was comprised of two villages of Thoung Nhat commune, called village 1 (Ta Rin) and village 2 (Lap). According to MARD [42] and VCF/BMNP [29], people in village 1 and 2 could harvest NTFPs in region 1, which includes four zones: 424, 426, 427 and 429 (Fig. 2). These two villages were selected from the seven participating villages in the BSM for household surveys because data collected on harvesting of NTFPs from the two villages could be compared to an earlier study on harvesting amounts and the agreed benefit sharing arrangement (BSA) [29]. Also, these two villages expressed interest in the Benefit Sharing Plans (BSPs) [29] (Appendix 1), and being located in close proximity to each other facilitated our household surveys.

A pilot scheme in Bach Ma National Park (Fig. 1) had established a BSM to involve local people in developing rights and responsibilities to manage, protect and sustainably develop SUFs for income generation and livelihood support without negative impacts on the conservation objectives of the National Park [29]. Our research involved household surveys with local villagers in two adjacent villages, in the buffer zone of Bach Ma National Park, from April to May 2014, to examine the following:

- perceived benefits and difficulties experienced by local villagers through participation in the BSM;
- level and nature of household participation in the BSM, specifically involvement in several key activities of the BSM including: registration activities, BSM village meetings, monitoring and forest protection activities, and NTFP harvesting activities;
- villagers' level of awareness of the purpose of BSM pilot project, as well as household rights and responsibilities in the BSM; and finally
- the implications for conservation goals with BSM implementation in Bach Ma National Park and other SUFs in Vietnam.

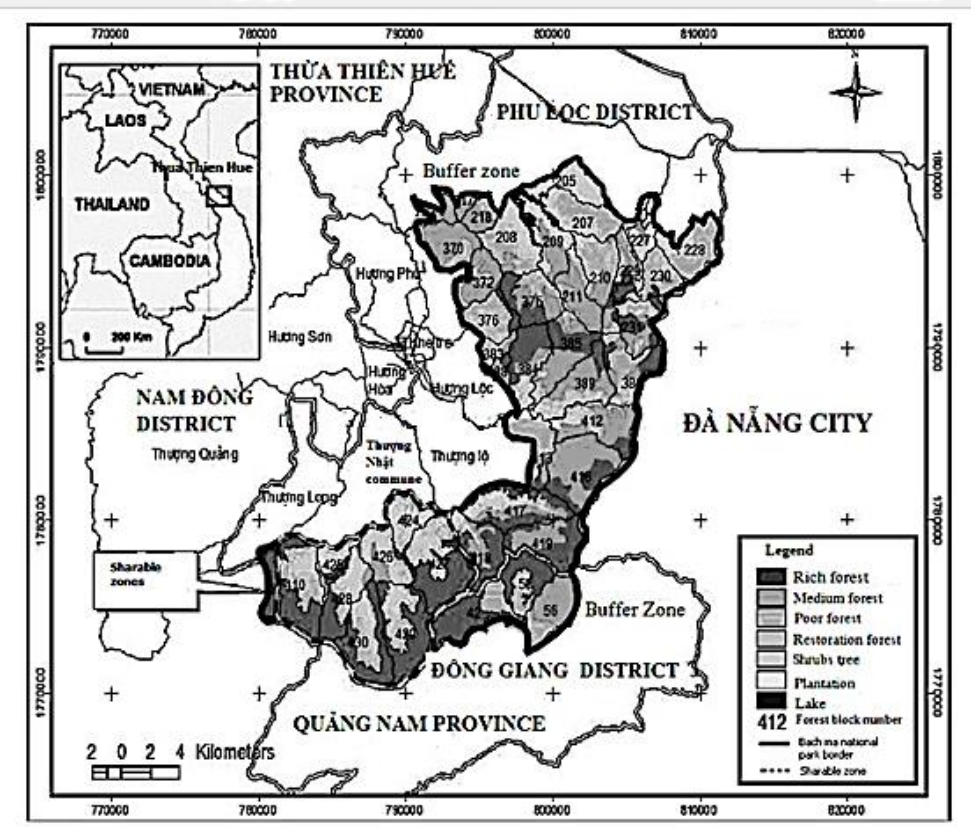

Fig. 1. Map of Bach Ma National Park in Thua Thien Hue province, Central Vietnam. Source [29]

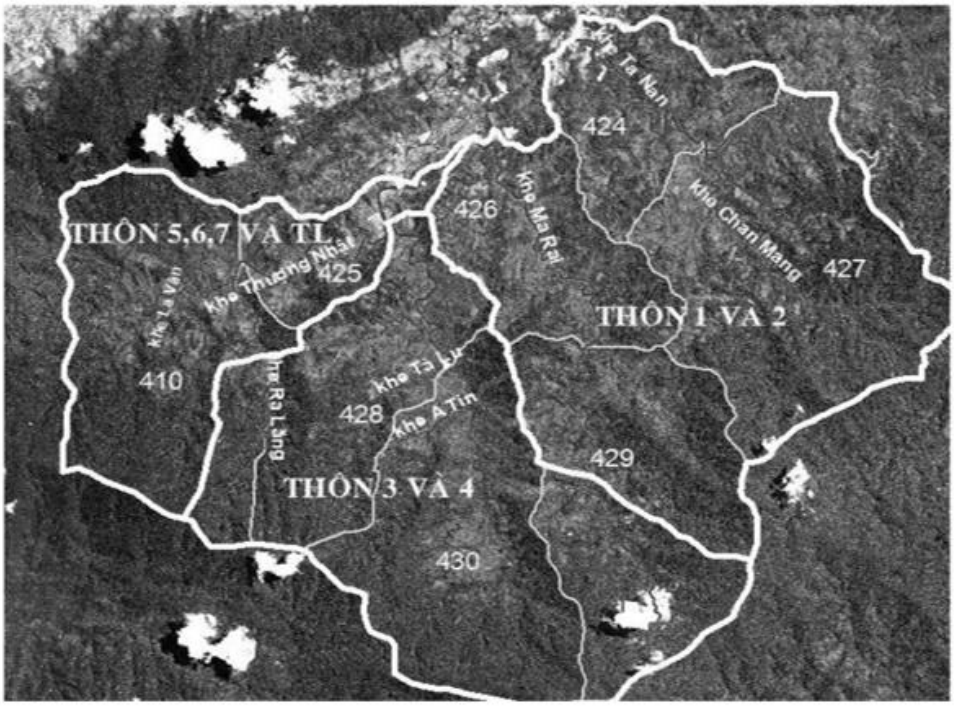

Fig. 2. Harvesting area for village 1 and 2 (zone 424, 426, 427 and 429) available under the Benefit Sharing Mechanism in Thuong Nhat Commune.

Methods

Data collection and analysis

We obtained Human Research Ethics Approval through the University of New England (HE 14-075) before conducting household surveys and associated activities. Informed consent was obtained before household surveys and interviews proceeded, and subjects were able to withdraw their consent at any time. We collected commune-level secondary data from Bach Ma National Park office, the Park Rangers' office, and government agencies. The secondary data included village populations in the commune, household names in each village, location map of the research area, and BSM participants in each village.

Data collected in the study area were mainly through household surveys, and supported by follow-up focus group discussions in each village, along with key informant interviews. Household surveys and focus group discussions were common in many studies examined prior to ours. In five studies the number of household (HH) interviews ranged from six to 90 HH per village (mean sample size of 29 HH per village) [14,16,43-45]. Reed et al [46] discuss the strengths and weaknesses of this approach (amongst others) for stakeholder analysis. Our key informant interviews were with Park rangers, the Commune chairman, and a vice director of Bach Ma National Park. Questions in these interviews addressed issues of community participation in the BSM from the perspective of local government and national park staff.

There are 155 households in village 1 and 2, from which 60 households (or 39% of total households) were randomly selected for household surveys. Household names were placed into a spreadsheet, randomly allocated a number, re-sorted from smallest to largest, and the first 30 names from the respective villages were selected for survey. The surveys were conducted from late April to end of May 2014. All household survey participants were over 18 years of age, and the main income earners of each household were surveyed together, normally husband and wife. Household surveys focused on the level and type of participation in BSM activities, changes in NTFP-based income after the BSM implementation, level of harvesting NTFPs, the benefits and difficulties of participation in the BSM for local people, household views about the BSM implementation, and their understanding of their rights and responsibilities. The survey was pilot-tested with six households from the two villages to verify and validate it before the formal survey. The final household survey is in Appendix 2. The household survey responses were coded according to categories determined in pilot testing and are in Appendix 2.

After completion of household surveys, focus group discussions were organised to clarify issues with a smaller group of participants. From the household lists 15 people per village were chosen randomly and invited to attend a focus group meeting in Ta Rin (village 1) and Lap (village 2). There was an 80% acceptance rate, with 12 people from village 1, and 14 people from village 2 attending in separate focus group discussions. Participants were divided into three or four groups, depending on size and gender (all women were placed together in a separate group from men, and comprised 30% of each focus group meeting). Their opinions and responses to issues arising from household surveys were summarized by the moderators. We compared these written records of focus group discussions to data from the household survey to verify the overall strength of emerging themes.

All income was reported in Vietnamese Dong and USD (1.00 USD = 22,483 VND). We used Excel 2010 spreadsheet to tabulate and undertake descriptive statistics of categorized data and harvesting amounts of NTFPs from the 60 household surveys. The percentages reported in the results are from 60 surveyed households, unless otherwise stated. To show the variability in the harvesting of NTFPs, the data were graphed for those NTFPS harvested by the majority of the villagers using IBM SPSS Statistics software, Version 22. The pre-BSM data on harvesting of NTFPs and harvestable amounts were obtained from a report by VCF/BMNP [29], which only has summary totals for 40 households and no individual household data, thus not allowing use of comparative statistics.

Results

Household profile

In the household surveys, village 1 and 2 were similar in their socio-economic profile (household size, occupation, and education levels), therefore the results will be presented as one study group, which importantly enables comparison to baseline data collected by a previous study on harvesting of NTFPs [29]. About 80% of respondents were 18 to 40 years of age. Although all people surveyed stated their primary occupation was "farmer," growing rice at home or cultivating forest trees, 92% also reported their secondary occupation was going into the forest to harvest NTFPs, or "exploiter". In response to questions related to occupation, many people said that income derived from farming was still inadequate to meet their family needs, and the NTFPs offer an alternative income stream as they are easily sold locally. The baseline survey of Thoung Nat Commune showed the breakdown in land use as SUF (52%), Production Forest (13%), Unclassified (29%), Upland Cropping (2.2%), Acacia Plantation (1.8%), and Paddy Rice (0.4%) [29]. Agriculture (including livestock) comprised 45% of the total household income, while NTFPs (mainly rattan and bamboo) were 35% of the total, and Acacia Plantation 20% of the total [29]. Hence, most villagers were reliant on forest resources in Bach Ma National Park for their livelihoods.

In terms of household wealth, the majority of households were classified as 'average' (60%) and 'near poor' (31.7%), and only 6.7% households were classified as 'better off'. Household classification was based on both the governmental standards (income assessments) and the local commune's assessments. Half of those surveyed had completed secondary school as their highest education level, while 35% of survey respondents had completed primary school. Thirteen percent of those surveyed had never attended school, as they were born before 1985, prior to economic renovation policy, and were too poor to go to school, having to focus on their subsistence livelihood. According to a survey by Loi and Chau [47], 189 people or 9.1 % of the total population of Thuong Nhat commune were illiterate. Therefore, the villagers in the study area had a lower level of education than the overall commune.

Household participation in the BSM

The VCF/BMNP [29] documented two types of registration, households and individuals: in village 1 (52 households) with five households (14 individuals) registered for wild boar and 60 individuals for over three NTFPs, while in village 2 (63 households), there were 24 households registered for rattan and 75 individuals for over five NTFPs. At the time of the baseline survey (pre-BSM) this showed a high level of interest in the pilot program, with 115 households registering interest out of 132 households (Appendix 1). In our study, after implementation of the BSM, 60% had registered with the BSM or 36 of the 60 households surveyed from both villages. From the surveys it appears that for some NTFPs, in particular for snails, honey and bamboo shoots, there were twice as many harvesters as those who had expressed interest in registering before the implementation of the BSM (Appendix 3). The number of harvesters exceeds the number actually registered by between 20 to 28%, depending on the NTFP (Appendix 3).

Nearly all households agreed that there were benefits from taking part in the BSM (97%). Three distinct advantages emerged from the survey responses: negotiating a benefit-sharing agreement to harvest (81%), receiving seed and livestock support from the livelihood program of the BSM (57%), and to some extent preventing outsiders from harvesting NTFPs (10%).

The other benefit was that household income had improved with the BSM. Appendix 3 documents the actual amount of NTFP harvested per year after taking part in the BSM. Based on these data, we calculated the average household income from NTFPs was 10,472,781 VND (419 USD) (excluding wild boar, Kost nut, and palm-leaf, which had only a few harvesters). Thirty-seven percent of this income was from harvesting rattan alone, which all survey households sell, and only a few households keep a portion for home use. According to the Bach Ma National Park survey data for 2011, the average income from forest resources per person from village 1 and 2 was about 7,400,000 VND (296 USD) [47]. Therefore, the income from NTFPs per household recorded in 2014 (after the BSM) was 29% more than in 2011 (before the BSM). This was consistent with answers from more than half of the household surveys (52%) who stated that their household average income

rose by 26% after the BSM implementation; the remaining 45% of households indicated no change in income, and only 3% experienced a loss of income.

The four main difficulties of participating in the BSM, raised by 55% of those surveyed, were: problems of applying new livelihood models (64%), followed by difficulties in registration with the BSM (27%), deduction of village fund (18%), and stricter management by rangers and forest protection teams (15%).

Staff and rangers of the Bach Ma National Park reported that the original design of the livelihood program and its implementation did not screen who joined the BSM, or who should have priority for receiving the livelihood support based on income. Hence, the majority of households were dissatisfied with the distribution of seed and livestock support and involvement in livelihood training courses. This disadvantage was evident in the explanation of a local participant: *"Some kinds of seed and livestock were not suitable for local conditions, such as banana trees and chickens, and we also lacked practical advice or support from experts."*

Regarding registration procedures before going into Bach Ma National Park to harvest, 15% of all households surveyed complained about efforts to obtain permit documents prior to harvesting NTFPs. Respondents said they had to go through three levels of approval, including village head, rangers, and commune chairman to obtain the permits, which took a lot of time. They said they generally did not wait for approvals, despite recognizing that compliance with BSM regulations was a key responsibility. For those villagers who went straight to the forest of Bach Ma National Park with no permit papers, there were generally no consequences such as fines or penalties.

A minority of all households surveyed (10%) commented that contributing to the village fund payment was a difficulty. Payment to the village fund, a small percentage contribution after selling NTFPs, is important because this fund provides allowances for villagers undertaking forest protection and monitoring activities, attending meetings, and supporting poor households. In village 1 the payment was 5% (1% for poor people, 1% for ceremonies, and 3% for forest monitoring and protection), and in village 2 it was 10% (5% for meeting attendance, awards and poor people, and 5% for forest monitoring and protection) [29]. Three reasons respondents gave for not contributing to the village fund were: poor economic position of their family, difficulty in calculating the percentage of deduction, and observing other villagers not contributing to the village fund. Moreover, it seems that the village head was not regularly monitoring contributions or reminding people of their responsibility to contribute to the village fund.

Finally, although stricter management by Park rangers and the village forest protection teams could reduce illegal exploitation activities, 8% of all household surveys stated that such stricter management made their harvesting work more difficult. Some respondents stated that before the BSM, they often used a large number of traps to catch several types of animals such as squirrels and mice. However, after the implementation of BSM, these traps were often removed by protection teams and Park rangers, because BSM regulations limited use of traps to catch animals.

Level and nature of community involvement in the BSM

The BSM was implemented through a series of activities: introduction to the scheme, registration with BSM, and development of BSM plans and agreements. Other ongoing activities included meetings for NTFPs harvest training, BSM assessment meetings, and protecting the forest from being destroyed by "insiders" and "outsiders" by monitoring any illegal activity. Our study focused on four types of activities: registration in BSM, BSM village meetings, forest protection and monitoring activities, and harvesting of NTFPs.

Registration is one of the most important activities at the beginning of the BSM to record who was involved as a BSM participant. However, we found that 40% of respondents who said they were BSM participants were not registered or noted in the lists supplied by Bach Ma National Park staff. Later on in the household survey, a much higher proportion accepted it was their responsibility to register the extraction form (78%) and to follow the NTFP extraction regulations (83%). Additionally, several respondents said that they did not

harvest NTFPs, but were in BSM registered lists and took part in other activities such as village meetings and relevant training courses. Table 1 shows that although a high percentage of people took part in all listed activities, numbers of participants gradually declined over time, with 53% of respondents saying they only attended "sometimes" because they were "busy." To explain the decline in participation of registered BSM participants, some respondents indicated that they were not chosen for BSM registration by meeting organisers, while other respondents were in the forest at the time of meetings, so they missed activities such as registration and BSM assessment meetings. To put it into the words of one interviewee: *"I really want to regularly participate in the BSM assessment meetings to give my comments on existing problems of several BSM activities, but there were only two or three meetings held for the whole year."*

According to the vice director of Bach Ma National Park, the BSM assessment meetings should be organised monthly by Park rangers and village head, but focus group discussions revealed that meetings occurred less often than that, and reports emanating from these meetings were uninformative. For those involved in the BSM, 55% said a benefit of their involvement was providing input at the BSM village meetings on topics such as those not following BSM regulations (39%), livelihood models (33%), stricter methods for controlling outsiders (9%), and improving monitoring and meeting activities (9%). The remainder were reluctant to have input into BSM meetings (45%), generally because (in their words) they lacked confidence (30%), felt they had nothing new to add (44%), or preferred to defer to elders in the group (11%). The Katu people, as a minority ethnic group, are often regarded as shy and inclined to simply follow ideas or comments from elders or speakers fluent in Vietnamese (45).

Table 1. Level of community participation in BSM activities (n=60).

BSM activities in chronological order	Participation (%)
Listen to BSM policy	98
Map exploitation zone	92
Discuss fund payment	92
Discuss BSM plan	90
Build agreement	88
NTFPs harvest training	85
Livelihood model training	82
BSM assessment meetings	75
Meetings for building livelihood models	60

According to the BSM program, each village has one forest protection team with five members. In the household survey, 14 people (23%) were involved in co-patrolling with a Park ranger as part of forest protection teams, but only six of these people were official members of forest teams. Almost half of those involved in forest protection teams (43%) were classified as "near poor" (31% of total), while 50% of forest protection team members came from the largest wealth category of "average" (60% of total). Members of the forest protection team also said in their household survey that they conducted monitoring activities in forest management zones on average three times per year (2-6 range), and when asked about the responsibilities of a forest protection team, they all mentioned the importance of reminding local people of harvest limits. However, only a minority of those on forest protection teams mentioned other duties such as arresting illegal exploiters (5 people), evaluating and reporting the level of exploitation to the BSM management board (3 people), and checking the condition of NTFP resources (2 people).

Table 2 indicates respondents' forest protection actions against the three main types of illegal activity in BMNP: intrusion of people from other villages, intrusion from other communes, and harvesters (location not specified) not following NTFP extraction regulations. In all three cases, most respondents warned illegal harvesters (64%). The most warnings were issued to people who did not follow NTFP extraction regulations

(77%) (Table 2). Stricter actions such as expelling unofficial harvesters and reporting them to authorities were taken against outsiders from other communes (18%) than against local people (3%). Respondents were also more likely to "do nothing" when they saw illegal harvesters from nearby villages (30%) than from other communes further away (3%) (Table 2). Also the "reporting" of intruders, either to forest protection team, village head, or Park rangers, was again higher with intruders from other communes (mean of all three categories: 24%) than from nearby villages (mean of all three categories: 8%) (Table 2). The predominance of "warning people" rather than reporting them to authorities indicates households were reticent to report people, and only a quarter of all respondents had communicated with the Park ranger (infrequently, once or twice a year), to usually report illegal activity by "outsiders."

Table 2. Community involvement in forest protection and monitoring activities from household surveys (n=60).

Actions	Intruders from other communes (%)	Intruders from nearby villages (%)	People who did not follow NTFPs extraction regulations (location not specified) (%)
Restrain them	7	3	2
Warn them	58	58	77
Report to the village forest protection team	20	13	12
Report to village head	25	8	10
Report to the park rangers	27	3	7
Expel them	18	3	
Do nothing	3	30	7

Finally, harvesting of NTFPs was analysed for quantity and whether it exceeded the amounts allowable by the BSA [29]. During the BSM implementation, local participants needed to follow its regulations, especially the NTFP amounts, harvesting periods, and harvest methods. Two types of products were not regulated by the BSM: mushrooms and palm-leaf. According to MARD [42] and VCF/BMNP [29], there were six main types of NTFPs harvested: rattan, wild boar, bamboo shoot, Kost nut (*Sterculia lychnophora* [Hance]), honey, and snails. Appendix 4 compares the regulated harvestable limits to the actual amount harvested of various NTFPs in 2014 [29]. The amount of NTFPs harvested when extrapolated to the whole village for four types of NTFPs (snail, bamboo shoot, honey and rattan) was more than the amount regulated by the BSA, but for all NTFPs except snails was slightly less than before BSM implementation (Appendix 4). Snails and bamboo had the highest ratio of extrapolated to regulated amount, followed by honey and rattan, while Kost nut and wild boar were below the regulation amount (Appendix 4). Snails and bamboo were the NTFPs most exploited by harvesters, with double the number of harvesters who had originally shown interest in the BSA (Appendix 3).

The survey results showed that the amount of NTFPs harvested by each household was quite variable, with a few households harvesting more than the majority (Figure 3 and 4). According to the vice director of the BMNP, the large number of harvesting events by several harvesters could be due an excessive number of permits being issued to these individuals. A large proportion of respondents (62%) said that participation in the BSM was not equal among households, with inequities in livelihood programs (84%), amount of NTFPs harvested (24%), and contributions to village fund (16%).

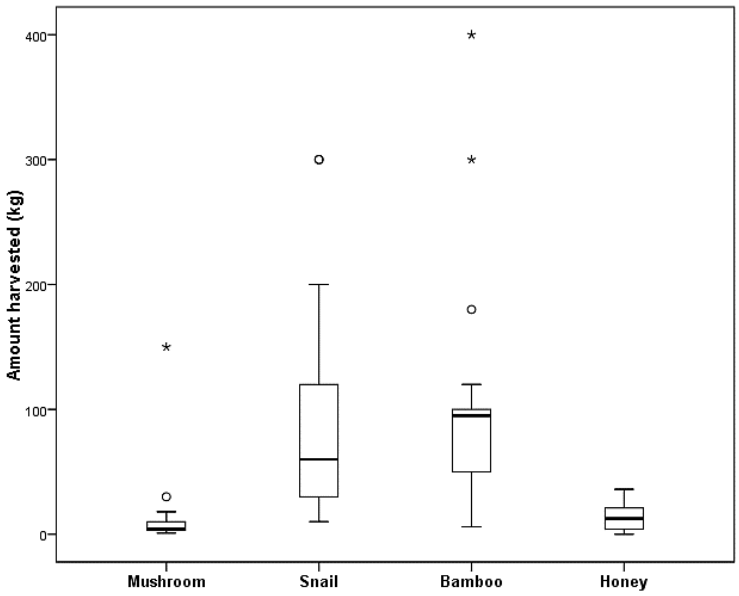

Fig. 3. Variability in harvesting of the main NTFPs from village 1 and 2 in 2014 (n=60).

[The horizontal line within the box represents the median; the bottom and top of the box are the lower and upper quartiles; the whiskers represent the maximum and minimum values, excluding outliers; and the circles and stars beyond the whiskers represent outliers and extreme outliers respectively].

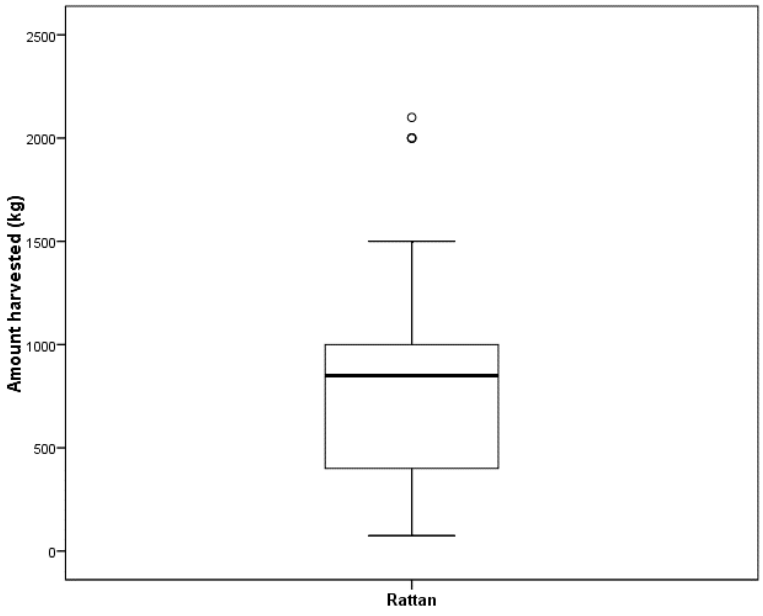

Fig. 4. Variability in harvesting of rattan from village 1 and 2 in 2014 (n=60).

[The horizontal line within the box represents the median; the bottom and top of the box are the lower and upper quartiles; the whiskers represent the maximum and minimum values, excluding outliers; and the circles beyond the whiskers represent outliers].

When asked about their rights and responsibilities, respondents generally said they were allowed to harvest NTFPs officially (89%), and more than half of the respondents agreed that forest protection (55%) and "warning off" illegal outsiders were their right (57%). Regarding responsibilities, the majority thought that they had to register the extraction form before going to the forest (78%), follow sustainable harvest regulations (83%), attend village meetings (60%), and remind others to harvest sustainably NTFPs (80%). Fewer respondents, but still over half (53%), agreed it was their responsibility to pay the village fund after selling NTFPs. When respondents had to nominate their most important right and responsibility, they identified: to comply with NTFPs through official channels (41%), to protect the forest (36%), to remind others to harvest sustainably NTFPs (38%), and to follow the NTFPs extraction guidelines (26%).

Discussion

Benefits accrued by households in implementation of BSM

There was unanimous support from respondents to continue with the BSM, the two main reasons being to protect the forest environment (47%) and to bring economic benefits to households and local community (33%). About one-third of respondents reported an increase in household income or at least no loss of income based on harvesting non-timber forest products in the BSA. The main reason for improved income, reported in focus group discussions, was the ability to harvest with official approval and limit outsiders' harvesting. A study in Satchari National Park, Bangladesh showed that there was a 9% increase in non-forest income over a year from four villages, due to increased opportunities to work in non-forest sectors under the co-management project, such as nursery raising and forest patrolling instead of illegal logging [48]. To maintain local villagers' interest in continuing with the BSM also meant additional support for forest protection and monitoring activities (28% of focus group participants) by increasing the salary of forest protection teams, as well as reducing illegal harvesting and intruders (18%). Respondents' level of involvement shows in the high percentage who warned harvesters from other communes about engaging in illegal activities and reported them to authorities (Table 2). Park rangers in the commune confirmed that a number of illegal activities, especially timber exploitation, decreased significantly after the first year of BSM implementation. Minh et al. [49] found no loss of forestland in the implementation area of BSM.

Difficulties encountered by households in implementation of BSM

There were some difficulties also experienced by BSM participants as shown by infrequent meetings and declining attendance. The BSM plans of VCF/BMNP[29] stipulated that NTFP users or forest harvesters who have a greater impact on forest resources should play an important role in co-management. Yet, the vice director from Bach Ma National Park explained that: *"Non-registration of many people was a consequence of holding meetings to inform villagers about the BSM registration at a time which was not suitable for them to attend."* Therefore, more attention needs to be given to the timing of meetings and composition of attendees to improve participation levels, as several participants who did not harvest NTFPs took part in the BSM meetings and vice versa. Also, in early meetings that decided on the types of NTFPs, some species were not included, such as Linhzi mushroom [29,42], even though nearly 40% of respondents harvested this product. To understand how this occurred, the vice-director of Bach Ma National Park explained that people might not have participated in initial meetings to register products, which consequently were not included in the BSA or noted in the species lists of the BSM [29].

Selection of participants to BSM meetings was often biased towards people well-known by the village head, and village heads and Park rangers held the BSM assessment meetings less frequently than expected. The low frequency of meetings contrasted with a study by KimDung et al. [32] who found nearly half of the SUFs (n=143 in Vietnam) had more than 12 meetings per year, in which those attending participated in making proposals or were informed about new policies. Payment is an incentive for attendance, but reliance on such payments may not be sustainable in the long term. Genuine participants in BSM meetings were discouraged by not being included on the meeting list, even though they were willing to contribute their ideas or experiences. A user-defined model, either by payment of a small fee or annual subscription fee, affordable to all income levels, including those of low socio-economic status, would increase participation in BSM meetings by people with genuine interest in the BSM [13,50]. Blomley [13] also stated that social capital was low due to a tendency for local NGOs to "buy participation" through payment of allowances or people from low socio-economic status were excluded from committees. Additionally, there is a need to scale-down gradually payments for meeting attendance to encourage genuine commitment to the BSM and its aims or investigate other ways to encourage genuine involvement from all income levels.

A number of researchers have found that the skills of the meeting organizers (village head and park ranger) are important factors in improving participation and co-management [11,51,52]. It is therefore important to provide support and training to meeting organizers, giving them the skills to encourage regular meetings during the BSM implementation and maintain local interest in BSM activities.

About 23% of respondents were engaged in forest protection and monitoring activities, but were often restricted to warning people away or reminding them of their responsibilities, rather than performing more forceful actions such as restraining or expelling unofficial harvesters from the forest. Local people were more proactive in dealing with intruders from afar than those from nearby villages. Moreover, the household surveys showed that members of forest protection teams were not undertaking all of their roles, especially monitoring harvestable levels or condition of NTFPs. A Park staff member reported that because village forest protection teams were unable to plan and implement forest patrols independently, forest monitoring by local people was still in the process of development. Similarly, in Bangladesh, members of patrolling groups were not committed to all activities of the project because they lacked adequate training and remuneration [48]. These authors also noted that members of patrolling groups were mostly poor and needed alternative means to support their livelihood, similar to the BSM and monitoring groups in the Bach Ma National Park.

Households could potentially receive more income by selling NTFPs harvested from the Bach Ma National Park rather than from community forest, since NTFPs were more abundant in the Park [53]. We found that two-thirds of NTFP types were over-harvested compared to the amounts set by the BSM (Appendix 4). According to Park rangers and Bach Ma National Park staff, the amounts of NTFPs were not always written on the permission papers that harvesters were required to obtain before going into the forest. Respondents who found registration procedures to be too complicated (18%), may have avoided those requirements. Additionally, harvesters without permits were unlikely to be "caught" because of infrequent monitoring by forest protection teams and Park rangers. Harvesters without a permit could be over-harvesting with few or no repercussions, while BSM managers would not be aware of actual harvesting levels. Nhi [54] stated that co-management models in Vietnam established regulations on the scale and techniques of harvesting forest resources, but did not define how benefits would be shared among community members. Perceptions of inequality, whether real or not, can erode participants' willingness to obey BSM regulations and weaken their co-operation in controlling control harvest levels of NTFP.

Despite unanimous support for BSM continuation there were several recommendations made by the households to improve the level of community participation in the BSM included: more frequent monitoring by forest protection teams of harvesting (47%), and that their salary be increased (28%). With improved remuneration, there would be greater incentive for members of forest protection teams to be more active as well as encourage local people to enforce stricter management methods. A possible solution trialled by Mai [55] in A Ro village (Vietnam), was that if outsiders were caught conducting illegal activities, the offenders had to compensate the community for the damage. The compensation can be shared among relevant people such as the person discovering the infringement (20%), the person detaining the offender (20%) and the village fund (60%) [25,55]. This system would not only encourage local people to apply stricter treatment of illegal cases, but also significantly increase village funds to support other activities of the BSM [56,57]. Income generated from the village fund is also an opportunity to address inequities and compensate the poor, which was the original intention.

Implications for conservation

Overharvesting of NTFPs will lead to a number of potential consequences including, local loss of a NTFP, reduced NTFP yield of a plant or animal, and subsequent loss of income, as well as wide-scale degradation of the forest landscape and habitat [45,58]. In terms of over-exploitation of forest resources, a survey from 55 case studies in Asia, South America and Africa revealed that 40% of cases had negative impacts on NTFPs or other natural resources, while nearly 25% of the cases had negative equity impacts despite financial benefits being "unequivocally positive" [59]. Based on these issues, two important questions arise. Is the BSM able to manage the amount of NTFPs harvested by local villagers and do so in a sustainable way? Following on from this, what is the "right" amount of NTFP that local people could collect from the forest, while still ensuring SUFs in Bach Ma National Park achieve their conservation goals?

In setting the "right" harvestable amount of NTFPs, there needs to be identification of suitable methods to determine sustainable harvestable amounts of NTFPs as well as effective ways to monitor equitable harvesting between households, especially given the range in harvesting amounts. Originally 40 to 60% reduction in baseline harvesting amounts for some NTFPS was set by BSA which seems an ambitious goal in the first year of implementation, and maybe not a realistic one [29]. This study found the level of NTFPs harvested was in general below those levels harvested before the BSM implementation, even though in some instances, well above those levels set by the BSA, especially for snails, bamboo shoot and honey (Appendix 4). Two studies one on management of wild mushroom in southwest China [43], and the other on rattan cane harvesting in Indonesia [60] provide some useful techniques, namely participatory problem diagnosis and participatory mapping of rattan harvesting zones, respectively, which could both be used in the BSM committee meetings to empower local people to define issues and map out NTFPs harvestable zones. Additionally, the BSM committee by meeting more regularly, and with a more representative composition, could assist Park rangers in regulating how many harvesting times per month or season should be allowable per household. Equally, if Park rangers have accurate records of permits allocated then they should be able to regulate equitably harvesting of NTFPs among households. An area of future research would be to interview those households from villages nearby who initially expressed less interest in participating in BSM, and compare and contrast their behaviours with the households examined here.

To provide households with an non-forest derived income, alternative income generation programs should be supplemented and strengthened to reduce the pressure on forest use and enhance the recovery of natural resources [26,61,62]. Similarly, Andrade and Rhodes [63] advised that alternative income generation must be aligned with capacity building such as environmental education, financial management, agriculture improvements, and marketing. Consequently, local people will not need to harvest such a large amount of NTFPs from the forest if they can also generate income through good financial management, selling products at higher prices, and applying successful agriculture models. The livelihood models, based on the primary occupation of all surveyed households - farming - should be continued and further developed alongside the BSM, rather than a subprogram. This recommendation is supported by Nhi [54] working on co-management models in Vietnam that identified enhancement of living standards for communities should not only focus on harvesting forest resources, but also focus on development of agriculture and other sectors.

Dependence on investment needs to be scaled down from initial levels in order to make communities more self-reliant [64]. Therefore, the BSM should make sure that the livelihood program supports the distribution of seed or livestock to those most in need, especially forest harvesters, as incentive to reduce dependence on NTFPs. Where people gain real benefits from co-management interventions, they are more likely to contribute to conservation, hence successfully protecting SUF areas and creating a virtuous circle [23,65].

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Appendix 1. Number of households and population of seven villages of Thuong Nhat commune in 2010 and 2014

Village	Number of households		Population (people)	
	2010	2014	2010	2014
Village 1	71	87	336	392
Village 2	61	68	281	295
Village 3	82	94	382	389
Village 4	47	53	227	249
Village 5	55	62	268	260
Village 6	65	73	288	313
Village 7	27	48	170	183
Total	**408**	**485**	**1902**	**2081**

(Source: Thuong Nhat Commune's People's Committee pers comm.)

Appendix 2. Household survey

Interviewer:

Time:

Date:

A. General Information

1. Interviewee's Name: _____

- Age: _____
- Gender: □ Male □ Female
- Ethnicity: □ Katu □ Kinh
- Village: _____
- Type of household: □ a. Poor □ b. Near poor □ c. Average □ d. Better off

2. For how long has your family been living here?

_____

3. Please list the household members with their age, sex, literacy and occupation (Please don't read all categories aloud, but ask the respondent about the different household members with their age, gender, literacy and occupation, and mark the answers below)

Household member No.	Age	Gender	Education level	Current occupation	Sector
Respondent					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					

Education level	Current occupation codes	Sector codes (link to occupation)
a= University/ College	01=child below 6 years	01=farming/cropping
b= High school	02=child (>6) not going to school	02=livestock
c= Secondary school	03=school/education	03=aquaculture
d= Primary school	04=self-employed	04=salt production
e= Illiterate	05=temporary labour	05=fishing
	06=permanent labour	06=construction
	07=non-employed	07=commercial/business
	08= household tasks	08=government/public sector
	09=retired	09=transport services
	10=other (specify)	10=other (specify)

4. Did you register in the BSM pilot policy?

□ No (Go to Part B)

□ Yes (Go to Part C)

B. Questions for the BSM non-participants

5. Why have you not joined the BSM pilot policy?

□ a. Do not receive any information relating to the BSM;
□ b. Have not seen any benefits from participation in the BSM;
□ c. Not interested in the BSM because our family income do not depend on harvesting products from forest;
□ d. Other reasons

_____

6. Do you wish to participate in the BSM if the BSM continues?

□ No
□ Yes
Reasons: _____

7. In your opinion, what Government should do to convince you to participate in the BSM?

□ a. Encourage local people to participate in the BSM;
□ b. Harvesting more TFPs and NTFPs;
□ c. Enhance power of local community when participating in the BSM in forest management;
□ d. Others:

.....
.....
.....

C. QUESTIONS FOR THE BSM PARTICIPANTS

I. Costs and Benefits of participation in BSM

8. How did you know about the BSM?

□ a. From village head
□ b. From neighbors
□ c. From the Park rangers
□ d. From commune staff/authority
□ e. Other…

9. After nearly 2 years of implementation, did the BSM pilot policy benefit to you or your family?

□ No
□ Yes
If yes, what are the benefits/ advantages?
□ a. Harvest NTFPs legally;
□ b. Increase income;
□ c. Apply models of livelihood development successfully;
□ d. Others: ……

10. After nearly 2 years of implementation, did the BSM pilot policy cost you or your family?

□ No
□ Yes.
If no, why? _____
If yes, what are the difficulties/disadvantages?

□a. Registration procedures;
□b. Deductions for village fund payment;
□c. Stricter management of rangers and village forest protection teams;
□d. Income generation;
□e. Others: _____

11. According to you, when participating in the BSM, which activities are you allowed to do?
□a. Harvest NTFPs officially
□b. Remind the outsiders when entering into the forest
□c. Chase out the outsiders when entering into the forest
□d. Remind others of sustainable NTFP extraction
□e. Monitor the village fund
□f. Protect the forest
□g. Other …
According to you, what is the most important activity?
_____

12. When participating in the BSM policy, what are your duties/responsibilities?
□a. Register the extraction form
□b. Follow the NTFP extracting regulations
□c. Pay for the village fund after selling the NTFPs
□d. Provide messages for rangers
□e. Oversee the payment for the village fund
□f. Participate in village meetings
□g. Reminding others to sustainably harvest of NTFPs
□h. Other …
According to you, what is the most important responsibility?
….....

13. What kind of NTFPs did you collect in the BMNP before and after BSM implementation?

Species	**Amount /year (a)**	**How to use the extracted products**		**Abundance level** (A lot: XXX, Average: XX, A few: X)	
		Home use (%) (b1)	Sell out/ year (%) (b2)	Before BSM (c1)	After BSM (2012, 2013) (c2)
Rattan (kg)					
Wild boar					
Bamboo (kg)					
Malva nut					
Bee honey (bottle)					
Snail (kg)					
Linzhi mushroom (kg)					
Others….					

14. Has the pilot BSM changed your household income?

□ Increase
□ Decrease
□ No change
□ Do not know
What percentage of the increase/ decrease? _____
Reasons:_____

II. Level of community participation in the BSM

II.1. Participation in decision making process and livelihood program

15. How often do you attend the BSM meetings?

□Never □Hardly ever □Sometimes □Full participation
Why? _____

16. Did you participate in which following activities?

□a. Meeting to hear about the pilot policy;
□b. Meeting to map the village management and exploitation zone;
□c. Meeting to discuss BSM plans in NTFPs harvest and forest protection;
□d. Meeting to build agreement on the rights and responsibilities of people joining BSM;
□e. Meeting to discuss the rate of village fund payment after harvest of NTFPs;
□f. Meetings to collaborate with consultants and Park staff to build models for village livelihood development;
□g. Monthly meetings to assess the implementation of BSM;
□h. Training session on sustainable NTFP collection;
□i. Training sessions on livelihood models.

17. When participating in the meetings, do you ever raise ideas?

□ No, because...
□ Yes, how many times? … Idea(s) about...

II.2. Participation in forest monitoring and protection

18. Have you ever communicate with the Park forest rangers?

□ Yes □ No
If yes:
How many times? ... / year
What is normally the purpose of your communication? …….

19. Did you participate in co-patrolling with the Park forest rangers?

□ Yes □ No How many times? ... / year
* If yes, what are your responsibilities? ....

20. When extracting NTFPs, do you follow the sustainable harvest regulations?

□ Yes, why? ....
□ No, why? ....

21. When you see someone from other communes extracting NTFPs in your management forest, what did you do?

□ a. Restrain them
□ b. Warn them
□ c. Report to the village forest protection team
□ d. Report to village head
□ e. Report to the park rangers
□ f. Report to the commune police
□ g. Do nothing. Why? .....
□ h. Other…

22. When you see someone from other villages extracting NTFPs in your management forest, what did you do?

□ a. Restrain them
□ b. Warn them
□ c. Report to the village forest protection team
□ d. Report to village head
□ e. Report to the Park rangers
□ f. Report to the commune police
□ g. Do nothing. Why? .....
□ h. Other...

23. When you see someone extracting NTFPs without following the regulations what did you do?

□ a. Restrain them
□ b. Warn them
□ c. Report to the village forest protection team
□ d. Report to village head
□ e. Report to the Park rangers
□ f. Report at the village meetings
□ g. Do nothing. Why? .....
□ h. Other...

III. Involvement of beneficiaries in the design of the BSM

24. How aware do you think your village community is of the importance of forest protection?

□ a. Very high
□ b. High
□ c. Low
□ d. Very low
□ e. Do not know

25. In your opinion, is it equal among local people when participating in the BSM?

□ No
□ Yes
□ Not sure

If no, what is not equal or choose options below:

❑ **a.** Hear about the pilot policy;
❑ **b**. Map the village management and exploitation zone;
❑ **c.** Discuss the rate of village fund payment after harvest of NTFPs;
❑ **d.** Implement models for village livelihood development;
❑ **e.** Other .....

26. After nearly 2 year of implementation of the BSM policy, do you feel that the protection of the forests in Bach Ma is better than before the BSM?

□ a. Much Improved
□ b. Moderately improved
□ c. Slightly improved
□ d. No improvement
□ e. Do not know
- If improved, in what manner has it improved?

_____

27. This pilot policy ended in late December 2013, according to you should we continue to pilot the policy?

□ Yes, why? _____
□ No, why? _____

28. If continuing your involvement in the BSM program, how would you suggest the BSM could be improved?

□ a. Harvesting more NTFPs;
□ b. Registration procedures should be easier/simpler;
□ c. Pay more attention to models for village livelihood development;
□ d. The village fund after selling the NTFPs should be reported to participants quarterly/annually;
□ e. Increase the amount of salary for local people who participate in co-patrolling with the Park forest rangers to encourage their participation;
□ f. Having NTFPs collection places near villages or the commune with good price;
□ g. Enhance power of local community to monitor outsiders/ intruders;
□ h. Enhance power of local community to monitor local authorities;
□ i. Others: .....
.....

Thank you!

Appendix 3. Average Income from each type of NTFP per household (HH) after the BSM implementation (2014) (n=60).

Non-Timber Forest Product	Unit dimension	Number of Registered HH or *Individuals* V1/V2[#]	Actual Number of harvesters n=60	Average amount harvested (A)	Price of NTFPs (VND) (B)##	Price of NTFPs (USD) (C)###	Average Income (VND)/ HH (A*B)	Average Income (USD)/ HH (A*C)
Wild boar	One = 50kg	*18/12*	2	2.0	100,000/kg	4.45/kg	10,000,000	445
Linhzi mushroom	kg	0	23	15.4	250,000/kg	11.12/kg	3,857,500	1712
Rattan	kg	*24*/26	50	849.5	3,700/kg	0.16/kg	3,143,150	140
Honey	bottle = 500ml	*11/15*	45	18.2	150,000/bottle	6.67/bottle	2,723,333	121
Kost nut	kg	*21/6*	5	22.0	120,000/kg	5.34/kg	2,640,000	117
Snail	kg	*0/20*	44	65.8	9,000/kg	0.40/kg	592,159	26
Palm-leaf	leaves	0	2	2450.0	8,000/100 leaves	0.36/100 leaves	196,000	9
Bamboo shoot	kg	*0/22*	45	62.2	2,500/kg	0.11/kg	155,444	69

Number of registered households or in italics refers to numbers of individuals for each village 1 and 2 from VCF/BMNP [29]

Price for NTFP [53], ###1USD = 22,483 VND

Appendix 4. NTFP harvesting levels before and after BSM implementation, and comparison to BSA regulation (n=60).

Non-Timber Forest Product	Unit	Total amount harvested from sample households (n=40) 2011[1] A	Total amount harvested from sample households (n=60) 2014 B	Before BSM Implementation: Extrapolated amount to all households (n=132)[1] C=A*132/40	After BSM Implementation: Extrapolated amount to all households (n=155) D=B*155/60	Amount regulated by BSA for village 1 and 2# E	Ratio of extrapolated amount to regulated amount D/E
Snail	kg	510	2,895	1,680	7,479	300	25
Bamboo shoot	kg	3,500	2,798	11,550	7,228	480	15
Honey	bottle = 500ml	800	817	2,640	2,111	480	4
Rattan	kg	34,200	42,475	112,286	109,727	43,125	2.5
Kost nut	kg	2,200	110	7,260	284	475	0.6
Wild boar	One = 50kg	12	4	40	10	16-26	0.4
Palm-leaf	leaves	12,000	4,900	39,600	12,658	NA	n/a
Linhzi mushroom	kg	NA	355	NA	917	NA	n/a

1 Source of actual harvest in 2011, and number of households [29]

Source of allowable harvest amount [29]