

Preliminary results of assessments on the impacts of Payments for Forest Environmental Services (PFES) on forest networks and governance, household income and forest loss in Vietnam

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Key messages

- PFES and the large number of workshops have helped catalyze or strengthen cooperation between participants, which in turn can help organizations contribute more effectively to forest governance initiatives. However, when organizations work in the same provinces, they are less likely to collaborate.
- The impact of PFES on household income depends on the levels of payments, livelihood options available in the area, the area of forest managed by households, and PFES contract types (between individual households and the fund or between village administrations and PFES agencies). There were substantial differences between study sites.
- PFES appears to have been successful in lowering rates of deforestation for forest plots that were standing in 2000. The longer PFES programs have been active in a province, the greater the expected reductions in deforestation.
- Estimated PFES impacts can vary significantly depending on the assessment method used. While this infobrief discusses the impacts of PFES on forest governance, local livelihoods and forest loss separately, their interaction could offer a more complex picture of PFES impacts.

Introduction

Vietnam's Payment for Forest Environmental Services (PFES) policy is one of very few national-scale payments for ecosystem services programs in the world and the only one to date in Asia. The program, launched in 2008, primarily aims to reward and support the efforts of forest managers in Vietnam to protect and manage forested areas, which in turn provide environmental services including watershed protection, scenic beauty, biodiversity conservation and carbon sequestration. PFES plays a significant role in financing the forestry sector, accounting for 29% of total forestry investments in 2019. Earlier government reports have documented positive impacts of PFES on environmental and economic outcomes such as increases in forest cover and contributions to

household income. However, there is a need for a more comprehensive and scientific assessment of the impacts of PFES, as the current lack of rigorous methodologies and available data could lead to misinterpretation and inaccurate impact assessment. To address this knowledge gap, this infobrief summarizes preliminary results from two projects, Identifying Conditions for Successful Landscape-Scale Conservation Policy Implementation in Vietnam, funded by USAID through the Partnerships for Enhanced Engagement in Research (PEER) program, and the Global Comparative Study on REDD+, funded by NORAD to assess the impacts of PFES on forest governance, household income and deforestation reduction in Vietnam. This infobrief is a joint collaboration between CIFOR, The Ohio State University and Lafayette College, as part of the PEER project.

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The impact of PFES on networks and governance

A key objective of PFES is to mobilize all social groups (government agencies, NGOs, communities, the private sector and academia) to contribute to forest protection and development.

Forest management outcomes hinge on how well governance systems facilitate coordination and cooperation among stakeholder organizations at large spatial scales. For example, organizations might share data or information on effective PFES implementation, thus facilitating social learning. Such mutual learning and coordination can also improve policy efficiency and efficacy. Organizations might also cooperate in implementing forest management projects or programs jointly, which can help avoid duplicating efforts and may also mitigate conflict risks, given the diverse values at stake in forest management.

Therefore, one focus of our research is the factors supporting collaboration between organizations involved in PFES-related activities. We are particularly interested in the role of PFES-related events (consultation workshops, training and policy dialogues on PFES), and how these events might catalyze collaboration. Prior research suggests such events provide opportunities for organizations' representatives to get to know one another and identify shared interests or complementary capabilities, which may in turn lead to more substantial partnerships later on. Since the launch of PFES in Vietnam in 2008, international donors and national government agencies have devoted substantial funding to organize numerous PFES-related workshops and training programs. However, there is limited systematic analysis on the impact of these workshops, particularly whether and how they have affected collaboration between PFES stakeholders. We were also interested in evaluating whether organizations would be more likely to collaborate if they implemented forest management-related projects and programs in the same provinces. Here too, prior research has generally found that collaboration is more likely between organizations working in close proximity, as this should foster familiarity with each other's capabilities and present opportunities for complementary joint activities.

To explore how workshop co-attendance and proximity affect the development of collaborative relationships between organizations involved in PFES in Vietnam, we drew upon several sources of network data, including:

- i. Data from CIFOR's Global Comparative Study on REDD+ and its REDD+ Policy Network Study. This project, funded by NORAD, examines collaborative

interactions among forest stakeholder organizations across three time periods (2011-2012, 2015-2016 and 2018-2019).

- ii. Records of how these organizations participated in the large number of workshops on PFES and REDD+ organized by USAID, GIZ and CIFOR in collaboration with Vietnam Forest Protection and Development Fund over a time period including the three waves of data on collaborative interactions. We acknowledge that more workshops may have been organized by other agencies, but as USAID and GIZ are the two most substantial donor agencies working with PFES, and CIFOR is the only research organization to date with longitudinal data on PFES impacts, we believe the data used in our analysis are sufficiently representative of the workshops organized during this time period.
- iii. Publicly available information (e.g., from organizations' websites) identifying the provinces in which each organization in the REDD+ Policy Network Study implemented PFES and REDD+ projects and programs.

We combined these three datasets into a longitudinal network comprised of three different types of "nodes": organizations, workshops and locations (provinces). Given our interest in understanding how collaborative relationships form based on conditions at prior points in time, we estimated a stochastic actor-oriented model (SAOM). SAOMs are statistical models that evaluate how networks change over time; in our case, we focused on changing patterns of collaboration among organizations (See Table 1 for more details).

Table 1. Factors that affect collaboration between organizations

Parameter	Estimate (standard error)
Rate parameter period 1	7.39 (0.49)***
Rate parameter period 2	5.58 (0.45)***
Outdegree (density)	-1.61 (0.18)***
Reciprocity	-0.00 (0.20)
Organizations co-attending workshops in the previous time period	0.53 (0.22)*
Organizations working in the same provinces	-0.31 (0.15)*
Governmental organizations	0.51 (0.33)
Collaboration between governmental organizations	0.56 (0.20)**
Iterations	2669

Note: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Source: Authors' own analysis (2021)

Our results suggest two important findings:

- i. **When organizations jointly participate in workshops, they are more likely to collaborate in the future.** Workshops have many functions. For example, participants can gain technical training or access new information. Our results highlight another function: workshops may catalyze or strengthen cooperation among participants, which can in turn help organizations contribute more effectively to forest governance initiatives. Certainly, many workshop participants already had existing partnerships. However, even in such cases, workshops organized to provide a platform for stakeholder feedback and for sharing information might have helped strengthen or expand on extant or past partnerships. Second, for actors that had not previously collaborated, workshops provided opportunities to build new relationships.
- ii. **When organizations work in the same provinces, they are less likely to collaborate.** This result stands in contrast to prior work showing that proximity can facilitate collaboration. One possible explanation for this finding is that organizations may be motivated to **“highlight identity and not step on others’ toes”** when considering prospective partnerships.

For example, in one GCS-REDD interview, an organizational representative explained that, “We need to protect our identity and avoid duplications. Although we and other organizations might work in the same province, we will not work in the same district or commune. Due to different approaches, we select to implement the project as well as the different studied sites we are operating, we see no need to collaborate.” A local government agency representative shared that, “Having several projects and donors in the province who each adopt different standards and approaches is challenging for us. For example, applying different social safeguards policies causes us confusion and increases the costs of delivering different products for the same purpose. Different government and donor initiatives and programs each supporting different in-kind and in-cash payment for environmental services also raised confusion for environmental services providers and local communities about the different treatment and their equity outcomes, and it takes us a lot of time to explain it to them.” This result, if confirmed by ongoing analysis, highlights a potential challenge to coordinated forest management and for local authorities in implementing PFES.



CIFOR research team went to Cat Tien National Park and carried out research on PFES’s impact

Photo by Dao Thi Linh Chi

This analysis is ongoing, and we expect to build upon these results in several ways. In particular, we plan to use organizations' geographic affiliations to link the governance network with environmental data, including changes in forest cover (as described below) and patterns of forest and hydrological connectivity. The resulting social-ecological network will help us evaluate how patterns of social interaction among organizations have implications for environmental outcomes and how patterns of environmental interdependence (such as hydrological connectivity or habitat corridors) may influence collaborative interactions among organizations. In particular, if organizations that work in the same provinces avoid collaborating with one another – as our findings suggest – these subsequent analyses could help diagnose “collaboration gaps” (instances in which collaboration between organizations would be desirable, but is absent). In this context, qualitative data could help us better understand organizations' strategies for participating in the governance network.

Impact of PFES on household incomes

Although the primary objective of PFES is to enhance forest protection and development, its twin objective of improving local people's livelihoods is also treated as a national priority. Since 2017, CIFOR has conducted a comparative study to document and analyze the contributions of PFES to household incomes in Son La, Thua Thien Hue, Dak Lak and Cat Tien National Park.

These four study sites capture significant variation in ecological zones, forest users and forest managers groups, forest categories, PFES revenue and PFES payments per hectare. In total, 2991 people took part in this CIFOR study. Figure 1 gives an overview of the contributions of PFES to overall household incomes in these four study sites.

Across the four sites, 28% of households reported that PFES contributed more than 75% of their income, while 27% stated it accounted for less than 10% of their income. These results varied substantially across sites. While in Thua Thien Hue and Son La, the majority of households reported PFES provided less than 10% of their income (55% of households interviewed in Son La and 66% in Thua Thien Hue); in Cat Tien and Dak Lak, some households interviewed (30% in Cat Tien and 35% in Dak Lak) claimed that PFES play an important role, accounting for more than 75% of their overall income. Interestingly, despite the majority of households in Son La reporting little PFES income, 37% reported it accounted for over 75% of household income. The impact of PFES on household income depends on the level of payments from PFES, livelihood options available in the area, the area of forest managed by households, and whether PFES is managed via individual contracts with households or contracts with village administrations. All these factors vary substantially across study sites. Differences between and within sites point to challenges for local government in ensuring that those for whom PFES contributes less than 10% of their income actively engage in PFES, particularly when they have to fulfil the same contractual requirements as those for whom PFES contributes substantially more to their income.

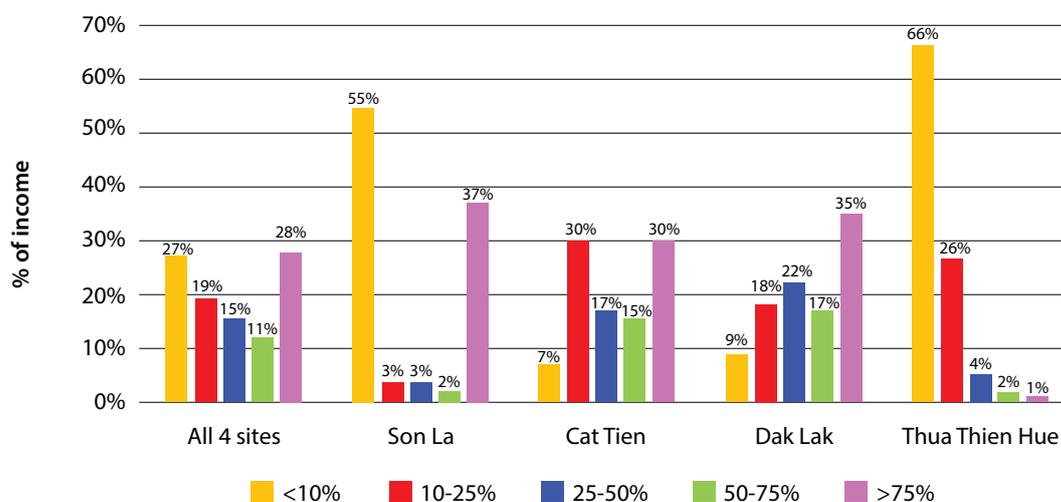


Figure 1. Income from PFES as a percentage of total household income

Source: Pham et al. (2020)



Forest protection officers in Cat Tien National Park

Photo by Binh Dang/GLZ

Impact of PFES on forest loss

In evaluations of PFES performance, a core question concerns whether the program actually reduces forest loss. As a preliminary assessment of the impact of PFES on forest cover, we conducted a statistical analysis using the Hansen Global Forest Change Dataset (Hansen et al. 2013), covering forest loss in Vietnam at a 30 meter X 30 meter pixel resolution from 2000 to 2018. Because of the size of this dataset, this preliminary analysis is based on a random sample of approximately 2.5 million pixels that were forested in 2000, approximately 1% of Vietnam’s forested area that year.

Because we are studying discrete events (deforestation of a pixel that was forested as of 2000), we use Cox proportional hazard regressions to model the processes leading to deforestation. Cox proportional hazard regressions model the expected time until an event, in our case, deforestation, occurs. The model allows us to include independent variables that might affect the risk of deforestation, and we can use this technique to estimate the impact of PFES onset on deforestation risk, controlling for other factors such as **elevation**, distance from roads, and **surrounding land cover**.

One of the most straightforward ways to interpret the results of an estimated Cox model is to consider how the predicted risk of the event of interest, in our case, deforestation, differs based on the values of an independent variable of interest. In our case, the primary variable of interest is how long PFES has been active at a particular point in time. Because it takes time to implement PFES programs – and because PFES has been designed to facilitate policy learning, we anticipate that the program’s impact on forest loss will increase over time. Because provinces implemented PFES in different years, we can use a frailty estimator at the provincial level, which can be thought of similarly to a random effects term in an ordinary least squares regression model, to take advantage before and after comparisons of deforestation rates across provinces as they implement PFES to assess the program’s average impacts.

Figure 2 below visualizes the difference in deforestation risk that we would expect were all the pixels in our dataset to have the deforestation rate associated with various years of PFES implementation for the entire time period we observed. While this is a hypothetical simulation, it helps us to understand the magnitude of PFES’ impacts on forest loss estimated in our model.

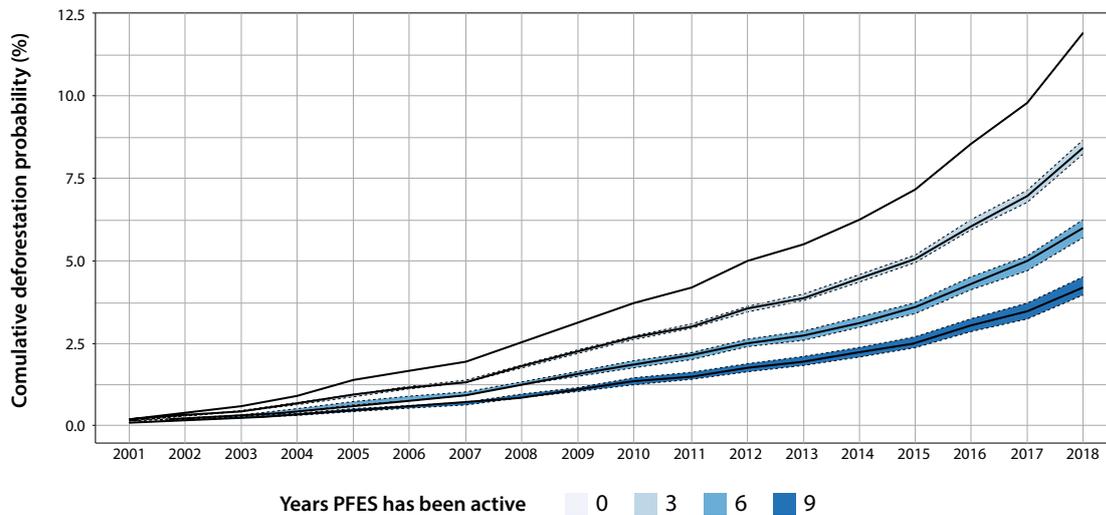


Figure 2. Predicted cumulative deforestation by PFES status, all other variables set to zero

Source: Authors' own analysis (2021). Bands show 99% confidence intervals for the predicted cumulative deforestation risk in each scenario.

While hypothetical, the figure above makes clear the most important message from our currently best-fitting model. First, small differences in deforestation rates compound over time, so even if PFES lowers deforestation only slightly in the short term this can lead to more substantial differences in forest preservation in the long term. Over the course of many years, the difference between forest loss risk for a province that has engaged in PFES for a decade, for example, is estimated to be roughly a third of the risk were PFES inactive. Second, it is important to remember that we find these effects even while controlling for geographic differences in forest pixels' locations and including a frailty term by province.

While these results seem promising for PFES, it is important to note a few limitations. First, because of how the Hansen forest data are structured, we are only considering pixels that were forested in 2000, meaning that we are restricted to forested areas of at least moderate age. Our findings might be different for areas that have been reforested or afforested since 2000. Second, and following on from this point, we are only considering deforestation risk, not total forest cover change, an issue we hope to rectify in future analyses. Finally, we have yet to bring together these data and our network data, which would help us better understand how network governance affects PFES effectiveness.

Discussion

This infobrief highlights some important impacts of Vietnam's PFES program on forest governance, local household incomes, and forest loss. While these preliminary findings reveal some promising outcomes of PFES, we also identify some

implementation challenges that should be considered to improve the program's efficacy.

The fact that PFES workshops have served as a catalyst to establish or foster collaboration between forest governance stakeholders suggests PFES may have some positive social impacts for forestry sector stakeholders. However, the avoidance of collaboration among stakeholders operating in the same provinces highlights the difficulties local governments face in coordinating multiple but poorly aligned initiatives while avoiding confusion and dissatisfaction on the part of stakeholders receiving different levels of treatment and support. Furthermore, weak coordination and collaboration between actors in the same province also prevent opportunities to build on each other's projects and expand the scope of support for larger numbers of current beneficiaries by bundling financial and technical support together.

Addressing such challenges requires a more complete understanding of how stakeholders choose between possible collaborators, a core focus of the first analysis we describe in this infobrief. Understanding who is likely and who is unlikely to collaborate is an important first step, while understanding *why* they select certain partners is a necessary second step. For example, organizations may not collaborate due to lack of information, lack of interest, power conflicts, disparities in financial or other capacities, or the lack of a legal framework. Rather than blaming organizations who do not collaborate, we believe this type of knowledge could help strengthen the already important role of the central government, provincial governments and donor agencies in fostering collaboration.



Discussion on PFES’s impact in Son La province, Vietnam

Photo by Pham Thu Thuy/CIFOR

Admittedly, in many cases, limited collaboration not only applies to organizations but also to government agencies. For example, many projects are approved by the central government with little consultation with provincial governments. Another important question concerns the representation of diverse stakeholder groups (e.g., government agencies, local communities, CSOs, and project managers, among others) in workshops, and the degree to which collaboration spans different groups. If a project does not work with CSOs and local communities in implementing PFES, this could indicate challenges in delivering sustainable environmental and social outcomes. Evaluating representation and cross-sector collaboration among workshop participants is a core focus of ongoing analysis.

The differences we observed in the contributions of PFES to household incomes across different study sites also suggests the government might need to work to support those with limited incentives to support PFES due to the limited benefits they receive (i.e., groups for which PFES contributes less than 10% of household income). In many cases (as Son La and Thua Thien Hue show), these groups are currently the main PFES beneficiaries, suggesting they can be critical for the continued success of PFES. Increasing PFES payment levels for these groups, however, might be challenging, as they often manage small, forested plots, while livelihood options are limited. However, the combination of in-kind (e.g., technical assistance,

information exchange) with in-cash payments can offer stronger incentives for these actors to engage in PFES.

Our findings on the impact of PFES in reducing forest loss also highlights the importance of conservation initiatives in providing financial support to reward forest managers for better protecting forests. However, as we noted above, estimated PFES impacts will likely differ depending on the data source and methods used. The above analysis should be complemented with different datasets and modelling techniques to assess the robustness of these findings. This simple point also has policy implications regarding what monitoring, reporting and verification system the government chooses to adopt to measure PFES impacts and report those findings to the public.

Furthermore, the impacts of PFES cannot be assessed in isolation but must be considered in the context of already existing policies, local environmental conditions, and local socioeconomic dynamics. While this infobrief discusses the impacts of PFES on forest governance, local livelihoods and forest loss separately, their interaction could offer a very different picture. Overlaying data on stakeholder collaboration, PFES financial benefits and forest change in PFES sites could help stakeholders identify the factors influencing PFES impacts and support a more comprehensive understanding of what further policy interventions might enhance PFES outcomes.

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