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Implementing payment environmental services in Langbiang Biosphere Reserve, Vietnam

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Abstract Langbiang Biosphere Reserve (total area of 275,439 hectares) is in the North of Lam Dong Province, in Southern Highland Region, Vietnam. The biosphere reserve the global values of biodiversity and diverse natural landscapes in the mixture with the unique gong cultural space in the Central Highlands. The sustainable financing mechanisms for conservation based on payment for forest environmental services (PFES) was established successfully. Through PFES, There were around 8,000 households benefited from PFES in this biosphere reserve through their contributions to the protection and maintenance of ecological values. However, there was a lack of discussion and information sharing among stakeholders, especially between the buyer and seller. Mechanisms for information sharing need transparency and time.

Keywords: Benefit sharing mechanism, Collaborative management, Payment environmental services

Introduction

In June 2015, Langbiang Plateau was recognized by UNESCO as the 9th World Biosphere Reserve of Vietnam located in 5 districts including: Lac Duong, Lam Ha, Dam Rong, Don Duong, Duc Trong and Da Lat City. Forests in the Langbiang Biosphere Reserve have the potential to contribute greatly to forest environmental services: supply of clean water for daily life, hydroelectric power generation, ecotourism services and other services. PFES is quite a new concept for implementing in the world, starting from the policy of environmental services. The Vietnamese government has established the legal basis to implement the national program on PFES approved the Law of Protection and Development Forest and Decree No. 99/2010/ND-CP. Vietnam became the first country in Asia to promulgate and implement policies of PFES

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at the national level (Pham *et al.*, 2013) in which Langbiang Biosphere Reserve is one of the piloting regions performed PFES quite successful. It applies PFES as a sustainable financial mechanism to involve the local community in forest protection. A PFES basic principle is to ensure benefits for the provider of environment services at both the individual and the community scale, through the receiving reimbursement for the cost of providing these services through forest protection activities (Pham *et al.*, 2013). PFES objective is protected existing forest area, improving forest quality, increased the contribution of the forest sector to the national economy, relief the burden of the State budget for investing in protection and for forest development as well as guaranteeing the social security of people engaged in forestry (Pham *et al.*, 2013).

Materials and methods

Explore the laws and regulations of Vietnamese government are related to realize the support as well as hindering factors for implementing PFES. Evaluate PFES mechanism have an effect on environmental efficiency, increase economic effect and social equity. Related studies also used for reference and analysis. Using PRA tools such as semi-structured interviews combined with open questions and interviews with the key people to get information. Using SWOT analysis was to find out the cause and effect as well as the limitations of the PFES program.

Results

Main achievements of PFES in Langbiang biosphere reserve

PFES has received attention and support from the government significantly because it does not exploit timber and non-timber products as before so creating an important legal basis for the implementation. PFES revenues are mainly from hydroelectric power production facilities and water supply companies. Specifically, the PFES collection rates had two phases, (1) from 2009-2017 which collectrd 20 VND/kwh from hydropower plants and 40 VND/m^3 of clean water from water plants and (2) from 2018-present, the revenue from electricity was 36 VND/kwh and water was 52 VND/m^3. In addition, tourism companies also paid 1-2% of total annual revenue. In the environmental services regulation, watershed protection services (soil conservation, erosion control, and sedimentation; regulating and maintaining water resources) has obtained important achievements and also got the learned lessons for improving the organizational structure for implementing PFES. On

September 24, 2010, the successful implementation of the pilot PFES policy in Lam Dong Province during its two-year trial culminated in an announcement from the Prime Minister of Vietnam that a National PFES Decree had been approved. The PFES Decree transforms the way forests are viewed and managed in Vietnam, providing a measure of assurance that critical forests, and the ecosystems services they provided. It would be protected into the future through the scaling up of PFES nationwide. This is provided a positive impact for the objectives setting in the context of the Central Highlands to cope with climate change.

By using the value of environmental services, PFES bring more benefit for local people than using timber or non-timber products as before, so it is interested and supported from the government and made consensus with local people. PES is the new financial resources, contributing to sustainable development of social economic, poverty reduction for ethnic minority areas and remote areas. Most of people involved in PFES program were the poor and the ethnic minorities. Thus, PFES program generated income and improved their livelihood as well as raised their awareness in forest protection. Establishing forest protection groups then the members of a group would monitor by themselves, it is created the equity and ensured that the forest are maintained and people are paid adequately. Besides, it also made the strong connection between communities by the households in the same village cooperate and supported together in forest protection work.

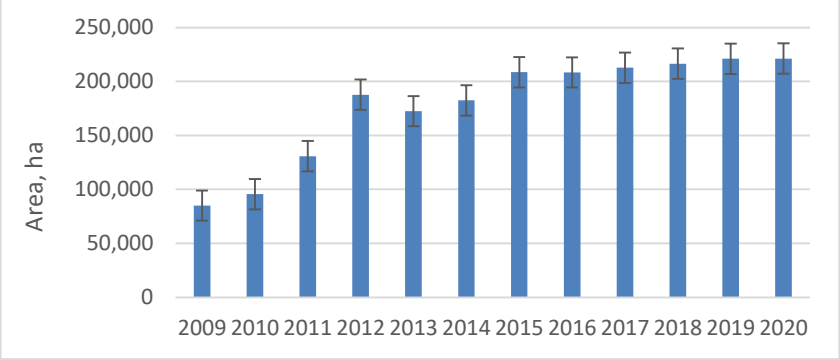

Figure 1. Total area of PFES in Langbiang Biosphere Reserve

The area of payment for forest environmental services has increased year by year; in 2009 only paid for 84,989 hectares, then it has increased to 221,186 hectares in 2020; occupies 80% of the area of Langbiang Biosphere Reserve. Most of forest land has protected by local community within Langbiang Biosphere reservation.

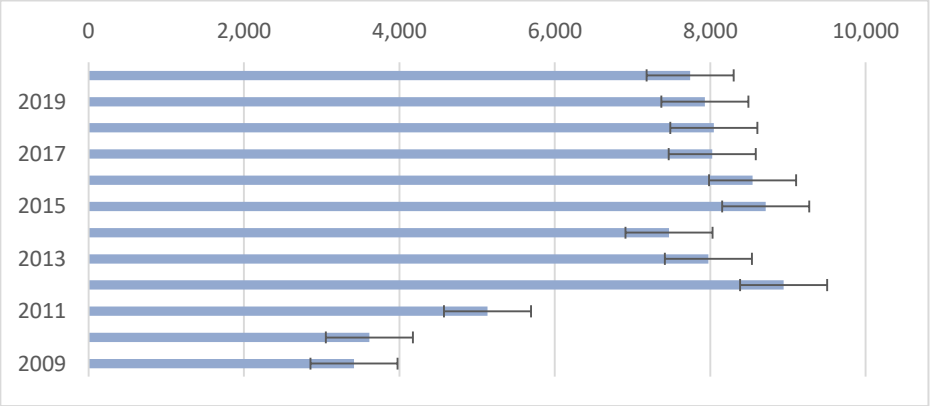

Figure 2. Number of households participate in PFES

The number of households contracted for forest protection has also increased together with the area of PFES, the chart showed that in 2009 there were only 3.418 participating households and in 2020, the number of contracted households has increased to 7.741. The data reflected the forest in Langbiang biosphere reservation is received more and more attention from resident in term of forest protection. PFES has created a closedly cooperation between the forest owners with local authorities in the protection of forests. Forest owners have paid more attention to capacity building in technical term through using the diaries of forest patrol combined with remote sensing technic in the management of forest resources and monitoring of changes in the forest. The number of violations of forest law has dropped significantly since implemented this PFES policy.

Positive impacts from forest environmental services were recorded. Environment impact: Biodiversity values and forest status in Langbiang Biosphere reserve are enhanced, protected and preserved from PFES revenue. Watershed forest basins of major rivers (Da Nhim River, Dong Nai River, Serepok River...) are better protected. Society impact showed that many socio-economic sectors have been interested in providing forest environmental services including 15 state-owned forest owners, 184 non-state enterprises, 06 households and 40 participating communities. It showed the relevant stakeholders raise awareness and actively participate in forest protection. Forest environmental services have become a matter of social concern and are recognized as a major forestry activity reflected in the Law on Forestry. It is sustainable finance mechanism to pay for forest protection because it is not depended to support policy programs of the state in the context of budget difficulties currently. Economic impact revealed that PFES is a solution to increase revenue for the forestry sector. it did not directly exploit to forest products, but it is used indirect value of forest environmental services to reduce

expenditures from the state budget for forest protection activities parallel with create additional livelihoods for people and communities.

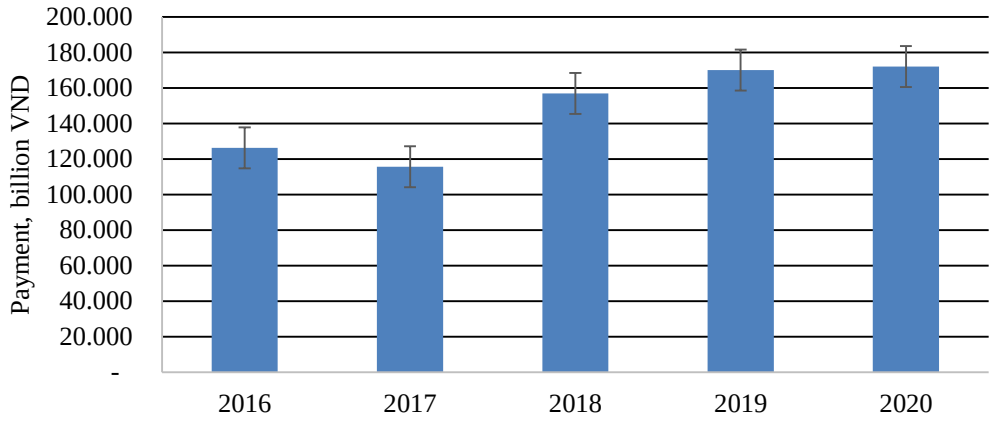

Figure 3. Budget for PFES in Langbiang biosphere reserve

Inadequacies

Payment rates showed different according to the total proceeds of each basin, so that community is wondered when participating in forest protection because they had the same activities, but they got a different income. Even if the PFES mechanism is towarded all the environmental services but there were not enough technical provisions for environmental monitoring on the quality of forests, and soil erosion or regulating water sources. Although some reports are indicated growth forest quality from PFES mechanisms, but these assessments are mainly based on subjective observations without convincing scientific evidence of growth or improvement forest. The effectiveness and accountability of some households are not highly found because sanctions were not enough power to deal with the households and lack of responsibility. So it is caused deforestation, encroachment, and illegal harvesting of forest products.

Discussion

The sustainable PFES-based financing mechanism was developed by Winrock's Asia Regional Biodiversity Conservation Program (ARBCP) designed to maintain biodiversity at a landscape level. The pilot approach supported natural resource management and conservation in ways that provided real economic opportunities to rural communities, using sustainable financing targeted at poverty reduction. The pilot policy was being implemented

successfully, PFES payments were become an important source of income for poor households, especially those of ethnic minorities. The national pilot policy on PFES provided guidance for applying a coefficient (the 'K coefficient') to determine the relative value of different forest areas based on an average of four factors: forest type (protection category/special use/production); quality of forest (rich/moderate/poor/secondary); origin of forest (natural forest/planted forest); and human impact. However, Lam Dong Province does not apply K-coefficient but it just keeps the payments consistent on a 'per hectare' basis because the communities involved wanted an equal distribution of payment, and saw the K coefficient as a source of potential social discontent (Thomas *et al.*, 2011). It is important to note that PFES does not use government budget for payment – rather, fees are collected from PFES users and paid to households that are contributing to forest protection with the objective reduces poverty for people living in the mountainous and forest areas. Besides, these environmental effects have not been clear yet, hence it is impossible to measure the variables related to the environmental services such as forestland cover, biodiversity enrichment, and watershed improvement. In conclusion, it is important for the PFES sustainable program to establish a committee to monitor/control the quality of forest and water in catchment area under Pilot PFES area and define rights and responsibility of PFES services providers as well as mechanism in which PFES payment rate is defined on the quality of forests

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