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Identifying Stakeholders' Roles in Implementation of Payment for Forest Environmental Services in Hoa Binh Province, Vietnam

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Abstract. *The policy of payment for forest environmental services (PFES) has been implemented in Vietnam since 2011 and in Hoa Binh province since 2013. Governmental agencies have conventionally implemented PFES at central, provincial, and district levels. However, there are shared responsibilities of the governmental organizations and other stakeholders at different levels in reality. Using social network analysis (SNA) indicators shows that the provincial Forest Forest Protection and Development Fund plays the most important role among involving stakeholders. Both density and centrality measurements have shown that the stakeholders in the PFES implementation network in Hoa Binh province have good coherence. Additionally, district-level governmental organizations and Viettel Telecom Company have shown their powerlessness in the policy implementation network.*

Keywords: Implementation, Policy of payment for forest environmental services (PFES), Social network analysis, Stakeholder

JEL Codes: Q00, Q18, Q19.

1. Introduction

The policy of payment for forest environmental services (PFES) has been implemented in Vietnam since 2011, followed by the Decree 99/2010/ND-CP in 2010 and amended and supplemented by Decree 147/2016/ND-CP in 2016 and Decree 156/2018/ND-CP in 2018. PFES is one of the major forestry policies in Vietnam as it has contributed 25% of the total annual investment in the forestry sector since 2008 (Pham et al., 2018). PFES aims to enhance forest cover and forest quality, improve local livelihoods, and reduce state investment in the forestry sector (Pham et al., 2018). Apart from the achievements, shortcomings still exist such as unsustainable PFES funding sources, unequal distribution of PFES among forest owners, inadequate PFES income sources (lack of aquaculture services, carbon sequestration and use of industrial water, pilots have been developed across the country), and overlapping tasks and functions of stakeholders involving PFES implementation.

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Regarding involving stakeholders, the Vietnam government has assigned to main organizations to implement PFES, including Provincial-level People's Committees (PPC), Provincial-level Forest Protection and Development Funds (FPDF), Provincial-level Departments of Agriculture and Rural Developments (DARD), Vietnam Forest Protection and Development Fund (VNFF), users of forest environment services, and providers of forest environment services. However, many stakeholders (individual actors and organizations) participate in PFES policy in practice. The inter-relationships among these stakeholders may be consensus or contradictory, though they are working in a network.

Stakeholders and their relationships play an important role in the success of policy implementation. Stakeholders can be defined as an individual or a group of individuals who are influenced by or able to influence a project or a program (Freeman, 1984; Freeman & Mc Vea, 2001; Xiao et al., 2021). Stakeholder theory speculates that an organization is a social construction made of interaction of various stakeholders. The organization is visualized as the center of a stakeholders' network (Chepkoech & Waiganjo, 2015).

The problem of identifying key players in a network has been discussed for a long time. One stream of relevant research is node centrality (Freeman, 1979; Bolland, 1988; Borgatti, 2005; Gneiser et al., 2010) which attempts to quantify the structural importance of stakeholders in a network. Additionally, work on identifying cores and peripheries (Rombat et al., 2013) is relevant. Other approaches have also been applied to identify key players in a network, for example, social capital by Burt (1999).

For roles of key players in public policy, most studies focused on the design or policymaking phase (Mulyaningrum et al., 2013; Helbig et al., 2015; Hutahaean, 2017). These researches tried to explain how different stakeholders participate in policymaking and how to encourage effective stakeholders to involve in the policymaking stage. In fact, policy implementation is an important stage that makes policy possible to achieve its objectives and delineate the targeted groups' perimeter (Varone et al., 2019). In other words, the implementation phase puts public administrations in direct contact with representatives of civil society, especially the groups targeted by the policy.

Policy implementation arrangement is characterized by a high level of coordination, both horizontal (between units or organizations) and vertical (between the district, province, region, and central levels). Further, it can also be characterized by considerable fragmentation (Varone et al., 2019). Thus, policy implementation requires working with a set of stakeholders (individual actors and organizations) to communicate policy objectives, ensure the availability of resources, and achieve ownership of the policy by implementers (Oliver, 2006).

The stakeholders who involve in policy implementation have different statuses and roles. They develop a variety of interactions and form a sophisticated stakeholders network (Xiao et al., 2021). The stakeholder's relationships in the network strongly impact on effectiveness and efficiency of a public policy in general and PFES policy in particular. The question is, which stakeholder plays an important role in the network of PFES implementers? Who has more connections with others? Who is able to control others in the network?

Based on data and information collected from Hoa Binh province, Northern Vietnam, this paper aims to identify and analyze stakeholders involving PFES implementation, particularly: (1) stakeholders at local

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levels (provincial, district, and commune levels) and (2) the vertical and horizontal interplay between stakeholders at different levels.

2. Methods

As mentioned in the previous section, the important research question is "which stakeholder influences PFES policy implementation the most?". Based on this question, the detailed methods of data collection and analysis have been selected and developed. Social Network Analysis (SNA) approach has been applied for all research process because it was conducted by recording data on "who is connected to whom" (Valente et al., 2015). Moreover, SNA is one of the principal methods to analyze stakeholder relationships. The SNA relationship contains the presence or absence of the tie and the strength of relational ties to uncover the structure of the stakeholders' network based on the centralization of the individuals (Reed et al., 2009). SNA also plays an important role in the determination of the connections within and between parts of a network which is known as cohesion (Wasserman & Faust, 1994; Scott, 2000), and it is considered as an important characteristic of networks. This characteristic is measured by SNA indicators, including density, degree, closeness, and betweenness centrality (Carrington et al., 2005; Valente et al., 2015). These indicators are explained in section 2.2.

2.1 Data collection

Similar to Pelyukh et al. (2021), this research has been structured in three stages, including (i) identification of stakeholders who involving in PFES implementation, (ii) semi-structural interview, and (iii) classification of the involved stakeholders. According to the assignment of the Vietnam government, PFES implementation at the provincial level involves five specialized working organizations which are: (1) Provincial People's Committee, (2) Forest protection departments, (3) Provincial forest protection and development fund, (4) users of forest environmental services and (5) providers of forest environmental services as described in Figure 1. For the first stage of collecting data, the discussion with five representatives of these working groups has been carried out, then 19 actors involving in PFES implementation in Hoa Binh province have been investigated as presented in Table 1.

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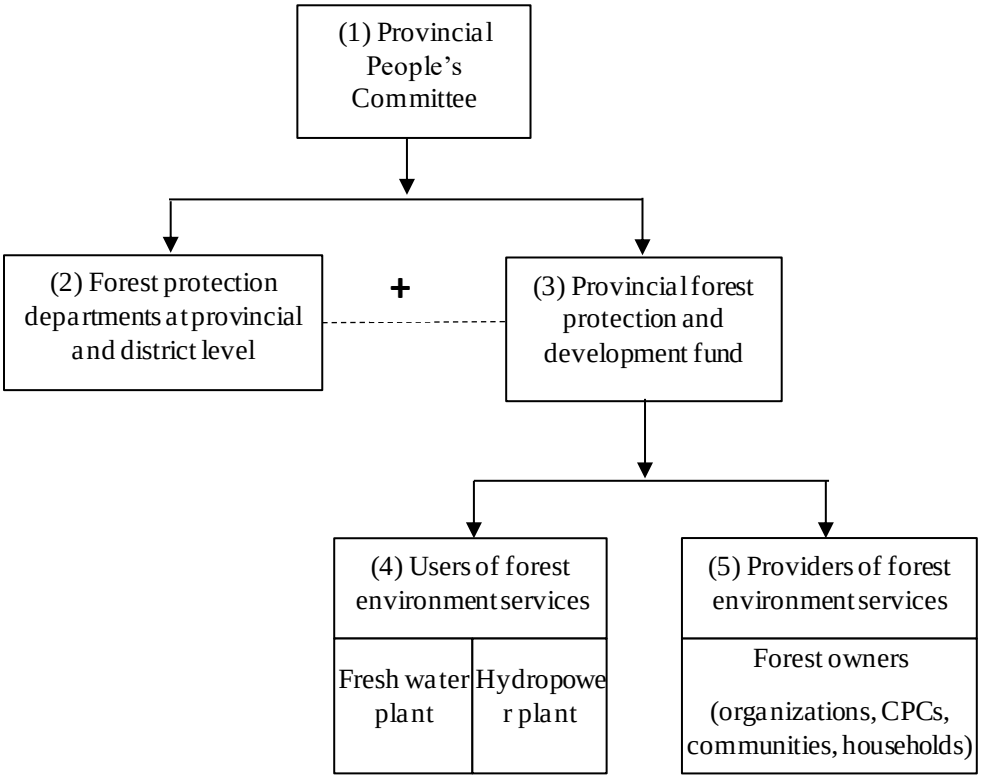

Fig. 1: Involving stakeholders in PFES policy implementation assigned by the Vietnam government

In the next step, a matrix of actors was created using the Excel software, and a semi-structural questionnaire was developed in order to interview 19 representatives selected from 19 stakeholders. The interviewees were asked to indicate the links between actors, and they had to complete a semi-structural questionnaire in a face-to-face interview. Binary data were used in this study (absent, i.e., 0.0 and present, i.e., 1.0). The value is present if there be a selection within the team members. If each pair of team members does not select each other, the value of 0.0 will be allocated. The tie is directed from one member to another in a pair, i.e., it has an origin and a destination (Wasserman & Faust, 1994).

2.2 Data analysis

The analysis and visualization of the survey have been performed using UNICET (version 6.0). The stakeholders who played the role of nodes in the networks and their relations were mapped out. The links were weighted by the scores of each link in 19 response questionnaires. The cohesion indicators of SNA such as density, degree centrality, and betweenness were used to describe the structure of the network.

Density has been used to measure the total connectedness of a network in various researches (Valente et al., 2015; Tabassum et al., 2018; Yousefi Khoshsabegheh et al., 2021). It is the number of ties in a network as a ratio of all possible ties in a network and describes the general level of cohesion. A network with n nodes can maximally have n (n − 1) directed links or n (n − 1)/2 undirected links. Density 1 represents a

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fully connected network, and density 0 represents a fully sparse network with no link (Wasserman & Faust, 1994; Scott, 2000). In this study, density is used to measure the number of ties in the stakeholders' network involved in PFES implementation in Hoa Binh province.

Table 1: Real stakeholders participated in PFES policy implementation in Hoa Binh province

Node of network	Stakeholders	Node of network	Stakeholders
1	Provincial People's Committee	11	Headman of village
2	Provincial Department of Forest Protection	12	Bank for Agriculture and Rural development
3	Provincial Department of Tax	13	Vietel Telecom Company
4	Provincial Forest Protection and Development Fund	14	Households as forest owners
5	District People's Committee	15	Communities as forest owners
6	District Department of Finance	16	Commune People's Committees as forest owners
7	District Department of Forest Protection		
8	District Treasury	17	Organizations as forest owners
9	Commune People's Committee	18	Fresh water plant
10	Forest protection staff	19	Hydropower plant

Source: Focused group discussion, 2020

Degree centrality is one of the first centrality measures which count the number of links by each node in the network (Valente et al., 2015; Zedan & Miller, 2017; Yousefi Khoshsabegheh et al., 2021). The higher the degree of a node means the greater its authority (Butts, 2008). In a directed network, in-degree and out-degree can be different for each node. In-degree counts the number of the interaction of other nodes with a node, and out-degree counts the number of the interaction of a node with other nodes. In PFES stakeholder's network, in-degree shows the frequency that other organizations refer to an organization for coordinating and their actions. In contrast, out-degree shows the frequency that an organization contributes to other organizations in the network.

Closeness centrality measures how many steps are required for a particular actor to access every other actor in the network (Yousefi Khoshsabegheh et al., 2021). This is measured as 1 divided by the sum of geodesic distances from an actor to all alters in the network. The measure will reach its maximum for a given network size when an actor is directly connected to all others in the network and its minimum when an actor is not connected to any others. This captures the intuition that short path lengths between actors signal that they are closer to each other (Zachary, 1977).

Betweenness centrality is roughly defined as the number of shortest paths between alters that go through a particular actor (Zedan & Miller, 2017; Yousefi Khoshsabegheh et al., 2021). More precisely, it is the sum of the shortest path lengths between every set of alters where the path goes through the actor we are calculating the measure for divided by the shortest path lengths (not necessarily through the target actor) between those actors. This intuitively measures the degree to which information or

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relationships have to flow through a particular actor and their relative importance as an intermediary in the network (Zachary, 1977).

3. Results and Discussion

3.1 Involving stakeholders and state-regulated functions in PFES implementation

The institutional setting for PFES policy implementation in Vietnam relied heavily on the VNFF and FPDFs that was established at central and provincial levels, respectively (Figure 1). In the arrangements, stakeholders' roles and responsibilities were clearly defined. According to Circular No. 85/2012/TT-BTC (issued by the Ministry of Finance), the FPDF is not operated for profit. The VNFF signs contracts with buyers that set out the amounts they must pay for environmental services; the VNFF also collects, coordinates, and monitors payment to provincial FPDFs in areas where environmental services are supplied from two or more provinces and supports the operations of the provincial FPDFs. The VNFF extracts 0.5% of the total revenue from PFES payments, including any interest accrued, to cover its operations. All provincial government staff interviewed stated that the VNFF is active in mobilizing funds but that it has not been able to meet technical needs in a timely manner because of limited staff and capacity.

The provincial FPDF signs contract with service buyers and collects payments for services supplied within the province. It also prepares payment plans, monitors and releases payments to service suppliers, and submits periodic reports to the VNFF. The provincial FPDF is allowed to use 10% of the total revenue from PFES to cover its operations and can extract a further 5% of the total revenue from payments collected and other sources for a contingency fund, which is used to support service suppliers in the case of natural disasters (Circular 85/2012/TT-BTC – issued by the Ministry of Finance). Circular 85/2012/ TT-BTC sets out details on the financial management of the FPDF, but provincial authorities interviewed said that more detailed guidelines were needed on penalties for late payments and contract violations and on how to use the 10% management fee, specifical procedures for payments and monitoring protocols.

Service suppliers are individuals, households, communities, commune people's committees, or organizations that the provincial FPDF deems to be qualified to supply a service based on their land-use right certificate. They must sign a commitment to forest protection. Service suppliers that are organizations, such as management boards for protection and special-use forests, can take 10% of payments collected to cover their costs of management and running activities related to forest protection.

Procedures for making payments from central to local levels and between buyers and suppliers are set out in Circular No. 62/2012/TTLT-BNNPTNT-BTC (issued by the Ministry of Agriculture and Rural Development and the Ministry of Finance) and Circular No. 20/2012/TT-BNNPTNT (issued in 2012 by the Ministry of Agriculture and Rural Development) (Figure 2). The roles and responsibilities of central and provincial authorities in collecting and delivering funds are clearly defined, and the process includes several internal checks.

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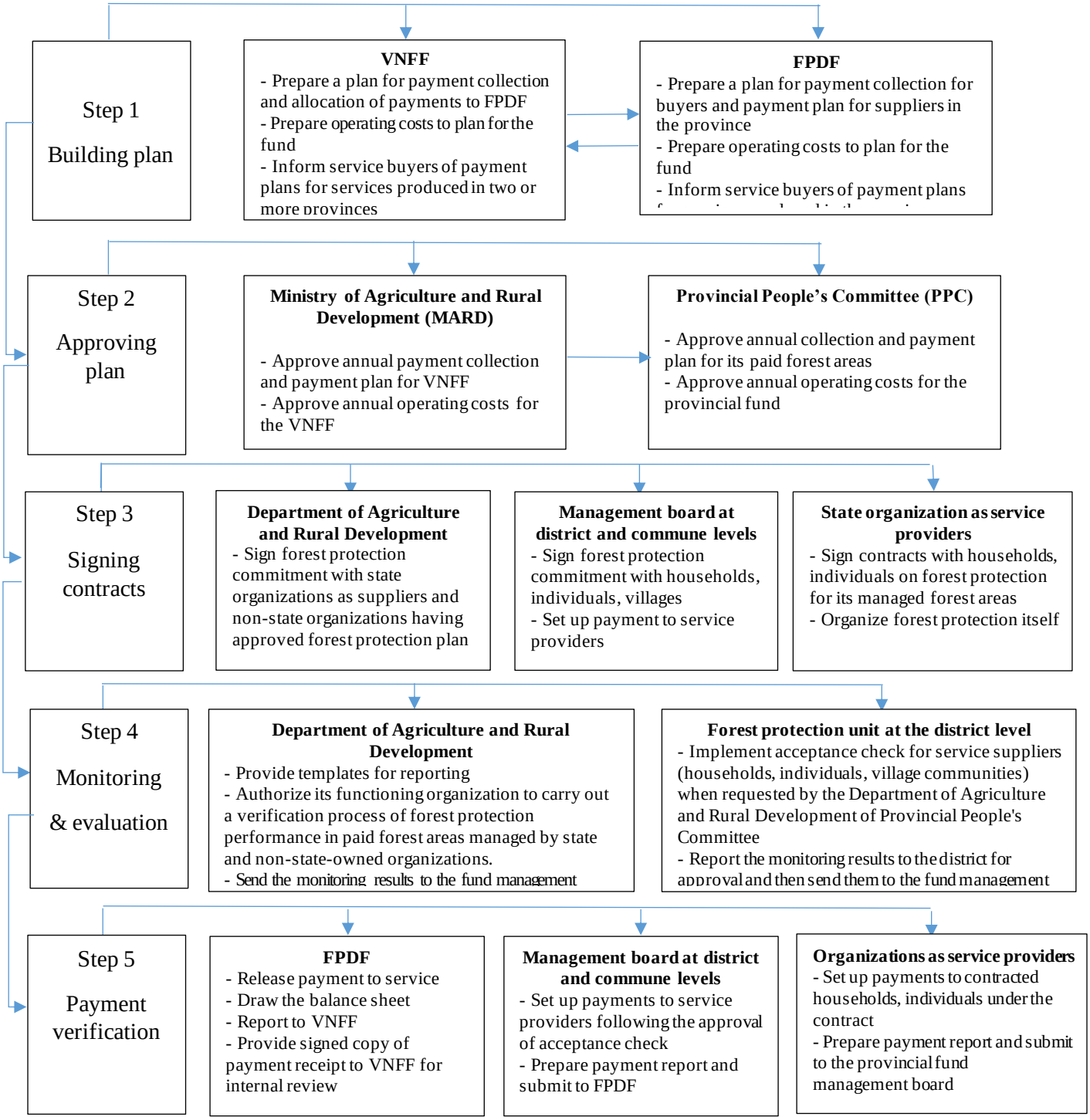

Fig. 2: Responsibilities of state stakeholders in PFES implementation (modified from Pham Thu Thuy et al., 2013)

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When a forest area is assessed, its owner is required to join the verification team. The provincial Department of Agriculture and Rural Development (DARD) forms the verification team to carry out checks on forest protection by service suppliers that are organizations, and the district Forest Protection Unit forms the team to conduct checks on service suppliers that are households individuals or village communities. A written assessment of the quantity and quality of the forest in the contracted area is produced and signed by a representative of the verification team and the forest owner. Before the check, service suppliers submit a self-assessment to the village, which is then sent to the commune and finally to the Forest Protection Unit. Verification checks are only required when servicing suppliers, the village, or the commune lodge a complaint about the forest protection performance assessment. The Forest Protection Unit finalizes reports on service suppliers' performance, which it then submits to the District People's Committee for approval. Once approved, the report is sent to the provincial FPDF, which then releases payments to service suppliers.

The provincial FPDF is responsible for sending water companies and hydropower plants that made payments directly into the FPDF information on the following: the total amount received in the year; the amounts distributed to the FPDF and forest owners; use of revenue by forest owners; use of revenue by the FPDF; enterprises' comments on payments; and any other relevant information. In addition, the FPDF is responsible for monitoring contracting procedures, making quarterly payments to forest owners, reporting on forest management and protection in the pilot area, reviewing financial documents, and delivering a quarterly progress report on PFES implementation.

3.2 Social network analysis of Stakeholders' influence on PFES implementation

The analysis and visualization of the surveyed data have been carried out by UCINET (Version 6.0) SNA program (Analytic Technologies, Lexington, KY, USA) (Borgatti et al., 2002). The relationship among all stakeholders in PFES implementation in Hoa Binh province is outlined in Diagram 1. The names of all stakeholders are so long that the numbers (presented in Table 1) are used as replacements. It can be seen that the nodes number 1 and number 4 in the center have more connections with others while the nodes number 3 and 13 have very few. However, relations among the stakeholders and their influences on policy implementation are studied in detail using network analysis tools.

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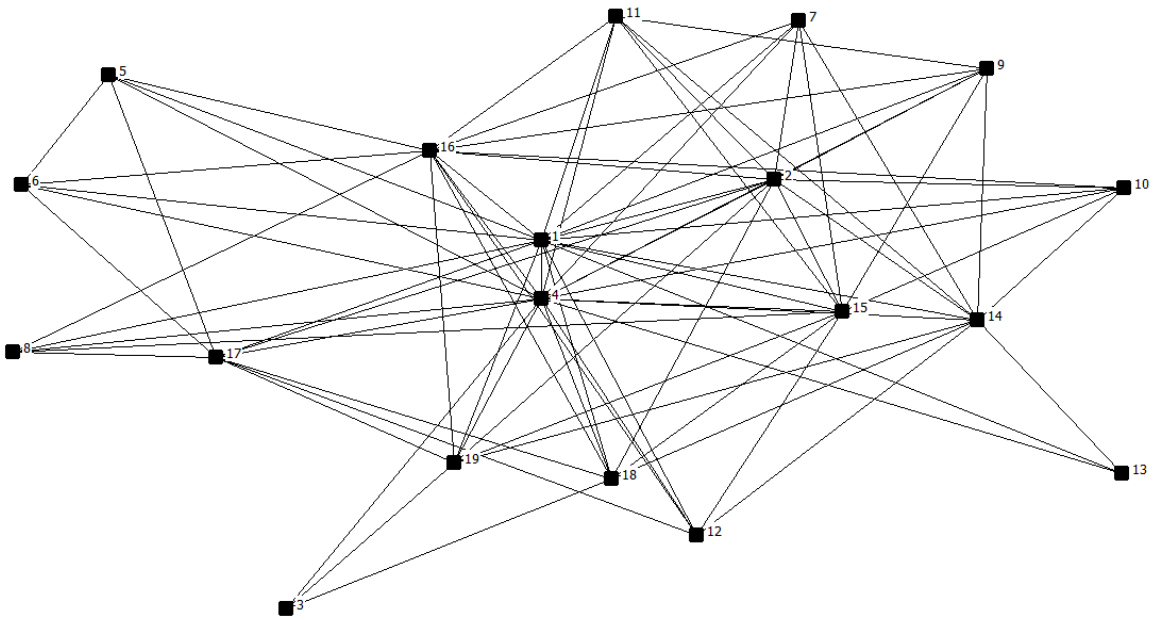

Diagram 1: Relationship among stakeholders in PFES implementation in Hoa Binh province

Source: SNA illustration

The density of the whole network is 0.468. This means that 46.8% of all possible connections among involving stakeholders are present. This also indicates that the actual ties among stakeholders are limited compared to the probable ties that may occur if coordination is conducted optimally. Overall, the density level of the whole network was moderate.

Table 2: Indicators showing stakeholders' influence on PFES implementation in Hoa Binh province using SNA tools

Node of network	Stakeholder	Number of Connected stakeholders	Degree centrality	Closeness centrality	Betweenness centrality
1	Provincial People's Committee	17(2)	0.944 (2)	0.972 (2)	13.575 (2)
2	Provincial Department of Forest Protection	12 (4)	0.667 (4)	0.833 (4)	2.834 (6)
3	Provincial Department of Tax	3 (18)	0.167 (18)	0.583 (18)	0.082 (16)
4	Provincial Forest Protection and Development Fund	18 (1)	1.000 (1)	1.000 (1)	20.765 (1)
5	District People's Committee	5 (15)	0.278 (15)	0.639 (15)	0.073 (17)
6	District Department of Finance	5 (15)	0.278 (15)	0.639 (15)	0.073 (17)

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7	District Department of Forest Protection	6 (12)	0.333 (12)	0.667 (12)	0.190 (12)
8	District Treasury	5 (15)	0.278 (15)	0.639 (15)	0.225 (11)
9	Commune People's Committee	7 (10)	0.389 (10)	0.694 (10)	0.190 (12)
10	Forest protection staff	6 (12)	0.333 (12)	0.667 (12)	0.190 (12)
11	Headman of village	7 (10)	0.389 (10)	0.694 (10)	0.190 (12)
12	Bank of Agriculture and Rural development	6 (12)	0.333 (12)	0.667 (12)	0.465 (10)
13	Viettel Telecom Company	3 (18)	0.167 (18)	0.583 (18)	0.000 (18)
14	Households as forest owners	11 (5)	0.611 (5)	0.806 (5)	4.909 (4)
15	Communities as forest owners	11 (5)	0.611 (5)	0.806 (5)	3.524 (5)
16	Commune People's Committees as forest owners	13 (3)	0.722 (3)	0.861 (3)	6.901 (3)
17	Organizations as forest owners	9 (7)	0.500 (7)	0.750 (7)	2.565 (7)
18	Fresh water plant	8 (8)	0.444 (8)	0.722 (8)	1.772 (8)
19	Hydropower plant	8 (8)	0.444 (8)	0.722 (8)	1.772 (8)

Note: The numbers in the parentheses reflect the ranks of stakeholders' influence in the network of PFES implementation

Source: Surveyed data processed by SNA, 2020

The ranks of stakeholders in the network of PFES implementation in Hoa Binh province are totally similar by the number of connections, degree centrality, and closeness centrality, whereas ranking by betweenness centrality brings a little different result. The provincial FPDF was rated the most important stakeholder and had the highest analytical indicators (number of connections, degree, closeness, and betweenness). This is relevant to the provincial FPDF's functions which were regulated by MARD and VNFF (Figure 2). The Provincial People's Committee was mentioned by almost all interviewees and was rated the second most important stakeholder. The reason is the fact that the Provincial People's Committee is the most powerful agency in promulgating regulations and approving PFES implementation plans at the local level. The third most crucial stakeholder is the Commune People's Committee as a forest owner. Commune People's Committees (CPCs) are not holders who are allocated forest by Forest Law (instead, they are temporarily assigned by the State to manage and protect forest). They receive the highest value and proportion of PFES in Hoa Binh province. Following the government agencies, forest owners are the influential groups among stakeholders involving PFES implementation.

Although district-level organizations were assigned particular responsibilities in PFES implementation, the indicators of centrality and their ranks in Table 2 show that they are not important stakeholders in the network. District organizations are ranked from 11th to 17th on the ranking of stakeholders' influence. This situation causes by the structure of the provincial FPFD and payment system in Hoa Binh province. The provincial FPFD directly signed contracts, collected forest environmental services, then paid to forest owners. There's no management board at the district level, as described in Figure 2. At the district level, only the Department of Forest Protection cooperates with provincial FPFD in determining the forest areas where should be applied PFES.

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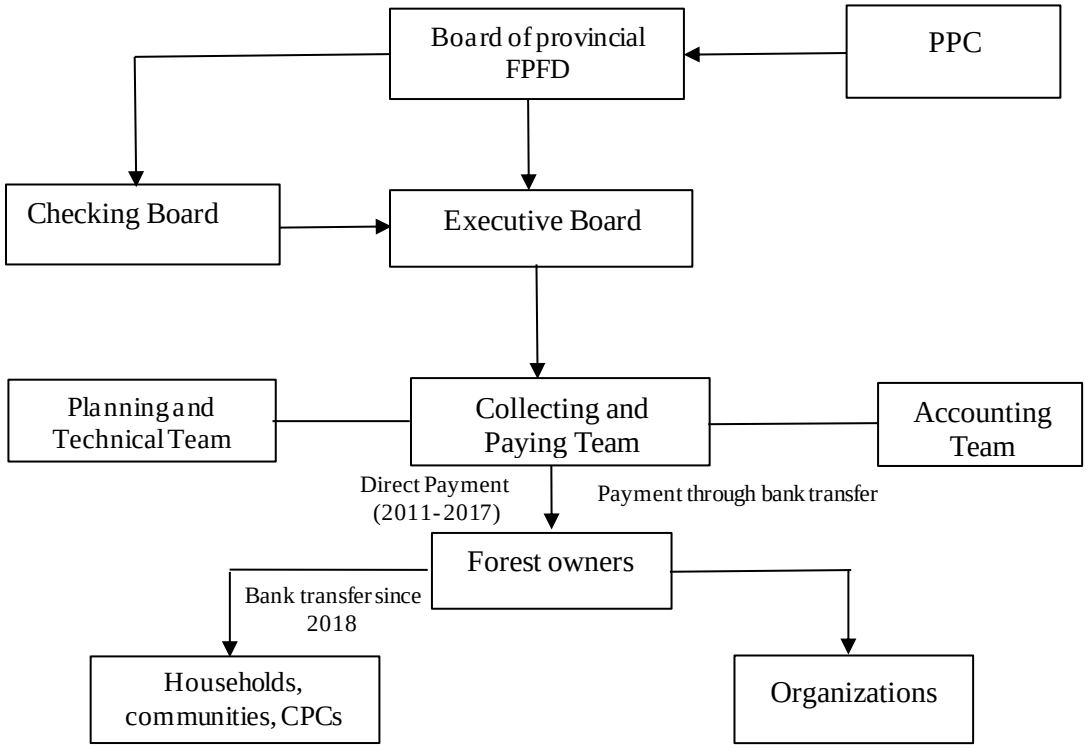

Fig.3: Structure of FPFD in Hoa Binh province

Viettel Telecom Company was invited to PFES program in order to implement electronic payments, particularly VietelPay. VNFF hopes that e-payments will help provincial FPFDs to save money, time, and human resources and to create more transparency in PFES payments. To receive PFES payments via ViettelPay, the forest owners have to create an account via a phone number (any network operator for smartphones and Viettel network for ordinary phones). For forest owners who are households, when creating a personal account, they must bring their phone, identity card, and the forest owner's decision on land and forest allocation. For community forest owners, when creating a community account, there must be 3 - 6 people (named in the report of election of the Community Forest Management Board) to open an account; when opening, they need to bring their phone, identity card of each person along with the community's decision on land and forest allocation. When the provincial FPFD transfers money to the forest owner's account via ViettelPay, the forest owner will receive at least three notification messages on the forest owner's phone about the amount received and the agent's address authorized by Viettel nearest place to get money. In many provinces, Viettel plays an important role in payment implementation. However, interviews and SNA results showed that this stakeholder is not a crucial actor in the case of Hoa Binh province. Almost all payments have been transferred through the Bank of Agriculture and Rural development since 2018. Viettel is ranked at the bottom according to a degree, closeness, and betweenness.

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Especially the betweenness indicator of Viettel equal to zero. This means that the stakeholder cannot promote coordination among other members of the network.

In summary, Vietnam has a good system of legal regulations on PFES in comparison with other countries (Mai & Ngoc, 2018). Among government agencies and non-government organizations, VNFF at the central level and FPFD at the local level take very important parts and are the most powerful organizations in the PFES implementation network. However, only VNFF or FPFD cannot successfully implement PFES, but they need to cooperate with other stakeholders, especially PPC and different types of forest owners, including Commune People Committees, communities, organizations, and households.

4. Conclusions

PFES has been conventionally implemented by governmental agencies at central, provincial, and district levels as regulated in Figure 2. However, in reality, there is a shared responsibility of the governmental organizations and relevant stakeholders at different levels. By using centrality measurements of SNA (degree, closeness, and betweenness centralities) to find influential and powerful organizations in the PFES implementation network, it is witnessed that the provincial FPFD plays the most important role among involving stakeholders. Both density and centrality measurements have shown that the stakeholders in the PFES implementation network in Hoa Binh province have good coherence. Interestingly, governmental organizations at the district level have not effectively participated in PFES implementation in Hoa Binh because the provincial has directly signed contracts with forest owners. This can be suggested that the province can reduce the workforce who participate in policy implementation and save the state budget for wage payment. SNA results also indicated that Viettel Telecom Company is not as important as the government's expectation.

SNA is a method that can provide a visual and tangible picture of the status and interrelationships among the stakeholders and identified groups with better interaction in policy implementation in general and PFES in particular (Diagram 1). SNA can also determine the role and significance of different organizations in the network of PFES implementation. It can be said that SNA was not only able to identify key stakeholders but also to get an understanding of interrelationships among involving stakeholders in PFES implementation. This knowledge helped local authorities and policymakers further engage stakeholders in their preferred ways, assisted policy implementers in finding the right way to assign the different stakeholder groups to appropriate tasks, and facilitated the co-production of relevant stakeholders, particularly in connecting them with each other in PFES implementation.

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