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Global Media Discourse analysis of the Payment for Ecosystem Services (PES) of Forest

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Student
Hojong Song (1000702)
MSc Forest and Nature Conservation

Supervisor
Dr. ir. M.A. Hoogstra-Klein
Department of Environmental Sciences
Forest and Nature Conservation Policy

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Hojong Song

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Abstract

Ecosystems provide various services to the people. However, even with recognizing the importance of ecosystem management for human well-being, several anthropogenic activities still cause ecosystem degradation. Various approaches have been developed to deal with these problems, such as command-and-control regulation, collective actions, and integrated conservation development programs. However, so far, these approaches have not effectively and efficiently supplied ecosystem services (ES) required by society. In the call for a new conservation paradigm, Payment for Ecosystem Services (PES) has come to the fore as a new promising approach, which is expected to harmonize ecosystem protection and human well-being. PES is a market-based approach that internalizes natural resources' external effects to induce financial transfers from ES's beneficiaries to suppliers. Especially in the forestry sector, PES is increasingly being highlighted because of the rising awareness of deforestation's adverse effects on the global environment. Although PES received much positive attention as an economic approach that could directly impact securing ES conservation and provision, PES is also a topic of much debate. PES is criticized because it simply monetizes the value of nature by the marketization of ES. Some scholars, therefore, argue that PES should also reflect various social aspects, not only the market mechanism. Another argument is that various PES opinions should be understood within a global context to overcome superficial understandings. So far, PES studies have a gap in global contextualization with social-embeddedness and an exhaustive overview of the views on PES. Therefore, the research's main objective is to explore forest PES discourses globally by analyzing global media to gain more insight into the scientific and social debate. The study conducted a content analysis of newspaper articles of global media to collect the discourse analysis data. This study found four different discourses: (1) Conservation pipeline, (2) Pro-neoliberal, (3) Responsibility, and (4) Local livelihoods. Discourses had similarities in terms of positive valence towards PES, favored solution for PES: Increasing fund, Preferred treatment: more collaboration, the necessity of more detailed PES data, and prioritizing the environmental goal of PES more than improving local livelihoods. Regarding differences of discourses, views on government enforcement against illegal actions and funding sources were identified as contradicting points among discourses. The results explain the forest PES debate on how PES stakeholders view the policy. This study provides some vital references to unravel the complexities that forest PES stakeholders confront. Today, PES is seen in international media as a reasonable approach for nature conservation. PES policy's positive valence implies that PES initiatives are likely to increase in number and geographic reach if investment and other institutional requirements are fulfilled.

Keywords: Payment for ecosystem services, Forest, Discourse analysis, Media discourse, Content analysis

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1. Introduction

1.1 Background

Humans are an essential component of ecosystems (Farley & Costanza, 2010; Millennium Ecosystem Assessment, 2005). At the same time, people obtain extensive benefits from ecosystems, referred to as "ecosystem services" or "ecosystem goods and services" (ES). These ES vary from provisioning services, such as water and nourishment, and regulating services including disease and inundation management to cultural services, in particular, recreational and spiritual satisfaction, and supporting services as, for instance, nutrient circulation to sustain the living conditions for the creatures (Millennium Ecosystem Assessment, 2005; TEEB, 2010). Considering the importance of these ES for humans' and societies' well-being, ecosystems' sustainable management is crucial to secure ES provision (Farley & Costanza, 2010; Millennium Ecosystem Assessment, 2005; TEEB, 2010).

However, even with recognizing the importance of ecosystem management for human-wellbeing, various anthropogenic activities interactively cause the ecosystem's degradation (Masson-Delmotte et al., 2018; Millennium Ecosystem Assessment, 2005; TEEB, 2010). Specifically, key drivers – either indirect (such as economic, demographic, sociopolitical, cultural and religious, scientific and technological aspects) or direct (including climate variability and change, pollution, land conversion, invasive species, and diseases) have a negative effect on ecosystems, which can also render adverse effects on the ES provision (Millennium Ecosystem Assessment, 2005; Nelson et al., 2006). Pollution, for example, from, o.a., unprocessed waste, mining, toxic dumping, and industrial pollutants, can destroy the living space for various living creatures in ecosystems (Schwarzenbach et al., 2010). Invasive species may take over ecosystems, wiping out native species (Masson-Delmotte et al., 2018). Developments in the industrial and agricultural sectors have caused a worldwide decline in the forest area (Masson-Delmotte et al., 2018; UNEP & FAO, 2020), threatening nature's resilience capacity against climate change (Bellard et al., 2012; Millennium Ecosystem Assessment, 2005; TEEB, 2010).

The most apparent symptom of ecosystem deterioration is biodiversity loss, which refers to the loss of diversity between the genus and species within the ecosphere (Brondizio et al., 2019; Díaz et al., 2020). Nowadays, the species extinction rate is hundreds of times greater than the average trend of the last 10 million years and is even increasing (Brondizio et al., 2019). Also, while humanity represents only 0.01% of life from in the Earth, people spawned the loss of 83% of wild animals and 50% of vegetations compared to the beginning of the human civilization (Bar-On et al., 2018). Additionally, research has argued that the sixth mass extinction is already in process, and there will be severe ecosystem service loss if people do not deal with current environmental problems (Ceballos et al., 2015). As a result of the biodiversity diminution, there are several adverse effects on humanities welfare in connection with the loss of ecosystem services, such as food insecurity, business risk, health risks, and global warming (Addison et al., 2019; Roe, 2019; Stiglitz, 2006; Thomford et al., 2018).

For a long time, people have taken ecosystem services for granted (Tallis & Kareiva, 2005). However, since ecosystem services became short of supply, various endeavors were implemented to secure these ecosystem services (Ballabh & Singh, 1988a; Brandon & Wells,

2009; Jindal & Kerr, 2007). First of all, governments utilized command-and-control measures, such as setting up nature protection areas or forcing land use regulation (Jindal & Kerr, 2007; Vogel, 2003; Wang & Shen, 2016). However, command-and-control measures had shortcomings since the cost for implementing these measures is high, and the measures are also characterized by reduced regulatory flexibility, i.e., every situation asks for different sets of measures making uniformly designed regulations impossible (Ellerman, 2003; D. Sinclair, 1997). For example, farmers in several countries were expected by governments to contribute to measures designed to protect natural resources, such as planting trees or constructing soil conservation systems (Babai et al., 2015). As a result of high costs, governments did not have sufficient funds to protect all environmental services and national goals; the lack of finance caused the gap between the governments' priority nature conservation goals and those desired by local communities (Cox et al., 1986).

In addition to the command-and-control measures, local groups also took collective action on environmental resources that are important to them (Berkes, 2007). Examples as the Van Panchayats, local forest councils in India, and the Subak irrigation systems in Indonesia are well known in this regard (Ratner et al., 2013; Somanathan et al., 2007). The Van Panchayat controlled the use of forests under the guidance of the Van Panchayat Act while preventing infringement of dweller from the neighboring village (Rawat & Rawat, 2010), and Subak irrigation groups tried to overcome the water deficiency through negotiation regarding water distribution across a shared stream (Ruttan, 2008). However, these locally organized collective actions do not always occur and do not usually concentrate on value-added environmental services outside the local community (Ballabh & Singh, 1988b).

Another conservation approach attempted is the Integrated Conservation Development Program (ICDP) (Alpert, 1996). These programs seek to build economic opportunities for local citizens to protect globally valuable resources, namely wildlife and biodiversity (Brandon & Wells, 2009). ICDP can also include vocational training, building infrastructure, and other local economy improvements (R. Hughes & Flintan, 2001). The goal of ICDP is to create a stronger partnership between local citizens and conservation institutions and resolve the shortcomings of the 'fines and fences' methods that were based on a hostile relationship in which the authorities sought to shield critical natural resources from local and users (Barrett & Arcese, 1995). This method's main drawback is that economic benefits are indirect and not related to concrete environmental outcomes, i.e., local citizens received economic benefits, whether or not they conserve the lands (Winkler, 2011). Moreover, in some situations, the local economy's improvement intensified the strain on limited natural resources (Johannesen, 2006).

Overall, such nature conservation approaches (including Command-and-Control measures, Collective actions, and ICDPs) have not effectively supplied the proper level of ecosystem service required by society (Jindal & Kerr, 2007; Winkler, 2011). Not surprisingly, this resulted in a call for a "new conservation paradigm" (Wunder, 2005). One of the most prominent new paradigms is the concept of Payment for Ecosystem Services (PES) as a possible solution to harmonize ecosystem protection and human well-being by incentivizing landowners to retain, re-establish or improve the ecosystem (Martin-Ortega & Waylen, 2018).

Payment for Ecosystem Services (PES) is a market-based approach that encourages specific activities that directly or indirectly contribute to environmental preservation by taking action on market prices and internalizing natural resources' external effects to induce financial transfers from beneficiaries of ecosystem services to suppliers (Farley & Costanza, 2010; Sattler & Matzdorf, 2013). PES aims to manage the global environmental challenge by making the depletion of ecosystem and biodiversity more evident by monetization utilizing a holistic cost-benefit approach relative to conventional conservation mechanisms (Grima et al., 2016; Jindal & Kerr, 2007; To et al., 2012). PES has shown up equipped with more direct and active measures than traditional conservation mechanisms, such as Command-and-Control measures, Collective actions, and ICDPs (Farley & Costanza, 2010). All in all, PES has become one of the representative economic policy tools in the biodiversity sector and is designed in various forms and diverse application, which covers, a.o., the field of watersheds management, biodiversity protection, scenic beauty preservation, and forest and land-use carbon cases are reported world-widely (Angelsen, 2009; Capodaglio & Callegari, 2018).

Although all PES fields are significant for nature conservation and securing ecosystem services for human well-being, forest PES is increasingly being highlighted as of enormous importance. This is due to the increasing awareness of the detrimental effects of deforestation on the global environment, biodiversity, and the presence of plants that are critical to maintaining watershed management and protecting landslides (Alix-Garcia & Wolff, 2014; Salzman et al., 2018). Another driving factor that accelerated the development of various forest PES schemes is the perception that curbing deforestation emissions or creating additional sinks by forest regeneration and extension will be cost-effective compared to other approaches to deal with climate change (Alix-Garcia & Wolff, 2014). As a result, since 2009, 2.8 billion US dollars have been spent on market-based forestry and land-use practices (Salzman et al., 2018). Additionally, there are 48 forest and land-use carbon PES projects in practice, comprised of 31 government-funded projects and 17 compliance-driven transactions such as regulation on greenhouse gas emissions, usually by cap-and-trade, enabling forest carbon sequestration (Salzman et al., 2018). Prime examples of forest PES are China's Sloping Land Conversion Program (SLCP), the Greening India program, and Costa Rica's Programa de Pagos por Servicios Ambientales (PSA) (Alix-Garcia & Wolff, 2014).

Based on recent trends, the scale of payment is expected to rise, establishing new ecosystem resources management conditions (Arriagada et al., 2012; Kronenberg & Hubacek, 2013; Moros et al., 2020). Especially in the forestry sector, it is estimated that by 2030, 50 million low-income individuals will participate in the forest carbon PES and PES purchases are expected to increase up to 1.1 trillion US dollars by 2050 (Carroll & Jenkins, 2008; Milder et al., 2010).

1.2 Problem Statement

Although PES received vast attention among conservation practitioners, stakeholders, and scholars because of its expected supremacy and institutional novelty over other conservation instruments, the concept is also a topic of much debate (Van Hecken, Bastiaensen, & Windey, 2015). First of all, no clear evidence exists about the social and environmental effects of PES schemes. Adhikari & Agrawal's (2013) study exploring 40 PES cases revealed that most social outcomes scored between low and medium. Pattanayak et

al. (2010) also admitted that neither the circumstances under which PES has positive environmental and socio-economic impacts nor its cost-effectiveness is yet clearly understood. Besides, it is argued that the narrow market-based approach of PES cannot provide an appropriate description of the PES's interrelated dynamics and accompanying effects (Van Hecken & Bastiaensen, 2010). Moreover, it is challenging to demonstrate PES's assumed efficiency gains (Muradian et al., 2010a). Also, uncritical endorsement of the PES idea has contributed to the suspicion that the PES's success story is more focused on morals than practical situations (Büscher, 2012).

As a result, PES has drawn increasing criticism from some academics, rejecting PES as a neoliberal commoditization method (Büscher, 2012), whereas others asked for conceptual modifications of PES by introducing an ecological economics perspective or hybrid approaches that consider the complexities of PES (Farley & Costanza, 2010; Muradian et al., 2010a). PES's contested dynamics spurred researchers to scrutinize the issues and suggest alternative ways of looking at PES. For example, Muradian et al. (2010a) noted that, until the present, PES's critical conceptual basis had been Coasean economics, which suggests that regardless of the initial distribution of properties, the social optimum could be reached by negotiation, which would make direct government control unnecessary. Muradian et al. (2010a) pointed out that the Coasean PES cannot be easily generalized and applied in practice. They suggested an alternative approach that considers social-embeddedness, namely, an approach that considers the dynamics of uncertainty, distributional issues, social inclusion, and power relations (Muradian et al., 2010a). Looking at PES with considering social-embeddedness makes it possible to appraise the various contexts and institutional settings wherein PES works (Muradian et al., 2010a).

Van Hecken et al. (2015) agree with Muradian et al. (2010). According to Van Hecken et al. (2015), the Coasean PES scheme, which environmental economists advocated, received various criticism: typically, some scholars condemn PES as a form of illegal trade sponsored by multilateral organizations and nation-states; this criticism referred to PES as green neoliberalism or neoliberal conservation. Additionally, the Coasean paradigm is short of describing several dynamics underlying PES implementation. Thus, Van Hecken et al. (2015) argued that PES should also consider various social aspects, not only the market mechanism and commodification of nature. Van Hecken et al. (2015) also pointed out that the PES discourse promoted by environmental economists restricts the analysis of inherently complex social-environmental issues to simplistic apolitical diagnoses. This framing hinders environmental governance from establishing an adequate institutional framework and finding the PES mechanism's excellent price to implement (Van Hecken, Bastiaensen, & Windey, 2015). Hence, Van Hecken et al. (2015) argued that it is vital to understand the PES discourse within a global context to overcome such shortcomings and challenge PES's superficial understandings.

Although PES analysis's importance in terms of social-embeddedness or global context has been emphasized, it is almost impossible to find such an analysis, especially in the forest PES sector. Also, it is difficult to examine the overall PES efficiency and effectiveness and compare over programs within current PES studies considering the argumentation of Salzman et al. (2018) that most existing PES literatures focus on case studies. The only

exemption seems to be the study of Moros et al. (2020) which partly can be considered as an example of responding to the call of Muradian et al. (2010) and Van Hecken et al. (2015).

Moros et al. (2020) investigated the discourses that influence PES controversies and activities in Colombia. They identified PES-related discourses and identified which discourse is most endorsed by participants (Moros et al., 2020). Based on the result, the authors concluded that PES in Columbia has a high acceptance level (Moros et al., 2020). The research produced significant findings to understand the PES's discursive beliefs and assumptions in Colombia and considered social-embeddedness for studying; however, the findings' generalizability is questionable because of the case study's nature. Moreover, the relatively low sample did not reflect the diversity of rural and indigenous people in Colombia, possibly resulting in a representativeness issue (Moros et al., 2020).

To fill the gap revealed by the case study's nature in the work of Moros et al. (2020) and to further explore the observations of Muradian et al. (2010) and Van Hecken et al. 2015) in a societal context, this research will study diverse discourses regarding forest PES on a global scale. It will do this by utilizing global media as an analysis source. The reason for focusing on the global media is the following.

As Muradian et al. (2010) and Van Hecken et al. (2015) stressed the importance of global contextualization with social-embeddedness and the lack of an exhaustive overview of the views on forest PES, this study is expected to fill the gap by having a closer look at how global media have assessed and still assess forest PES which has not yet been explored. Also, the study investigated the key similarities and differences of the discourses since the process can promote further discussion and cooperation on the PES debate (Moros et al., 2020). This study will contribute to a more in-depth understanding of forest PES discourses and see which forest PES aspect has been stressed by global media. Therefore, the study results may provide some insights that will bring the critical sources to the scientific debate and the social discussion.

In terms of global media as a source of analysis, Olausson (2013) defined global media as any medium that offers a global interpretative platform for its audiences. CNN, Fox News, BBC World News, and Al Jazeera are typical global media examples (Olausson, 2013). It is also argued that global broadcasters provide viewers with a deeper understanding of global affairs (Chalaby, 2003). They also deliver new journalistic forms and platforms capable of transgressing the nation-state perspective and generating new horizons for political stance and citizenship (Olausson, 2013). Accordingly, the ability to constitute or contribute to a global or public domain has been attributed to international media (Chalaby, 2003). An example of utilizing global media in the forestry literature is Park & Kleinschmit's (2016) research, which examined how global media framed disputed forest conservation topics.

Another example is the study by Sadath et al. (2012), which compared public discourse between global print media and Bangladesh print media. This is because the global media have a significant impact on reflecting various public opinions (Hjarvard, 2008), and global media is being used as a valuable source for discourse analysis in forestry study. Therefore, this research will also use global media as a source of research to study different forest PES discourses.

1.3 Research Objective & Questions

Based on the above, the research's main objective is to explore forest PES discourses globally by analyzing global media to gain more insight for scientific and social debate. The research questions are set as follows:

RQ 1. What are the main forest PES discourses in the global media?

RQ 2. What are the similarities and differences of discourses on PES in the global media?

RQ 3. Which of these discourses on forest PES is dominant within the global media?

1.4 Structure of the report

The rest of this report is organized as follows. Chapter 2 continues by explaining the theoretical framework of this research. The background knowledge of PES and discourse theories are given. In chapter 3, the data collection strategy and the content analysis methodology are explained. Chapter 4 provides the analysis result. Chapter 5 presents reflections on the results, theory, and methodology, and chapter 6 concludes the study.

2. Theoretical Framework

This section describes the theoretical underpinnings of the study and focuses on the two main concepts of this study, i.e. (1) Payment for Ecosystem Services (PES) and (2) Discourse. Section 2.1 of the chapter first of all describes the definition of Ecosystem Service. This is followed by an explanation of the economic background of ES in 2.2 Section 2.3 focuses specifically on PES (definition of PES, underlying theorems of PES, the PES principle, and categorization of PES used in the research). Section 2.4 explains discourse theory and media discourse, followed by an an explanation of discourse analysis in 2.5 Lastly, section 2.6 integrates all the insights and provides the conceptual frame underlying this research.

2.1 Ecosystem Service – a definition

Discussing PES means, first of all, discussing Ecosystem service (ES). ES is a concept describing the interrelationship between nature and humankind. Even though the term 'Ecosystem service' was first coined by Ehrlich & Ehrlich (1981), the origins can be traced back to the 1960s. Between the 1960s and 1970s, Ehrlich et al. (1977) proposed to define a social value of the ecosystem functioning. Later, De Groot (1987) also contributed to defining the ES concept by emphasizing the people's socio-economic dependency on natural resources to attract the public's interest regarding biodiversity conservation. Definitions for ES were later established by, a.o., Daily (1997) and Costanza et al. (1997). Daily (1997), for example, defined an ES as a facilitator and satisfier of human life. Costanza et al. (1997) described ES as direct and indirect benefits that individuals achieve from ecosystem functioning.

Since then, many definitions of ES have been proposed and discussed (Fisher et al., 2009; Gómez-Baggethun et al., 2010; Norgaard, 2010). Most notably is the Millenium ecosystem assessment (MEA), expanding the notion of ES worldwide and establishing the definition of ES that is nowadays commonly used (Burkhard & Maes, 2017). The MEA, which took place from 2001 to 2005, included more than 1.300 scholars from around 100 different countries. The main aim was to evaluate the effect of ecosystem change on human well-being and discover scientific rationale to promote the conservation of ecosystems and sustainable use (Millennium Ecosystem Assessment, 2005). The MEA defined ES as 'benefits that people achieve from the ecosystem,' and based on the definition, MEA suggested conceptual frameworks that embrace all the goods and services provided by the ecosystem services (Fisher et al., 2008). Furthermore, the Millennium Ecosystem Assessment (2005) categorized ES into four categories:

1. Providing services refers to the material aspects of services provided to humans, such as food, wood, and fuel.

2. Regulating services, standing for air quality control, climate control, disease control functions.

3. Culture services, describing aesthetic values such as cultural diversity, religion, aesthetic landscape value, ecotourism.

4. Support services, indicating the services which are necessary for the production of all the other ecosystem and biodiversity conservation, such as photosynthesis, soil generation, and nutrient saline circulation.

Later definitions are those of, for example, Boyd and Banzhaf (2007) and Fisher et al. (2009). Boyd & Banzhaf (2007) defined ES as the ecosystem's contribution to humans when ecological components are consumed directly. However, Boyd & Banzhaf (2007) overlooked the importance of the ecosystem's indirect functions and services by emphasizing that indirect environmental processes and functions cannot be categorized into ES. Fisher et al. (2009) defined ES as an active/passive ecosystem utilized to improve human quality of life. Additionally, TEEB (2010) suggested a link between the ecosystem and human welfare by dividing the concept of ES into (1) services, (2) functions that are derived from services, and (3) benefits attained from functions (TEEB, 2010).

As part of the ES definition development process, the ES concept has transcended the academic field to reach out to the governmental, private, and financial sectors (Bayon, 2004). However, the mainstreaming of ecosystem services has also resulted in the term's application varying significantly from the original intent for which the ES concept was introduced (Gómez-Baggethun et al., 2010). For example, Peterson et al. (2010) noted a change from the original focus on ES as an educational concept intended to improve public interest in biodiversity conservation to increase monetizing ES as resources on potential markets. These findings contributed to the increasing collection of literature that has raised concerns about how the utilitarian framing of ecological problems and market approaches may change the way humans interpret and relate to nature in a way that could, in the long term, be counter-productive for achieving conservation goals (Gómez-Baggethun et al., 2010; Kosoy & Corbera, 2010; Spash, 2008).

2.2 Economic Framework for Ecosystem Service

Valuation and commodification of nature, which is closely linked to the concept of ES that is rapidly getting popular, are subject to some debates (Martin-Ortega et al., 2019). For example, the nature valuation trend has been criticized because some ES values cannot be commensurated with a single element such as money (Schulz et al., 2017). Also, Norgaard (2010) pointed out that utilizing the ES concept to monetize nature may oversimplify the severity of global environmental problems. Some concerns were raised regarding natures' conversion into tradable goods and marginalizing local people by an inhumane ecosystem service framework (Corbera et al., 2007; Raymond et al., 2013). On the contrary, the ES concept proponents see nature commodification as a way of enhancing biodiversity loss consciousness of people by assessing the benefits that nature provides to society (Martin-Ortega et al., 2019). Fürst et al. (2010) further argued that utilizing the ES concept is vital to identify land use planning's economic needs.

However, before going deeper into the nature commodification discussions, it is crucial to understand how economic theories have historically been integrated to ES concepts. This will provide the background context for the apprehension of the above-mentioned nature commodification discussions.

Interestingly, anthropogenic activity's degradation in nature's benefit has already been described in ancient times. For example, Plato's note on deforestation on soil decaying and spring drought in B.C. 400 (Hughes & Thirgood, 1982). However, the main advances in economic theory for nature commodification can be traced back to two to three centuries ago, from the era of Pre-classical Economics (Baggethun, 2020). The basic notion of pre-

Classical Economists, also known as physiocrats, of seeing the world was a physical approach, which means that they only accept tangible items as commodities and deny the object's invisible values. Furthermore, based on the physical approach, Pre-classical Economists thought the land is essential because of the notion that land is the only origin of prosperity (Baggethun, 2020).

In the 18th and 19th century, the at that time dominant School of Economics (Classical Economics) also considered the land (e.g., natural capital) as a core element (Gómez-Baggethun et al., 2010), next to labor and capital. These three elements were considered to be the essential resources of production. However, Classical Economists' focus on the production of wealth changed over time and focused mostly on labor. This can be seen in the famous book of Adam Smith, Wealth of Nations, published in 1776, in which he refers to the wealth of society being the result of the amount of labor put into the economy (Smith, 2010). Although Smith considered output from nature (such as timber from wood and pastures from rangelands) in his book, he did not consider nature itself to produce value but instead focused on the value in terms of rent derived from owning it (Smith, 2010). In other words, Classical Economists conceived nature's service no more than use values (e.g., tangible commodity).

In the 19th Century, after the world experienced unparalleled industrial growth, accumulation of assets, and remarkable technological advances, Classical Economic's focus towards nature gradually changed in three points. First, the fundamental focus switched from land and labor to labor and capital (Daly et al., 1994). Second, the focus moved from physical to financial analysis (Hubacek & van den Bergh, 2006). Third, the focus changed from use values (e.g., tangible commodity) to exchange values (e.g., money price) (de Groot et al., 2017; Gómez-Baggethun et al., 2010). This series of gradual yet ground-breaking shifts referred to as the "post-physiocratic epistemological break," entails a paradigm shift in economic thought that would pave the way for the later theoretical consideration of nature regarding exchange values and the theorization of the Neoclassical Economy in terms of the exchangeability of natural resources with human-made capital (Gómez-Baggethun & Naredo, 2015). By the mid 19th Century, these changed views became the basis for Neoclassical Economists for analyzing nature; their view on economic theory is still dominant up to the present (Gómez-Baggethun et al., 2010).

For Neoclassical Economists, nature's economic valuation was no longer concerned with all environmental goods and services essential for prosperity or human well-being (Hennings & Samuels, 2012). Neoclassical Economists considered only a small subset of essential goods and services, which comply with the following criteria (Baggethun, 2020):

(1) Goods and services must be beneficial for individuals.

(2) Goods and services must be able to be appropriated; excludability must exist that can be put in place. Otherwise, no one is willing to pay for anything that can achieve free access.

(3) Goods and services should be able to be expressed as exchange value or market prices.

This is the Neoclassical Economists' conventional economic analysis scope, and 'externalities' are anything beyond this scope (Goodland & Ledec, 1987). However, it is essential to note

that, contrary to what Neoclassical Economists claim, there are far more externalities than internalities (Goodland & Ledec, 1987). People have, therefore, tried to find a solution by bringing correct economic values into all of these positive and negative externalities (Baggethun, 2020).

Hence, with the raised concern regarding externalities in environmental issues, in the second half of the 20th Century, new economic subdisciplines were created to overcome the conventional economics' downsides for analyzing environmental problems (Seneca & Taussig, 1974). One subdiscipline was formed in the early 1960s around the Society of Environmental and Resource Economics (i.e., Environmental Economics) (Turner et al., 1994). The School of Environmental Economics expanded Neoclassical Economics's scope by developing methods for measuring and internalizing economic impacts on the environment in decision making. Concerning ES, Environmental Economics believed that calculating the monetary valuation of the non-market ecosystem, which they considered positive externalities, will pave the way for ES values to be considered in the economic decision-making process (Gómez-Baggethun et al., 2010). In other words, the essential assumption for Environmental Economists is the commensurability of ES (Munda, 1997). Various ES valuation techniques, such as the travel cost method and hedonic pricing method, have been developed by Environmental Economists to make these ES also commensurable (Gómez-Baggethun et al., 2010).

In addition, throughout the 1970s and 1980s, the School of Ecological Economics emerged, originating from Environmental Economics. The reason was that several scholars within Environmental Economics questioned the theoretical ideas of the Society of Environmental and Resource Economics (Røpke, 2004). They questioned the Environmental Economists' conceptualization of ES that utilized Neoclassical Economics' perspective (Gómez-Baggethun et al., 2010). Against this framework, Ecological Economics conceptualized ES as an open ecosphere subsystem to exchange energy, resources, and waste with the social and ecological structures that evolve together (Braat & De Groot, 2012). Also, unlike Environmental Economists, Ecological Economists argued that there is an incommensurability between the economy and the environment; therefore, monetizing every ecosystem element is not appropriate (Munda, 1997). Ecological Economics also supported a robust and sustainable approach; mand-made capital and natural capital are not substitutable; they are complementary (Burkhard & Maes, 2017; Røpke, 2004). Besides, Ecological Economists endeavored to integrate various perspectives on environmental issues by embracing different stakeholders' views and divergent disciplines' positions (Munda, 1997). Also, Ecological Economists attempted to expand the perception of Environmental Economists focusing on the market mechanism by developing methods for accounting for economic success's material and social costs using monetary, together with biophysical and other non-monetary valuation indicators (Martinez-Alier, 2003).

Both perspectives, i.e., Environmental Economics and Ecological Economics, significantly impact the PES scheme's definition and fundamental assumption further explained in the next section 2.3.1.

2.3 Payment for Ecosystem Services
2.3.1. Defining PES

As the PES's popularity immensely increased, there were various endeavors to define PES (Pirard et al., 2010b; Sommerville et al., 2009; Swallow et al., 2009). These attempts contributed to developing the PES definition from Wunder's (2005) narrow definition to the more comprehensive definition of Muradian et al. (2010b). Understanding the difference between the broad spectrum of PES definition will provide a basis for contextualizing how global media currently express forest PES definition.

The classic definition of PES, which seems to underly all of the above-mentioned scholars' definitions, is as follows: "(1) a voluntary transaction where (2) a well-defined ES (3) is being 'bought' by at least one ES buyer (4) from a minimum one ES provider (5) if and only if the ES provider secures ES provision" (Wunder, 2005). The definition suggested by Wunder (2005) is essential in that it provides not only the basic concept of PES but also the detailed criteria for achieving the payment scheme:

(1) a voluntary transaction

First of all, PES is based on a voluntary contract, namely, a framework of negotiation. It means that service providers choose whether to participate in a particular contract or not, which sets PES apart from other regulatory-oriented policies (e.g., command and control system).

(2) a well-defined ES

Second, PES-schemes target clearly defined ES, which presupposes that the ES should be directly measurable or that the terms of implementation specified in the contract should improve the ES supply. However, it is not easy to scientifically determine how a particular act affects a particular environmental service and quantifies its consequences. Thus, in many cases, PES schemes rely on "belief" rather than "scientific proof." However, PES still emphasizes the correct definition and quantification of the targeted ES. This is because if the buyer does not know which product they are buying, there is no reason to buy ES through voluntary transactions.

(3) is being 'bought' by at least one ES buyer

(4) from a minimum of one ES provider

Third and fourth, PES requires at least one ES buyer and supplier and requires a medium to pay for the service supply. The type of PES can be subdivided again, depending on whether the buyer or supplier belongs to the public or private sector domain, and depending on whether the form of payment is a reward, a compensation, or a market price.

(5) if and only if the ES provider secures ES provision

Fifth and last, PES must meet the conditions under which the ES supply must be secured. This means that PES is a mutual compliance program based on monitoring ES supply and that sanctions should be prepared to take corresponding measures if the ES desired by the buyer is not adequately supplied.

This narrow definition of PES suggested by Wunder (2005) results in that only a few cases can be classified as "true" PES systems since most real-life conditions do not comply with it (Muradian et al., 2010b). As such, Muradian et al. (2010b) redefined PES as the "transfer of resources between social actors that aims to create incentives to align individual and collective land-use decisions with the social interest in managing natural resources." Also, Muradian et al. (2010b) suggested three criteria for broader categorization of PES schemes:

(1) the importance of the economic reward

The first factor relates to the role of incentives in the practical provision of the ES. There are cases where the economic reward is not the critical factor contributing to the ES's delivery, which might have been given without the PES scheme because of the underlying motivations, and there are other cases in which the economic reward plays a significant role.

(2) the directness of the transfer

Second, this criterion applies to the extent of the mediation between the ES providers and the actual recipients of the ES: 'The most indirect case will be if the State represents the purchaser, there is one broker between the State and the providers, and the latter does not obtain individual compensation for their environmental protection efforts.' In this scenario, reimbursement to suppliers will be rendered by spending on public goods.

(3) the degree of commodification

Third, the factor relates to the magnitude and clarity in which the ES may be measured and obtained in appreciable amounts. In certain instances, the ES can be specifically commodified, such as tons of carbon sequestered, and in others, it may be less specified.

2.3.2. Coase theorem and Pigou theorem

The environmental economists' perspective has provided the earliest and most-quoted definition of PES, which is in line with the Coasian approach (Engel et al., 2008). However, later, the core idea of the ecological economics perspective, which advocating the Pigouvian approach, has become the basis for criticizing the definition proposed by environmental economics (Tacconi, 2012). Therefore, different theorems coping with the externality effect greatly influenced the difference of definition between Wunder (2005) and Muradian et al. (2010b): Coase theorem and Pigou theorem, respectively.

Wunder's (2005) narrow PES concept can be interpreted as a practical application of the Coase theorem, suggesting that the external issue can be resolved through private negotiations between interested parties. Meanwhile, PES can be understood as environmental compensation for service providers and a use fee for purchasers. The idea of the classical PES concept is closely related to the Coase theorem attributed to the economist Ronal Coase (Coase, 1960), with the basic assumption that in certain circumstances, external effects can be resolved by private agreements directly with the parties involved, irrespective of the original allocation of property rights (Engel et al., 2008). Thus, the negotiations' outcome would automatically lead to improved economic efficiency (Pascual et al., 2010). However, in reality, barriers to successful bargaining such as high transaction costs, power imbalances, or poorly specified property rights prevent a Coasean solution (Sattler & Matzdorf, 2013).

Opposed to a solely market-based approach exclusively implementing the Coasean theory, the idea of PES was later applied to some forms of government interventions (Sattler & Matzdorf, 2013), in which the notion of PES is more in line with the work of the economist Arthur Pigou, who advocated environmental taxation and subsidization for correction of negative externalities (Pigou, 2013). And thus, PES's broader concept embraces the Pigouvian theorem later defined by Muradian et al. (2010b).

In comparison, in the Coasean type PES case, the beneficiary directly pays private money to the ES provider on a strictly voluntary basis due to private agreements. In contrast, in the case of the Pigouvian type PES, the government intervenes and either pay itself or lets others pay for the ES service on behalf of the direct beneficiaries (Long et al., 2015). Therefore Coasean PES spends public funds for the good of society as a whole (Sattler & Matzdorf, 2013). While in Pigouvian PES, third parties are expected to pay for the compensation of environmental pollution activities for society (Martin-Ortega & Waylen, 2018). Moreover, the arrangement does not always have to be strictly voluntary since it can be motivated by enforcement laws, either on the demand side or on the supply side (Bellver-Domingo et al., 2016).

Therefore, the differences in definition spectrum between Coasean PES and Pigouvian PES affect the number of PES complying with each definition. The relation of the PES definition spectrum and the number of real-life PES cases can be depicted in figure 1.
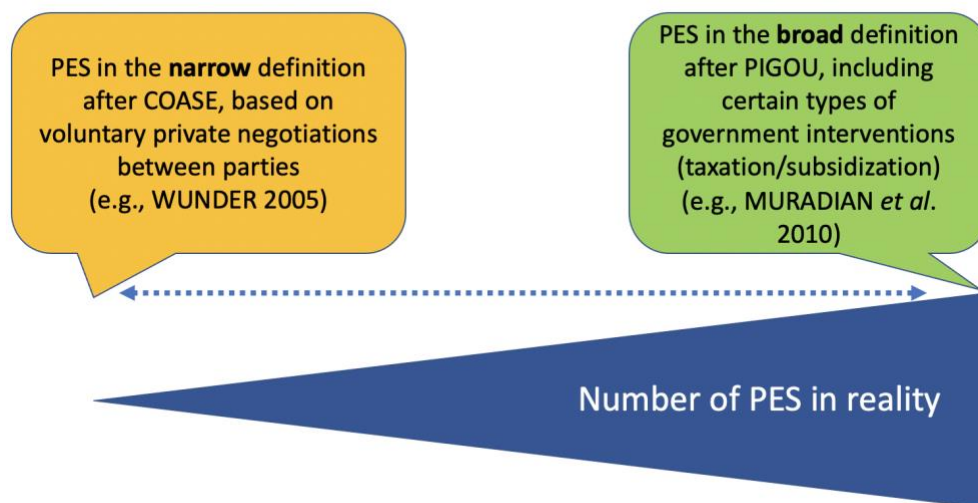
Figure 1. A conceptual spectrum of PES concept from Sattler & Matzdorf (2013)

2.3.3. The underlying principles of PES

As described in 2.3.1, PES is an incentivizing policy tool that encourages landowners to maintain, reinstate, or strengthen the ecosystem by bridging ES sellers (e.g., ES providers) to ES buyers (e.g., ES beneficiaries) in the form of contact arrangements with the basic assumption that the beneficiaries reimburse the providers (Martin-Ortega & Waylen, 2018; Moros et al., 2020; Sattler & Matzdorf, 2013). In this way, it creates a market-like way for ES, which previously provided as public goods for free (Kinzig et al., 2011). The running mechanism, with forest ES as an example, can be depicted in Figure 2.

Figure 2. The logic of payments for ecosystem services from Engel et al. (2008).

In general, the economic benefits that forest owners can achieve from forest conservation are relatively small compared to the benefits of conversion forests to pasture or farmland (Engel et al., 2008). However, if the forest land changed to pasture for economic benefits, the supply of ecosystem services such as water purification, biodiversity conservation, and carbon sequestration, provided through forest conservation, will be discontinued, resulting in social cos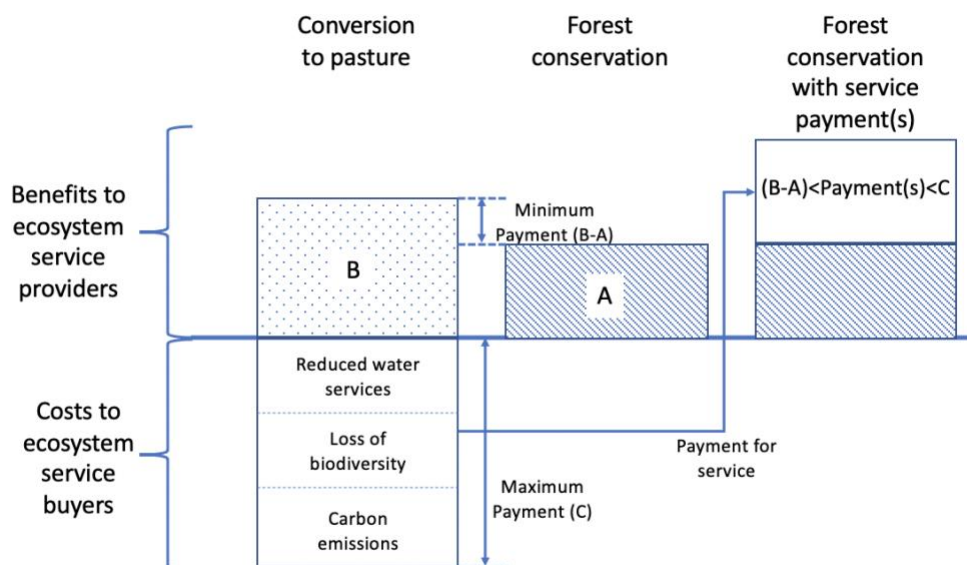ts (i.e., external effects). In other words, in Figure 1, the expected benefits of forest conservation are assumed to be A, the benefits of forest conversion to pasture are assumed to be B, and the loss of ecosystem services such as reduced water services, biodiversity loss, and carbon emissions is assumed to be C. In this case, the purchaser of ES can guarantee forest conservation by paying for the provision of ES, which can be at least B-A and maximum C. Therefore, PES can be established if the price of ES for the buyer is between B-A and C.

2.3.4. Types of PES mechanism

Different categories of PES mechanisms exist. Gutman (2003), for example, divided PES into public-funded PES and private-funded PES. Wunder et al. (2008) distinguished PES into user-financed and government-financed. Muradian et al. (2010) suggested a PES classification rooted in (1) the significance of the profit-making inducement, (2) the forthrightness of the transfer, and (3) the capitalizing degree of the ecosystem. A recent overview of Salzman et al. (2018) presented four categories based on previous frameworks. Table 1 shows these four categories suggested by (Salzman et al., 2018)as such as (1) User-financed PES, (2) Government-financed PES, (3) Compliance PES, and (4) hybrid PES (Salzman et al., 2018).

Table 1. PES categorization from Salzman et al. (2018)

Categories	Definition
User-financed PES	Users of ecosystem services agree to compensate landholders for activities that maintain or enhance ecosystem services delivery.

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	Users may be individuals, companies, non-governmental organizations (NGOs), or public actors that are direct beneficiaries of ecosystem services protection, enhancement, or re-establishment.
	This includes payments by hydroelectric companies to landholders in the upper watershed to maintain forests and their ecosystem service of erosion control.
Government-financed PES	Third parties acting on behalf of users compensate landholders for activities that maintain or enhance ecosystem services delivery.
	The buyer is a public or private entity (such as a conservation group) that does not directly use the ecosystem service.
	e.g., government programs in Costa Rica and China that pay landholders for reduced deforestation, afforestation activities that enhance flood protection, water quality, or other ecosystem services.
Compliance PES	Parties facing regulatory obligations compensate other parties for activities that maintain or enhance comparable ecosystem services or goods in exchange for a standardized credit or offset that satisfies their mitigation requirements.
	e.g., water quality trading, wetlands mitigation banking, and the European Union's emissions trading scheme for greenhouse gases.
Hybrid PES	Programs do not fit neatly into these categories

In addition to the categorization of PES, Salzman et al. (2018) further presented the division of PES sectors such as (1) Watershed PES, (2) Biodiversity/habitat PES and (3) Forest and land-use carbon PES. Considering that this research will focus on the forest PES sector, Table 2 presents the forest PES suggested by Salzman et al. (2018). The study's scope will be limited to the extent of the most recent forest PES classification of Salzman et al. (2018) to investigate the forest PES's global context.

Table 2. Forest and land-use carbon PES from Salzman et al. (2018)

PES mechanism	Definition	Example
Voluntary forest and land-use carbon market (user-financed)	Buyers willingly purchase offsets outside government regulation	Companies such as Microsoft, Disney, and Natura Cosmeticos voluntarily purchase forest carbon offsets to meet corporate social responsibility commitments.
Compliance forest carbon market (compliance)	Regulation on greenhouse gas emissions, typically through cap-and-trade, allows forest carbon sequestration or avoided deforestation to provide offsets for emissions	California's cap-and-trade program, launched in 2013, includes US forestry as one of its offset protocols.
REDD readiness finance (government-financed)	The mechanism under the United Nations Framework Convention on Climate Change in which developing tropical forest countries receive payments from countries for implementing activities that avoid deforestation and maintain carbon stocks in	The World Bank Forest Carbon Partnership Facility Readiness Fund Provides support to countries preparing to receive REDD+ payments, including the development of national REDD+ strategies, systems for monitoring reporting and verification, and reference emission levels.

		standing forests.
Public sector payments for performance (government-financed)	Developed countries may agree to pay developing countries for reducing deforestation (REDD), with payments flowing once results are achieved.	Norway pledged US$1billion to Brazil's Amazon Fund to reduce the deforestation rate in Brazil. Because Brazil has reduced deforestation by more than 80% since 2004, most of the money has been disbursed.

2.4 Discourse
2.4.1. Background – Development of Discourse Theory

Untwining discourses can be considered as a way in order to understand the forest PES context on a global scale. Discourse study has taken a prominent position in forest policy science (Leipold, 2014; Sadath & Rahman, 2016). With the prominence of discourse analysis in forestry policy, scholars effectively use discourse analysis to clarify the forestry sectors' new governance modes (Kleinschmit et al., 2009). This is because investigating discourse can introduce new viewpoints to the current analysis of forestry policy (Arts & Buizer, 2009).

The term discourse generally means dialogue or debate, but discourse is much more than that for academics and has a deep historical background (Gee et al., 2005). Two strands of linguistic theory proved to be significant influences for the study of social development of meaning: a structuralist one, pioneered by the linguist Ferdinand de Saussure (Saussure, 1916), and later, a pragmatic one which received essential impulses from the philosophy of Ludwig Wittgenstein (Wittgenstein et al., 1953). They have different origins that need to be taken into account. Structuralism is based on linguistics, which attempts to describe the diversity of meaningful phenomena through a collection of grammatical rules (Angermuller et al., 2014). On the other hand, pragmatics emerged from philosophy and sociology and saw meaning as the result of linguistic action in a particular sense (Boncompagni, 2016). These intellectual traditions have merged to the degree that these characterizations seem obsolete; however, both pragmatic and structural language theories have given rise to a wealth of academic innovations of discourse studies, particularly in France, the United Kingdom, the United States, and Germany (Angermuller et al., 2014).

The history of discourse studies notably began in France. Foucault (1970) and Pêcheux (1982) introduced discourse theoretical concepts by raising questions about power and subjectivity, ideology and knowledge (Angermuller et al., 2014). Discourse Studies' development was favored by some advances in corpus analysis and text linguistics (Bhatia et al., 2008), also accompanied by studies from sociology, political science, and media studies (Williams, 2014). Around the 1990s, French discourse studies have expanded their research agenda beyond the study of political discourse and have also begun to incorporate qualitative aspects of social research (Angermuller et al., 2014).

Aside from France, there is a wide range of discourse studies in the United Kingdom. Although poststructuralist discourse theories, which based on the notion that meaning is an incomplete outcome of a different relational structure, stands for dominant social sciences in the United Kingdom (Hall et al., 1980; Laclau & Mouffe, 1985), linguistic discourse research has followed the direction of social semiotics (Halliday, 1978) or sociolinguistics (Sinclair & Coulthard, 1975). Also, by looking at oral and written texts, discourse studies

include methods as diverse as speech act theory or corpus analysis (Baker, 2006; Widdowson, 2007). As in France, many discourse researchers in the United Kingdom share a vital interest in power and inequality, mainly as described by the Critical Discourse Analysis (CDA) (Fairclough, 1992), which also can be seen in comparable developments in Continental Europe (Van Dijk, 2009; Wodak & Meyer, 2015).

Since the 1960s, 'discourse' has also become a significant issue in the United States, especially in communication ethnography, sociolinguistics, corpus analysis, and applied linguistics (Biber et al., 1998; Gumperz & Hymes, 1986; Johnstone, 2017; Kramsch & Widdowson, 1998). Until lately, in the United States, the discourse was often perceived as consistent with a conversation, i.e., as regulated and situated turn-taking processes, even though the debate between conversation analysts (Schegloff, 1997) and critical discourse analysts led to the impression that 'discourse' relates more to written texts than to conversations (Angermuller et al., 2014). Cognitive strands of discourse linguistics have insisted on connecting language and socially shared knowledge (Lakoff & Johnson, 1980).

Social science discussion has also encouraged organic and holistic approaches to Meaning in Germany, which have been expanded in several ways by Habermas' deliberative, consensus-based discourse model (Habermas, 1985), and social phenomenologists such as Berger & Luckmann (1991), who emphasize the inter-subjectively mutual character of social knowledge (Angermuller et al., 2014). On the other hand, numerous poststructural trends usually insist on discourse and critically analyze humanist theories of the subject (Angermuller et al., 2014). Until the 1990s, the competition between descriptive-analytical approaches and normative-critical orientations, such as the Critical Discourse Analysis (CDA), was in the process of establishing a single interdisciplinary field of discourse studies (Kendall, 2007; Wodak, 2007)

Today, discourse studies can be considered an international and interdisciplinary area of study by the establishment in several stages: around 1970, local or national schools established in France and the USA after the mid-1970s discourse analysis originated in the United Kingdom, while the deliberative discourse theory of Habermas appeared on the scene in Germany (Angermuller et al., 2014; Habermas, 1985; Halliday, 1978; Wodak, 2007). The transnational reception of such orientations took shape in the 1980s (Bhatia et al., 2008). While discourse-analytical tools from qualitative social science in the United States have found widespread audiences, European discourse theories received considerable international attention, particularly Foucault's work on the nexus of knowledge and power (Angermuller et al., 2014). Later, a growing academic hybridization began in the 1990s (e.g., CDA), and is still ongoing (Fairclough & Wodak, 1997).

2.4.2. Discourse theory

According to Angermuller et al. (2014), there is a common thread to the different perspectives of discourse studies:

(1) Discourse is a way to look at meanings or ideas created through social practices.

(2) Meaning cannot be interpreted as an intrinsic property of utterances or documents; rather, it stems from the use of language in particular contexts.

(3) Texts ought to be contextualized in order to provide some meaning for somebody.

(4) Embedded in broader socio-historical arrangements and systems, discursive practices may function with different forms of media (e.g., oral, written, or multimodal), enabling participants' interaction.

Within the diverse perspectives, in this study, the Foucauldian discourse perspective, which heavily influenced forestry policy discourse studies (Winkel, 2012), is adapted and used since Foucault's idea provides a fruitful source to understand the concept of power within discourse (Hook, 2007).

For Foucault, discourse is a power conveyed by many words spoken and other discursive activities; power generates and breaks, as well as constructs, time, and location-bound rationales; it shapes how we interpret reality (Stahl, 2004). Foucauldian discourse can be perceived as "a wild stream of language and other discursive practices that challenge its banks' settlements and well-ordered areas and are always prepared to change its flow and break away from its well-maintained direction" (Winkel, 2012). As discourse gives meaning to social activities, it also enables people's thinking and legitimizes individuals' actions (Foucault, 1971). In so doing, however, discourse automatically removes other potentials for speaking, thinking, and acting, leading to a lack of appropriate claims about reality; discourse simultaneously allows and restricts expression (Joutsenvirta, 2009). This ambivalence is consistent with the 'productive role' or 'empowering effect' of the Foucauldian discourse: By delineating legitimate forms of production of truth from illegitimate ones, the discursive formation involves replication and the distribution of empowering and disempowering subject positions (Feindt & Oels, 2005).

Consequently, discourse automatically establishes power dynamics that are important to social and political actors' freedom of action (Bevir, 1999). Power is thus interpreted as a power of definition that eliminates alternative realities and is based on different resources, i.e., the social structuring of what we perceive to be real (Winkel, 2012). Power is omnipresent in all social behavior and cannot necessarily be placed within society (Ball, 2012). In Foucault's goal of moving the focus away from the formal centers of influence and into the misty power of debate, power becomes as ambivalent as the idea of discourse itself, since it is seen not only as coercive but at the same time as 'constitutive' and 'enabling' (Darier, 1999). This Foucault's concept of power is an essential assumption to understand discourse's contribution to study particular policy (Winkel, 2012).

The Foucauldian discourse perspective is not only interested in words but also in the functioning of knowledge (Feindt & Oels, 2005). Certain knowledge orders establish society's reality at a particular time and space and evolve (Crampton & Elden, 2007). In line with the Foucauldian concept of power's ubiquity, power is ultimately bound up with all kinds of information (Biebricher, 2007). Therefore, social power/knowledge complexes are created and distributed by institutions with which, according to Foucault, scientific disciplines can be identified (Winkel, 2012).

Foucault prefers a context-based approach to rationality with a theoretical interest in knowledge change processes (Ball, 2012). This conception allows discourses to be viewed as 'strategic situations'; in other words, at any moment, a wide array of discursive elements is organized in different strategies of power (Feindt & Oels, 2005). Foucault is concerned with

the reconstruction of discourses' dissemination, the processes involved, the results that have been generated (Gottweis, 2003).

Lastly, the relation between the individual and the discourse is a critical feature of understanding Foucault's discourse concept because Foucault took a great interest in discursive practices and strategies between actors and the discourse (Winkel, 2012). The definition of subjects suggested by Foucault is that "an actor capable of performing an action and, at the same time, being subjected to power so that the actors are never fully determined by a strategic situation" (Feindt & Oels, 2005). In this sense, the role of subject roles is contingent in a particular discursive domain (Gottweis, 2003), whereas actors do not have stable subjects but continuously establish their subjectivity in a discursive interaction (Gottweis, 2003; Hajer, 1994).

2.4.3. Media discourse

This study focused on identifying forest PES discourse produced by media. In line with Foucault's perspective that stressed the power aspects of discourse, media discourse is the theory that delineates the power relationships of stakeholders that appears on the media (Van Dijk, 1995).

Media is a public domain platform where the gathering of opinion, concern, and stakeholders' point of view is defined (Kleinschmit, 2012). Mass media positively impact building the public opinion agenda on several topics (Kingdon & Stano, 1984). The mass media keeps track of the government's policy and reaction to such issues and the public's response to those specific issues (Miller et al., 1979). Also, Media discourses are essential sources of public opinion (Sadath & Rahman, 2016). Media discourse is a specific text output material, which consists of public debates on various political and environmental issues, transmitted through media where discussions have taken place between the relevant actors (Sadath & Rahman, 2016).

Among the numerous media sources, print media is selective in news processing (Melican & Dixon, 2008). Thus, newspapers' particular feature influences which information becomes news and is not based on particular rules (Kleinschmit, 2012). Both peripheral and central stakeholders are aware of these rules and conform to them while struggling for media exposure; therefore, the reported news is already a tailored reality with the media's rules (Sadath & Rahman, 2016). Given such position of media, media discourses in globally published media provide international public opinion and the collection of central and peripheral stakeholders' views on forest PES issues (i.e., media impacts that have more or less power) that can, in turn, affect policy decision-making (Bielsa & Bassnett, 2008; Van Dijk, 1995).

Analyzing forest discourses in forest policy science is not fully functional unless sufficient attention has been given to stakeholders who form forest discourses in the media (Sadath & Rahman, 2016). Therefore, one of the study's aims is to understand different stakeholders who are speaking in print media as a speaker. This is because a certain actor's appearance as a speaker in the media is a strong predictor of media standing (Sadath & Rahman, 2016). In other words, the more chances certain actors have of interacting in the media, the more possibilities particular actors have of influencing the discourse (Sadath & Rahman, 2016).

Therefore, the opportunity for a central or peripheral actor to form discourses can be clarified by the idea of diverse speakers' media standing (Feindt & Kleinschmit, 2011).

In policy science terminology, public stakeholders such as the judiciary, politicians, and governments are seen as central actors (i.e., powerful actors) in a political system, while NGOs, social activists, scientists are regarded as peripheral actors (i.e., marginalized actors) (Kleinschmit & Krott, 2008). However, in the PES mechanism, various stakeholders (e.g., broadly, ES buyer, ES seller, Intermediaries) are identified, but the media standings that involve PES stakeholders' power-relationship are not well defined (Van Hecken, Bastiaensen, & Windey, 2015). Identifying the stakeholders' with either powerful and marginalized positions in the PES scheme is a potentially important factor for deeper understanding and contextualization of PES and PES policy making because the role of center actors in the policy sector is quite imminent, as they can play a decision-making role within the policy system (Feindt & Kleinschmit, 2011). These actors' media standing is limited to their position and assets and depends on how much value they add to specific issues (Sadath & Rahman, 2016). Hence, the determined role of specific stakeholders in the media discourse can be a vital indicator of the power of certain central or peripheral actors who have a voice in the media instead of others (Feindt & Kleinschmit, 2011).

2.5 Discourse analysis

Discourse analysis is a powerful tool to analyze public policy used by policy scientists (Sadath & Rahman, 2016). The common idea of discourse scholars' is that they perceive discourse as a dynamic entity that can be analyzed from several angles. Discourse analysis should deal with three factors: a language, a practice, and a context component (Metzger & Bahan, 2001). In this viewpoint, discourse arises from the interaction of these three factors; however, in most cases, discourse analytical methods focus on one point in an analytical way when theoretically accounting for the other two (Angermuller et al., 2014). However, to be seen as a fully-fledged approach to discourse, all three elements must be understood and incorporated. Many other disciplinary methods outside of Discourse studies are also defined by being confined to either one or two of the perspectives mentioned above. For example, structural linguistics addresses language but not practices, and qualitative sociology works with practices but often neglects language. Compared to conventional disciplines, which prefer to deal with pure objects, Discourse Studies call for cooperative and holistic work beyond individual disciplines.

Thus, the heuristic aim of the discourse triangle suggested by Angermuller et al. (2014) should be highlighted. First, 'Language' refers to semiotic material such as formal patterns, conventions, resources in the broadest sense. It can be made up of written and oral texts and audio-visual materials required to create information about the wider context. Second, 'Practice' designates the particular ways of appropriating and processing language and extends to anything that can occur between the participants in the conversation, including the different arguments made due to expertise and exclusion. Third, 'Context' refers to the environment, circumstance, or information available to discourse participants in contextualizing texts. Such information can be situation-dependent or situation-transcendent, individual, or shared by broad collectives.
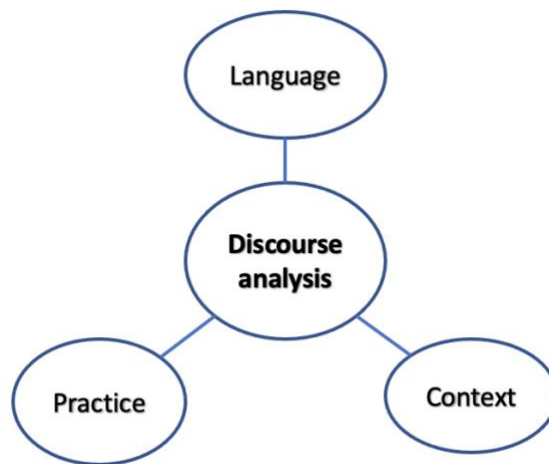
Figure 4. Triangle of Discourse Analysis from Angermuller et al. (2014)

2.6 Conceptual Framework

Based on the theoretical exploration above, the study's conceptual model can be illustrated in figure 5. In the illustration, it is assumed that in the social context of the forest PES framework, numerous opinions about forest PES are generated in the interaction of various stakeholders, including other stakeholders (e.g., NGOs, scientists, and others) and expressed through the media as discourses. Due to the media's selective nature, dominant discourses that have power stand out, which would affect the forest PES policy process and ultimately influence forest PES stakeholders again. Accordingly, the research focused on the forest PES discourse itself generated by global media and the stakeholders' standings within the media discourse to better understand the global media's view.

Figure 5. Conceptual Framework

3. Methodology

This part explains the methodology utilized in the study. Section 3.1 describes the research approach of the research. Section 3.2 explains the data collection strategy. In section 3.3 the data analysis is described.

3.1 Research Approach

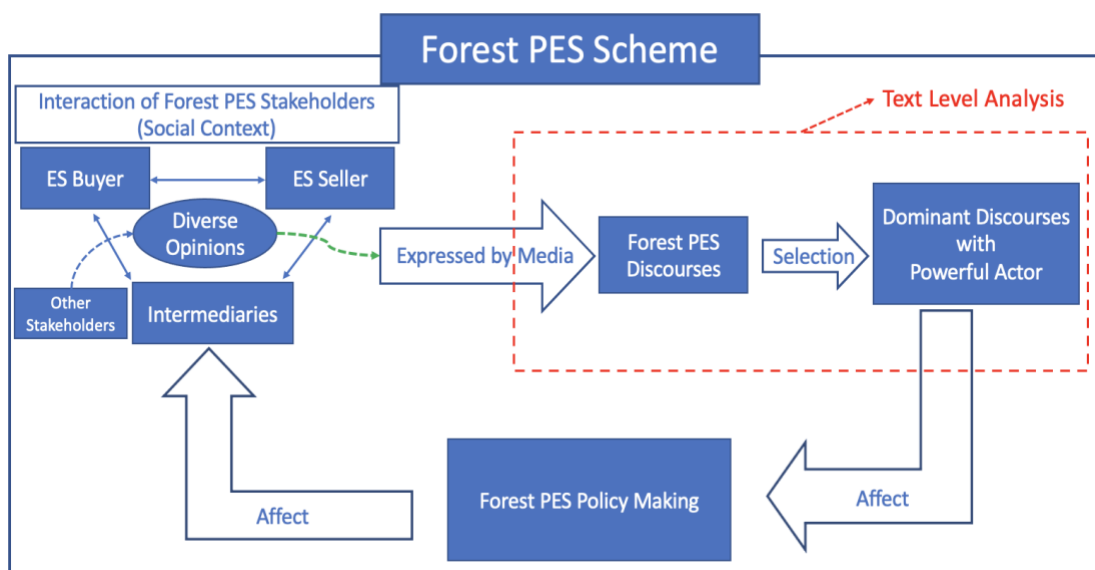To investigate the media discourses of forest PES, the study will apply a qualitative explorative approach. Qualitative research seeks to understand, describe, and clarify those human circumstances by examining society's attitudes and meanings (Bengtsson, 2016). An alternative quantitative methodology approach, which generally deals with large quantities of data to make generalizable outcomes (Bock et al., 2011; Neuendorf & Kumar, 2015), could have been an approach such as LDA topic modeling. However, the quantitative approach is not practically applicable for analyzing forest PES discourse because most forest PES scheme is too recent and does not have enough documents for LDA topic modeling (Pagiola, 2011; Zhao et al., 2015). Compared to the LDA topic modeling, content analysis enables text analysis regardless of the amount of data because content analysis is a flexible method that can handle either large or small sets of data (White & Marsh, 2006). Although the qualitative study results may be less generalizable than a quantitative approach, its versatility is one of the most important reasons for using the qualitative approach (Kumar, 2019). Using a qualitative approach fits the study's goal, i.e., exploring the diverse forest discourses made out of global media. Nevertheless, due to the qualitative nature of the content analysis, the possibility of excessive interpretation remains; therefore, data should be carefully interpreted during the analysis process (Elo & Kyngäs, 2008).

3.2 Data collection

Specifically, for analyzing media discourse, text-level discourse analysis is applied. Therefore, texts in each individual article regarding forest PES published by global media were the basic study unit. Also, it is essential to mention that different discourses often found in the same paper; thus, the discourses were classified by individual speakers who appeared in the newspapers. The spectrum of text analysis is from 'narrow' (e.g., a particular text) to 'broad' (e.g., the entire social structure), but the research would focus on the linguistic version of discourse placed at the 'narrow' ends of the spectrum, limiting the discourse study mainly to what is said or written (Howarth et al., 2000; Potter & Wetherell, 1987). Therefore a careful review is needed for linguistic discourse analysis (Arts & Buizer, 2009). However, it is essential to note that the text-level discourse analysis would not be carried out in exclusion from the social context since, in the text-level discourse analysis, it is assumed that the context influences how a particular text is written and understood (Arts & Buizer, 2009). Therefore, adopting the view of text-level discourse analysis that text itself is already reflecting the social context, the main objective of this study can be translated into the following main question: "what words are used and what meanings are mainly conveyed in media expressions, in the context of the forest PES framework, by specific actors" (Fairclough, 1992).

In addition, Jasanoff (2015) proposed that news articles' study may be an effective way to obtain socio-cultural evidence. Also, news articles' analysis is used throughout the forestry

studies to apprehend media discourses (Ekayani et al., 2016; Fabra Crespo & Rojas Briales, 2015; Park & Kleinschmit, 2016; Sadath & Rahman, 2016). Therefore it seemed reasonable to use news articles in this research.

For the data collection, the Lexis Nexis database that provides full-text media via the internet is used to retrieve newspaper articles. To be specific, the searching procedure executed was as follows:

(1) First, search categorization was set by narrowing search classification to "news" published by "major world publications," and the timeline was set as "from January. 01. 2017 to December. 31. 2020." The four-year time frame was chosen to explore recent PES discourses.

(2) Second, once categorization for searching is selected, the relevant articles were chosen in a two-step process. In the first phase, newspapers that contain the keyword 'payment for ecosystem services' were searched. Based on the keyword entered, the Lexis Nexis database also searched whether the heading, abstract, and body of the newspaper also contain the word.

(3) Third, with the articles retrieved in step 2, a further search was conducted with the keywords based on forest PES categorization of Salzman et al. (2018). Hence, three subsets of keyword combination were searched (e.g., 'payment for ecosystem services' AND 'forest,' 'payment for ecosystem services' AND 'REDD,' and 'payment for ecosystem services AND 'carbon')

The study only focused on news articles that clearly mention the keyword 'payment for ecosystem services.' This use of keywords can be seen as a limitation because of the alternative terms that could apply to the same subject (e.g., payment for environmental services) (Capodaglio & Callegari, 2018). However, it was appropriate to omit the term since the pilot search with the keyword 'payment for environmental services' revealed no satisfactory result (n=4) with irrelevant results. And using the keyword seems reasonable since 'payment for ecosystem services' is the most commonly used expression in the PES scheme context (Jack et al., 2008).

First, 37 articles were retrieved after the initial article searching on the Lexis Nexis database, and 16 overlapped articles were eliminated. Also, the news data sets went through the screening process, and two articles were additionally removed because these two news articles did not contain adequate contents for this study. For example, one of the excluded articles mainly explained the relation between electricity production and Pakistan's economic growth (Rehman, 2020), and another newspaper focused on installing petroleum refinery towers in the USA (The Philadelphia Inquirer, 2020). As a result, 19 news articles from 11 different media publishers were selected for content analysis. The news article selection procedure is summarized in the flow diagram in figure 6, and in appendix 1, all 19 newspaper articles are listed.

Before presenting the process, it is essential to note that three sets of articles were overlapped in their contents. Therefore, clarification on how this study managed the issue of overlapping contents depending on the degree of imbrication, e.g., either (1) identical content, (2) or same topic, but not identical content, will firstly be presented. First, by referencing appendix1, a group of articles including numbers 5, 8, 10, and 11 handled the same topic. Although articles number 10 and 11 had different titles, they presented identical

contents due to the difference between the domestic and international versions of article publication; therefore, article 10 is only used for coding. Also, articles number 5 and 8 shared the same topic; however, they had minor differences in interviewees' comments. Hence, in this study, articles number 5, 8, 10, and 11 were carefully handled to avoid overlapping in coding. Second, articles number 14 and 15 presented identical contents; thus, only one of these articles, e.g., article 14, was utilized for coding. Third, regarding articles 1 and 2, article 1 extracted PES-related interviews from article 2, which contains other redundant interviews; therefore, article 1 is selected for coding.
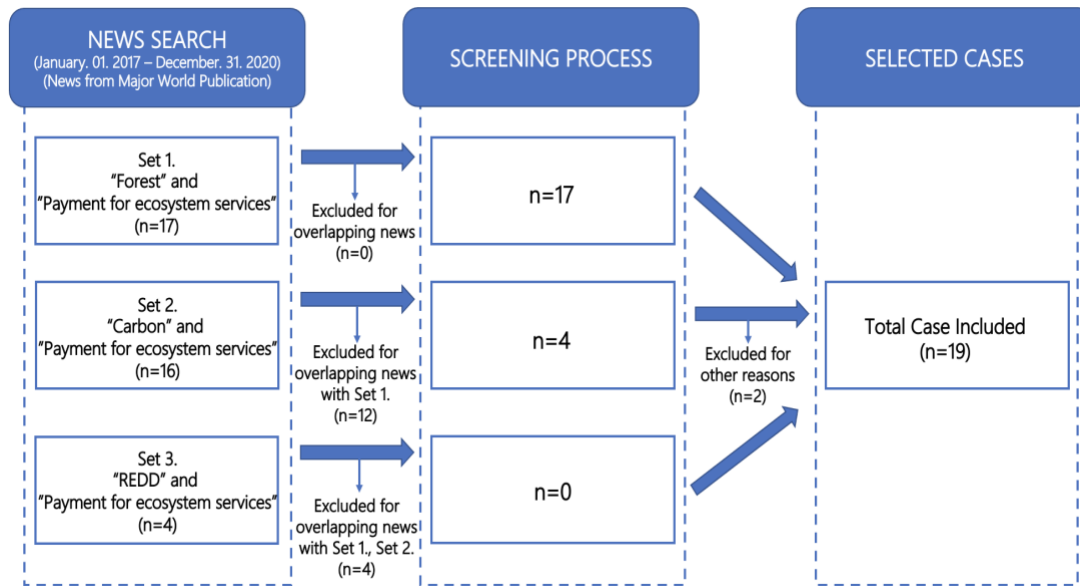

Figure 6. Flow diagram of news article selection procedure.
*n: number of newspaper articles

In total, 19 articles from 11 different global media publishers were included in coding for the data analysis (*Euromoney 4, The Guardian 3, The Christian Science Monitor 2, The New York Times 2, New Strait Times 2, The Independent 1, London Evening Standard 1, The Nation 1, The Australian 1, Africa News 1,* and *Farmer's Weekly 1*). Regarding article style, the majority of selected articles (n= 14, 74%) were written in the style of an interview, followed by three articles were announcement (16%), including two articles that stated declaration made by the international summit, and one article that was recruiting landowners for participating in PES auction. Moreover, two reportage styles of articles (11%) that carried particular events or specific cases related to PES were identified.

3.3 Data analysis
3.3.1. Introduction of Content analysis

The study utilized content analysis as a research methodology. Content analysis is a technique known as an objective and systematic way of analyzing informational text data, also known as a document review tool (Forman & Damschroder, 2007; Sandelowski, 1995). The content analysis enables distilling words into less content-related categories (Elo & Kyngäs, 2008). Also, It is assumed in content analysis that phrases and words have the same meaning when listed into the same categories (White & Marsh, 2006). The goal of content analysis is to obtain a condensed and comprehensive description of the phenomenon, and

the result of the study is categories or definitions explaining the phenomenon (Bengtsson, 2016).

Content analysis is criticized by the quantitative field, who considered it to be a simple methodology that did not apply itself to comprehensive statistical analysis, whereas others claimed that the content analysis was not sufficiently qualitative (Elo & Kyngäs, 2008). However, thanks to the flexible nature, the benefit of content analysis is that the methodology is not related to any specific science. There are fewer guidelines to be followed; therefore, the possibility of misunderstanding in issues concerning philosophic principles and discussions is minimized (Bengtsson, 2016). Therefore, due to these reasons, content analysis has been a common method in various field of research (Elo & Kyngäs, 2008), as well as widely used in forest policy studies (Ekayani et al., 2016; Kleinschmit & Krott, 2008; Park & Kleinschmit, 2016; Sadath et al., 2012; Sadath & Rahman, 2016).

Depending on the study's purpose, contents analysis can be executed either inductively or deductively (Elo & Kyngäs, 2008). The inductive approach concludes the data obtained by incorporating new information into theories (Bengtsson, 2016). Accordingly, inductive content analysis is recommended when background knowledge is not enough or fragmented (Elo & Kyngäs, 2008). In contrast, the deductive approach is searching for predetermined subjects by testing hypotheses (Berg et al., 2004). This research will adopt the inductive approach of content analysis since its focus is to explore various forest PES discourse without a predetermined hypothesis.

Based on how contents would be analyzed, the content analysis may be classified into a manifest analysis and a latent analysis (Bengtsson, 2016). In a manifest analysis, the researcher explains what the text sources actually mean, remains very faithful to the text, uses the words mentioned, and explains what is visible and apparent in the document(Bengtsson, 2016). On the other hand, the latent analysis is applied to an interpretive level in which the researcher tries to find the hidden message of the document (Elo & Kyngäs, 2008). In this study, to minimize the interpretation bias (Elo & Kyngäs, 2008) and considering the assumption that social context is already reflected in the text (Arts & Buizer, 2009), the manifest analysis will be applied to determine what has been said about forest PES throughout the global media.

3.3.2. Content Analysis Procedures

The general procedures of content analysis are described below. This section's information is brought and modified from Elo & Kyngäs (2008) and Bengtsson (2016).

(1) Decontextualization: The research begins with the selection of the analysis unit. It may be a term or a theme. A unit of meaning can consist of more than one sentence and may contain many meanings. Each defined unit of meaning is labeled with a code that should be understood concerning the context. This method is known as the "open coding process." Open coding means that annotations and headings are written in the text when reading the text. When reading through written material, as many headings as possible are written in the margins to explain all facets of the content to reduce cognitive adjustments during the review process to ensure reliability. Headings are collected from the margins on the coding sheets, and categories are freely created at this level.

(2) Recontextualization: After the meaning units are identified, it is essential to check whether all aspects of the content have been covered concerning the research objective. The original text is re-read next to the final list of meaning units. After this process has been carried out, the unmarked text is almost always left. The researcher must then decide whether the unmarked text should be used or not. If the unmarked text provides any answers to the research query, it should then be included in the analysis; otherwise, this "dross" may be omitted. An important thing to note in this stage is that research should keep the distance from the text; otherwise, every element would seem necessary.

(3) Categorization: In the third stage, the content will be classified with a logical description. Category lists are grouped under higher-order headings. The grouping data aimed to minimize the number of categories by collapsing identical or dissimilar categories to larger higher-order categories. However, it is pointed out that the development of categories does not necessarily put together observations that are identical or related; instead, the data is categorized as belonging to a specific classification, and this implies a distinction between such data and other observations that do not belong to the same category. The purpose of developing categories is to provide a means of explaining the phenomenon, to increase comprehension, and to generate information. Although there is no particular way to sort categories, all categories must be embedded in the data they derive.

(4) Compilation: Lastly, The conclusion will be drawn based on the content categories listed. Formulate a general overview of the research topic through the creation of categories. In a manifest analysis, the researcher works progressively through each defined category and the analysis themes. In a manifest study, the researcher frequently uses the informants' language and remains mindful of the need to refer back to its original text. In this way, it is possible to remain closer to the original definitions and contexts. A list of themes, categories/sub-themes, and sub-categories/sub-headings can be provided as a table to allow the reader to get a brief overview of the findings. Also, it is essential to include an example of the review process. It is also possible to add information by doing any quantification in which subcategories and categories are counted, which is not typically done with other qualitative research approaches. Also, as a final check, the researcher must consider how the new results relate to the literature and whether it is rational and logical.

The summarized figure of contents analysis procedure is depicted in figure 7.

For this research, based on the inductive approach, the following coding themes were found: (1) Article style, (2) PES type discussed, (3) Stakeholders, (4) Issues with PES, (5) Scope, and (6) Valence.
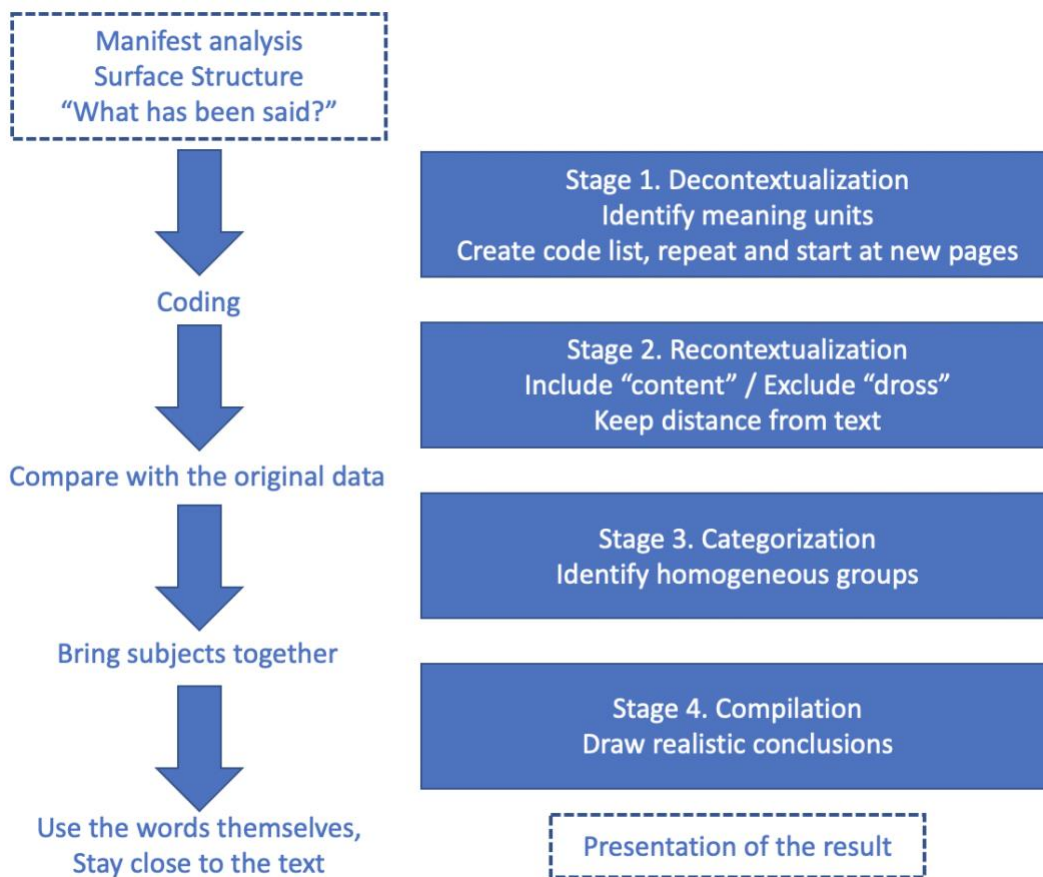
Figure 7. Overview of contents analysis process from Bengtsson (2016).

The analysis procedure was aided by ATLAS.ti (Version 9), one of the major computer-assisted qualitative data analysis software (CAQDAS)(Paulus et al., 2013). ATLAS.ti facilitates a review of documents, video, and audio data, as well as photographs (Smit, 2002). ATLAS. ti has been chosen for this study because qualitative content analysis utilizing ATLAS.ti proved its value of reducing the researcher's bias by providing a trackable analysis process (Mayring, 2004). Another reason for the selection is that reviewed data via ATLAS.ti can be a basis of discourse analysis (Paulus & Lester 2016) since finding diverse forest PES discourse is the study's aim. In addition, through analyzing text contents manually with ATLAS. ti, diverse forest PES stakeholders' relationships and contested discourses regarding forest PES can be contextualized more profoundly. Therefore, more realistic and practical information can be provided for understanding the forest PES scheme.

4. Results

This chapter presents the result of the analysis. Section 4.1 provides an overview of the results of the content analysis. Based on these results, section 4.2 presents the distinguished discourses. Section 4.3 explains the commonalities of and the differences in the identified discourses.

4.1 Results of content analysis

In terms of the PES type discussed, in most of the paper, PES was considered as Pigouvian type PES (n=8, 62%), followed by the Coasian type PES (n=5, 38%). The remainder of the articles (n=6) did not provide information on the type of PES, and/or no specific type could be distinguished. This means that the rest of newspapers (n=6) focused more on illustrating environmental issues and mentioned PES without in-depth discussion.

Differences were found in the expected implementation of the two types of PES. Not surprisingly, in all papers on the Pigouvian type PES, it was expected that the government would administer this PES. This is in line with the Pigouvian PES definition that is based on a certain type of governmental intervention, such as subsidization or taxation (Muradian et al., 2010b). The Coasian type PES were being administered by or proposed to be implemented via the private market (n=3, 60%) and climate funds (n=2, 40%).

The content analysis results also showed that 117 different stakeholders were mentioned, which for this research were classified into nine different groups. The most often mentioned stakeholder was the local community (n=30, 26%), followed by governments (n=21, 18%), NGOs (n=14, 12%), scientists (n=13, 11%), intergovernmental organizations (IGOs) (n=12, 10%), climate funds (n=10, 9%), banks (n=9, 8%), enterprises (n=3, 3%), and others which include a journalist, bank clients, tourists, multi-stakeholder initiative (MSI), and a management consulting firm (n=5, 4%). However, not all of these stakeholders were able to present their views on forest PES. In total, 17 speakers from 7 different groups actively expressed their opinions in the news articles among these identified stakeholders: three scientists, three bankers, three representatives of governments, three NGOs, two IGOs, two climate funds, and one journalist. This means that scientists, bankers, governments, and NGOs were equally represented in the discussion (each 18% of identified speakers). IGOs (12%), climate funds (12%), and a journalist (6%) were also represented but less than the aforementioned speakers. Not represented as speakers were, a.o., the local community, enterprises, bank clients, tourists, MSI, and a management consulting firm.

This research also found that the most salient two issues related to forest PES in global media were deforestation (n=10, 14%) and watershed management (n=10, 14%) issues. Apart from these two issues, biodiversity conservation (n=8, 11%), carbon sequestration (n=6, 8%), climate change (n=6, 8%), environmental degradation (n=6, 8%), sustainable forestry (n=3, 4%), soil management (n=3, 4%), desertification (n=3, 4%), illegal actions (n=3, 4%), local livelihoods (n=3, 4%), coastal area conservation (n=2, 3%), aforestation and reforestation (n=2, 3%), and others (n=5, 7%), including agriculture intensification, food production, food waste, land management, sustainable fisheries were other PES related issues appeared on the global media.

The global media issues focused more on the regional/national scale (n=7, 58%) than on the global scale (n=5, 42%). The remaining articles (n=6) did not provide a clear PES focus. This indicates that the articles were more concentrated on providing a general description of PES.

The content analysis also revealed that most PES articles had a positive tone (n=12, 92%). An illustration of such a tone is a quote from one of the papers stating that *"There is a surprisingly cheap and easy way to slow the pace of deforestation.* (Plumer, 2018).*"* Only one article adopted a neutral/mixed tone (n=1, 8%).

4.2 Discourses distinguished

Based on the distinctive view, four discourses could be distinguished. Extracted quotations of each discourse are posted in the appendices (i.e., appendix 2-1 to 2-4), and the summary of discourses is described in table 4.

Table 3. Summary of discourses

	Discourse 1. Conservation pipeline	Discourse 2. Pro-neoliberal market	Discourse 3. Responsibility	Discourse 4. Local livelihood
No. of Speakers*	6	5	5	1
Actors included	3 Scientists, 1 Government, 1 Journalist, and 1 NGO	3 Bankers, 1 IGO, and 1 Climate fund	2 Recipient Governments, 1 IGO, 1 Climate fund, and 1 NGO	1 NGO
Valence	5 Positive, 1 Neutral	4 Positive, 1 Neutral	4 Positive, 1 Neutral	1 Neutral
Distinctive view	PES is a novel, ideal, and cost-effective measure	The market mechanism should be promoted for PES	Developed countries funding should be increased	Securing local livelihoods is the foremost goal of PES
PES goal of Environmental vs. Local livelihoods	4 Environmental 1 Local livelihood	5 Environmental	5 Environmental	1 Local livelihood
Market PES vs. Governmental PES	1 Market 3 Governmental	5 Market	5 Governmental	Unidentified
Key argument	Scrutiny of PES effectiveness, stricter enforcement to illegal activity, and more collaboration of stakeholders	Inclusion of financial industries to PES, Promoting private funds, and Collaboration of stakeholders	Increasing PES funds from developed countries and introducing a tax on a global scale	Developing PES program improving local livelihoods, and less government enforcement to illegal actions

*No. of Speakers: discourses were classified by individual speakers who appeared in the newspapers

4.2.1. Conservation pipeline discourse

The most prominent PES discourse among global media is recognized as the conservation pipeline discourse. This discourse conceives PES as a novel, ideal, and cost-effective measure that can simultaneously foster economic development and nature conservation. Accordingly, conservation pipeline discourse focuses on sharing successful stories of PES without a critical view. This discourse embraces PES in a celebratory position and arguing that PES should be widely promoted. For example, PES was positively viewed:

"We have learned that the pocket is the quickest way to get to the heart (McGinnis, 2020)"

"So if PES turns out to be a cheap way to help avoid deforestation, then it should certainly be on the table (O'Carroll, 2017)."

"Pong Krai village is only one example of how sustainable human living and biodiversity conservation can be successfully achieved within Unesco Biosphere Reserves, providing insights that can be applied to other Biosphere Reserves and communities around the world (Million, 2018)."

Also, this discourse acknowledges that the current PES system is not scrutinized in terms of efficiency; for instance,

"We needed better evidence about how well this approach worked in order to know if we should be scaling it up or rethinking it (Hance, 2017)."

"By committing to ongoing research and understanding of natural systems and the resources they provide, innovative solutions that allow for sustainable development in balance with nature will continue to evolve (Million, 2018)."

Thus, this discourse perceives that it is now natural for policymakers and other stakeholders to question the benefits of PES. However, speakers of this discourse argue that a study of the PES effect will provide useful data to unveil the PES impact's vagueness for persuading PES funders and policymakers that PES is a cost-effective tool for biodiversity conservation. Also, one speaker mentioned that local people's illegal actions such as logging and poaching are the barrier to the successful PES implementation.

Hence, the solution raised from this discourse is based on the promotion of PES, varying from more funding for studying PES, stricter governmental enforcement against illegal activities of local communities, and more vital collaboration of PES-involved stakeholders.

"Controlled experiments can be expensive to set up. But without them, economists have been unsure whether forest payment programs in places like Costa Rica are having any impact (Plumer, 2018)."

"If we are to see any improvement in BTRC's conservation efforts, stricter enforcement of laws is needed. The federal and state governments must play a larger role in eradicating illegal logging and poaching (Summit Discusses Belum's Survival, 2018)."

This discourse is shaped by six speakers: three scientists, one government, one journalist, and one NGO. The conservation pipeline discourse is dominated by speakers advocating the environmental goal of PES, while one speaker stressed the importance of improving local livelihood through implementing PES. Content analysis results also revealed that most constituents of this discourse expressed PES positively, while only one described PES with a neutral valence. Besides, most speakers perceive PES as a policy being implemented by governments, not by the market mechanism.

4.2.2. Pro-neoliberal market discourse

This discourse presumes that the development and protection of nature are compatible and may coexist. An indirect driver for deforestation is the failure of markets to mitigate negative impacts and the unintended side-effects of modernization and globalization. The pro-neoliberal market discourse shows confidence in markets' role in finding answers to environmental issues by presenting adequate financial solutions. It strongly favors market mechanisms and considers that further segmented commodification of a natural

environment will promote private investors' inclusion in the PES sector and provide valid data to the policymakers.

Interestingly, as one of the speakers said,

"Biodiversity credits, carbon offsets, payments for ecosystem services, impact investments, bonds, equities, taxes, lotteries, crowdfunding. We have to be open to it all (Avery, 2019)*."*

This discourse's major constituents, bankers, do not see PES policy as the only solution for the environmental problem. Instead, they think PES is just one of the options to deal with challenges along with biodiversity credits, carbon offsets, impact investments, equities, crowdfunding, taxes, and lotteries.

Also, speakers from the climate fund and IGO expressed that the current PES system is a useful tool to achieve the ecosystem's sustainable management; for example,

"Maximisation of benefits from land resources do not cause ecological damage, economic risks and social disparity. The approach combines maintaining and enhancing condition of land which is still in good health, as well as restoration of the already degraded land (Inter Press Service (Johannesburg), 2017)*"*
"If I were a millionaire, I wouldn't have all my money in the bank. I would be using it (Dwyer, 2019)*."*

Furthermore, one banker mentioned the importance of commodification to provide sensible data to policymakers.

"The bank believes that creating monetary values for its forests, water resources and natural energy sources will enable better measurement and management of the country's environmental policies (Dwyer, 2019)*"*

The solution proposed by this discourse is more segmented commodification of nature value, the inclusion of financial industries to the PES policy to create a green bond, motivating other sectors to private funds for the PES system to make blended economic benefits, and collaboration of PES-related actors. References to the proposed solutions can be found in various statements.

"The challenge, however, is the pipeline of investable projects, and that needed new partnerships and collaboration (Avery, 2018)*."*
"Global goals are becoming more ambitious as the world is moving towards China 2020, and most of the funding for these goals won't be provided by traditional providers. The only way to meet them is to leverage other sectors and use private and blended finance (Dwyer, 2019)*."*
"It may require a form of blended finance whereby the private sector steps in at the end (Avery, 2019)*."*

This discourse is used by five speakers: three bankers, one IGO, and one Climate fund. All of the speakers in the pro-neoliberal market discourse highlighted the environmental goal of PES rather than improving local livelihoods by implementing PES. Also, four speakers expressed a positive impression of the PES policy, and only one had a neutral position. All constituents of pro-neoliberal market discourse recognized PES is being administered by or proposed to be implemented by the private market.

4.2.3. Responsibility discourse

Responsibility discourse is the third discourse from the analysis. This discourse demands a more substantial responsibility for environmental degradation globally, especially from developed countries. Although the responsibility discourse holds an analogous problem definition with the pro-neoliberal market discourse that perceives economic development as triggering deforestation and other environmental problems, in the responsibility discourse, these adverse effects are the consequence of the negligence of societies toward environments rather than unintentional consequences of anthropogenic activity. Consequently, this discourse describes that the cause of current deforestation is a shortage of active awareness of developed worlds to deforestation caused by industries and other actors.

Similar to conservation pipeline discourse, the responsibility discourse perceives PES as a promising policy tool to conserve biodiversity. This discourse stressed the cost-effectiveness of PES by comparing the implementation cost of PES with spendings for other purposes.

For instance, one speaker mentioned:

"To contextualize the current $50 billion spending figure, RodrÃguez* points out that the US spends $70 billion annually on pet food (Dwyer, 2019)*"*
* RodrÃguez: Costa Rica's minister of environment

Besides, this discourse criticized the indifference of wealthy countries towards PES funding.

For example,

"The "missing piece" in combating global deforestation is not good ideas, but funding from wealthy countries (Hance, 2017).*"*

"He describes that price as: "An insult to anyone who is working to stop deforestation." It is not only fair but necessary to share the maintenance cost of the natural capital that we still have, and it is essential for the long-term survival of the planet (Dwyer, 2019)*"*

In addition, this discourse believes that the biodiverse country's recent endeavor may constrain their potential for economic growth; thus, more funding from wealthy countries is necessary for the successful implementation of PES.

"Costa Rica's reforestation to 52.6% coverage is a great effort, but it obviously represents a constraint on the potential productive use of this landscape. That's why it is necessary to support developing countries such as Costa Rica, so they persevere in their efforts to preserve the ecosystems and associated biodiversity (Dwyer, 2019).*"*

The solutions proposed in this discourse are grounded on global society's responsibility, such as increasing PES funds and donations from developed countries, introducing a tax form globally to secure the PES implementation budget.

For example,

"Obtaining sufficient financial backing from developed nations for so-called mega biodiverse countries would be the key sticking point in the agreement (Greenfield, 2020).*"*

"There should be an international financial mechanism," he says. "Initially it would be fund based. Today, however, global policymaking lags surprisingly far behind (Dwyer, 2019).*"*

The responsibility discourse is embraced by five speakers: two Governments from recipient countries, one IGO, one climate fund, and one NGO. The coding showed that all speakers of this discourse prioritized environmental objectives of PES rather than local livelihoods. Also, most speakers supporting this discourse described the PES system positively as they expressed that PES policy is a promising tool for combatting environmental degradation, while one speaker expressed a neutral tone towards PES. Besides, this discourse is fully supported government-based PES.

4.2.4. Local livelihood discourse

The fourth forest PES discourse is local livelihood discourse. This discourse was raised by only one speaker: an NGO. The content analysis result has shown that this speaker prioritized the PES role of improving local livelihoods more than an environmental goal. Moreover, this discourse expressed neutral valence towards PES policy. Although only one speaker was identified for the local livelihood discourse, this discourse's core value was different from the others in that the discourse argues for improving local livelihood. Therefore it was considered to be different from the other discourses.

This discourse's core belief is that securing local livelihoods is the most crucial factor for addressing environmental issues, such as deforestation. The local livelihood discourse believes that stricter law enforcement constrains local people's living. Hence, this discourse concerns the adverse effects of PES when strict administration continues.

"Trying to solve this problem through strict laws doesn't always work (Plumer, 2018)*."*

Therefore, the solution proposed by this discourse is including measures that improve livelihoods by developing a PES program that takes into account the needs of local people. Also, it is argued by this discourse that studying the effectiveness of PES policy is a way to figure out the necessity of local people.

For example, the speaker of local livelihood discourse argued:

"You have to build a program that takes into account the needs of people on the ground (Plumer, 2018)*."*

4.3. Similarities and differences within identified discourses

The findings from this study indicate that there are differences, but also significant similarities between the discourses.

4.3.1. Similarities between discourses

Overall, the majority of speakers in global media describe PES with a positive tone. Although various problems of PES were raised, the general expression of PES was dominated by a celebratory valence. This result may imply that PES discourses in global media positively viewed the PES policy.

Each discourse also shows a strong link between favored solutions and perceptions of PES factors. This may imply that support for a specific discourse by particular stakeholders can significantly impact PES treatment choices. For example, an increasing fund for PES promotion is favored by the conservation pipeline and the pro-market neoliberal market, as well as by the responsibility discourse. While these discourses support different PES types

(e.g., Market-based PES vs. Government based PES), they agreed that more PES investment is essential to promote PES.

Another salient commonality of the identified discourses is the argument that calls for more collaboration with PES-related stakeholders, supported by conservation pipeline, pro-neoliberal market, and local livelihood discourse. For instance, one speaker from the conservation pipeline discourse stated:

"All parties with a stake in Belum-Temengor must do their part to ensure the survival of the rainforest (Summit Discusses Belum's Survival, 2018)."

From the pro-neoliberal market discourse, the following statement was identified:

"As a bank, we are good at intermediating money, building a network and structuring financial products. But we don't necessarily have scientific expertise around which projects will work and how to build them. That's why for any financial institution looking at conservation finance, joining a community is crucial (Avery, 2018)."

Also, a speaker from the local livelihood discourse mentioned:

"You have to build a program that takes into account the needs of people on the ground (Plumer, 2018)."

Besides, the conservation pipeline and the pro-neoliberal market discourse emphasized the necessity of more specific data either regarding the efficacy of PES or the financial value of nature. They commonly argued that PES's current lack of study prevents policymakers and funders from participating and strategic decision-making towards the PES scheme.

Lastly, all discourses except for the local livelihood discourse prioritized the environmental goal of PES rather than improving the local livelihood purpose of PES.

4.3.2. Differences between discourses

In terms of differences in discourses, some contrasting views between speakers were identified. First, the conservation pipeline and the local livelihood discourse had a conflicting view of governmental enforcement against illegal actions. For instance, conservation pipeline perceives local people's unlawful actions as a barrier for successful PES; thus, this discourse supported stricter enforcement to illicit activity, such as illegal logging and poaching. On the other hand, local livelihood discourse doubts the effectiveness of government enforcement. Instead, the local livelihood discourse argues that developing PES programs that improving local livelihoods are more crucial than governmental enforcement.

Second, the pro-neoliberal market discourse, the responsibility discourse, and the conservation pipeline discourse had conflicting views on funding sources. For example, the pro-neoliberal market discourse showed confidence in the market economy's power for solving environmental problems, and they supported the market-based PES mechanism. On the other hand, as the responsibility discourse argued in favour of global responsibility on the environmental issue and increasing tax form globally, this discourse defended government-based PES. Besides, although the conservation pipeline discourse did not have a concerted view on the funding source, most speakers except for one speaker from this discourse supported government-sourced PES more than market-based PES.

5. Discussion

This chapter first of all reflects upon the different parts of this research. Section 5.1 provides reflections on the results, section 5.2 reflects the theories utilized in the study, and section 5.3 reflects upon the methodology of this research. In section 5.4 the implications of this study are provided. Lastly, section 5.5 discusses the contribution of the study and suggests the direction of future research.

5.1 Reflection on results

This study found four different discourses, i.e., (1) the conservation pipeline discourse, (2) the pro-neoliberal market discourse, (3) the responsibility discourse, and (4) the local livelihood discourse. This study might not have captured all the relevant PES factors from the global media, so the results have to be interpreted with care. However, the findings may provide some keys for the PES debate, compromise PES solutions between diverse PES discourse groups, and contribute to the contextualization of opinions regarding current PES practice appeared on global media.

The identified discourses resonated with, but sometimes also contradicted a number of existing studies on PES. First of all, this study's results can be compared with the findings of Moros et al. (2020) in terms of identified discourse groups. The PES discourse analysis in Colombia identified three discourses: Contextual conservation, Conservation conduit, and Inconvenient conservation. Similar to this study, the general valence towards PES was relatively positive in the contextual conservation discourse and the conservation conduit discourse because of the notion that PES is a new source of income that can promote both economic growth and conservation in rural communities, and PES can supplement other conservation and land use management policy (Moros et al., 2020). On the other hand, unlike this study, the inconvenient conservation discourse explicitly criticized the PES scheme because it perceives that PES will weaken the pro-environmentalists' motivation and increase third-party control of environmental resources (Moros et al., 2020). In addition, the discourses of Moros et al. (2020) were distinguished by various factors of PES (e.g., PES with motivations, mechanisms to halt environmental degradation, cost-effectiveness of PES, and negative effects of PES). Although some of these elements were also found to be of importance in the discourses found in this study (e.g., cost-effectiveness of PES and negative effects of PES), by exploring the discourses broader, this study was able to distinguish discourses also based on the speakers' general opinions towards PES.

One of the main PES discourses found in this study is the conservation pipeline discourse. Within this discourse, scientists strongly favored the PES mechanism. This is in sharp contrast with scientists' view from the study of Moros et al. (2020), where all of the scientists are opposed to and criticized PES. This disparity may imply that stakeholders from a similar position can have diverse opinions depends on the context.

The pro-neoliberal market discourse is another one of the discourses distinguished in this study. It was notable that in contrast to some academics' criticism of PES's neoliberalism (Büscher, 2012; Van Hecken, Bastiaensen, & Windey, 2015) and lack of robust pro-market perspective from other studies (Moros et al., 2020; Sandbrook et al., 2013), the pro-neoliberal market discourse is identified as one of the main PES discourses raised by global

media. This result can be interpreted as this discourse's consideration on PES funding source is more on the stability and quantity of funding than the intrinsic ethical issues that market mechanism may cause.

The responsibility discourse is the third discourse found in the study. This discourse's core argument is that more funding from developed countries is essential because biodiversity conservation may confine the potential for biodiverse countries' (i.e., developing countries) economic growth. The central reasoning of the discourse resonated with the findings of (Daw et al., 2011): in developing countries, where the socioeconomic disparity between ES providers and ES beneficiaries is generally large, PES is viewed as a mechanism for accounting for the unfair distribution of conservation benefits and costs. This perspective may also assume that the lack of ES provision is due to market failure, which can be resolved in current socioeconomic systems (Pascual et al., 2010). Considering that biodiverse countries are the main places for the PES implementation (Salzman et al., 2018), contemplation upon this discourse's argument is essential for harmonizing the different discourses and potentially, make PES more effective.

The fourth and the smallest discourse in the study was the local livelihood discourse. It is worth mentioning that there was no strong emphasis on improving local livelihood in the discourses of global media, even though the collaboration with local people and consideration of the needs of local residents is one of the crucial factors for the successful implementation of PES (To et al., 2012). The result may suggest that the local people have weak media standing, and the current forest PES discourse may overlook the significance of considering local livelihoods for the PES implementation (Jackson & Palmer, 2015).

Illustrating the main similarities and differences of the discourse identified is believed to be a critical step in this research, as the procedure can encourage further cooperation and dialogue on the PES discourse (Moros et al., 2020), as discourses serve to raise awareness among practitioners, researchers, and interested parties of the various mechanisms, trade-offs, and presumptions in environmental governance (Zinngrebe, 2016). Also, prevailing views extracted across different discourses can be interpreted as a discourse that can potentially perform an action, and opposing views of distinct discourse speakers can potentially be the source of debate. This study found more similarities than differences across different discourses, and the result may imply that there are possibilities of cooperation among discourses.

Regarding the similarities within the discourses, the results show that positive tones dominate forest PES discourses in global media. This finding resonates with the growing reference of PES as a policy instrument which can be viewed as an outcome of "general disenchantment with the traditional command-and-control framework" (Rodríguez de Francisco & Boelens, 2015). This is supported by the expansion of an influential epistemological PES community that encourages the success stories of PES, not always grounded on empirically validated data (Büscher, 2012; Van Hecken, Bastiaensen, & Huybrechs, 2015). This tendency is noticeable not only within this discourse study of the PES but is also evident, for instance, in the study illustrating the PES discourse of Colombia (Moros et al., 2020). The trend is also found in the literatures on propagating pro-market thoughts and pro-PES policy among the U.K. and the U.S. conservation experts (Blanchard et

al., 2018). This tendency also matches forest-related global discourses review results, which identified the enhanced dominance of economic theories and notions in a particular forestry discourse on forestry (Leipold, 2014).

Additionally, it was found as a common point that all discourses agreed that more PES investment is essential to promote PES. This homogeneous point can be a significant source of PES debate, as the issue of the increasing fund is supported by the actual field study that identified funding as a significant issue facing PES execution (Sheng et al., 2020). Besides, it was found that the conservation pipeline, the pro-neoliberal market, and the local livelihood discourses call for more collaboration with PES stakeholders. Reflecting upon To et al.'s (2012) PES case study of Vietnam, participating actors' asymmetric benefits from the PES scheme with a low level of cooperation is one of the hampering factors of successful implementation of the scheme. Also, emphasis on collaboration in the discourses partly shares a consensus with Hayes et al.'s (2015) research that argues increased participation from local people can be a solution for the uncertainty of PES.

Calling for more specific data regarding the efficiency of PES and the financial value of nature was another common argument across the discourses. This commonality resonates with the statement that the efficiency of PES is underrepresented in most PES studies (Salzman et al., 2018), also with the view of Redford & Adams (2009), which articulated the skepticism of PES is primarily based on a deficiency in technical details regarding PES. The argument commonly raised by those two discourse groups should be considered since "there is currently a significant discrepancy between the valuation of ES and the PES designing, which is expected to persist" (Pirard et al., 2010a).

The last commonly argued point among discourses is that most discourses prioritized environmental goals rather than improving the local livelihood purpose of PES. This point is also a significant factor to be considered in the PES debate because it is argued that poverty reduction should be addressed separately from the PES scheme (Kinzig et al., 2011). Similarly, it is also known that PES targeting poverty reduction and environmental goals have significant trade-offs (Alix-Garcia & Wolff, 2014). However, since local people's participation is a crucial factor for the successful PES implementation (To et al., 2012), prioritizing PES goals has to be handled with care in the context of different PES targets on-site.

5.2 Reflection on theory

Guided by discourse theory and specifically media discourse theory, this study explored recent forest PES discourses in global media and identified similarities and differences, but not without challenge.

First of all, Foucauldian discourse theory primarily argues that discourse is a power conveyed by words spoken in a particular context which shapes how people interpret reality (Stahl, 2004). Based on numbering and comparing the particular views, this study was able to spot that there are different discourses exist. While Foucault offered this study with an inspiring perspective, a number of challenges were encountered using Foucauldian discourse theory. First, the study had a limitation in relating discourse and social practices. Foucault's discourse theory's critical aspect is an interpretation of discursive practices and strategies between actors and the discourse (Gottweis, 2003; Winkel, 2012). However, the relationship of discourse and social practice remains unknown in this study because the identified

discourse does not reach the realities in terms of how each stakeholder is strategically performing discourses. More blended analysis (e.g., ethnographic observation combined with discourse analysis) will add more insight to figure out the linkage between discourse and social practice (Krzyżanowski, 2011). Also, matching the appropriate analytical method with Foucault's theory of discourse was a challenge. This is because Foucault's perspective on discourse is more like a philosophical view of the world than an applicable analytic theory or framework (Winkel, 2012), which does not provide a clear and practical guideline of the analysis to the researcher.

By the guidance of media discourse theory, this study identified PES stakeholders with robust media standing and marginalized media standing by analyzing particular actors' appearance in the media as speakers (Sadath & Rahman, 2016) and those of stakeholders' discourses. It was found that speakers who appeared on news articles actively engaged to represent their interests; however, this study was confronted with the challenge of defining and generalizing the center actor and peripheral actor, as suggested by Kleinschmit & Krott (2008), in the context of forest PES. Nevertheless, by using media as a source of analysis, this study facilitated understanding various PES stakeholders' viewpoints with different interests and social positions.

Despite the aforementioned limitations, the choice of the theoretical frame satisfied the intention of the study. Thus, this research recognized forest PES discourse generated by global media and the stakeholders' standings within the media, which can contribute to understanding the global media's view towards forest PES.

5.3 Reflection on methodology

One limitation in the methodology of this study is the number of news articles used. Even though the selected news article samples are believed to provide an insightful perspective on forest PES discourse (n=19), the study's external validity (i.e., the extent to which the causal relationships are generalizable to different time-frames, settings, and people) may not be fully satisfied to generalize the PES forest results on a global scale (Steckler & McLeroy, 2008). Despite being limited in the numbers of papers included in the analysis, this study was able to extract distinguishing media discourses. Still, further exploration of the media could be recommended to increase the number of news articles from different media sources to enhance future research results' external validity. However, it is essential to mention that it was challenging to find useful news articles that fit the research aim and share relevant information to conduct an accurate analysis. This is because, as the content analysis result suggested, forest PES is not holding a distinguished position from other PES policy on the media, thus adding a specific keyword to achieve forest PES-related news data, such as 'forest,' 'carbon,' and 'REDD' significantly confined the number of attained data.

Another methodological limitation is the analytical method based on the study's qualitative nature characteristics. This is because the method may not be sufficient to identify all factors that may be significant to the forest PES. According to Bengtsson (2016), there is no consensus on which definitions to evaluate the findings' trustworthiness should be used or how best to determine the quality of research based on content analysis. From a qualitative perspective, some scientists believe that the collection of parameters and concepts is

required (e.g., credibility, dependability, and transferability) to increase the qualitative study's trustworthiness (Catanzaro, 1988; Graneheim & Lundman, 2004).

(1) Credibility refers to the analysis process, that is, to establish how the data and the analytical procedures are carried out and guarantee that data analysis covers the intentional focus of research (Graneheim & Lundman, 2004). Credibility can be improved by choosing research subjects with diverse backgrounds, which increases the likelihood of elucidating the research question from various stakeholders' views (Denzin & Lincoln, 2008). In this study, analyzing news articles from different major world publishers reflects diverse views contributed to find a richer discourse variation.

(2) The second term, dependability, refers to continuity: the degree to which data changes over time and the changes made to the researcher's decisions during the analysis process (Bengtsson, 2016). The aim here is to keep track of coding decisions, and the researcher must use notes to monitor changes in progress, as re-coding and re-labeling are often required during the process (Graneheim & Lundman, 2004). In this research, the dependability issue is believed to be handled using ATLAS ti software, thanks to ATLAS ti's unique function that provides traceable analysis procedure (Mayring, 2004).

(3) Transferability means the extent to which the research findings might be relevant to other environments or groups and the number of informants or research items. The sample's representativeness decides how generally applicable the findings would be (Krippendorff, 2018). Typically, qualitative approaches do not assert generalizability, as generalizability is often an indicator of external validity for quantitative methods (Curtin & Fossey, 2007). However, qualitative research results should be transferable to be credible or authentic (Curtin & Fossey, 2007). To promote transferability, a detailed explanation of the research (e.g., context, selection, and attributes of research subjects, data collection, and the analysis process) should be provided (Graneheim & Lundman, 2004). The clear descriptions would enable readers to decide if the results can apply to other contexts or to help readers compare the results with other research outcomes (Curtin & Fossey, 2007; Graneheim & Lundman, 2004).

Even if the analysis was carried out with the factors mentioned above in mind, it has to be admitted that the results of qualitative analyses are often unlikely and difficult to reproduce the outcomes since the results are taken from a particular context (Krippendorff, 2018). Also, It has to be acknowledged that certain practices in the PES field can remain unexplored from the researcher's perspective if the researcher is new to the research background (Flick, 2018). Nonetheless, it is essential to mention that this study's qualitative approach facilitated an in-depth understanding of the retrieved news contents (Choy, 2014); thus, it could extract PES issues and distinguish the discourse groups.

5.4 Implications for forest PES policy and stakeholders

By identifying the desired solutions, commonalities, and differences identified from diverse discourse groups, suggestions and sources of considerations for further action may be proposed to PES stakeholders.

First, based on the findings, this study may suggest that there are possibilities of cooperation of different discourses. For example, the conservation pipeline discourse and the pro-neoliberal market discourse shared all of the common points within different discourses (e.g., necessity of increasing PES fund, more collaboration, more PES data, and prioritization of environmental goal of PES). Although these two discourses showed a disparity in terms of preferred funding source (e.g., government-based PES vs. market-based PES), these two discourses can potentially collaborate since they both primarily concern more collaboration of PES stakeholders and share other commonalities.

A specific stakeholder may bridge the gap between the discourses with conflicting views. For instance, the conservation pipeline discourse and the local livelihood discourse are contrasted in terms of governments' enforcement (e.g., strong restriction vs. less restriction). A journalist from the conservation pipeline discourse can connect these two discourses because the journalist has a common point with the local livelihood discourse in that they both strongly supported prioritization of local livelihood of PES. The study results can also suggest that there is a probability of collaboration at a stakeholder level. An example can be scientists from the conservation pipeline discourse and bankers from the pro-neoliberal market discourse. Both stakeholders argued that there is a need for specific data for the PES implementation. Even though the favored type of data is different from each stakeholder (e.g., a case study of PES efficiency vs. segmented nature commodification), they can cooperate since both stakeholders aim to increase the PES scheme's effectiveness.

In addition, by recognizing the importance of increasing PES funding, this study can suggest some practical recommendations. First, there is a more comprehensive understanding of how to enhance the funding source is required. Although the lack of PES funds is a significant issue found in this study, the problem of 'whom to pay' or 'how to pay' for the fund is not mentioned in the news articles. This should be designated through active negotiations with related stakeholders. Besides, even though the importance of the length of the funding period was not highlighted in the news articles, the funding length is a crucial factor of successful PES execution because the long-term effect of PES enrollment with a comparatively shorter period is unclear; thus, it may cause adverse effects in the end (Núñez-Regueiro et al., 2019). Therefore, the funding period issue should also be taken into account to negotiate on the PES decision-making process.

In response to the call for responsibilities for environmental degradation on a global scale, wealthy nations' collective action to provide monetary assistance can be considered an option. Accordingly, to increase PES funding from developed countries, recipient nations may consider setting up national agencies independent from national government powers to minimize corruption issues of concern to donor countries (Kronenberg & Hubacek, 2013). The importance of handling the corruption issue is well supported by the study that revealed that the integration of PES with local politics ameliorates unjust social structures and weakens the long-term advantages of PES programs for local people (To et al., 2012).

Last, this study provides pragmatic implications for marginalized speakers in the field of PES; local communities. It is noticed that local people's media standing is significantly underrepresented in the current media discourse of the forest PES. To promote their benefits and causes, local community groups need to become more prominent in the media

(Bielsa & Bassnett, 2008). For example, by providing more newsworthy information, they can access mainline news media.

5.5 Directions for future research

This study contributes to the current state of knowledge by exploring forest PES discourses; this study explains the debate on how PES stakeholders view the approach. This study is among the first empirical study to explore how the international presses have reflected diverse opinions and still assess forest PES, which has not yet been investigated. In terms of methodology, this study analyzed media discourse using Foucault's discourse theory from a forest PES perspective. Hence, this study can be one of the example discourse research in the field of forest PES.

However, this study left several aspects to be supplemented from future research. First of all, there is a need of more study in terms of efficiency of PES. Although most speakers favor the PES scheme, the PES interventions currently advocated are primarily untested. Although some studies exist on PES efficiency, scientific proof of PES effectiveness is hard to obtain (Salzman et al., 2018). Especially the long-term effects of PES implementation are unknown (Núñez-Regueiro et al., 2019). As a result, it is found in the news article that policymakers and funders hesitate in decision making and participating in the PES scheme (Avery, 2019; Plumer, 2018). In order to make PES more efficient, this study suggests more longitudinal and large-scale studies by scientists that can build traceable data on the efficacy of PES, and more segmented commodification by the financial industry, along with epistemological communities, will provide more insight into the PES approach.

This study only took a snap-shot of the global media discourse on forest PES by examining the content of newspapers published by major world publications. Further investigations of the media discourse on forest PES can benefit from investigating how PES is described in medium- and small-scale print media or how the media discourse on forest PES has shifted over time. Aside from the conventional mass media, such as newspapers, the Internet space has been considered a potential public area for a social conversation comparatively independent of the traditional media and the government and traditional media (Rosen, 2010). In addition, professional publications, such as scientific articles are valuable sources that provide a less-biased answer on the subject and offer information based on evidence for the practice and policy (Petticrew & Roberts, 2008). Therefore, exploring PES discourse through both the Internet and professional publications will supplement a comprehensive understanding of how the PES forest is conceptualized and negotiated in the other medium. Although analyzing media content is necessary to understand the media attention of forest PES, conducting interviews with news reporters or media professionals may provide first-person viewpoints and ultimately highlight the inside story behind the global news coverage of forest PES.

Besides, given that a forest PES's discourse is continually being formulated and negotiated by diverse stakeholders, future study needs to investigate how the relationships and discussions between diverse key-actors developed over time. Case studies on particular PES issues may help spotlight the developments in the discourses advocated by various stakeholders and how these discourses form and communicate with one another. Significantly, studying marginalized local communities' discourse will shed new light on their

needs and determine the practical implications of PES policy. Also, this study had a limitation on identifying center actors and peripheral actors in the PES context. To identify and define actors' positions, a document study with a more extensive timeline and more in-depth research, such as interviewing key actors of PES, will be necessary. The precise identification of center actors and peripheral actors of PES will facilitate a more systematic understanding of PES stakeholder's view for more effective PES policy decision making and nourish some insights for future PES discourse analysis studies. Finally, since this study has limitations on the theoretical framework and methodology, it is desirable to carry out a similar study that might make up those limitations.

6. Conclusion

This study explored forest PES discourses from global media and investigated similarities and differences of these discourses. A content analysis method was used to extract and distinguish discourses' differences. Although study findings have to be carefully interpreted, the following can be concluded based on the research questions.

RQ 1. What are the main forest PES discourses in the global media?

Four main forest PES discourses were identified in the global media. (1) Conservation pipeline discourse perceived PES as a novel, ideal, and cost-effective measure for nature conservation, (2) Pro-neoliberal market discourse argues that the market mechanism should be promoted for PES, (3) Responsibility discourse contends that funding from developed countries should be increased, and (4) Local livelihood discourse prioritizes improving the local livelihoods over the environmental goal of PES and refusing stricter government enforcement.

RQ 2. What are the similarities and differences of discourses on PES in the global media?

This study found more commonalities than differences. In terms of commonalities, (1) positive valence towards PES, (2) favored solution for PES: Increasing fund, (3) Preferred treatment: more collaboration, (4) necessity of more detailed data of PES, and (5) prioritizing the environmental goal of PES more than improving local livelihoods were recognized. Regarding differences of discourses, views on (1) government enforcement against illegal actions, (2) funding sources were identified as contradicting points among discourses.

RQ 3. Which of these discourses on forest PES is dominant within the global media?

Due to the sample number issue, this research question should be answered with care. Still, conservation pipeline discourse was the most dominant discourse on forest PES within the global media with six speakers.

In conclusion, the four forest PES discourses identified in global media reflect today's relatively high PES acceptance as a nature conservation policy tool. Today, PES is seen in international media as a practical approach for nature conservation. PES policy's positive valence implies that PES initiatives are likely to increase in number and geographic reach if investment and other institutional requirements are fulfilled, such as well-funded enacting institutions, more collaboration with donor countries, and sufficient participation by communities and PES stakeholders.

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8. Appendix
Appendix 1. Overview of retrieved articles

Media	No.	Date	Author	Title
Euromoney	1	October 8, 2018	Helen Avery	Meet the champions of global impact banking
	2	October 8, 2018	Helen Avery	Impact banking champion: Fabian Huwyler, Credit Suisse
	3	October 28, 2019	Helen Avery	Conservation finance: Can banks embrace natural capital?
	4	October 28, 2019	Rob Dwyer	Conservation finance: Costa Rica costs its success
The Guardian	5	July 28, 2017	Jeremy Hance	We know how to reduce deforestation – so where's the money?; Paying people not to cut down trees works, evidence shows – so can we really afford not to do so?
	6	March 19, 2018	Jonathan Watts	Water shortages could affect 5bn people by 2050, UN report warns; Conflict and civilisational threats likely unless action is taken to reduce the stress on rivers, lakes, aquifers, wetlands and reservoirs
	7	March 2, 2020	Patrick Greenfield	Rich countries could be asked to pay billions to protect biodiversity; NGOs express disappointment with ambition of UN talks on global nature agreement
The Christian Science Monitor	8	July 21, 2017	Eoin O'Carroll	Should we pay people not to cut down trees?; A two-year study in Uganda helps ease some of the biggest concerns about programs that pay landowners to leave natural resources untouched
	9	August 21, 2020	Lindsey McGinnis	Point of Progress: Esselen Tribe reclaims land, and more; In good news this week; After closing a $4.5 million deal, the small tribe will regain control over ancestral territory – plus more positive stories
The New York Times	10	July 20, 2017	Brad Plumer	A cheap fix for climate change? Pay people not to chop down trees
	11	July 21, 2017	Brad Plumer	To slow deforestation, study offers an easy fix
New Strait Times	12	September 28, 2018	Not recognizable	Summit discusses Belum's survival
	13	July 25, 2020	Dr. A. Aldrie Amir	Ban conversion of mangroves
The Independent	14	November 21, 2020	Not recognizable	Conservationists unite in unique declaration to step up the fight to protect wildlife
London Evening Standard	15	November 21, 2020	Not recognizable	The full declaration made by the Wildlife Conservation 20 to global leaders at the G20 Summit
The Nation	16	June 20, 2018	M Wade Million	Sustainability redefined
The Australian	17	August 9, 2019	Graham Lloyd	Go vegetarian to limit climate change: IPCC
Africa News	18	August 29, 2017	Inter Press Service (Johannesburg)	Africa; Protecting africa's drylands key to the continent's future
Farmer's Weekly	19	December 20, 2019	Jonathan Riley	Grant deadline looms for Devon environment scheme

Appendix 2-1. Discourse: Conservation Pipeline

Article no.	Speaker	Key Quotation
5	Scientist	"We needed better evidence about how well this approach worked in order to know if we should be scaling it up or rethinking it"
		"I'm not surprised that the programme reduced deforestation, but I am very surprised by how big the impact was"
		"Study would inspire others working on conservation to evaluate their programmes' impacts through 'field experiment"
		"Many of the ideas under the new conservation philosophy banner - such as PES - have not been rigorously tested, despite being implemented by many of the world's largest conservation groups"
		"Unfortunately, the funding for the Uganda initiative has run out, but Jayachandran hopes that its success will convince funders to kick-start it again"
8	Scientist	"I think this study is very well executed and provides important and rigorous evidence on a policy topic that has received quite a lot of attention"
		"So if PES turns out to be a cheap way to help avoid deforestation, then it should certainly be on the table"
11	Scientist	"It's shocking that foundations aren't willing to fund more studies like this"
		"Controlled experiments can be expensive to set up. But without them, economists have been unsure whether forest payment programs in places like Costa Rica are having any impact"
9	Government	"Unlike its neighbors, the small Central American country Costa Rica has regrown most of the land. It did so by pairing a ban on deforestation with payments for ecosystem services, financed mainly by a fossil fuel tax"
		"Over the past 20 years, the government has paid $500 million to landowners, and it's how many farmers in Costa Rica make an income"
		"We have learned that the pocket is the quickest way to get to the heart"
12	NGO	"Topics - such as new directions for ecotourism, payment for ecosystem services were discussed"
		"All parties with a stake in Belum-Temengor must do their part to ensure the survival of the rainforest"
		"Research and conservation organisations such as WWF-Malaysia and MNS are actively promoting the rainforest's importance, and other groups such as Yayasan Emkay have been reaching out to local indigenous communities"
		"If we are to see any improvement in BTRC's conservation efforts, stricter enforcement of laws is needed. The federal and state governments must play a larger role in eradicating illegal logging and poaching"
16	Journalist	"The PES concept involves local communities in restoring and maintaining these important ecosystem services in return for financial incentive. There are multiple benefits to this model"
		"Innovative approaches Pong Krai village has taken to maintain that balance between economic development and nature conservation"
		"Pong Krai village is only one example of how sustainable human living and biodiversity conservation can be successfully achieved within Unesco Biosphere Reserves, providing insights that can be applied to other Biosphere Reserves and communities around the world"
		"By committing to ongoing research and understanding of natural

systems and the resources they provide, innovative solutions that
allow for sustainable development in balance with nature will
continue to evolve"

Appendix 2-2. Discourse: Pro-neoliberal Market

Article no.	Speaker	Key Quotation
2	Banker	"The conservation finance world is relatively straightforward, and while conservation finance is itself small right now, it has the potential to grow massively over the next few years"
		"The challenge, however, is the pipeline of investable projects, and that needed new partnerships and collaboration."
		"To move large-scale financing towards protecting and restoring natural resources, financial institutions need to be able to put a price on nature so they can begin to understand the risk and opportunity that nature-related investments hold"
		"As a bank, we are good at intermediating money, building a network and structuring financial products. But we don't necessarily have scientific expertise around which projects will work and how to build them. That's why for any financial institution looking at conservation finance, joining a community is crucial."
3	Banker	"Companies are slowly starting to understand their impact on natural capital and ecosystems through their supply chains, and are wanting to transition those to be aligned with the UN's Sustainable Development Goals, which includes helping preserve our natural resources. Where we as a financial industry can play a role is by helping them do that"
		"Biodiversity credits, carbon offsets, payments for ecosystem services, impact investments, bonds, equities, taxes, lotteries, crowdfunding. We have to be open to it all.
		"It may require a form of blended finance whereby the private sector steps in at the end"
4	Banker	"The bank believes that creating monetary values for its forests, water resources and natural energy sources will enable better measurement and management of the country's environmental policies"
		"We decided to produce multiple sets of accounts to build a time series and enable us to see how policy impacts on these physical resources"
		"Those responsible for developing environmental accounts need to focus on how to make them accessible and of interest to policymakers, otherwise they are only used by a couple of researchers"
		"You need to socialize the accounts in an attractive way"
4	Climate Fund	"We are lagging far behind the international commitment"
		"If I were a millionaire, I wouldn't have all my money in the bank. I would be using it.
		"Global goals are becoming more ambitious as the world is moving towards China 2020, and most of the funding for these goals won't be provided by traditional providers. The only way to meet them is to leverage other sectors and use private and blended finance"
		"Conservation finance is always an innovative field, and the future will require organizations like FCRA working with strong, private-sector companies to unleash more capital that is aligned to our sustainable goals"
18	IGO	"Maximisation of benefits from land resources do not cause ecological damage, economic risks and social disparity. The approach combines maintaining and enhancing condition of land which is still in good health, as well as restoration of the already

degraded land"

"There is need for 'win-win' approaches with multiple short- and long-term benefits in combating land degradation, as well as restoring or maintaining ecosystem functions and services, thereby contributing to sustainable livelihoods and rural development"

"There is a need to sensitize and motivate the private sector to invest in SLM, Payment for ecosystem services should be promoted as way of giving incentive to the communities to use land in a sustainable manner"

Appendix 2-3. Discourse: Responsibility

Article	Speaker	Key Quotation
4	Government	"On a global basis, we need to be mobilizing at a minimum $150 billion a year "" equivalent to about 0.8% of GDP "" to fill the gap between current funding for nature conservation and what is needed"
		"To contextualize the current $50 billion spending figure, RodrÃ-guez points out that the US spends $70 billion annually on pet food"
		"He describes that price as: "An insult to anyone who is working to stop deforestation." It is not only fair but necessary to share the maintenance cost of the natural capital that we still have, and it is essential for the long-term survival of the planet"
		"The planet needs [other countries to] develop something very similar to what we have done"
		"There should be an international financial mechanism," he says. "Initially it would be fund based. Today, however, global policymaking lags surprisingly far behind"
		"Economic development and conservation are not necessarily at odds with each other.Costa Rica was able to triple the size of its economy while we doubled the size of its forests and also while moving to almost 100% of renewable energy production"
		"Thanks to Costa Rica's efforts around restoring and conserving its natural areas, tourism has become an important economic force"
4	Climate Fund	"Costa Rica's reforestation to 52.6% coverage is a great effort, but it obviously represents a constraint on the potential productive use of this landscape."That's why it is necessary to support developing countries such as Costa Rica, so they persevere in their efforts to preserve the ecosystems and associated biodiversity"
		"It is not only fair but necessary to share the maintenance cost of the natural capital that we still have, and it is essential for the long-term survival of the planet."But for now, at least, local private-sector engagement with conservation finance projects is largely left to small project-based impact investments or the work of trusts and environmental funds"
5	NGO	"Paying people to keep forests standing can be a cost-effective way to reduce deforestation and thus fight climate change"
		"The "missing piece" in combating global deforestation is not good ideas, but funding from wealthy countries"
7	Government	"The negotiating team for Brazil, led by Leonardo Cleaver de Athayde, was particularly robust about the need for financial payments for ecosystem services"
		"Obtaining sufficient financial backing from developed nations for so-called mega biodiverse countries would be the key sticking point in the agreement"
7	IGO	"When you're talking about biodiversity, it's not just biodiversity, it's our life on this planet. If the loss of biodiversity continues at this pace, human beings won't be on this planet"

"It's about us assuring our survival here and for generations to come. So really, on that basis, why wouldn't more money be put there? It's for our own good"

Appendix 2-4. Discourse: Local Livelihood

Article no.	Speaker	Key Quotation
10	NGO	"Trying to solve this problem through strict laws doesn't always work"
		"You have to build a program that takes into account the needs of people on the ground"