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Article

## Do PES Improve the Governance of Forest Restoration?

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**Abstract:** Payments for Environmental Services (PES) are praised as innovative policy instruments and they influence the governance of forest restoration efforts in two major ways. The first is the establishment of multi-stakeholder agencies as intermediary bodies between funders and planters to manage the funds and to distribute incentives to planters. The second implication is that specific contracts assign objectives to land users in the form of conditions for payments that are believed to increase the chances for sustained impacts on the ground. These implications are important in the assessment of the potential of PES to operate as new and effective funding schemes for forest restoration. They are analyzed by looking at two prominent payments for watershed service programs in Indonesia—Cidanau (Banten province in Java) and West Lombok (Eastern Indonesia)—with combined economic and political science approaches. We derive lessons for the governance of funding efforts (e.g., multi-stakeholder agencies are not a guarantee of success; mixed results are obtained from a reliance on mandatory funding with ad hoc regulations, as opposed to voluntary contributions by the service beneficiary) and for the governance of financial expenditure (e.g., absolute need for evaluation procedures for the internal governance of farmer groups). Furthermore, we observe that these governance features provide no guarantee that restoration plots with the highest relevance for ecosystem services are targeted by the PES.

**Keywords:** Payments for Environmental Services; forest restoration; Indonesia; Cidanau; Lombok; watershed services; large-scale governmental programs; afforestation; incentives; multi-stakeholder agency

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## 1. Introduction

This article studies the implications of innovative funding instruments for forest restoration, acknowledging that an increasing proportion of lands are degraded in the tropics [1] and that private and market-oriented approaches are acknowledged for their potential ability to address environmental issues [2]. Admittedly, a number of economic approaches for natural resource management as a whole have been in existence for a long time (e.g., with incentives provided through fiscal policies, see [3] for an ambitious analysis that embraces a multitude of instruments), and land degradation is not a new phenomenon. However, the scale has changed dramatically and effective policies are today required more than ever. The search for these policies for forest and land management is influenced by a pervasive context of discourses presenting environmental services [4] as the way forward [5]. Thus, Payments for Environmental Services (PES), a direct application of the latter concept combined with market-oriented approaches, became the subject of many experiments [6] and the center of attention of scientists, practitioners and policy-makers. It essentially involves voluntary payments by the beneficiaries of a service to its providers, so long as pre-agreed conditions are met, hence relying on individual incentives to account for externalities in land-use decisions.

There are many ways to study their implications for forest restoration [7], e.g., effectiveness [8,9], equity [10,11], sustainability of funding [12] or even the risks of disappearing intrinsic motivations for the preservation of nature [13,14], to single out only a few examples among a rapidly growing literature. In this article, we are interested in the implications specifically related to governance [15], which is the focus of this special issue. Governance refers here to the number, nature and interactions of the stakeholders that are involved in the programs, and to the institutional arrangements that are put in place for funding and spending among land users. It is therefore as much a matter of participation and local politics as it is a matter of technical arrangements to make sure that funding is sustained and spending leads to effective outcomes for land management.

Previous research has emphasized the risks and challenges of forest restoration in Asia-Pacific when based on large-scale governmental programs [16]. Taking a political economy approach, the authors identified a number of governance challenges that might impede an effective implementation of forest restoration initiatives. Among these they cite the control of state agencies and the political connections of the main corporate actors, the existence of corruption practices and ultimately the risk that reforestation activities prioritize lands with natural forest cover (and hence forest conversion before reforestation). They conclude that “*tree-planting programs have been guided by forest rent distribution practices of state forest bureaucracies and by corporate accumulation strategies*” (p. 9).

We add to this analysis by looking at reforestation and forest restoration efforts from a different angle, with a focus on small-scale and privately-funded experiments based on the PES rationale. The latter payment schemes are indeed presented by some as particularly effective when applied to

restoration purposes [17,18]. On the one hand, PES schemes are reported to enable investors and practitioners to face high up-front capital needs and labor costs associated with tree plantations [19]. On the other hand, these schemes are assumed to provide farmers with technical assistance and economic incentives, which guarantee local participation in reforestation activities over time [20] and orient farmers' behavior towards forest restoration [19]. Besides, it is contended that PES will also be a critical new source of funding generated by public and private demand for ecosystem services [21] so as to financially support restoration activities [22,23].

Our study is a contribution to this debate about the compared merits of “traditional” vs. “innovative” approaches to forest restoration, from a governance perspective. It starts from the assumption that innovative instruments might provide better solutions for addressing the risks of embezzlement or corruption, as opposed to public programs, especially when the latter involve rent-seeking industrial corporate actors, as suggested by [16]. The distinction between these broad categories is somehow artificial and may not always be reflected by practice, but it still provides us with a starting point to conduct an investigation into the impacts that we can reasonably expect from any attempts to innovate funding and incentives in this domain.

The primary intent of our analysis is to answer the research question: “Do PES improve the governance of forest restoration programs as a basis for sustainable outcomes on the ground?”. To investigate the impacts and added value of PES programs, we study the characteristics of their governance. This research question is addressed through the analysis of two assumptions: first, that a defining feature of PES compared to public programs is the key role given to multi-stakeholder agencies in terms of fund management, which is important from a governance perspective and creates the conditions for all views to be expressed including those of environmental NGOs and local residents; and second, that another crucial PES feature is the specific contracts that involve land users and assign objectives to them in the form of conditions for payments. These specific contracts result from service beneficiaries being attentive to effective service provision due to their direct, if not vital, interest in success, and they might provide more guarantees for sustained impacts on the ground.

A major problem for this analysis is the confusion around the term *PES* itself, and the diversity of understandings and experiments that the term encompasses. This “category” of policy instruments includes various types with contrasting characteristics, some of which are reported to match the characteristics of public subsidy programs [24]. This finding was further documented in [25], who made the point that many PES schemes could also be studied from the perspective of traditional public policies except for their underlying justification based on the remuneration of environmental services. Besides which, in many cases PES schemes tend to refer to the way that funding is secured for a given forest restoration initiative, notably through trust funds, rather than to the way that land users are involved through contracts [26]. Hence, we see that no black and white situation exists and the multidimensionality of all these policies and policy instruments tends to disqualify any attempts to make rigorous distinctions.

We have attempted to bypass these methodological hurdles in two ways. First, by studying two cases that illustrate the other end of the spectrum from public and national restoration programs, in that they are local and privately funded. Second, by looking at both sides of the table, namely funding (how financial resources are collected) and incentive distribution (how financial resources are spent). These two sides are complementary and involve governance challenges of equal importance for success.

Funding determines the sustainability and scale of forest restoration efforts and can follow various paths from mandatory taxes to voluntary contributions; while incentive distribution determines the effectiveness of a scheme and can also take different forms, ranging from individually tailored contracts to flat subsidies.

Another source of confusion is the role of public authorities in “PES schemes”. Clearly all depends on the scope of these policy instruments and what schemes this category encompasses. The evidence so far suggests that public authorities keep a firm grip and maintain a central role in many of the market-based instruments for environmental services, which runs counter to the common belief of a “rolling-back” of the state [27]. This fact also provides justification for our investigation and empirical documentation of the changes—if any—of governance induced by new mechanisms for forest restoration, which can certainly not be taken for granted.

Before proceeding with the analysis, we need to make one additional remark concerning the forest restoration activities that are studied in this article. While being justified by their positive contribution to water services, their actual effect on ground water is complex and controversial. The “*more trees more water*” myth is discussed and challenged in the literature [28–32], yet some recognize that forest cover might have positive impacts on infiltration in smaller scale catchments [33] with steep [34] and degraded soils [31,33]. Examples of improved groundwater storage are indeed documented in tropical forests [31,35]. The scope of our article is limited to the governance of a few restoration activities that are assumed by stakeholders to provide water services; it does not include a discussion of the impacts of forest cover on water. We only observe that forest restoration activities are undertaken based on their assumed capacity to increase the availability of groundwater in the dry season, which is an assumption that runs counter to some evidence in the literature [29,31,32].

In order to assess the reality of institutional changes in PES-related restoration schemes, we undertook field research in two of Indonesia’s most prominent PES experiments, one in the Banten province west of Java (Cidanau) and the other in the island of Lombok in the eastern part of the country. The next section provides details about the chosen case studies and our analysis methods before presenting and discussing results.

## 2. Case Studies and Methods

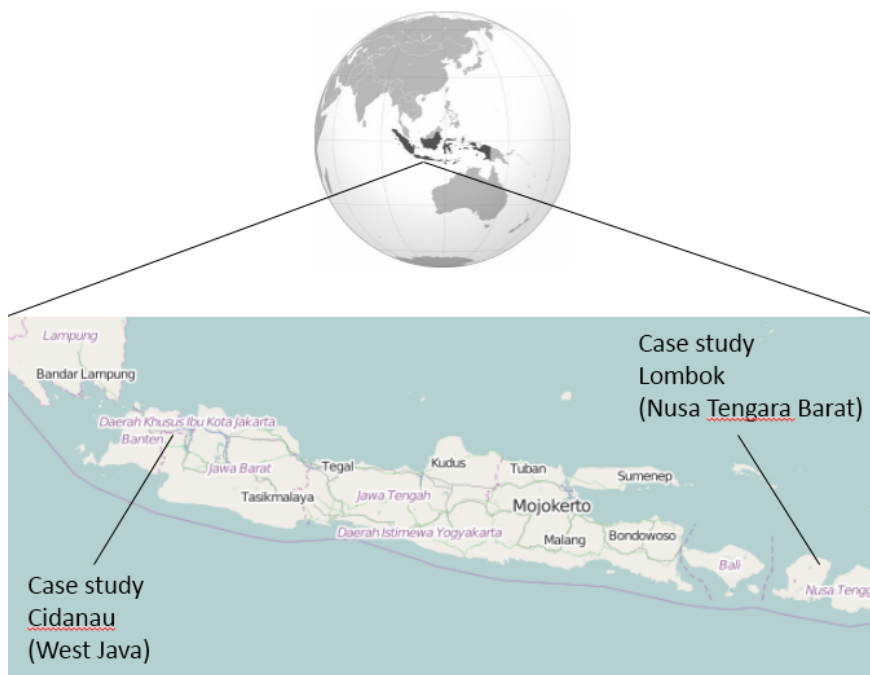
### 2.1. Case Study Presentation

#### 2.1.1. Lombok: Three Successive Funding Arrangements with Water Users

The first initiative is located on the island of Lombok in the eastern part of the archipelago and is one of the driest Indonesian islands. Its population is mainly concentrated in the lower plain where the capital city Mataram is located (see Figure 1), which has around 400,000 inhabitants. In the dry season, from March to October, there is little rainfall on the plain. The regional public water supply company (PDAM) therefore uses water catchments located at the bottom of the Rinjani volcano. These catchments play a key role in the regulation of water flows. However, a dramatic decrease in water flow from the springs was observed following the deforestation of the volcano’s slopes in the 1990s, with around 50% of the springs drying up in the Rinjani area between 1985 and 2006, according to the

Provincial environment agency (BLHP) [36]. Most stakeholders, both local and international, have assumed that these facts are related.

**Figure 1.** Location of the two case studies (Indonesia).



The whole process to develop a PES was initiated in 2001 with the financial and technical support of international agencies (US Agency for International Development (USAID), United Nations Development Programme (UNDP) and the Ford Foundation) through the organization of workshops and economic valuations addressing environmental issues in the watershed. These early activities led to a first and short-lasting PES experiment set up by local NGOs (Konsepsi, WWF-NT) and PDAM in the mid-2000s. Following a willingness-to-pay study among Mataram residents, an intermediary body (Bestari Community Funds) was created to collect and manage voluntary financial contributions. However, transaction costs were too high relative to the amount of money collected and potential to make a difference on the ground. Indeed there was no certainty about the available budget based on voluntary (hence, unpredictable and subject to large fluctuations and decline) contributions that remained extremely limited but with constant fixed costs to organize the system.

Since water tariffs are regulated by a regional decree, the district government had the opportunity to take control of the PES [37]. After a long legislative process, a new district regulation on “environmental services management” was issued in 2007, which paved the way for the establishment of a second PES from 2009 onwards. This second PES replaced the existing private intermediary body (Bestari Community Funds) with a sophisticated multi-stakeholder public agency (IMP). This new intermediary acted as fund manager, while implementing and controlling field operations, with the participation of civil society (WWF-NT, Konsepsi, *etc.*) and public agencies such as district authorities. The regulation established a monthly tax on water subscription that has been enforced since December 2009 and is collected through the PDAM billing system, and the funds have been used since 2010 by the IMP to cover expenses for forest restoration and local empowerment activities

proposed by farmer groups. Restoration activities consist of the distribution of seedlings to individual farmers, under the supervision of a farmer group (kelompok).

Finally, a third PES scheme emerged in parallel after 2011, when the company PDAM (a major service beneficiary) decided to design and promote its own approach, probably because of the perceived ineffectiveness of the two previous attempts. This scheme involves bilateral agreements with farmers (without the multi-stakeholder agency IMP as intermediary) and takes place in parallel with the activities supported by the second scheme [37] (p. 272). Case selection is ultimately made by PDAM on the basis of proposals from the district forest service that in turn considers initial requests that originate in the farmer groups. While the funded activities (seedling distribution) that serve as incentives are very similar to the second and third schemes, the funding and coordination aspects are contrasting. Fee collection is clearly innovative in this third scheme. It relies on the “cost recovery principle” to justify an internalization of the restoration costs as operational costs which are passed on to water consumers. Indeed, as opposed to the second scheme that exhibits features of a regional tax allocated to public activities through the district budget [38], [37] (p. 280), this third scheme has the company directly charge the costs of land rehabilitation to water users [37] (p. 272).

#### 2.1.2. Cidanau: Funding by a Private Water Company, Management of Incentives Agreements by Local Stakeholders

The second case study is sited in the Banten province, which is located in the western part of the island of Java (see Map 1). The Cidanau river watershed covers 22,036 hectares and most of the land is privately owned, except for a few plantations that are managed by the parastatal company Perum Perhutani and the 2500 ha Rawa Danau National Reserve in the center. Local residents rely heavily on agricultural development and show interest in using forestry systems for fruit and timber [39]. While the causes of land degradation remain unclear, many acknowledge locally that there has been an increase in illegal farming and migration to the area after the 1998 economic crisis. Both the Rawa Danau National Reserve and the surrounding public forests are affected by this degradation [39].

Land degradation in the Cidanau watershed is thus a source of concern because of soil erosion and surface rainwater runoff. The Rawa Danau swamp area downstream faces eutrophication and sedimentation threats [40,41], and the water quality and average flow of the Cidanau river have decreased [41].

PT Krakatau Tirta Industry (KTI) collects water near the Cidanau river mouth. The water is then processed and distributed to a number of users including (i) the regional public water supply company PDAM (as in the Lombok case) and (ii) another 120 industrial users. While water supplies are currently sufficient to meet the needs of users, KTI staff expressed concerns about the future given that water demand is expected to steadily increase and the above-mentioned environmental problems could lead to a further decrease in water availability and quality, especially during dry seasons. For these reasons the state agency in charge of the watershed management (BPDAS) undertook forest restoration measures in the mid-1990s; in parallel, KTI has been distributing free seedlings to promote reforestation efforts in the watershed.

However, according to concurring views gleaned from interviews with local key informants, such efforts have not met expectations because of poor coordination and unsatisfactory governance.

Therefore, in 1998 a broader group of stakeholders established the multi-stakeholder Cidanau Catchment Communication Forum (FKDC) that includes representatives from government agencies (Forest Office, Agriculture Office, provincial and district planning agencies and BPDAS), universities, upstream and downstream farmers, private companies (e.g., KTI), and NGOs (e.g., Rekonvasi Bhumi). In 2002, the Forum received legal recognition with a decree issued by the governor of the Banten province.

The concept of downstream-upstream payments was first introduced to Cidanau stakeholders in 2002 by the German Technical Cooperation (GTZ) and the national NGO LP3ES [42,43]. This move was part of a broader project to develop PES in several watersheds in Indonesia, under the coordination of the International Institute for Environment and Development (IIED). While options were being considered in 2002, a member of the local NGO Rekonvasi Bhumi visited the renowned FONAFIFO Costa Rican PES scheme whereby landowners are paid for sustainably managing their land. During this visit, he understood that conditionality was a real innovation compared to land rehabilitation and reforestation programs in Indonesia, which explains its introduction to the Cidanau scheme. In 2004, the service beneficiary KTI agreed to participate in and fund a PES scheme using the services of FKDC as an intermediary. In principle, KTI would pay the FKDC to support forest management including forest restoration in the watershed, and FKDC would in turn contract with upland farmer groups to plant on their private lands. Payments on both sides—funding and incentive distribution—would be on the condition of satisfactory reports by a monitoring team.

## 2.2. Methods

This article is an institutional assessment of several PES schemes that are underway in Indonesia. In both case studies, fieldwork was undertaken by two economists and one political scientist during 2012 and 2013. Research techniques included numerous in-depth semi-structured interviews in addition to the analysis of secondary data, from the reports of NGOs and other stakeholders to pieces of legislation and peer-reviewed articles.

At the program level, we interviewed key informants from the main stakeholder institutions: government officials (e.g., the forestry department), intermediary organizations (the essential roles of which are described), companies as main service beneficiaries (water supplier or producer), and NGOs. These interviews led to the collection of data on institutional design and changes, and to the analysis of stakeholder motivations and PES rationale.

At the village level, we interviewed farmer group leaders who were participating in one of the PES schemes under assessment. Their views provided us with relevant first-hand information about the governance of the schemes, their implementation in the field, and their evolution. Data were also collected at the farmer level with focus groups and individual interviews, giving us a comprehensive understanding of farmers' views, the level of information-sharing, and their participation in decision-making processes.

All three levels of observation combine to enable an assessment of the governance structures of two PES in Indonesia, with an analysis of the strategic relationships between the stakeholders involved in these schemes. It provides the framework for the discussion of our research question on institutional change and the effectiveness of new approaches to forest restoration. Collaboration was sought with



locally-active research institutions (Bogor Agricultural University, the World Agroforestry Center-ICRAF) and all information collected at different levels could be consistently triangulated with information collected at another level.

### 3. Results: Institutional Analysis

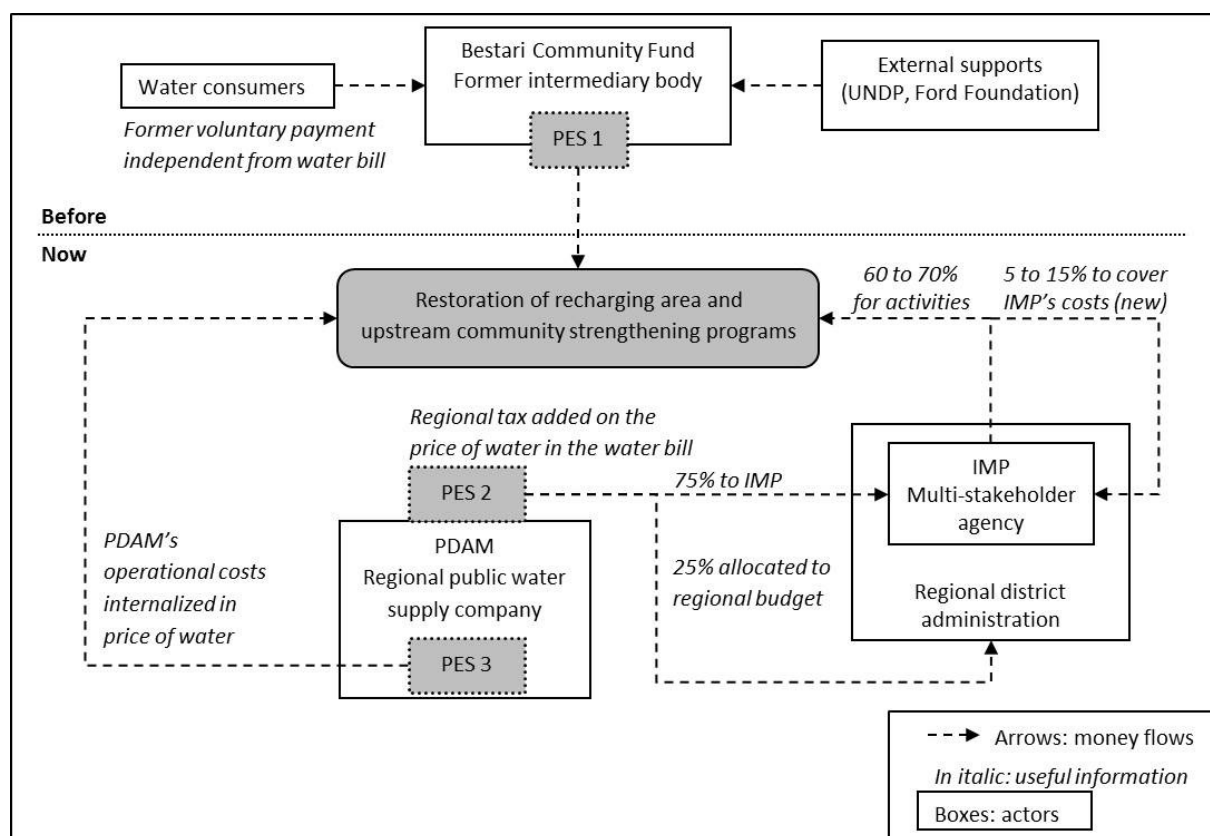
Results are presented for the two cases and insights are drawn from the data that relate to funding (particularly Lombok) and incentives (particularly Cidanau) so as to assess the situation from both sides of the PES table. This analysis provides the basis for the discussion section where information from both cases is combined to address the research question and the two assumptions.

#### 3.1. Lombok: An Intriguing Process of the Embedment and De-Embedment with Public Policies

##### 3.1.1. Embedment into Public Policies with the Enactment of a Regulation to Secure Funding

The evolution of the Lombok scheme with its three consecutive PES versions is briefly described above. The latter two versions are taking place in parallel, if not in competition with one another. While such an approach may seem complicated at first glance (see Figure 2), an institutional analysis enables a better understanding from a governance point of view.

**Figure 2.** Governance structure of the three PES in Lombok. Source: [44].



The substitution of PES 1 by PES 2 was clearly justified by the need to secure and enlarge the funding potential of the scheme, so as to increase its capacity to induce forest restoration with the

distribution of incentives to farmers. The first PES was initiated by private actors in collaboration with the main service beneficiary, namely PDAM, the public water supply company. In the Lombok context, economic studies of the willingness-to-pay and economic valuations of the environmental services appeared innovative, but the resulting impacts were fated to be anecdotal. The shift from private action to regulation was a consequence of the decision to rely on the PDAM billing system. Even if the willingness-to-pay was high, consumers did not pay spontaneously. It was thus logical to search for another way to collect financial resources.

A legislative process was launched to endorse the new regional tax, as required by national fiscal regulation. It resulted in the establishment of a very limited tax per contributor that is added to monthly bills. The amount depends on the payer: 24,000 households pay USD 0.1 per month (the price of a cigarette), while business entities pay USD 0.2 per month and commercial water producers pay just USD 0.001 per cubic meter of water produced. These new contributions are minimal for each contributor but substantial overall.

Due to the reluctance to pay a new tax in a context where contributors have doubts about the reliability of public authorities to manage the funds, it was decided to establish an intermediary body representing a majority of stakeholders. This multi-stakeholder agency (IMP) involves representatives of civil society and the public sector. This step arguably represented a great move towards participatory governance and enhanced transparency in decision-making, which increased the popularity of the scheme compared to previous land rehabilitation programs in the area.

With the PES 2, based on a political consensus, 75% of collected funds were initially earmarked for PES field activities with the remaining 25% being attributed to the district budget to cover IMP's operational costs. However, recent changes have led to the 75% being used to cover IMP's costs as well, instead of the district budget (see Figure 2), hence reducing the funding available for field activities [37] (p. 270). This move shows less political will than expected in addressing the provision of water services with the PES. Despite a lack of publicly available data on money issues, we were told by IMP that IDR 100 million (USD 10,000) were spent annually in the field, an amount expected to increase in 2013. Over the first two years (2010–2011), 10 agreements materialized with farmer groups, but the contracts did not stipulate conditions on the provision of environmental services once restoration had been performed. Once funding had been received, farmers were free to manage their lands according to their own preferences, and this potentially includes logging the planted trees when mature. Legally, the agreements between IMP and farmer groups are more like legal formalities that are necessary in order to receive a public subsidy that is made on the basis of an administrative decision (unilateral), rather than genuinely negotiated bilateral contracts [37] (p. 271).

This version of the Lombok scheme illustrates the capacity of local actors to engage in up-scaling of funding in order to seek greater impacts with forest restoration. A first and rather naive attempt with voluntary contributions from individual water users led to this refinement, which has characteristics that differ from the original PES concept where funders are free to participate.

### 3.1.2. A Process of De-Embedment and Cost Internalization... to Enhance Effectiveness?

The main beneficiary from forest restoration activities—the water supply company PDAM—was not entirely satisfied by this course of action and launched a third version of PES in 2011. Indeed,

effectiveness was anything but guaranteed with these lax contracts that imposed few, if any, strict conditions on farmers. The third version involves bilateral agreements between the service beneficiary and farmers. However, the district forest administration still intervenes in the management of the scheme on behalf of the PDAM (pre-selection of activities and follow-up of implementation), but contracts and payments directly link the farmer groups with the PDAM. This is an important distinction between PES 2 and PES 3; indeed in PES 2, PDAM is just one of the 16 IMP council members with limited influence on operations, while PDAM is the major actor in PES 3 [37] (p. 204). The second important difference is that conditions are associated with payments in PES 3: tree losses must be replaced at the cost of the farmer. Although payments are made before these conditions are actually verified, our interviews led us to the conclusion that farmers understood that credibility was at stake [37] (p. 276); however the real impacts of this fact have yet to be assessed and cannot be taken at face value.

Our interviews revealed that the high transaction costs of the IMP-led scheme were part of the reason for its replacement, while PDAM sought to lighten the administrative burden, in other words, to reduce bureaucracy. Our interviews also found that PES 3 contracted farmer group leaders thought that procedures were much simpler than with PES 2. The agreement negotiation process is similar in the different PES schemes, but PES 3 follow-up requires less administration for the monitoring, reporting and verification stages [37] (p. 264). A second important point is that PDAM payments are much more generous than IMP ones. In 2011, PDAM disbursed around USD 65,000 (IDR 738 million) to 10 farmer groups, while over the same period IMP distributed around USD 10,000. The larger scale of the PDAM scheme derives from the wider scope of its payment collection process. Indeed, to internalize the costs of water service provision, *i.e.*, PES activities on the ground, the water company collects IDR 1,000 per month (USD 0.01) from all of its 75,000 subscribers in three districts (compared to the 24,000 households subject to the tax in the West Lombok district with PES 2). Farmers prefer to join the PDAM scheme (PES 3) when given the choice, even if the conditions are more restrictive. This competition between the two might explain why IMP is currently trying to move its scheme into new areas where agreements have not yet been signed with the PDAM.

Based on the information collected from key informants, it appears that PDAM had a specific motivation for establishing a new and parallel scheme, specifically, to raise its profile and reputation. With the incorporation of forest restoration costs into the company accounts (PES 3), which are formally included in the water bill as part of water production costs, as opposed to a tax that is imposed by regulation and presented separately on the bill (PES 2), PDAM presents itself as a generous contributor with more attractive contracts for farmers, rather than as a tax collector [37] (p. 272).

This third version consists legally of administrative contracts, a hybrid between a private transaction and a delegation of a public task. When PDAM negotiates a contract, it acts in a similar way to private actors, despite its public legal status. The legitimacy of such payments is based on the contribution provided to the public good and relies on a formal legal basis (although one which is largely ignored) stating that all Indonesian public water supply companies can include restoration activities in their operational costs [37] (p. 170). In contrast, PES 2 consists in the implementation of a public regulation (a *perda*, a regional law, enforced in a *perbup*, a district ordinance). Both are regulated by public law, but they fundamentally differ in nature.

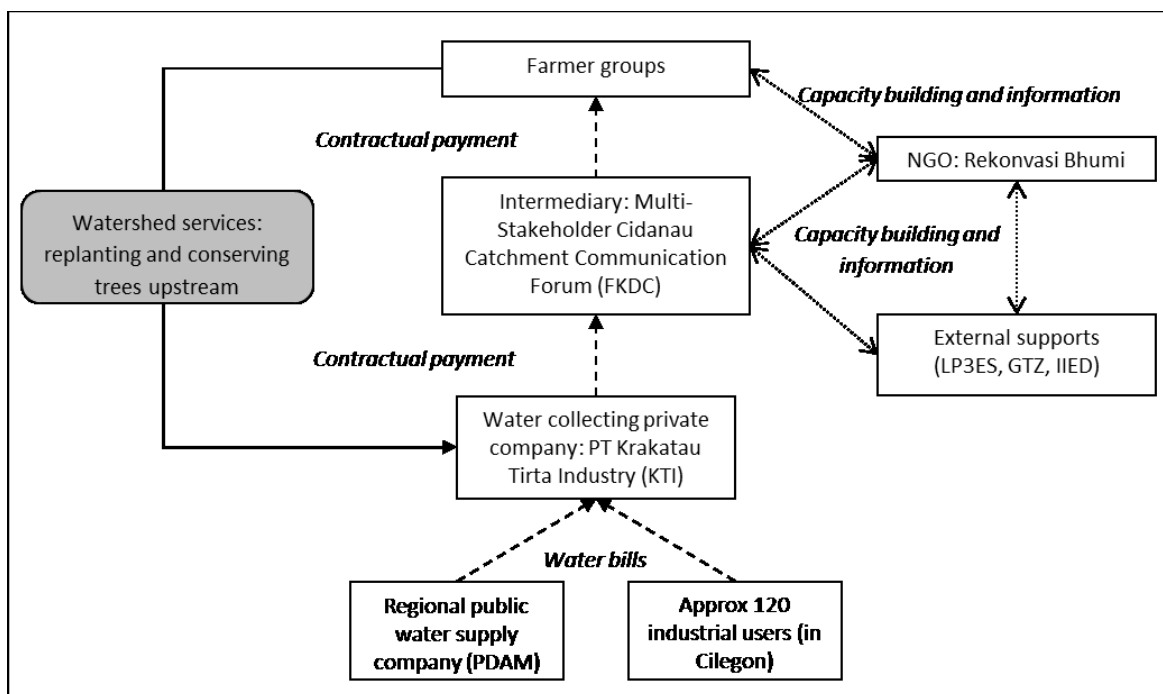
As a conclusion and based on the explanations and details above, it appears that three types of contracts, regulating three distinct types of relationships, are used to conduct similar activities in the same area in a different institutional manner: private contracts in PES 1, implementation of a public regulation in PES 2 and administrative contracts in PES 3 [37] (p. 281). Therefore, from a governance point of view, we observe differences in terms of voluntary (private contracts) or mandatory (public regulation) financial contributions by service beneficiaries, and the role of public authorities in organizing and controlling the transactions (public regulation supervises tax collection with PES 2, but a parastatal company is in charge with PES 3).

### 3.2. Cidanau: A New Governance without Guarantees of Improved Targeting and Decision-Making

#### 3.2.1. Farmer Groups and the Multi-Stakeholder Agency as Two Key Components of the Governance Structure

This scheme involves two different contracts: the intermediary makes agreements with both the buyer of the service and its provider (see Figure 3). On one side, a Memorandum of Understanding (MOU) was signed in 2005 with the private water producer KTI (renewed in 2010) as the funder, leading to an annual payment of USD 350 per hectare per year for planted and/or conserved forest. Most MOU conditions were decided on by the technical team, which is composed of various stakeholders (KTI, district and provincial planning agencies, the Forest Department and Rekonvasi Bhumi) in consultation with farmers. Building on rules set in previous government land rehabilitation programs, it was decided that a minimum of 25 hectares of *contiguous* lands per farmer group would be necessary for inclusion. Decisions with respect to the number of trees per hectare (which was set at 500) and the level of payment were also inspired by past practice in the national forest rehabilitation program (GERHAN), which was coordinated by the national government [45].

**Figure 3.** Governance structure of the PES in Cidanau.



On the other side, contracts were signed between the FKDC and farmer groups as providers for an equivalent period of five years, which included clauses on payment levels and related conditions, including the specification of eligible tree species. The FKDC initially wanted to pay USD 100 per hectare per year, *i.e.*, a much lower sum than that requested by farmers (USD 250 per hectare per year), but negotiations resulted in a deal being struck at USD 125 per hectare per year (Personal Communication, Pak Hutang, January 10, 2013). Concerning tree species, farmers negotiated for a 70:30 ratio of fruit to timber trees as sufficient for eligibility, contrary to rules commonly followed by past governmental programs.

During the five-year period of the contract, a minimum of 500 trees per hectare must be maintained. The FKDC monitoring team is responsible for ensuring adherence to this stipulation. The team, which includes representatives from a number of stakeholders (e.g., the forest department and KTI), goes into the field once a year to monitor 2.5 hectares of randomly chosen land within each farmer group. Once approval has been given, payments are made to farmer group leaders, who in turn are responsible for the distribution of cash to individual participants. If the team submits a negative report, *i.e.*, if it discovers that even one farmer failed to meet the conditions, then payments are terminated for the whole group. Since the beginning of the scheme's implementation in 2005, two groups breached their contracts, while two others renewed theirs for a further five years, out of a total of eight farmer groups that have been involved at some point.

### 3.2.2. Business as Usual?

All interviews with key informants confirmed the widespread opinion that the FKDC technical team had a strong tendency to make contracts with farmer groups that it had prior experience working with in various other programs. Its choices were also influenced by the good organizational capacity that these farmer groups had demonstrated in the previous programs. Following on from this, the selection of individual owners and their land remains in the hands of the farmer group leader, so long as those selected meet the requirement of having at least 25 hectares of contiguous land. As a result of this tendency, much land where PES efforts are critically needed, for example land that is steeply sloping, has a high risk of soil erosion or low forest cover, may be excluded from the program; or if it is covered this could be merely coincidence.

The fact that land selection is practically carried out on the basis of social criteria rather than scientific assessment is of critical importance. Indeed, one might question the relevance of PES-funded forest restoration if the provision of environmental services is not high on the agenda, which the analysis of the targeting process suggests. Another article [46] conducted an in-depth investigation into this hypothesis through an extensive survey with more than two-thirds of the scheme's participants (270 interviewees out of 382 participants). The results showed that most of the land engaged in the program already had good forest cover prior to its enrollment, with almost three quarters of participants not requested to plant trees on their lands. Moreover, more than a third of participants described social motivations as the basis for their decision to enroll [46].

### 3.2.3. Transparency and Decision-Making: Towards Real Innovation?

Qualitative observations and key informant interviews tend to show that participating farmers have a limited understanding of the program and that farmer group leaders retain most of the information. This is a consequence of negotiating and managing contracts with groups as opposed to individuals. As stated by a high-level KTI staff member when asked about cash distribution and internal communication within the farmer groups, “we do not want to look into their local politics” (interview with a KTI Director, Thursday, January 10, 2013). As a result, the amount of knowledge that circulates among participants largely depends on the desire and capacity of group leaders to disseminate information within the group.

We noticed that participants had a good knowledge of the rules in general, although only a few could quote all of them. For instance they were well-aware of the requirement to have more than 500 trees per hectare on their lands to receive funding, but a majority failed to mention the requirement that all lands had to be contiguous over 25 hectares. In fact, it appeared that the role of the farmer group leader was perceived as central, with many respondents declaring to be “actually selected by the farmer group leader”. This could mean that local leaders involved in this PES were somehow playing the role of “regulator”, whereas these instruments are presented as market-oriented, as opposed to national public programs where public authorities are expected to regulate.

Another critical observation in the field was that participants only had a limited knowledge of the financial amounts that they should receive in the near and mid-term future, and the schedule for these payments, assuming that they met the contractual conditions. This finding was confirmed by [46] who reported that a large majority of households did not know the payment schedule or the amount that they would receive for their next payment. These results point to a lack of transparency and the limited dissemination of information about the PES scheme.

Other observations could also be interpreted as support for the view that the amount of information given to participants is far from satisfactory and the decision-making processes remain opaque. Indeed, the farmer group leader was named by a large majority of participants in response to questions about the persons in charge of determining rules and payments. It is striking that other stakeholders with a strong involvement in contract design were almost completely forgotten: the intermediary FKDC, the water supply company KTI, and representatives from Rekonvasi Bhumi. Moreover, only a handful of participants saw themselves as having a voice in the negotiations about rules and payments, whereas PES are presented as innovative policy instruments that make negotiation and participation a priority.

## 4. Discussion: Do PES Improve the Governance of Forest Restoration?

Our objective is not to position large-scale governmental programs and PES as opposite ends of a scale of policy instruments for forest restoration; rather we find a continuum of situations in practice. Policy instruments are multi-dimensional: governmental programs can deliver incentives while PES can be designed and implemented by governments. Nonetheless, as a starting point for our analysis, we used the reported weaknesses in terms of governance of traditional public programs for forest restoration in Asia-Pacific [16].

Therefore, instead of comparing two large groups of policy instruments that are artificially separated from one another along the lines of public, traditional and large-scale *versus* private, innovative and local, our study looks at the governance implications of PES through the investigation of two assumptions. The first is that multi-stakeholder agencies as PES intermediaries represent an institutional innovation, positioned between the collection of funds and the distribution of incentives (as opposed to top-down land rehabilitation programs); while the second assumption is that specific individual (or collective) results-oriented contracts with associated conditions attached to payments (as opposed to corporate subsidies or daily salaries) are essential to the success of PES programs.

#### *4.1. First Assumption: PES Intermediaries Represent an Institutional Innovation*

Regarding the first assumption, a key governance feature that is present in both Indonesian PES cases is the creation and influential role of a multi-stakeholder agency, which has responsibility for the management of the distribution of incentives among service providers. However, there are striking differences between the two cases. In Lombok, the multi-stakeholder agency was presented as a means to make the tax more palatable to water users in a context where there is mistrust in the government's ability to manage public money. This was the main justification for the creation of the scheme, along with good prospects for a high standard of fund management. However, it appeared that the forest agency benefited from the uneven distribution of power among stakeholders, and was in a position to promote its own priorities using PES financial resources in a context of low budgets allocated to forest agencies. As a consequence, the water distribution company decided to create a parallel scheme that would put environmental services at the center again. By taking this step, the water company no doubt intended to raise its profile and reputation as well as to challenge the power of the forest agency, in addition to addressing other factors such as the high transaction costs.

The non-linear process is the crux of the matter and the most interesting part of the story: early embedment of the PES into public policies with a reliance on regulation to set a specific tax on water users with the creation of the multi-stakeholder agency; followed by a de-embedment, through the creation of a financing mechanism that is fully integrated into the business model of the water supply company. This de-embedment process is expected to strengthen the effectiveness of financial expenditure for the purposes of service provision, or at least address cost-effectiveness issues. Indeed, some observations indicated that fund management by the existing multi-stakeholder agency (PES 2) had weaknesses: the number of contracts finalized so far is limited, and the agency recently decided to allocate to the district budget the share of the collected taxes previously earmarked for covering the implementation costs. It might indicate the temptation of embezzlement that arises in certain contexts when public administrations take the lead, which is precisely the reason why new PES-like experiments are highly praised, as opposed to more traditional governmental programs. Therefore, in this particular case study, the creation of a multi-stakeholder agency might not be a guarantee for better governance.

The situation in Cidanau tells us a different story; here the multi-stakeholder agency remains the principal and widely recognized actor in the area. The agency is also seemingly dominated by one stakeholder from civil society which has a great influence owing to its past accomplishments. Yet another important layer exists at the interface between the agency and individual farmers, namely the

farmer group leaders, and it was this layer that was a focus of our study in Cidanau. Our field observations showed that these farmer group leaders played a vital role in the scheme, a finding that was confirmed by the two instances of breach of contract, both of which could have been avoided with appropriate action on their side. The problem is that there is much variability in the management abilities among the farmer group leaders. Governance in the Cidanau situation depends a great deal on the capacities of these farmer group leaders, and the intermediary agency neither guarantees good governance nor has a negative impact in this regard. On the whole, the internal governance of the farmer groups appears to be decisive for the sustainable effectiveness of forest restoration efforts.

Another key observation is the inability of this governance structure to ensure the satisfactory targeting of lands for restoration. Having a multi-stakeholder set up provides no guarantee that participants will be identified and selected in a neutral way and that decisions will be based only on scientific information with regard to the provision of environmental services. Social connections were favored as a criterion for farmer enrollment (and hence land selection), which in our opinion constitutes a weakness of the scheme as it puts effectiveness at risk. In other words, land with the highest potential contribution to environmental services provision is probably not more likely than other land to be earmarked for forest restoration. This result is consistent with other empirical cases of small-scale watershed projects. In Central America, it was demonstrated that the choice of PES participants results from a complex social process rather than a rational technical assessment [47]. These authors conclude that payments only provide complementary “support” for activities that farmers would have carried out for social and cultural reasons. In Peru and Ecuador, it was contended that better spatial targeting could be achieved in two watersheds in order to include genuinely critical areas [48].

At a larger scale, our finding also complements the aforementioned observation that large-scale governmental forest restoration programs in Asia-Pacific have sometimes resulted in forest conversion prior to planting [16], which is another hazardous method of land targeting from the perspective of forest restoration.

#### *4.2. Second Assumption: Results-Oriented Contracts Are an Essential Aspect of PES*

Regarding the second assumption under investigation, the results-oriented conditions that constitute a key feature of PES as a new approach to forest restoration are not particularly strong. While their full impact remains to be demonstrated, the two case studies examined here provide lessons that differ from our assumption. In Lombok, few (if any) PES 2 conditions are enforced, and it is not yet clear whether PES 3 will be any better at putting pressure on farmers to carry out effective land-use changes. Besides which, the contracts are at an early stage and cannot compete with larger scale intensive reforestation programs financed by regional and provincial forest administrations. That said, the three successive versions of the scheme are assumed to have the potential to eventually tackle causes of deforestation owing to their capacity to change local perceptions and habits. They rely on the active participation of farmers to make proposals and are not perceived as top-down public policies; as a consequence, they are thought to have an indirect leverage effect that may exceed the direct corrective effort of more “traditional” restoration programs. The latter usually involves the payment of



salaries to local laborers who are hired to plant trees but have little stake in their maintenance in subsequent years.

In Cidanau, these conditions are more stringent, which is demonstrated by the fact that infringements led to the breaching of two contracts. The credibility of the threat to withhold payments is also a central element of PES governance and one that is seen as a step towards greater effectiveness compared to traditional governmental programs because it generates better results than salaries paid to locals in return for daily labor, or the opaque distribution of subsidies to well-connected corporations. In this regard, despite many examples of individuals having a poor understanding of these conditions and their implications for future payments, we could indeed observe a certain level of achievement. Yet we also observed a tendency to enroll farmers who might not have dramatically changed their business-as-usual activities, which means limited additionality and a low level of threat with the conditions. In addition, farmer group leaders have a certain amount of latitude to prevent the breaching of contracts when conditions are not met.

Overall, the two sites exhibit the same characteristic that is detrimental to effectiveness: most stakeholders have a vested interest in the perpetuation of the scheme, whatever its level of success in terms of sustaining the provision of environmental services. In other words, NGOs, local authorities, research institutions, and even private companies—as service beneficiaries when they use funds from Corporate Social Responsibility budgets—prefer to avoid apparent failure at any cost. In practical terms, failure is understood as the cessation of payments rather than a lack of service provision, which is clearly a controversial view. The problem is that, regardless of the degree of stringency for conditions, effectiveness is eliminated whenever additionality is absent or the targeting of service providers is irrelevant. Therefore, a “winning” strategy (for a number of stakeholders but certainly not from an environmental point of view) would be for payers and intermediaries to demonstrate that strong conditions are attached to sustained payments, while at the same time involving the most easily targetable service providers. This typically implies that farmers do not attempt to change their activities and there is no guarantee that the right farmers are brought on board.

## 5. Conclusions

This article discusses the capacity of innovative policy instruments such as PES to improve the governance of forest restoration activities compared to more traditional large-scale governmental programs. To do so, two assumptions were investigated, the first regarding the establishment of multi-stakeholder agencies as intermediaries and fund managers; and the other concerning the inclusion of conditions in the contracts with service providers. Both of these assumptions are believed to enhance forest restoration efforts.

An initial finding was that intermediary bodies are certainly not sufficient to guarantee success. As shown in different ways by the two cases under investigation, outcomes were greatly dependent on the internal governance of these bodies. While virtually all local stakeholders were represented, in each case we found that about one was able to dominate the decision-making process: the forest agency in Lombok and a local NGO in Cidanau. Interestingly, the main service beneficiaries in each case study adopted opposite strategies in reaction to this domination by another actor: the public water company in Lombok moved on and created its own scheme, whereas the private water company in Cidanau

decided to keep the ball rolling, its expectations being little more than the nurturing of its image. The situation in Cidanau might however deserve a more positive appraisal given that the local NGO involved understands the difficulty in achieving a high degree of effectiveness but is making incremental changes towards improvement. For instance, the somewhat shaky governance of many of the farmer groups is identified as one area of reform for the future. Reforms are probably more difficult to undertake in Lombok where the intermediary body is de facto controlled by local administrations. It remains to be seen whether stakeholders can improve the scheme based on its existing format, instead of creating an alternative, as PDAM has done.

A second conclusion is that even when conditions exist, they do not guarantee success. Not only because they can be applied to the wrong participants in the sense that their business-as-usual activities remain unchanged, but also because there is a common interest among many stakeholders to keep the schemes alive and visible. Since the service beneficiaries do not have any alternative options, they must find ways to ensure that forest restoration takes place on the ground, even if it means ignoring (temporary) failures when the wrong plots are targeted and there is no additionality. In this context, conditions can be seen as a means to raise awareness among service providers and to increase the chances of success in future rounds. Another interpretation would be that conditions are designed in response to local capacities and not the other way around; in other words these conditions would encourage rather than strictly regulate service providers.

Although our results reveal the limited effectiveness of the schemes that aim at promoting forest restoration despite innovations in their governance owing to PES schemes, either because the scale is too small, additionality is not proven or targeting is flawed, our overall conclusion is that local stakeholders have a great ability to adapt and make progress. In both case studies, processes were initiated by international actors eager to replicate the PES model as conceptualized in foreign institutions: the London-based IIED coordinated the project in Cidanau in the early stages, and international organizations such as the Ford Foundation, USAID and UNDP were influential at the very beginning of the process in Lombok. Yet directions have largely diverged over time, and it is undeniable that a sense of ownership has developed among local stakeholders. While one case exhibited a very dynamic evolution with three successive versions of PES and an unstable reliance on regulation and public policies (Lombok), the other example has proven to be more resilient in design with a classical “private beneficiary-intermediary-land users” set up (Cidanau). This finding is interesting because both schemes were influenced by the international discourse advocating new ways to foster good forest management, and both schemes addressed the same water services in a same country. Therefore, having such diversity in terms of governance is a key issue: rules, modalities of intermediation and participation, fund collection, conditions, and payments, are all elements that differed in order to adapt to the local context.

Ultimately, and despite the limited scale of forest restoration activities and a lack of evidence for the effectiveness of these PES schemes with respect to service provision, we find optimism in the future possibilities for these new ways to govern forest restoration in a developing country context. Lessons from past failures in governmental programs—or at least assumed failures—are in the minds of local proponents of innovations in governance for forest restoration initiatives. Innovations can deliver and yield positive results, despite resistance from local administrations or state agencies that are used to taking advantage of opportunities for embezzlement and thus want these opportunities to

continue. Yet these public actors will remain indispensable for the provision of these public goods, and it might prove to be more productive to find enabling conditions for their positive participation, rather than just trying to bypass them.

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### Conflicts of Interest

The authors declare no conflict of interest.

### References and Notes

1. FAO. *Global Forest Resources Assessment 2010: Main Report*; FAO Forestry Paper; Food and Agriculture Organization: Rome, Italy, 2010; Volume 163.
2. TEEB. *The Economics of Ecosystems and Biodiversity for National and International Policy Makers—Summary: Responding to the Value of Nature*; United Nations Environment Programme (UNEP), The Economics of Ecosystems & Biodiversity: Geneva, Switzerland, 2009.
3. Sterner, T.; Coria, J. *Policy Instruments for Environmental and Natural Resource Management*, 2nd ed.; RFF Press: Washington, DC, USA, 2011.
4. We are aware of the discussions around the use of terms such as environmental, ecological or ecosystem services, but in this article we prefer to use only one of these terms consistently, assuming that these distinctions are not relevant for the purpose of our analysis.
5. Armsworth, P.R.; Chan, K.M.A.; Daily, G.C.; Ehrlich, P.R.; Kremen, C.; Ricketts, T.H.; Sanjayan, M.A. Ecosystem-service science and the way forward for conservation (editorial). *Conserv. Biol.* **2007**, *21*, 1383–1384.
6. Engel, S.; Pagiola, S.; Wunder, S. Designing payments for environmental services in theory and practice: An overview of the issues. *Ecol. Econ.* **2008**, *65*, 663–674.
7. Forest restoration is defined in this special issue as the process to assist the recovery of damaged forest ecosystems. Although the cases studied in this article were not designed with this definition of forest restoration in the minds of their promoters, but rather as attempts to fund reforestation with a diversity of species, we argue that the implications for governance would be identical. Therefore, PES can be viewed as vehicles of forest restoration as long as ecosystem services are targeted.
8. Chen, X.; Lupi, F.; Viña, A.; He, G.; Liu, J. Using cost-effective targeting to enhance the efficiency of conservation investments in payments for ecosystem services. *Conserv. Biol.* **2010**, *24*, 1469–1478.

9. Muñoz-Piña, C.; Guevara, A.; Torres, J.-M.; Brana, J. Paying for the hydrological services of Mexico's forests: Analysis, negotiations and results. *Ecol. Econ.* **2008**, *65*, 725–736.
10. Leimona, B.; Joshi, L.; van Noordwijk, M. Can rewards for environmental services benefit the poor? Lessons from Asia. *Int. J. Commons* **2009**, *3*, 82–107.
11. Corbera, E.; Kosoy, N.; Martinez Tuna, M. Equity implications of marketing ecosystem services in protected areas and rural communities: Cases from Meso-America. *Glob. Environ. Chang.* **2007**, *17*, 365–380.
12. Pirard, R. Payments for Environmental Services (PES) in the public policy landscape: “Mandatory” spices in the Indonesian recipe. *For. Policy Econ.* **2012**, *18*, 23–29.
13. Fisher, J. No pay no care? A case study exploring motivations for participation in payments for ecosystem services in Uganda. *Oryx* **2012**, *46*, 45–54.
14. Garcia-Amado, L.R.; Ruis Perez, M.; Barrasa Garcia, S. Motivation for conservation: Assessing integrated conservation and development projects and payments for environmental services in La Sepultura Biosphere Reserve, Chiapas, Mexico. *Ecol. Econ.* **2013**, *89*, 92–100.
15. Vatn, A. An institutional analysis of payments for environmental services. *Ecol. Econ.* **2009**, *69*, 1245–1252.
16. Barr, C.; Sayer, J. The political economy of reforestation and forest restoration in Asia-Pacific: Critical issues for REDD+. *Biol. Conserv.* **2012**, *154*, 9–19.
17. Sierra, R.; Russman, E. On the efficiency of environmental service payments: A forest conservation assessment in the Osa Peninsula, Costa Rica. *Ecol. Econ.* **2006**, *59*, 131–141.
18. Mauerhofer, V.; Hubacek, K.; Coleby, A. From polluter pays to provider gets: Distribution of rights and costs under payments for ecosystem services. *Ecol. Soc.* **2013**, *18*, 41.
19. Montagnini, F.; Finney, C. Payments for environmental services in Latin America as a tool for restoration and rural development. *AMBIO* **2011**, *40*, 285–297.
20. Le, H.D.; Smith, C.; Herbohn, J. What drives the success of reforestation projects in tropical developing countries? The case of the Philippines. *Glob. Environ. Chang.* **2014**, *24*, 334–348.
21. Bullock, J.M.; Aronson, J.; Newton, A.C.; Pywell, R.F.; Rey-Benayas, J.M. Restoration of ecosystem services and biodiversity: Conflicts and opportunities. *Trends Ecol. Evol.* **2011**, *26*, 541–549.
22. Brancalion, P.H.S.; Viani, R.A.G.; Strassburg, B.B.N.; Rodrigues, R.R. Finding the money for tropical forest restoration. *Unasylva* **2012**, *239*, 15–34.
23. Ciccacese, L.; Mattsson, A.; Pettenella, D. Ecosystem services from forest restoration: Thinking ahead. *New For.* **2012**, *43*, 543–560.
24. Fletcher, R.; Breitling, J. Market mechanism or subsidy in disguise? Governing payment for environmental services in Costa Rica. *Geoforum* **2012**, *43*, 402–411.
25. Lapeyre, R.; Pirard, R. *Payments for Environmental Services and Market-based Instruments: Next of Kin or False Friends?* IDDRI Working Paper; Institute for Sustainable Development and International Relations: Paris, France, 2013.
26. Wunder, S. Of PES and related animals. *Oryx* **2012**, *46*, 1–2.
27. Broughton, E.; Pirard, R. *What's in a Name? Market-based Instruments for Biodiversity*; IDDRI Analyses; Institute for Sustainable Development and International Relations: Paris, France, 2011.

28. Calder, I. Forests and Hydrological Services: Reconciling public and science perceptions. *Land Use Water Resour. Res.* **2002**, *2*, 2.1–2.12.
29. FAO. *Forests and Water*; FAO Forestry Paper 155; Food and Agriculture Organization: Rome, Italy, 2008.
30. Van Dijk, A.; Keenan, R. Planted forests and water in perspective. *For. Ecol. Manag.* **2007**, *251*, 1–9.
31. Bruijnzeel, L.A. Hydrological functions of tropical forests: Not seeing the soil for the trees? *Agric. Ecosyst. Environ.* **2004**, *104*, 185–228.
32. Dye, P.; Versfeld, D. Managing the hydrological impacts of South African plantation forests: An overview. *For. Ecol. Manag.* **2007**, *251*, 121–128.
33. Keenan, R.; van Dijk, A. Planted Forests and Water. In *Ecosystem Goods and Services from Plantation Forests*; Bauhus, J., van der Meer, P., Kanninen, M., Eds.; Earthscan: London, UK; Washington, DC, USA, 2010; pp. 77–95.
34. Holl, K.D.; Aide, T.M. When and where to actively restore ecosystems? *For. Ecol. Manag.* **2011**, *261*, 1558–1563.
35. Chandler, D.G. Reversibility of forest conversion impacts on water budgets in tropical karst terrain. *For. Ecol. Manag.* **2006**, *224*, 95–103.
36. Nugraha, P. Number of Natural Springs in West Nusa Tenggara Sees Sharp Fall in Recent Years. *The Jakarta Post*, 29 May 2011.
37. De Buren, G. *La régulation des interdépendances entre les forêts et l'eau domestique en Indonésie: études de cas sur le site de Lombok*; Idheap Working Paper; Swiss Graduate School of Public Administration: Lausanne, Switzerland, 2013. Available online: <http://idheap.ch/deBuren2013Lombok> (accessed on 10 March 2014).
38. The tax created by the second PES is collected through monthly water bills, which adds to the confusion between both funding mechanisms. While it is not part of the water production costs, neither does it constitute a source of income for the water supply company. It is thus not a process of internalization on behalf of the company, and was even declared illegal by a commission of the national Financial Advisory Board (BPKP).
39. Yoshino, K.; Ishikawa, M.; Setiwawn, B.I. Socio-economic causes of recent environmental changes in Cidanau watershed, west Java, Indonesia: Effects of Economic Crises in Southeast Asia in 1997–1998 on Regional Environment. *Rural Environ. Eng.* **2003**, *44*, 27–41.
40. Adi, S. *Proposed Soil and Water Conservation Strategies for Lake Rawa Danau, West Java, Indonesia*; Water Resources System, Hydrological Risk, Management and Development No. 281; International Association of Hydrological Sciences Publication (IAHS): Wallingford, UK, 2003.
41. Yoshino, K.; Ishioka, Y. Guidelines for soil conservation towards integrated basin management for sustainable development: A new approach based on the assessment of soil loss risk using remote sensing and GIS. *Paddy Water Environ.* **2005**, *3*, 235–247.
42. Munawir, S.; Vermeulen, S. *Fair Deals for Watershed Services in Indonesia: IIED Natural Resource Issues*; International Institute for Environment and Development: London, UK, 2009; Volume 9.

43. This NGO was also involved in the discussions in Lombok as part of a project with IIED to promote PES in the country. This can be viewed as a factor of standardization, but our analysis also points to great differences in terms of design and evolution between both sites.
44. Pirard, R.; de Buren, G. *Payments for Watershed Services in Indonesia (Lombok): Uncovering Actor's Strategies in a "Success" Story. Factsheet for the Multi-Stakeholder Dialogue (September 13 2013)*; Food and Agriculture Organization: Rome, Italy, 2013.
45. Leimona, B.; Pasha, R.; Rahadian, N.R. The Livelihood Impacts of Incentive Payments for Watershed Management in West Java, Indonesia. In *Livelihoods in the REDD? Payments for Environmental Services, Forest Conservation and Climate Change*; Tacconi, L., Mahanty, S., Suich, H., Eds.; Edward Elgar: Cheltenham, UK, 2010; pp. 106–129.
46. Lapeyre, R.; Pirard, R. Payments for environmental services in Indonesia: What if economic signals were lost in translation. *Ecol. Econ.* **2014**, submitted.
47. Kosoy, N.; Martinez-Tuna, M.; Muradian, R.; Martinez-Alier, J. Payments for environmental services in watersheds: Insights from a comparative study of three cases in Central America. *Ecol. Econ.* **2007**, *61*, 446–455.
48. Quintero, M.; Wunder, S.; Estrada, R.D. For services rendered? Modeling hydrology and livelihoods in Andean payments for environmental services schemes. *For. Ecol. Manag.* **2009**, *258*, 1871–1880.

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