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Governing Forest Landscape Restoration: Cases from Indonesia

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Abstract: Forest landscape restoration includes both the planning and implementation of measures to restore degraded forests within the perspective of the wider landscape. Governing forest landscape restoration requires fundamental considerations about the conceptualisation of forested landscapes and the types of restoration measures to be taken, and about who should be engaged in the governance process. A variety of governance approaches to forest landscape restoration exist, differing in both the nature of the object to be governed and the mode of governance. This paper analyses the nature and governance of restoration in three cases of forest landscape restoration in Indonesia. In each of these cases, both the original aim for restoration and the initiators of the process differ. The cases also differ in how deeply embedded they are in formal spatial planning mechanisms at the various political scales. Nonetheless, the cases show similar trends. All cases show a dynamic process of mobilising the landscape's stakeholders, plus a flexible process of crafting institutional space for conflict management, negotiation and decision making at the landscape level. As a result, the landscape focus changed over time from reserved forests to forested mosaic lands. The cases illustrate that the governance of forest landscape restoration should not be based on strict design criteria, but rather on a flexible governance approach that stimulates the creation of novel public-private institutional arrangements at the landscape level.

Keywords: forest; landscape; restoration; governance; stakeholders; institutions; institutional space; institutional bricolage

1. Introduction

Forest landscape restoration (FLR) is rapidly gaining ground as an integrated approach towards allocating and managing land to achieve social, economic, and environmental objectives in areas where agriculture, mining, and other productive land uses compete with environmental and biodiversity goals [1]. Active lobbying by international organisations has led to FLR being integrated into international commitments such as the *Reducing Emissions from Deforestation and Forest Degradation* (REDD) arrangements identified by the UN Forum on Forests, the Aichi target No. 15 of the Convention on Biodiversity aiming to restore 15% of degraded ecosystems, and the Bonn Challenge, which aims to restore 150,000,000 ha by 2020 [2]. As part of the Bonn Challenge, an increasing number of governments have been pledging part of their national territory to be restored, and national assessments of the potential are currently being carried out looking at where and how these pledged areas could best be situated [3].

Although the FLR approach is formally recognised, many FLR programmes are still experimental in nature. In general terms, FLR refers to restoring the ecological services of forests within landscapes: not necessarily by bringing them back to their original state, but by restoring their functionality in terms of biodiversity, ecological functioning, livelihoods, or income [1]. Despite global efforts and ambitious targets for such attempts to reconcile conservation and development, there are as yet no general and effective solutions for meeting both nature conservation and human needs. The main reason is that the competing demands on land for conservation and development imply inevitable trade-offs, and there still is no unambiguous framework for how best to guide the process of decision making and implementation of forest restoration at the landscape level. Sometimes it is assumed that forest landscape restoration can be approached as a professional planning exercise, based on the idea that international and national targets “naturally” trickle down through the spatial planning systems of states. However, it is increasingly acknowledged that these politically and administratively oriented planning mechanisms do not always tally with the socio-ecological identity of forested landscapes. Several authors [2,4,5] have recognised the shortcomings of formal governance structures and their relative inability to govern restoration at the landscape level. These authors see the restoration process as involving “living” forest landscapes that are shaped by multiple social actors and networks, who operate across the bureaucratic sectorial and scaled planning structures of states. The landscape provides its inhabitants with the basis for their sociocultural and production practices, which in turn provide the institutional space for governance mechanisms to emerge. Consequently, forest landscape restoration involves multi-actor networks composed of people living in the landscape or indirectly belonging to it and requires new forms of planning and implementation of socio-ecological complexes. Such new forms of landscape governance should be characterised by (1) a geographical focus, integrating multiple sectors (agriculture, forests, water, *etc.*) within a single space; (2) a multi-actor focus bringing together public and private actors operating within a shared space; and (3) operating at

multiple scales, meaning that they stretch across local, regional and global networks of spatial decision making, sometimes referred to as “politics of scale” [2,4,5]. Based on these principles, Sayer *et al.* [1] identified 10 major design principles for a landscape governance approach, including multi-functionality of landscapes, multi-level and multi stakeholder involvement, the importance of a shared concern, strengthened stakeholder capacity, negotiated and transparent change logic, clarification of rights and responsibilities, and continual learning and adaptive management. These principles are still rather generic, as they do not specify whether and how they are related to the two major critical issues in forest landscape restoration, *i.e.*, the object of governance and the nature of the governance process (*cf.* [6,7]). As a result of the multidimensional nature of the FLR governance process and the generic nature of the identified design principles, there is still a great deal of variation in the way FLR programmes are planned and implemented in practice. Consequently, further understanding is needed of the multiple interpretations of the concept of governing forest landscape restoration.

This article aims to contribute towards a better understanding of the nature and diversity of the process of forest restoration governance in terms of the object to be governed and the nature of the governance process. It takes the reader through an analytical framework based on (a) the different interpretations of forested landscapes and their relevant forms of restoration, and (b) the various modes of governance for steering decision making at the landscape level. Combining these two, the authors claim that the governance of forest landscape restoration can be regarded as a management tool; as a multi-stakeholder decision making process; or as the creation of new institutional space for spatial decision making. These three modes of governance are illustrated by three cases of forest landscape restoration in Indonesia, which are governed in different ways, depending on the gradual changes in both the substance and the modes of governance, which emerge out of their local realities.

2. Analytical Framework

Although the concept of forest landscape restoration is relatively new, the notion of the need to restore degraded and deforested landscapes is a long-standing one. As early as the mid-20th century, this notion resulted in programmes for watershed management and reforestation of degraded (or wasted) forest lands [8–10]. These “first-phase” forest restoration programmes were based on concerns about the loss of forest functions with respect to hydrological regulation, soil conservation and timber production. These programmes focused both on rehabilitation of denuded forest lands as well as erosion control and agroforestry development on the adjacent private agricultural lands. Gradually, the interpretation of forest degradation was extended to include a larger variety of forest services, such as supporting, regulating, provisioning and cultural services [11,12]. As a result, attention within forest restoration gradually shifted from the original emphasis on watershed services to a larger complex of ecological services, and understanding of the multiple manifestations of restored forests widened [13]. One repercussion of this development was that the concept of forest landscape restoration became more holistic and inclusive on the one hand, but it strengthened the forest focus on the other, with less attention being paid to adjacent agricultural lands. At the same time, the interpretation of the best approach to forest landscape governance and the related approaches to decision making and implementation also changed. Initially, an administrative and professional approach predominated, but gradually a multi-level and multi-actor governance approach evolved. Consequently, when considering

the actual nature of forest restoration programmes and their governance, divergent interpretations can be identified in terms of (1) the substance of the governance process with respect to the type of forested landscapes and related forms of restoration; and (2) the modes of governance for steering decision-making at the landscape level.

2.1. Types of Forested Landscapes and their Relevant Form of Restoration

The notion of a “forested landscape” is open to various interpretations. On the one hand, it may be interpreted in an ecological sense as referring to a complex of different forest ecosystems which are integrated in a natural ecological structure, allowing good provision of ecological services and good distribution and dispersal of biodiversity. Alternatively, it may be interpreted from a socio-geographical perspective as referring to a spatial unit of land with a mosaic of forest and agricultural fields, created by local people as part of their livelihood activities. These mosaics often include a variety of forest types ranging from natural forests to various forms of anthropogenically modified forests, the latter also being referred to as rural or domestic forests [14–16]. These different interpretations of forested landscapes imply different approaches towards their restoration. The first interpretation leads to a restoration which focuses predominantly on restoring the ecological structure and environmental services of the forests as natural ecosystems. It is recognised here that ecological restoration improves the environmental services that forests provide for the various stakeholders, but little attention is paid to the question of how these services are delivered to the intended beneficiaries [13]. In contrast, the second interpretation leads to the recognition that forest landscape restoration often takes place in areas where forests have been adapted to human needs and where agriculture and other productive land uses compete with the environmental and biodiversity goals of restoring the forests. The second interpretation therefore considers not only how to ecologically restore forests, but also how to optimise the interactions between forests and other forms of land use. This offers scope for focusing not only on the restoration of natural forests, but also on anthropogenically modified forests and agrarian lands that are incorporated into forest mosaic landscapes.

This latter issue raises the question of what the role of people in the forest landscape is. Although forest degradation is the result of human exploitation of forests, it does not mean that local people should be considered as mere environmental degraders, who should be removed from the forest landscape; people can also act as an aggrading rather than degrading force in forested areas [17]. Such human agency is illustrated by the many creative examples of hybrid and sustainable human/nature systems in the form of rural (or domesticated) forests, managed by local people [18,19]. Such adapted forests, in which the provisioning services for local use have been optimised, indicate the potential for developing ecologically healthy landscapes with forests types that are adjusted to the needs of the inhabitants. Forest mosaic landscapes consisting of a mix of natural forests, adapted forests and agrarian land often provide better human living conditions than extended natural forest reserves, which implies that restoration of forested landscapes may imply more than the restoration of forests [20].

2.2. Modes of Governance for Steering Landscape Decision-Making

Forest landscape restoration concerns not only the implementation of a specific set of technical and ecological practices for developing a specific type of restored forests, but also the design, the planning

and the decision-making at crucial moments during the process [1]. It is generally agreed that this process is quite complex, due to the nature of a landscape as involving multiple land uses and multiple stakeholders. In particular, the restoration of mosaic landscapes usually requires participation of the stakeholders involved in the various landscape components. The process even becomes more complex when landscapes stretch across political and administrative boundaries, and therefore cover more than one administrative planning unit. Whereas the initial watershed management projects mainly involved forestry agencies and local communities, in the current forest landscape restoration programmes, a much larger variety of stakeholders are recognised, including commercial enterprises. Moreover, the increased focus on a variety of forest services has resulted in increasing numbers of sectorial regulations and guidelines that need to be taken into consideration.

As a result, it is becoming increasingly recognised that landscape restoration requires the involvement of multiple stakeholders operating in multiple sectors, and at multiple scales. This type of stakeholder involvement in design, planning and decision-making of forest landscape restoration programmes is increasingly referred to by the term “landscape governance” [2,4]. During the last decade, the concept of landscape governance has become generally accepted as referring to the multi-stakeholder process of negotiation and decision making about policies and programmes for effective conservation and sustainable use of forests, and for implementing the planned measures within spatial landscape units [2,5,21]. Despite this general acceptance, there still is divergence in the way landscape governance is perceived and implemented in different restoration programmes. Treib *et al.* [22] identify different modes of governance with respect to the three different dimensions of politics, polity and policy. The modes of governance in the political dimension are related to whether only public actors are involved or also private ones (the actor constellation). The modes of governance in the polity dimension may vary, depending on whether they are based on a hierarchical government or a market approach; on a central locus of authority *versus* dispersed loci of authority; or on institutionalised *versus* non-institutionalised interactions (the institutional properties). The modes of governance in the policy dimension are related to whether the process is based on legally binding rules or on soft law; on a rigid approach to implementation *versus* a flexible one; on the presence or the absence of sanctions; and on material *versus* procedural regulation (the steering instruments). Deriving from these ideas, the authors conclude that three main modes of governance may be identified within forest landscape governance, *i.e.*, landscape governance primarily as a management tool; landscape governance as a multi-stakeholder decision making process; and landscape governance as the creation of new institutional space for spatial decision making.

Landscape governance as a management tool is still based on a rather traditional hierarchical system of decision making based on a central locus of authority, professional knowledge, binding regulations and a rather rigid approach to implementation. This does not mean in practice that stakeholder interaction may be less rigid, and management responsibilities may be shared. Such sharing of responsibilities is generally considered to be more effective than straightforward governmental control, as it increases a feeling of responsibility among landscape users and provides an opportunity to incorporate location-specific information. Sharing of responsibilities is also seen as an effective tool for mitigating conflicts, as it helps improve relationships between governments, private actors and a landscape’s inhabitants. This interpretation of landscape governance is closely related to the concepts of co-management and collaborative management that are frequently applied in the local management

of forest resources [4]. Stakeholders can be trained as co-managers in implementing management techniques, and made jointly responsible for the results. This is especially relevant to conservation agencies that plan forest restoration programmes on the forest lands they own.

Landscape governance as a process of multi-stakeholder decision-making is a mode of governance that pays attention specifically to the formation of new institutional interactions with increased scope for private actors and a flexible soft law approach to stimulating location-specific landscape practices rather than just implementing professional practices. This governance mode is often adopted in programmes covering complex mosaics of different land uses, where management involves a process of delicate and politically oriented decision making concerning preferred land use, paying attention not only to the rules, regulations and practices from the forest sector, but also to those from the agricultural sector. Multi-stakeholder decision making thus becomes a complex process of negotiation, conflict mediation and trade-offs [4,23]. This process is often conflictive in nature and needs careful facilitation and procedural management. Decisions about different land uses involve not only the direct stakeholders but also the complex networks they represent; networks that may transcend the boundaries of sectors and scales. There is a need here to recognise the different power positions of stakeholders operating from various sectors and scales, influenced by institutional drivers related to access to resources, as well as external drivers such as global market forces.

Landscape governance as the creation of institutional space is a mode of governance that allows more power for the private actors and market forces within the governance process. This requires more flexible forms of institutionalisation and implementation, especially in cases where landscapes are not restricted to a specific level in the spatial decision making structures of the state bureaucracy (provincial, district, or municipal level). Where landscapes stretch across administrative boundaries and political entities, multi-stakeholder decision making at the landscape level is hampered by the absence of spatial decision-making structures embedded in formal institutional frameworks. These cases illustrate the fact that landscapes are socio-ecological constructs, shaped and reshaped by landscape actors themselves, stretching beyond the planning structures of states. In such cases, landscape governance cannot be the outcome of formal planning structures, but is rather the outcome of “institutional bricolage”: landscape actors from different sectors and scales create new institutional space by creatively combining traditional and locally embedded institutions with new governance mechanisms coming from the outside, thereby crafting new and hybrid institutions adapted to the socio-ecological characteristics of landscapes [2,24–26].

The distinction between these modes of governance emphasises the distinction between governance as based on clearly institutionalised central locus of authority, established rules and regulations, and a professional interpretation of the nature of the restoration process on the one hand, and governance as a process based on dispersed authority, following a flexible approach to implementation based on procedural rather than predefined ecological standards, on the other. Whereas the mode of landscape governance as a management tool is based on a refinement in the political dimension of governance, the polity and policy dimensions are not subject to major change. In contrast, the mode of landscape governance as the creation of new institutional space involves major changes in all three dimensions, as it leads to the development of new institutional arrangements at the landscape level. Such institutional bricolage [24–26] involves not only combining traditional institutions with new governance mechanisms, but also adapting nationally and internationally designed measures and plans to local

circumstances. This latter form of bricolage happens when local inhabitants reject, alter or accept centrally designed rules in an attempt to maximise their positive impact, or minimise their negative impact. It also happens when policy makers decide to soften, alter or adapt the centrally designed rules in an attempt to reduce conflict with local inhabitants, or because they are familiar with local realities and realise that adaptation to local circumstances is necessary to make them fit. In both cases, such institutionally “bricoled” space is intentionally crafted to suit a landscape’s socio-ecological realities better. However, the risk is that they may lack sufficient embedding in the formal spatial decision-making structures of states, which hampers their application at larger scales [2,5].

2.3. Framework for Comparative Analysis of Cases

The various interpretations of the nature of forested landscapes and their restoration, as well as the different modes of landscape governance, have been combined into one analytical framework to allow comparative analysis of different cases of forest landscape restoration (Table 1). The table also indicates how both are related to the design principles of the landscape approach as identified by Sayer *et al.* [1].

Table 1. Analytical framework for assessing different interpretations of forest landscape restoration and landscape governance.

Nature of a forested landscape and its restoration	Relevant modes of landscape governance	Relationship to the main design principles formulated by Sayer <i>et al.</i> [1]
Ecological complex of different forest ecosystems needing restoration of ecological services	Landscape governance as a management tool	• Importance of common concern entry points as formulated in sectorial regulations and guidelines; • Strengthened stakeholder capacity for implementing professional norms
Socio-geographical space of complex mosaic land use requiring restoration of both conservation and productive functions	Landscape governance as a multi-stakeholder decision-making process	• Importance of common concern entry points deriving from multi-stakeholder negotiation process • Multi-stakeholder involvement for better coordination and planning • Negotiated and transparent change logic • Clarification of rights and responsibilities
Socio-geographical space, stretching over administrative boundaries and jurisdictions requiring restoration of both conservation and productive functions	Landscape governance as the creation of new institutional space for spatial decision making.	• multi-stakeholder involvement for joint decision making • multi-scale linkages for effective institutional embeddedness at scale • “Navigating complexity” through adaptation and continual learning

3. Research Background and Methodology

The analytical framework described in Section 2.3 served as a basis for assessing three case studies on landscape governance in Indonesia that were prepared by three MSc students from Wageningen University (Wageningen, The Netherlands) in 2012 and 2013. Each of these three students assessed the governance process behind forest landscape restoration from different angles. This section presents a systematic comparative analysis of these three studies. The analysis focuses on two main questions: (1) What form of forest landscape restoration has been at stake? (2) How was the governance process initially designed, and how did it change over time?

3.1. Research Methodology

Three of Indonesia's diverse forest restoration programmes were selected to be subjected to in-depth study (Figure 1). All three cases are part of the Masyarakat Bentang Alam Indonesia (MASBENI)—which means Landscape Community of Indonesia—a network of restoration advocates in Indonesia. All three cases have a working relationship with Tropenbos Indonesia, which is part of the Netherlands-based NGO Tropenbos International (a Netherlands-based NGO active in forest-related knowledge brokering and research [27]). The three cases were purposively selected as representing different interpretations on the nature of forested landscapes and their restoration; and representing different governance mechanisms, marked by differences in stakeholder involvement, institutional embeddedness and scale of operation. In all three cases, landscape governance has been used as a management tool, *i.e.*, as a tool to steer informal negotiations regarding managerial decisions. In only two of the cases, landscape governance has been used as a multi-stakeholder decision-making process; while in only one case landscape governance has been used to create new institutional space for spatial decision making. In view of their different geographical contexts, each of the original studies focused on location-specific issues and used specific conceptual approaches. All cases were studied through mixed methods. In each of the cases, a stakeholder analysis was carried out, based on which an average of 32 interviews were conducted among the most relevant stakeholders. This data was complemented with participatory mapping, ranking and scoring; focused discussions with mixed stakeholder groups, in-depth interviews with experts, analysis of satellite images and maps, and literature review. Further details of the precise research designs and methodologies are reported in the original studies by Hennemann [28], Brascamp [29] and Van den Dries [30], all available online. The comparative analysis of the cases presented in this article is based both on the original case study results as well as on the authors' own observations at the case study sites.

3.2. Historical Background

Indonesia is one of the countries where forest landscape restoration is high on the agenda [31,32]. The country is known for its high net loss in forest area, estimated at 8.3 million hectares from 2000–2010, representing a net decrease of about 1% per year [33]. Forest degradation, land-use conversion and fragmentation have led to a sharp reduction of ecosystem services and their benefits, which is not favourable for Indonesia's rural and urban population, nor for its economy, which is based on natural resources. Consequently, the importance of maintaining forest cover and restoring the lost

forest is increasingly being acknowledged. This is reflected in the government's Green Growth Agenda, which aims to integrate ecology, economy and human welfare [34–36].

Figure 1. Location of the three case study areas in Indonesia.



Since the second half of the 20th century, Indonesia has been a pioneer of forest landscape restoration. Initially, restoration focused on internationally sponsored watershed rehabilitation programmes. Currently, however, the scope has broadened to (urban) re-greening, restoration of waste land such as formal industrial sites, and post-mining restoration. The organisation of the restoration programmes has also gradually changed. The first watershed management programmes were managed by the Directorate of Reforestation and Land Rehabilitation, in collaboration with local communities. Currently, restoration of forested landscapes is increasingly done by governmental forestry departments in close collaboration with international conservation organisations and local NGOs, often within the framework of Reducing Emissions from Deforestation and Forest Degradation (REDD). Additionally, an increasing number of forest landscape programmes are carried out in collaboration with commercial forestry enterprises through the newly introduced ecosystem restoration concessions [36]. This latter collaboration has not always been successful. Especially during the 1990s, inappropriate incentives for encouraging timber companies to restore the timber production potential of “degraded” secondary forest resulted in the clearing of approximately 1.3 million hectares of forest land. The “degraded” sites from which previously valuable timber trees had been extracted were cleared and replanted as part of the Ministry’s restoration programme [37,38]. Nonetheless, these negative experiences provided important lessons for involving commercial enterprises in forest restoration programmes in the form of industrial forest plantations. The recent shift from the restoration of forests to the restoration of landscapes, recognising the multi-functionality of forested landscapes and the variety of restoration practice, has led to new dynamism in Indonesia’s forest community. A new voluntary association of landscape restoration advocates (MASBENI) has recently been formed, with the aim of actively promoting landscape restoration, in line with the international debate on integrated landscape approaches [36].

Simultaneously with the changed interpretation of forests, landscapes and their restoration, the Indonesian legal and institutional frameworks have also evolved. Whereas administrative decentralisation led to enhanced regional authority regarding the control over natural resources, including financial forest-related benefits, governmental regulation of private investments remained to be poorly monitored [39]. To allow for more transparent stakeholder involvement in forest management and restoration, new guidelines for companies investing in forest landscape restoration are currently in the making. Examples are the strict regulations for the restoration of former mining sites. Another novelty is the recognition of mosaic landscapes consisting of multiple types of land-use, in which forests provide multiple services to their inhabitants. Acknowledgement of this multi-faceted aspect of forested landscapes has led to increased inter-institutional coordination and more freedom for provincial authorities in determining the allocation of land to forestry *versus* non-forestry purposes within provincial spatial plans. There is also increased recognition of communities' multiple forest use and land rights, in an attempt to reconcile formal and informal land-use regimes. All these shifts seem to be leading to more creative restoration initiatives through multi-stakeholder arrangements at the landscape level [40].

3.3. Description of the Case Studies

The first case study was carried out in the Halimun-Salak National Park in West Java covering around 113,000 ha. This park covers the original area of Salak National Park (created in 1992), its extension towards the adjacent Halimun forest (2003), and the heavily degraded area in between. In 2003, it was proposed to restore this degraded area in between, and label it as an ecological corridor. The aim was to restore the ecological connectivity between Halimun and Salak, thus creating a much larger conservation area. Its principle focus is on restoring the landscape's original ecological structure, internal connectivity, and species mobility. An additional aim is to restore the area's function as water provider to West Java's major cities of Bogor and Jakarta. An important fact however, is that the degraded area to be restored is populated by approximately 100,000 people, who suddenly found themselves incorporated into the park, facing sharp restrictions regarding their land use and livelihood practices, which depend heavily on the natural resources (farm land, construction materials, firewood, and collection of non-timber forest products). The restoration plans therefore resulted in fierce conflicts between the inhabitants and the park's authorities [28]. To avoid further escalation, a multi-stakeholder dialogue was started, which led to the agreement that farmers can continue to farm in the area, under a number of conditions, one of which is the planting of trees. Seedlings are provided by an energy firm, operating a geothermal plant in the area.

The second case study was carried out in East Kutai District in East Kalimantan, where the private company Kaltim Prima Coal (KPC, which has a mining permit valid from 1991 until 2021) has taken the initiative to restore its former coal mining site of 90,000 ha, in line with formal government regulations. The main focus of the programme is to restore the productive function of the area, not only for commercial production, but also in the interests of the communities in and around the former mining site. These activities are based on KPC corporate social responsibility policy, which includes good post-mining management, meeting environmental standards, and involving stakeholders in the planning of social, environmental and economic development projects. Before the mining starts, the

topsoil is removed and stored elsewhere. It is moved back after mining and the area is returned to its original state. This procedure is entirely in line with government regulations. KPC however has gone far beyond government regulations by initiating an intensive dialogue with local stakeholders, which has made KPC realise that just restoring the ecological structure of the forest is not enough: restoring the productive function of the landscape is more interesting to the landscape's inhabitants. KPC is therefore actively promoting a multi-functional approach to restoration, aligned with the needs and desires of the inhabitants. The costs of restoration are not covered by the company's social responsibility budget, but from the company's restoration fund, thus calculated as part of the real production costs, fully integrated in its business model [29,30].

The third case focused on the peri-urban forest of Sungai Wain, just outside Balikpapan City, East Kalimantan. Due to its proximity to the city, this 10,000 hectare forest has an important function as a provider of clean air and recreational and leisure activities for the urban people. It is also important as the major provider of clean water for the urban population and the major industries located in the area. The state-owned oil company Pertamina in particular needs large amounts of water for pumping, cooling, electricity supply and water consumption for its many employees. The area used to be heavily degraded due to fierce forest fires in the 1990s. Fire-fighting campaigns initiated from civil society resulted in massive collective action and restoration, providing Balikpapan with its current identity of a "Green, Clean and Healthy City", expressed in the Sun Bear which appears in the city's logo as well as the organisation of cultural events featuring puppet shows and songs on forest and forest restoration [30,41]. Protection of the Sungai Wain forest is still high on the local political agenda, and strict regulation mechanisms have been designed by the municipality. Forest expansion is also envisaged through the establishment of a multi-functional buffer zone, offering surrounding communities the opportunity to collect non-timber forest products and practice agro-forestry. The creation of the Botanical Garden as a tourist attraction also highlights this multi-functional approach, as it contributes to the bio-cultural identity of the area [30]. Funding for these activities is provided by the government, and the industries operating within the landscape.

4. The Results: Governing Forest Landscape Restoration in Indonesia

The three cases differ both in terms of the interpretation of forested landscapes and their form of restoration, and with respect to the mode of governance for steering decision making. However, these interpretations were gradually adjusted in all cases during the implementation of the restoration programme.

4.1. What Form of Forest Landscape Restoration Has Been at Stake?

Although all three programmes were considered as forest landscape restoration programmes, they differ significantly in their original interpretation of the nature of the forest landscape and the restoration process. Whereas two projects initially focused on restoring specific forest ecological conditions in forest reserves, the third project focused primarily on restoring the ecological services for urban residents in an urban landscape.

In Halimun-Salak, the restoration plans were initially identified by the Park Authorities in the form of an ecological corridor, devoid of agricultural activities. This plan was developed without consulting

the large population (approximately 100,000) living in the area. This non-participatory approach led to serious conflict, and required adaptation of the rules: local inhabitants were allowed to farm in the newly created corridor, on the strict condition that they should actively plant trees. Notwithstanding the status as a formal conservation area, agricultural land use became tolerated as a way to mitigate conflicts and to help improve relations between governmental conservation services and local people. Consequently, local people became co-managers in the collaborative management of the forest and an energy company with local geothermal operations assisted in providing seedlings. So, while the government remained responsible for design, farmers became co-managers, and a commercial company contributed to the investments in restoration.

In East Kutai, the Kaltim Prima Coal company initially aimed to comply with the regulations of the Ministry of Mining, Energy and Mineral Resources (ESDM) regarding restoration of former mining areas; the regulations of the Ministry of Forestry regarding the structure and function of the new forest; the requirements of the Ministry of Environment for National Corporate Performance Rating Programme (PROPER); and various related regulations of the provincial and district government. However, during implementation, it was realised that establishing new forests on the denuded lands was not the primary interest of local inhabitants; hence, it was decided to broaden the scope of the restoration programme, by including community development activities (livestock rearing, agro-business and eco-tourism development, health, education and infrastructural development). In order to stimulate a process of joint planning, the original management approach was broadened to a more holistic and integrated landscape approach, with ample attention for the multi-functionality of the landscape, and the needs of local stakeholders.

In Sungai Wain, restoration activities were a direct response to the forest fires during the 1990s, and the result of collective action (NGOs, international donors and the general public). The activities did not just focus on restoring the forest cover, but rather on restoring its significance for people. The collective action provided the entire landscape with a new identity as a provider of green space and clean air for the inhabitants of Balikpapan City and clean water to Balikpapan's residents and industry. These activities contributed greatly to providing the city with a clean, green and healthy image. Within this context, the municipality has developed an active approach of involving stakeholders in formal planning procedures and implementation of management plans, while the private sector has taken care of the bulk of the investments required.

Hence, although the three projects initially differed in their interpretation of the nature of the forest landscape and the process of restoration, the interpretation of the forest landscape focused increasingly in all cases on forested mosaic landscapes.

4.2. How Was the Governance Process Initially Designed, and How Did it Change over Time?

In the cases of Halimun-Salak and East Kutai in particular, the restoration programmes were initially characterised by a professional management approach. However, during implementation there was a shift in all cases from a strict management approach to a more inclusive governance approach of stakeholder involvement. In the case of Halimun-Salak, stakeholder involvement was forced by local inhabitants supported by NGOs. Together they formed an advocacy network, and claimed institutional space to negotiate better land-use options with the Park Authorities. Thus, an informal platform was

created, offering space for negotiations. An agreement was reached through this platform, allowing local people to farm within the boundaries of the extended park, but only under strict conditions. The park management realised that this would be the only way to manage the land-use conflict and create an acceptable level of co-existence [40]. In the case of East Kutai, it was KPC's initiative to involve local stakeholders, which led to a multi-functional approach to restoration. KPC recognised that involvement of local stakeholders is essential for the realisation of such a multi-functional approach; hence, KPC facilitated a platform for stakeholder participation and dialogue. Most stakeholders accepted the invitation, although some NGOs refused, as they did not agree with KPC's dominant position in the platform, and its full financial responsibility over the joint landscape design [28]. In Sungai Wain, stakeholder involvement has been strong from the onset. Born out of collective action, restoration has become high on the municipal agenda. The municipal policy is based on participatory consultation and decision making through a specially created multi-stakeholder platform, which is fully formalised [30,41]. Horizontal coordination is very strong, as governmental agencies, NGOs, industries and local communities are all represented in the Sungai Wain Protection Forest Management Body. This multi-sector management body has formal authority over the design, planning, implementation and monitoring of spatial projects.

In all cases, the process of creating institutional space has been the outcome of institutional bricolage. Not as a deliberate strategy, but as a "way in which things happen". In Halimun Salak, the bricolage was triggered by the clash between the Park Authorities and the local inhabitants, after the latter realised that the changed legal status of their land had substantial implications for their livelihoods. Through mediation of NGOs and a high level of willingness of the Park Authorities, various agreements were reached which were acceptable to both parties, yet remained informal and *ad hoc*, and recognised only for a limited period of time. In other words, the rules were bent, not changed. In East Kutai, institutional space was created by KPC, and the arrangements made were in the interests of both the company and local stakeholders. Initially, the restoration plans followed the formal government regulations, but during the process they were further adjusted and tailored to the needs of local stakeholders. During this bricolage process, local stakeholders managed to stretch the formal rules, and extended them to an outcome acceptable to all, in this case a jointly designed spatial plan. It is however not clear what the legal status of this plan is, or how it is aligned with the formal provincial planning mechanisms. The legal status of the restored land also remains unclear, which may be a source of conflict as it is unclear who will benefit from post-mining restoration, and what will happen when KPC withdraws from the area. The Sungai Wain restoration programme is clearly embedded in municipal structures and policies. Stakeholder involvement has been formalised and embedded in the municipal administration. Here, the bricolage can be found in the way in which partners creatively used symbols and stories to gain not only political space, but also massive public support. This strong horizontal forest restoration alliance has become fully embedded in municipal politics and planning systems and is contributing greatly to the notion of the Sungai Wain forest as bio-cultural heritage contributing towards the identity of the municipality. The case shows that local-level institutional networking and bricolage is important for coherent forest landscape restoration. However, the case also shows that horizontal arrangements are not enough. Sungai Wain is currently under threat. The national government is planning to develop a new industrial area and construct the Trans Kalimantan Highway, connecting the new industrial area with the Kalimantan

hinterland. This will affect Sungai Wain, as the new road is planned to pass along its border. This may result in new settlements, forest encroachment and fragmentation. Although there is strong local consent for protecting and restoring Sungai Wain, this seems to be not enough. Vertical relationships with the higher political levels are poorly developed, anchorage in national politics is weak, and economically driven decisions from higher levels overshadow local rehabilitation networks [30,42].

4.3. Overall Comparison

The analyses of the three cases indicate that their governance process differed in several respects (Table 2). In all of them, restoration programmes were initiated to serve ecological and biodiversity goals, although of a different nature. Initially, stakeholder involvement was predominantly adopted as a way to manage conflict, or to mobilise the public. Over time, however, managers became more sensitive to a more diverse set of provisioning, regulatory and cultural services of the landscape, and became more open to alternative restoration approaches better responding to the multifunctional nature of mosaic landscapes and to developing a more inclusive governance approach.

5. Discussion

Forest landscape restoration has gradually become part of the international policies on forests, climate change and food security. The understanding of its precise nature however is still developing. Forest landscape restoration is first and foremost shaped by the nature of the landscape, and the way in which the landscape is interpreted by those taking the initiative to restore. However, forest landscape restoration is also shaped by the process in which decisions are being taken regarding the aims of restoration, and the way in which restoration is implemented. This process can be referred to as landscape governance. Landscape governance differs from other forms of governance of natural resources in the sense that landscapes do not necessarily follow political or administrative boundaries, and therefore fall outside the scope of the formal spatial planning structures of states [2,5].

The emergent understanding of this multifaceted nature of forest landscape restoration is illustrated by the three Indonesian restoration programmes. The three programmes started off as a professional management approach, with the government setting the initial rules and regulations. However, over time, the rules were adapted in all three cases to the specific conditions of the landscape, and the needs and desires of the different stakeholders, evolving into a more inclusive approach of multi-stakeholder involvement. In all cases, the legal and institutional context was changed by stakeholders themselves, leading to a multi-functional approach, in which forests were placed within a wider landscape mosaic, the functions of forests were better aligned with the landscape inhabitants' needs and desires, and non-forest functions of landscapes were equally taken into account. The underlying modes of governance have stretched beyond the formal spatial planning structures and sectorial fragmentation of the Indonesian state. They have included multiple stakeholders, making them co-responsible for planning and design, but also for investing in landscape restoration. In all cases, the private sector has started to play an important role as initiator, supporter or investor in restoration [23].

Table 2. Comparative overview of the governance process of three cases of forest landscape restoration in Indonesia.

Case study	Original restoration approach	Mode of governance	Evolution in governance approach
Halimun-Salak	Restoration of an area degraded due to agricultural expansion. Restoration of an ecological corridor to restore ecological integrity and species mobility	Landscape governance as a management tool: plans are designed and implemented by Park Authorities; stakeholder involvement merely seen as a conflict management tool	Initially not participatory and highly directive. However, focus changed to more stakeholder involvement to mitigate conflict. Multiple resource use negotiated and accepted, yet not legalised. Institutional space claimed by local inhabitants with NGO support, but not institutionalised. Main funder: government. Additional funding provided by private sector
East Kutai (KPC)	Restoration of former mining sites, emphasis on restoring the original forest cover	landscape governance as a multi-stakeholder decision-making process: within the formal government regulations on restoration there is room for multi-stakeholder dialogue, which has led to more creative multifunctional restoration practice (agriculture, livestock, tourism)	Initially focused on implementation of government regulation, but later on turned into an instrument for participatory spatial planning. Institutional space created for multiple land use. Institutional space created by the company, in agreement with a majority of local stakeholders, yet not formalised or institutionalised in formal planning mechanisms of the government. Main funding: private sector
Sungai Wain	Restoration of fire damage. Emphasis on ecological restoration, provision of clean water and cultural identity	Landscape governance as the creation of new institutional space for spatial decision making: collective action and strong multi-stakeholder collaboration has led to new space for decision making, institutionalised in local government authorities	Integrated and multi-stakeholder approach from the onset; stakeholder involvement as instrument for joint planning; institutional space for multi-stakeholder dialogue created, and formally embedded in local government and its planning mechanism, however poorly embedded in national politics. Main funding: initially civil society and international donors. Later on: municipal government, with substantial co-funding from industries operating in the area

In each of the three cases, flexible governance arrangements at the landscape level were lacking originally, and institutional space for negotiated decision-making at landscape level had to be claimed and created by the stakeholders involved through informal processes of bricolage [2,31]. In all cases, the formal rules were bent or changed, and turned into more flexible governance arrangements. Over time, several of these informal governance arrangements and related landscape configurations were formally recognised. This helped strengthen the landscape's identity and enhance stakeholder collaboration. In all three cases, the new governance arrangements managed to link the stakeholders into a horizontal process of spatial decisions regarding the landscape, in a more or less formalised way. Their embeddedness in the vertical or multi-layered structures of the state has however been less successful. Such embeddedness in "politics of scale" [5] seems to be a difficult yet crucial aspect of landscape governance, particularly in cases where international initiatives for forest landscape restoration require reconciliation of international, national and local interests, or in cases where landscapes are threatened by the pressures of economic development, and where stronger resilience of landscapes is needed in the face of externally driven resource exploitation and infrastructural development.

6. Conclusions

Our analysis indicates that forest landscape restoration should not be based only on design criteria such as formulated by Sayer *et al.* [1], but rather on a good understanding of (a) the different interpretations of the substantive nature of forest landscapes and their restoration needs; and (b) the different modes of landscape governance including the dynamics of their institutionalisation. Our analysis underlines the opinions of various authors [2,4,5] that forest landscape restoration must be based on the notion that local realities matter. It emphasises that landscape restoration requires a flexible approach of social learning rather than a strongly institutionalised approach based on design criteria. To be successful, also landscape governance has to be based on a thorough understanding of the nature of forest landscapes and their restoration. It cannot be solely based on considerations of the political dimensions of governance (with special attention to the participation of non-state organisations and private actors), but must include considerations on how best to incorporate space for social learning and a gradual adaptation of the polity and policy dimensions of governance through a process of institutional bricolage. All landscapes are fundamentally different, as they are the product of socio-ecological processes that are unique in time and place. It is therefore not only important to assess global potentials and design globally applicable instruments and guidelines, but also to support local landscape's stakeholders in planning and designing their own restoration programmes according to their specific needs and, more importantly, to help develop multi-actor, multi-sector and multi-scaled governance mechanisms that allow locally designed plans to be linked to overall planning mechanisms of the state. Most importantly of all, it has to be accepted that forest landscape restoration cannot be based on professional design alone, but rather depends on gradual changes in both the substance and the modes of governance, which emerge out of local creativity and the gradual emergence of innovative public–private arrangements at the landscape level.

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Author Contributions

Cora van Oosten and Freerk Wiersum are responsible for the overall research design and supervision of the entire research process. They are the main authors of the analytical framework, and the framework for the comparative analysis of the cases. Petrus Gunarso and Irene Koesoetjahjo are responsible for the field work, and supervised the process of data collection in Indonesia. They are the main authors of the description of the research background, the historical background, and the case studies. All the authors are co-responsible for the analysis of the results, the discussion and the final conclusion.

Conflicts of Interest

The authors declare no conflict of interest.

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