Intergovernmental Fiscal Transfers for Conservation: The Case of Reducing Emissions from Deforestation and Forest Degradation (REDD+) in Indonesia

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A thesis submitted for the degree of Doctor of Philosophy of The Australian National University Canberra, Australia December 2011
Declaration

I declare that this thesis is the product of my own independent research. It contains no material, which has been accepted for any other degree or diploma, or any copy or paraphrase of another person's material except where due acknowledgement is given.

The following published papers contain material from this dissertation:


Silvia Irawan
Date: 17/8/2012
Declaration

I, [full name], hereby declare that the contents of this document are true and correct to the best of my knowledge. If there are any inaccuracies or omissions, I accept full responsibility.

[Signature]

[Date]
Acknowledgements

This PhD journey has been long and tiring, yet very rewarding. Not only have I grown intellectually, but I have learned many great lessons about life, such as patience and persistence, throughout the process.

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Abstract

Properly designed intergovernmental fiscal transfers (IFTs) offer an innovative instrument to create incentives for local public actors to support conservation. As conservation restricts local governments’ capacity to generate revenues from alternative land-use activities, compensation to reconcile local costs with the benefits of conservation that reach beyond local boundaries is required.

Whilst studies on IFTs for conservation have focused mainly on the distribution formula, this thesis comprehensively examines all elements of the design of IFTs, including conditionality and accountability. The thesis considers both the theoretical justifications and the wider political and administrative context in developing the design of IFTs for conservation. The case of Reducing Emissions from Deforestation and Forest Degradation (REDD+) revenues distribution in Indonesia is selected as the case study.

The pragmatism paradigm, which incorporates both qualitative and quantitative methods, is adopted in this study. Policy analysis to develop policy options to address environmental problems should emphasise integration of the interpretivist and rationalist approaches. Decision makers need to define policy problems with the target groups, who often have contradictory values and beliefs; whilst simultaneously, environmental issues involve a great number of technical issues that require a rationalist approach. A multiple case studies approach is applied as the research strategy with two sample provinces, Riau and Papua.

In-depth interviews with government officials reveal that a dynamic interaction between actors and their different interest determine the final decision on land-use activities. Several factors should therefore exist when transferring IFTs for REDD+ revenue distribution including, inter alia, voluntary participation of local governments in REDD+. Moreover, government officials perceive that conditionality of IFTs is
preferred in conservation for political and administrative reasons. When the use of IFTs for conservation is left to political processes, there is a high possibility that the funds may be used for other development priorities. Earmarking is therefore important for IFTs, to compensate for the management and transaction costs of conservation; whilst, for opportunity costs, IFTs can be transferred with more flexibility for local governments to decide on the use of the funds.

The opportunity cost analysis conducted in this study shows that REDD+ would lead to a substantial loss of public revenues at all government levels. Institutional and political (including informal benefits) may no longer be obtained if local government choose to pursue REDD+. The distribution of REDD+ revenue, using IFTs, needs to create a direct link between the distribution of public revenues and district governments’ decisions on land-use activities. To determine the amount of IFTs to distribute REDD+ revenues, both the cost reimbursement and derivation approaches can be used. The cost reimbursement approach distributes IFTs just enough to cover the costs of REDD+, which vary between localities; whilst the derivation approach sets a fixed rate to determine the amount of IFTs and ignores the costs of REDD+.

Finally, the successful implementation of IFTs will be determined by the technical capacity of local governments to manage public resources at the local level. Hence, designing IFTs for conservation should consider political and administrative factors within a complex bureaucratic environment.
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<td>BAU</td>
<td>Business as Usual</td>
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<td>FMU</td>
<td>Forest Management Unit</td>
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<td>Gerhan</td>
<td>Gerakan Nasional Rehabilitasi Hutan dan Lahan or the national movement for land and forest rehabilitation</td>
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<tr>
<td>GHG</td>
<td>Greenhouse gas</td>
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<td>IFT</td>
<td>Intergovernmental Fiscal Transfer</td>
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<td>MRV</td>
<td>Measurement, Reporting and Verification</td>
</tr>
<tr>
<td>PMU</td>
<td>Project Management Unit</td>
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<tr>
<td>PSU</td>
<td>Public Service Unit</td>
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<td>REDD+</td>
<td>Reducing Emissions From Deforestation and Forest Degradation</td>
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<td>REL</td>
<td>Reference Emission Level</td>
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<td>VAT</td>
<td>Value-Added Tax</td>
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<td>UNFCCC</td>
<td>UN Framework Convention on Climate Change</td>
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Chapter 1 Introduction

Properly designed intergovernmental fiscal transfers (IFTs) present an innovative instrument that creates incentives for public actors to support forest conservation. Whilst much of the literature on payments for environmental services has focused on private actors, such as smallholders and companies, and their forgone benefits due to forest conservation (Wunder, 2007), the economic implications of conservation for these public actors have received less attention. Yet this group of stakeholders should not be overlooked. When the state claims ownership of forests – a situation common in many tropical forest-rich countries (Tacconi et al., 2010), public actors are responsible for maximising the revenues from resource utilisation. This does not imply that revenue maximisation is, or should be, the only parameter used by governments to make decisions concerning natural resources. There is evidence, however, that it is a significant determinant of resource management, as noted, for example by Barr et al. (2006) and Andersson et al. (2006). Conservation, however, restricts public actors from generating public revenues, as they can no longer issue permits to pursue income-generating activities in forests. Local governments usually obtain a share of revenues from timber extraction and agricultural development. As these revenues can no longer be generated due to conservation, compensation to reconcile local costs with the benefits that reach beyond local boundaries is required for local governments to support conservation.

IFTs considering ecological indicators for the allocation of transfers to decentralised governments, also known as ecological fiscal transfers, have been advocated as a means to address the spillover effects of environmental service provision. The provision of environmental goods and services, such as pollution control and conservation, create spillover effects (Oates, 2001; Sigman, 2005; Kunce and Shogren, 2005; Ring et al., 2010). These effects, also known as spatial externalities, occur when public service provision generates benefits that reach beyond their administrative boundaries, while
the costs are borne only by local residents and local governments (Oates, 1972). Due to these spatial externalities, local governments often neglect the benefits that spill over outside their administrative boundaries during the decision-making process. As a result, they tend to provide services below the efficient level (Oates, 1972). To address the spatial externalities of conservation, ecological fiscal transfers have been implemented in Brazil and Portugal and proposed in Switzerland, Germany and India to compensate the forgone opportunity costs of protected areas (Grieg-Gran, 2000; May et al., 2002; Köllner et al., 2002; Ring, 2002; Ring, 2008c; Ring, 2008b, Kumar and Managi, 2009; Santos et al., 2012). In Brazil and Portugal, the transfers have been used to distribute a portion of national governments’ taxes (i.e. the value-added tax) to local levels, based on a set of conservation and ecological indicators (Grieg-Gran, 2000; May et al., 2002; Ring, 2008c; Santos et al., 2012).

The agreement reached at the 2010 Cancun meeting of the UN Framework Convention on Climate Change (UNFCCC) on Reducing Emissions from Deforestation and Forest Degradation (REDD+) is expected to result in a significant flow of funds from developed to developing countries. Public finance that has been mobilized (and approved) for REDD+ finance between 2008 and November 2011 was estimated at $446 million, of which $252 million has been disbursed (Nakhooda et al., 2011). REDD+ finance is currently 13 per cent of total climate finance.

A REDD+ scheme would require developing countries to set aside additional forest conservation areas, which may not necessarily yield additional environmental services for local residents. Additional forest conservation should compete with other land-use activities, such as commercial logging, timber plantations and oil palm plantations, which can legally take place in productive forestlands. REDD+ measures that impose restrictions on the development of those land-use activities would therefore lead to a substantial loss of public revenues at the various government levels. At the sub-national level, local governments would be interested in REDD+ only when the benefits and costs of conservation are duly acknowledged, including when local public budgets increase together with (additional) forest conservation, in their localities.

One of the possible means to channel REDD+ payments to local governments is through an intergovernmental fiscal transfer (IFT) scheme. Using IFTs to channel
international payments for conservation at the local level may require a new approach to the design of IFTs, as their purpose is not only to correct spatial externalities of public service provision (conservation) but also to distribute public revenues vertically between government levels from resource utilisation. This thesis therefore aims to contribute to the growing literature on IFTs for conservation by examining different approaches to develop the design of IFTs for conservation in developing countries.

1.1 The importance of IFTs for decentralised forest management

Developing countries have progressed towards decentralising functions for the provision of basic public services to subnational governments. A similar trend can also be observed in forest management, where powers to manage forest resources are being transferred to subnational governments (Larson and Soto, 2008; Larson, 2003; Ribot et al., 2006). Decentralisation is advocated on the basis of bringing the decision-making process closer to the public to ensure that policies better suit local needs (Cheema and Rondinelli, 1983; Conyers, 1983; Rondinelli, 1990). Decentralisation in public administration also needs to be accompanied by the transfer of authority to subnational governments to generate public revenues to finance local public services. Through fiscal decentralisation, national governments can increase the tax authority of subnational governments or increase transfers to local governments to finance public service provision at that level (Schneider, 2003; de Mello, 2000; Bräutigam, 2002; Falleti, 2005). However, despite the massive decentralisation process in public administration, national governments in developing countries are often not willing to pursue real fiscal decentralisation as they fear that subnational governments cannot deliver public services devolved due to, inter alia, low capacity of subnational governments (Bahl and Wallace, 2005).

Decentralisation in forest management transfers administrative functions to subnational governments to deliver a number of forest related services, including forest monitoring and illegal logging control (Andersson et al., 2004; Andersson et al., 2006; Larson, 2003). However, as forest resources involve strong economic and political dimensions (Larson, 2003), decentralised forest management is often complicated by a lack of meaningful powers and sufficient resources transferred to local authorities. National governments often refuse to devolve authority over raising or spending revenues and
deciding the utilisation of high value resources to subnational governments (Ribot et al., 2006). Local governments, in turn, feel that they have been given the burden of delivering forest services without having the income to manage forests (Larson, 2003). When administrative functions are transferred to subnational governments without sufficient resources to fulfil these functions, subnational governments face a mismatch between revenues and expenditures, which will eventually compromise the quality and quantity of service provision (Bahl and Wallace, 2007; Bird and Smart, 2002; de Mello, 2000). The resistance of national governments to pursue true decentralisation policies have compromised the results of decentralised forest management in developing countries (Larson and Soto, 2008; Larson, 2003; Ribot et al., 2006). Moreover, the issue of spillover benefits resulting from forest conservation and protected areas has complicated forest management in developing countries (Ring et al., 2010; Kumar and Managi, 2009; Ring 2008c).

To address both the mismatch between revenues and expenditures as well as the spatial externalities of service provision, the literature on fiscal decentralisation suggests intergovernmental fiscal transfers (IFTs) as a suitable option. Two important purposes of IFTs are to distribute part of a national government’s revenues to close the gap between spending and revenues mobilised locally and to correct spillover benefits of public services to other jurisdictions (Bird and Smart, 2002; Bahl, 2000; Bahl, 1999; Bird, 2001; Bird, 1999). In decentralised countries, it is common practice for national governments to collect most public revenues and leave local governments with a limited tax base (Bräutigam, 2002; de Mello, 2000; Bahl and Wallace, 2007; Bahl and Wallace, 2005). Hence, if subnational governments are considered important providers of certain public goods and services, the higher level government needs to use IFTs to distribute part of its revenues to close the gap between spending and revenues mobilised by the local governments (de Mello, 2000; Bahl and Wallace, 2007; Bird and Smart, 2002). In relation to the spillover effects of public service provision, by providing a unit of subsidy to local units generating spillover benefits, IFTs can encourage local decision makers to take into account the benefits of public service provision that spill outside their administrative jurisdictions (Oates, 1972; Bird and Smart, 2002; King, 1984).

Designing IFTs to support conservation in decentralised countries requires a comprehensive examination of the impacts of forest management on the expenditures
and revenues of local governments. In forest management, government stakeholders are concerned about providing forest related services and most importantly about generating public revenues from forest resources. As conservation restricts local governments from generating public revenues from forests, IFTs for conservation are imperative to correct spatial externalities of forest related services and also to distribute public revenues generated from forest resources between government levels. The distribution of revenues from forests will impact the capacity of local governments to finance local public service provision in other sectors, such as health and education. This study therefore aims to design IFTs for conservation through a careful examination of both the expenditure and revenue streams of local governments.

1.2 Distribution of revenues from REDD+ in Indonesia as the case study

The case of Reducing Emissions from Deforestation and Forest Degradation (REDD+) revenues distribution in Indonesia is selected as the case study. This thesis assumes that a national-based implementation approach will take place for REDD+ where national governments would receive compensation for reducing emissions, whilst activities at the subnational level would not receive direct financial payments (Angelsten et al., 2008). Several scholars (e.g. Pedroni et al., 2009) have also proposed a nested approach to implement REDD+, where local governments are allowed to receive payments directly from international buyers. However, under the existing fiscal decentralisation in developing countries, the higher level of government collects the major portion of public revenues and shares part of these revenues with local governments, using IFTs to provide local public goods and services (de Mello, 2000). Hence, IFTs are still the cornerstones of subnational government financing in most developing and transition countries (Bahl, 2000).

Under the national-based implementation, REDD+ will then need to be carried out within an intergovernmental relationship because local governments do not operate independently from the national government (Irawan and Tacconi, 2009). The national government would decide the portion of REDD+ revenues to be allocated to local governments and possibly other parties through a consultation process with relevant stakeholders. This thesis examines the use of IFTs that can be used to distribute REDD+ revenues to subnational governments. The fiscal decentralisation literature offers various
types of IFTs that bind the different actors in an intergovernmental fiscal relationship to ensure efficient public service provision to be delivered in an equitable and stable way (Bird and Ebel, 2007).

The study focuses on Indonesia due to its significant role in contributing to the successful implementation of REDD+ globally, given that it has the second largest area of forest loss after Brazil (FAO, 2010). The alarming rate of deforestation in Indonesia is a major national and global concern. The Ministry of Forestry (2008b) reported that the deforestation rate in Indonesia increased from 1.6-1.8 million hectares per year in 1985-1997 to 2.83 million hectares per year in the period 1997-2000. Although the trend has declined in recent years, deforestation in Indonesia still reached 1.08 million hectares per year over the period 2000-2005 (The Ministry of Forestry, 2008b). Deforestation and forest degradation have positioned Indonesia as one of the major Greenhouse gas (GHG) emitters. Indonesia is the largest global emitters of GHG from the forestry sector if emissions from peatlands are included (Houghton, 2003), and it is also one of the global biodiversity hotspots (Myers et al., 2000). Indonesia’s President Yudhoyono has pledged to cut emissions to 26 per cent by 2020 compared to business as usual (BAU). The forestry sector accounts for 14 per cent of the 26 per cent target (Jupesta, 2010). In response to REDD+ negotiations, the government of Indonesia is developing a design to implement REDD+, using a national based approach. Local governments would be encouraged to participate to implement subnational REDD+ projects. Carbon credits generated at the local level would be standardised and accounted for within the national system. This approach requires the national government to distribute the revenues that would be generated from REDD+ to subnational stakeholders. This study contributes specifically to the design of a revenue distribution mechanism using IFTs and also informs the development of REDD+ implementation designs in other countries that have undergone decentralisation in public administration. A broad picture of forest management in Indonesia is provided below before further discussing the study’s objectives and research questions.

Forestry Law 41/1999 grants the national Ministry of Forestry the authority to manage 120 million hectares of state forestland. According to the Law, forested lands are classified into production, protection, and conservation forests. The main function of

1Tiers of government in Indonesia: national, provincial and district/municipality level. For simplicity, this
production forests is to produce forest commodities, mainly timber. Some production forests are also classified as conversion forests, which can be legally converted to other non-forest land-use activities. Protection forests provide environmental services such as hydrological regulation, flood prevention, erosion control, avoidance of seawater intrusion and maintenance of soil fertility. Conservation forests, which include national parks and nature reserves, are intended to conserve biodiversity.

A number of productive activities are permitted by law to exploit Indonesia's forests and often cause forest degradation and deforestation. Commercial logging is normally the first activity allowed to open up natural forests legally. This activity requires the issuance of a commercial logging concession, which is granted for a 20-year period to perform selective timber-cutting based on legal guidelines provided by the Ministry of Forestry (Kartodihardjo and Supriono, 2000). Over the past 40 years, commercial logging operators have failed to implement sustainable forest management (Kartodihardjo and Supriono, 2000). According to 1998 data, 16.57 million hectares out of 69.4 million hectares of forests under logging concessions were degraded (Kartodihardjo and Supriono, 2000). Forest degradation data for 2004 show that this trend continued into the first part of the 2000s (Nawir et al., 2007). The total area of degraded production forests amounts to 14.2 million hectares, with an additional 13.6 million hectares of logged-over areas. The area of degraded forests inside the protection forest category in 2004 was reported at 8.1 million hectares (Nawir et al., 2007).²

Despite the severe destruction of natural forests caused by logging operators, the government has continued to issue logging permits in natural forests to generate revenues and employment (Kartodihardjo and Supriono, 2000). Licences granted to logging operators that had caused severe forest degradation at the end of the concession period were terminated in some cases, and the degraded forests were handed over to a state-owned company for rehabilitation (Kartodihardjo and Supriono, 2000; Nawir et al., 2007). However, one of the so-called rehabilitation policies involves converting severely degraded forests to commercial timber plantations. The underlying concept was to replace forest vegetation (with a remaining standing stock of less than 16 m³ per hectare) with fast-growing species such as acacia (Kartodihardjo and Supriono, 2000; ²Forest degradation is defined as forested lands that are severely impacted by intensive and/or repeated disturbances, therefore, the ability of forests to supply goods and services is reduced (Nawir et al., 2007).
Nawir et al., 2007), thus legitimising forest degradation within commercial logging areas (Kartodihardjo and Supriono, 2000).

According to the Forestry Law, conversion forests can be allocated to a number of purposes, including infrastructure and other land uses such as agriculture, tree crop plantations and mining. Conversion forests are not supposed to have significant tree cover or timber potential. In reality, however, primary forests can also be found in areas designated as conversion forests. In Papua, approximately 3.6 million hectares of conversion forests are primary forests (Ministry of Forestry, 2008c). One of the major drivers of the massive conversion of Indonesia’s natural forests is the establishment of oil palm plantations (Butler et al., 2009; Koh and Wilcove, 2008; Sandker et al., 2007; Venter et al., 2009a). Conversion of natural forests to oil palm plantations provides additional profits for plantation companies because timber is harvested and sold during land-clearing at the beginning of operations. As a result, companies seek to acquire areas larger than the area which will actually be planted (Forest Watch Indonesia and Global Forest Watch, 2002; Kartodihardjo and Supriono, 2000).

All these activities generate revenues for government stakeholders to provide basic public services. In commercial logging, the national government collects revenues in the form of fees and taxes, which are then distributed amongst governmental levels, using a revenue sharing mechanism. If forests are converted to crop plantation activities, the government also obtains revenues from other taxes and charges. Other local government revenue sources related to plantation activities are local ‘fees’ on agricultural products. Following decentralisation, local governments are required to generate revenues from their own taxes and fees as well as the shared-revenues from the national government. REDD+ measures could then limit the revenue stream of local governments due to the restriction to pursue these productive activities in forestlands. On the expenditure stream, local governments would be required to perform additional services to support good forest management to ensure the successful implementation of REDD+. Services, such as better monitoring and managing of conservation and protected areas, would need to be strengthened in order to ensure REDD+ achieves the targets to reduce

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3The precise definition of unproductive forests, however, varies. Since 1986, large-scale timber plantations must be allocated on unproductive forests, ranging from 5 to 20 m³ commercial timber per hectare (Pirard, 2008).
deforestation and forest degradation (Nepstad et al., 2009). Both impacts would shift local governments’ fiscal capacity to deliver public services for local residents.

1.3 **The study’s objectives and research questions**

This study aims to design an IFT to provide incentives for local governments to support conservation using the case of REDD+ revenue distribution from the national to local governments in Indonesia. To achieve their objectives, IFTs need to be designed, with three elements; distribution formula, conditionality and accountability (Bird, 1999; Bahl, 1999; Bahl, 2000). Moreover, particularly in developing countries, designing IFTs for conservation requires careful consideration of technical challenges and constraints related to the capacity of implementing agencies. Research on IFTs for biodiversity conservation to date has appeared to focus on the distribution formula to estimate the amount of transfers allocated for each unit of subnational government (e.g. Köllner et al., 2002; Ring, 2008b; Kumar and Managi, 2009). Two other components of the design of IFTs, conditionality and accountability, have received inadequate attention. This thesis therefore considers both administrative and political situations in designing IFTs for conservation, by focusing not only on the distribution formula but also on the conditionality and accountability of IFTs. The research questions guiding the study are:

1. What are the roles of financial incentives and other factors in influencing local governments’ interest in and commitment to conservation?
2. What are government officials’ perspectives about the design of IFTs, including the distribution formula, conditionality and accountability, to distribute REDD+ revenues from national to local governments?
3. What are the distribution formula options for determining the amount of IFTs for REDD+ revenue distribution to local governments?

The first research question aims to set the scene to understand the role that IFTs can play to support conservation in Indonesia. Based on the perspectives of government stakeholders interviewed in the provinces chosen in this study, Riau and Papua (See Chapter 4), the study attempts to derive a causal mechanism of the roles of financial incentives in local forest governance and how other factors might influence the effectiveness of financial incentives in conservation (reducing deforestation) at the local level. Causal mechanisms are useful to explain why correlations exist in the first place
and/or to suggest new correlations that have not been previously discovered (Mahoney, 2001). The examination about how different factors affect local governments’ interest in conservation can provide suggestions on how financial incentives should then be distributed to subnational levels.

The second research question aims to capture the views of government stakeholders on the design of IFTs to distribute REDD+ revenues to subnational governments. The literature on IFTs supporting biodiversity conservation suggests that different options can be developed for fiscal transfers based on theoretical justifications, however political processes and community lobbying will influence the final design of IFTs (Ring, 2008b; Köllner et al., 2002). Since political negotiations to decide the final design of IFTs will involve a multiplicity of actors, who may have different values, it is then imperative to understand the perspectives of government stakeholders on the design of IFTs to distribute REDD+ revenues. In order to answer this research question, several sub-questions are also explored: 1) the purposes of REDD+ IFTs; and 2) government officials’ views on the distribution formula, conditionality and accountability of IFTs. To answer the second research question, qualitative data collected from interviews with government officials were analysed, using a constant comparison analysis, which applies the principles suggested by the grounded theory method (Robson 2002; Grbich 2007). The analysis involves coding and analysing categories and meaning of qualitative data.

The third research question focuses on the grant size and distribution formula of IFTs to allocate REDD+ revenues to subnational governments. To estimate the amount of REDD+ transfers to local governments, the study utilises tools from the analytical framework available in academic disciplines, including welfare economics and public finance. This study first examines the financial incentive structure currently influencing subnational governments’ decisions on land-use change and forest exploitation, by estimating REDD+ opportunity costs of subnational governments from alternative land uses. The cost analysis focuses on three land-use activities: commercial logging, timber and oil palm plantations. The opportunity costs of alternative land-use activities can be used as the basis to determine the size of the REDD+ distributable pool allocated to each government level. After the distributable pool is estimated, the study analyses the
impact of using different approaches to determine the amount of the transfers for district governments.

Finally, to recommend a policy option in the final stage of this study, all the results are combined into the design of IFTs for REDD+ revenue distribution. Based on the findings of the study, the design of IFTs is proposed taking into account three important considerations, concerning: i) the technical characteristics of the distribution formula, conditionality and accountability mechanisms; ii) the technical capacity of local governments to manage public resources; and iii) local forest governance. The first important consideration for designing IFTs for conservation is to define clearly the objectives of IFTs, which include ensuring the efficient delivery of public services (Bird, 1999; Shah, 2006). Second, the distribution formula of IFTs should not be able to be influenced by local governments and easily understandable. Third, IFTs transferred to local levels should ensure the autonomy and independence of local governments to set priorities, responding to local needs. Fourth, the design of IFTs should ensure accountability and transparency in the process of allocating transfers and in implementation at the local level. Finally, the design of IFTs should also be simple and easy to administer.

To answer the first and second research questions, interviews with relevant stakeholders were conducted in Riau and Papua. Between 2009 and 2010, a total of 36 respondents were interviewed in both provinces and two districts in each province. Detailed discussions on the methods and assumptions applied in this research are provided in Chapter 4, while the study limitation is discussed in Chapter 9.

1.4 Thesis Outline

This thesis consists of nine chapters, including this Introduction. Chapter Two reviews the theories of decentralisation and their relevance to forest management in developing countries. This chapter provides the overarching theories underpinning this thesis. Whilst most studies of decentralised forest management have focused on discussing the institutional configurations and balance of power amongst actors, this chapter analyses decentralised forest management from the fiscal decentralisation perspective. The analysis also explores the role of financial incentives, particularly IFTs, in influencing
the decision making process at the local level. This chapter concludes with a discussion of the important elements of the design of IFTs, suggested by the public finance literature and extracts the lessons from international experiences and proposals of IFTs to support biodiversity conservation.

After detailing the theoretical concepts of fiscal decentralisation in forest management, Chapter Three discusses the practical implications of decentralised forest management in the implementation of REDD+ and the possible role of IFTs in distributing REDD+ revenues to subnational governments. First, the chapter discusses several aspects of REDD+ implementation designs including: the implementation scale, reference emission levels, the measurement, reporting and verification (MRV) system, financing options and the implementation phases. Then, the chapter reviews the elements of REDD+ revenues and how intergovernmental fiscal instruments can be considered for REDD+ revenue distribution in decentralised countries.

Chapter Four details the overall approaches and methodology used in this study. The chapter first discusses the epistemology that determines the philosophical stands adopted in conducting the study. It also details the study’s stages and summarises methods used in data collection and analysis. Finally, the sampling process pursued is presented and the localities chosen as the sample in this study are then introduced. This chapter summarises the general approaches and methodologies of the study, while detailed methods used to answer each of the research questions are provided in the later chapters (Chapters 5-8) where the results of the analyses are presented.

To answer the first research question, Chapter Five presents the existing situation of local forest governance in Riau and Papua, based on responses provided by local government stakeholders. This chapter analyses a possible causal mechanism of financial incentives and other factors that will activate local governments’ interest in and commitment to conservation (and land-use change). In-depth interviews with government stakeholders reveal that each locality has different beliefs and values towards deforestation and forest degradation, which are heavily influenced by local residents. The interest of local stakeholders would also be different to their national counterparts; hence, a dynamic interaction between the actors and their different interest would determine the final decision on land-use activities. The chapter notes that three
factors need to exist when transferring REDD+ revenues using IFTs, including sufficient devolved authority in forest management and creating incentive for local community to prefer conservation to land-use change. Finally, the chapter also aims to provide a thick description (or detailed accounts) of the cases selected in the study, Riau and Papua, prior to presenting the results of analyses in the next chapters.

Chapter Six analyses stakeholders’ views on the preferred designs of IFTs to distribute financial incentives, which may be created under a REDD+ scheme, to subnational governments. The chapter first discusses the existing regulatory arrangements of IFTs in Indonesia to understand how to use them to distribute REDD+ revenues. The chapter then answers the second research question by examining the qualitative data collected through semi-structured interviews. The perspectives of governments on IFTs to distribute REDD+ revenue vary depending on the international-national payment mechanism, which would be agreed under the international level, and the technical capacity of local governments in REDD+ implementation. The chapter also provides a detailed discussion on the important aspects of the design of IFTs for REDD+, including the distribution formula, conditionality and accountability. Government stakeholders perceive that conditionality of IFTs is preferred in conservation due to political and administrative reasons. When the use of IFTs for conservation is left to political processes, there is a high possibility that the funds are used for other development priorities. A conditional grant is also considered easy to administer, as a clear guidance from the national government would prevent any mistake in spending the grant. Earmarking is important for IFTs that compensate management and transaction costs; whilst, the compensation for REDD+ opportunity costs could be transferred with more flexibility for local governments to decide on the use of IFTs.

Chapter Seven and Chapter Eight address the third research question. Chapter Seven discusses the existing incentive structure influencing subnational governments’ decisions on land-use change. The three major land-use activities considered in the analysis are commercial logging, timber and oil palm plantations. The results of the opportunity cost analysis of REDD+, incurred by government stakeholders, are presented. REDD+ measures that impose restrictions on the development of those land-use activities would lead to a substantial loss of public revenues at the various government levels. For instance, the opportunity costs of oil palm plantations on
mineral soil preceded by logging of degraded forests are prohibitively high. The design of the distribution of revenues generated from REDD+ activities should consider the specific incentives of the different government levels and across sectors, which have specific interest in promoting certain land-use changes. To influence their behaviour towards land-use change, REDD+ schemes need to create a direct link between the distribution of public revenues and district governments’ decisions on land-use activities in their localities.

Chapter Eight focuses on the distribution formula of IFTs for REDD+. The chapter estimates the amount of the fiscal transfers to local governments using two approaches, the derivation or cost reimbursement approach. The study demonstrates that both approaches can be used to distribute REDD+ revenues. Using the cost reimbursement approach, localities with degraded forests will receive a higher compensation per unit carbon emission reduction compared to districts with intact primary forests. Avoiding further conversion of logged-over areas is associated with higher opportunity costs compared to preventing the conversion of intact primary forests. In contrast, the derivation approach sets a fixed rate to determine the amount of transfers to local government per unit emission reduction at the local level and ignores the opportunity costs of REDD+ incurred by local governments. The distribution of REDD+ revenues to eligible district governments is based only on the assumed market price of carbon credits from REDD+. The chapter then concludes with a discussion of the implications of the findings to designing a REDD+ payment distribution.

Summarising the findings presented in the previous chapters, Chapter Nine proposes the design of IFTs to distribute REDD+ revenues from the national to local governments in Indonesia. Moreover, this chapter reflects on the theoretical implications of the results of this study, particularly on IFTs support of conservation in developing countries. Three main contributions of this thesis to the body of knowledge are discussed, including: i) the design of IFTs for conservation, including the distribution formula, conditionality and accountability; and ii) the factors that need to exist to ensure the successful implementation of IFTs considering the political and administrative situations in developing countries; and iii) the methodological approach in conducting policy analysis to address environmental problems, by applying both rational and
interpretivist analyses. The study’s limitations and suggestions for future research are then discussed to conclude the chapter.
Chapter 2  Theories of Decentralised Forest Management and Fiscal Decentralisation

This chapter reviews the theory of decentralised forest management from the fiscal decentralisation perspective to provide an overarching theoretical background for the thesis. The decentralised forest management literature has mostly analysed the administrative and political decentralisation implications on forest management (Ribot et al., 2006; Larson, 2003; Tacconi, 2007; Andersson et al., 2004; Andersson, 2004; Andersson and Gibson, 2007; Andersson, 2003). Studies of decentralised forest management have focused specifically on the institutional configurations and balance of power and interactions between actors involved in or affected by forest management (Larson and Soto, 2008). Although fiscal incentives have been highlighted as an important condition of success, specific research on decentralised forest management and fiscal decentralisation is lacking. The literature on fiscal decentralisation suggests a number of instruments for the efficient provision of public services at the local level (Bird and Ebel, 2007; Bird and Smart, 2002; Bahl and Wallace, 2007). This chapter sets out, therefore, to bring together the issues of fiscal decentralisation and decentralised forest management to understand how to design instruments that provide incentives for subnational governments to better manage forest resources.

Fiscal decentralisation theories are mainly concerned about the assignment of functions to different levels of government and the appropriate fiscal instruments for carrying out these functions (Oates, 1999). They can inform the implementation of decentralised forest management about: the function that should be performed by subnational authorities; how to locate resources generated from forest resources at different governmental levels to optimise social welfare (Musgrave, 1959); and the amount of resources best handled by each government level to deliver forest services (Oates, 1972). Fiscal decentralisation theories also suggest intergovernmental fiscal transfers (IFTs) as a means to ensure the efficient provision of public services at the local level. Fiscal instruments have long been used to address negative externalities of
environmental pollution in federal countries (e.g. Oates, 2001; Sigman, 2005; Kunce and Shogren, 2005) and also recently to compensate for local costs of biodiversity conservation resulting from land-use restrictions of forest conservation (Grieg-Gran, 2000; May et al., 2002; Kollner et al., 2002; Ring, 2002; Ring, 2008c; Ring, 2008b; Kumar and Managi, 2009; Ring et al., 2010).

The chapter first discusses administrative, political and fiscal decentralisation as well as how decentralisation in one dimension may influence decentralisation along other dimensions. It then reviews the practice of decentralised forest management in developing countries to understand the factors that determine its successful implementation. A link between fiscal decentralisation theory and the literature on decentralised forest management is then developed. Lessons from the relatively limited body of knowledge on IFTs for biodiversity conservation are discussed together with their potential influence on local governments' interest in supporting forest management and conservation. Specific fiscal instruments that can be used to influence subnational governments' behaviour in land-use management are then presented. Finally, the chapter discusses aspects of the design of IFTs that need to be considered to ensure they achieve their objectives.

### 2.1 Theory of decentralisation

Decentralisation is defined as the: 'transfer of planning, decision-making, or administrative authority from the central government to local administrative units, semi-autonomous, parastatal organisations, local governments, or non-governmental organisations' (Cheema and Rodinelli, 1983, p. 18). The types of decentralisation are administrative, political and fiscal decentralisation (Falleti, 2005; Schneider, 2003). Administrative decentralisation is the transfer of the administration and delivery of public services to subnational governments, such as education, health, or social welfare. Decentralisation of administrative functions may also include the devolution of the decision-making authority and resources to meet the costs of public service deliveries (Falleti, 2005). The transfer of authority to increase the fiscal autonomy of subnational governments, known as fiscal decentralisation, involves increasing fiscal transfers from the central government or transferring tax authority to subnational governments (Schneider, 2003). Political decentralisation is the transfer of political authority or
electoral capacities to subnational actors through a set of constitutional amendments and electoral reforms (Falleti, 2005).

Administrative decentralisation involves various degrees of autonomy. The degrees of autonomy can be categorised as deconcentration, delegation and devolution (Rondinelli, 1990; Schneider, 2003). Deconcentration occurs when central governments disperse responsibility for a policy to their field offices and retain authority over the local offices. Central governments exercise their authority through the hierarchical channels of the bureaucracy (Schneider, 2003). Delegation transfers policy responsibilities to subnational governments that are not controlled by the central government but remain accountable to it (Schneider, 2003). Finally, devolution takes place when the central government allows local governments to exercise power and control over the transferred policy. The national government can only exercise control over subnational governments by threatening to withhold resources or responsibility from them (Schneider, 2003).

Proponents of decentralisation suggest both political and economic rationales. From the political and public administration point of view, decentralisation is expected to (Cheema and Rondinelli, 1983):

- increase sensitivity to local needs and ensure that decision makers are more flexible and innovative. Hence, the policies and decisions made should be better tailored to local needs;
- promote greater participation of local people in the planning and implementation of national development;
- increase political stability by harmonising interest between national and local levels;
- increase the capacity of local governments especially when the transfer of powers and authorities is followed by adequate transfers of resources.

The economic rationale of decentralisation is to enable local governments to provide public services according to the different preferences of individuals in their jurisdictions. Decentralisation allows individuals to seek out a community that is best suited to their preferences and prevents welfare losses to society caused by the uniform provision of public services (Tiebout, 1956; Oates, 1972). In order to achieve the
economic objectives, decentralisation in public administration is usually followed by the devolution of fiscal power from the national government to the subnational governments (Davoodi and Zou, 1998; Bahl, 1999).

Decentralisation along one dimension may influence or cross over into decentralisation in other dimensions. Schneider (2003) suggests that increasing decentralisation in one dimension can lead to an increase in decentralisation in another dimension, however, it could also lead to a decrease in another dimension. Fiscal decentralisation might result in greater administrative decentralisation if subnational governments spend the increased resources to assert their administrative autonomy. However, fiscal decentralisation might lead to a lower degree of administrative decentralisation if national governments increase bureaucratic or regulatory controls as the counteraction of the release of resources (Schneider, 2003). Falleti (2005), who studied the decentralisation process in Latin America, argues that different types of decentralisation are negotiated and enacted at different points in time. When decentralisation is instigated due to subnational pressure, political decentralisation is likely to occur first, then governors and mayors would most probably demand fiscal decentralisation; and finally administrative decentralisation would follow (Falleti, 2005). In contrast, when decentralisation is pursued due to national interest, administrative decentralisation is likely to occur first. If fiscal resources do not accompany the transfer of responsibilities, the national government will strengthen its power by making subnational officials more dependent on transfers from the national government. Following this process, political decentralisation, if it happens, will be the third type of reform (Falleti, 2005).

2.2 The theoretical pattern of decentralised forest management

The rationale for decentralised forest management includes reducing costs, increasing forest department revenues and/or increasing control over local communities (Larson and Soto, 2008). From the administrative decentralisation perspective, the degree of decentralised forest management can also range from deconcentration to devolution. Deconcentration in forest management occurs when the national government provides forest related services at the local level through its field offices. Delegation in forest management involves the transfer of administrative functions (obligations) to subnational governments to deliver forest services such as: training for local user
groups, forest monitoring, controlling illegal logging, preventing and controlling fire, environmental education as well as forest protection and conservation (Gibson and Lehoucq, 2003; Andersson, 2003; Larson 2003; Andersson et al., 2006). In contrast, devolution in forest management transfers power to decide on the utilisation of forest resources to generate public revenues (Ribot et al., 2006; Larson, 2003; Andersson et al., 2006). Decentralisation in forest management often involves only the transfer of administrative functions to provide forest services without devolving the power to generate income from forest utilisation to local governments. Since forest resources can be exploited to achieve economic and political objectives, decentralisation in forest management involves high levels of conflict and resistance from central governments to pursue true decentralisation policies (Larson and Soto, 2008; Larson, 2003; Ribot et al., 2006).

There is a contentious debate about whether subnational governments should be provided with more authority in forest management. Devolution of power to local governments is considered necessary to ensure good forest management at the local level because elected local governments are more likely to be downwardly accountable (Ribot et al., 2006; Ribot, 2003). However, more authority to subnational governments does not always lead to better forest management (Tacconi, 2007; Wunder, 2010). Many developing countries have weak representative decision-making processes and local elite captures are common, hence, vested interest groups can often take advantage of decentralisation for their own benefits (Francis and James, 2003). Moreover, local people, as the electorates, may also prefer forest exploitation for their livelihoods instead of conservation (Tacconi, 2007), which puts pressure on local governments to pursue land-use change and forest exploitation.

The political and economic dimensions of forest management often make it more complicated to administer compared to other public service sectors such as health and education (Larson, 2003). Several empirical studies (i.e. Ribot et al., 2006; Larson, 2002; Andersson et al., 2004; Andersson and Gibson, 2007; Andersson, 2003) of decentralised forest management in developing countries have suggested that a set of important governance factors are required to ensure successful forest management at the local level (Table 2.1). These factors are: sufficient resources, financial incentives,
upward accountability, local governments’ commitment, discretionary power, demands from NGOs and pressure from local people.

### Table 2.1 Important factors for successful decentralised forest management

<table>
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<tr>
<th>Factors</th>
<th>Definition/ Explanation</th>
<th>Supporting Literatures</th>
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| Capacity/ sufficient resources (technical, administrative, and financial) | The ability of local governments to carry out their mandates, including: financial (and administrative management, problem-solving, technical skills and the capacity to be democratic leaders (Larson, 2002). | - Andersson et al. (2004) – studied 50 Bolivian municipalities  
- Larson (2002) – examined 21 municipal governments in Nicaragua  
- Gibson and Lehoucq (2003) - interviewed mayors in 100 municipalities in Guatemala |
| Financial incentives | The possibility of increasing municipal incomes (Larson, 2002; Andersson et al., 2006) | - Andersson et al. (2006) – studied 100 municipal governments in Guatemala and another 100 in Bolivia  
- Andersson (2003) – studied 50 Bolivian municipal governments  
- May et al. (2002) – studied the impact of fiscal transfers for forest conservation  
- Larson (2002) – examined 21 municipal governments in Nicaragua |
| Upward accountability/ central government coercion | Vertical accountability mechanisms to higher governmental levels – providing information and enabling sanctions | - Ribot et al. (2006) - used a comparative empirical approach in Senegal, Uganda, Nepal, Indonesia, Bolivia, and Nicaragua  
- Andersson (2003);*Andersson et al. (2006)* |
| Local governments’ commitment | Commitment to the long-term sustainable use or protection of forest resources (Larson 2002) | - Larson (2002) – examined 21 municipal governments in Nicaragua  
- Andersson et al. (2006)* |
| Discretionary powers | Secure domain of autonomous decision making and funding to implement the authorities devolved | - Andersson (2003)*; Ribot (2003)*; Ribot et al. (2006)* |
| Demands from NGOs | Local pressure or demands from local non-governmental organisations (NGOs) to take environmental initiatives | - Larson (2002)*; Andersson (2003)*; Andersson et al. (2006)*; Gibson and Lehoucq (2003)* |
| Local people pressure as the electorates | Local pressure or demands from local people or communities to take environmental initiatives | - Andersson (2003)*; Larson (2002)*; Andersson et al. (2006)*; Ribot et al. (2006)* |

*See description above

To understand how governance factors influence forest management at the local level, Larson (2003) developed a model of successful decentralised management. She grouped important factors that determine the outcome of decentralised forest management into: legal structure, local decision-making sphere and mediating factors (Figure 2.1). The legal structure determines the types of powers transferred, the accountability relations of
the actors receiving powers and the degree to which the powers transferred represent rights or privileges. The local decision-making sphere determines local government initiatives in the forestry sector and is influenced by four variables: local government capacity, power relations, the incentive structure for forest management and environmental and social ideology. The mediating factors lie between the legal structure and the local decision-making sphere and include the role of the central government (CG) and economic incentives.

**Figure 2.1 Larson’s model of decentralised forest management**

![Figure 2.1 Larson’s model of decentralised forest management](image)

**Source:** Larson (2003, p. 220).

Most of the studies listed in Table 2.1 focus more on public service delivery in the forestry sector than on the sustainability of forest management (i.e. preventing deforestation). The studies apply varying measures of good forest management as their dependent variable including: i) budget allocated, staff assigned and the level of importance assigned to the forestry sector by local governments (Andersson et al., 2006); ii) local governments’ responsiveness to local people (Andersson, 2004); and iii) local governments’ interventions in the forestry sector (Larson 2002). Two studies (Andersson and Gibson, 2007; Andersson et al., 2010) consider, however, deforestation as the dependent variable. Andersson and Gibson (2007) analyse the effect of local institutions, national policy, socioeconomic context and biophysical conditions on deforestation. They find that biophysical factors are the strongest determinant of both total and permitted deforestation. According to them, unauthorised deforestation is best explained by a combination of factors related to local institutional performance, national
policy and biophysical conditions. They find that the level of municipal forest governance performance has a negative and statistically significant effect on unauthorised deforestation. They suggest that municipal governments could mitigate pressure to deforest indiscriminately by facilitating local forest users to obtain more secure forest property rights. They consider that forest users with more secure property rights were less likely to convert forests to competing land uses such as agriculture or pasturelends (Andersson and Gibson, 2007).

Andersson et al. (2010) examine the impact of decentralisation (de facto and de jure) on the change of forest cover in municipalities in Guatemala, Peru and Bolivia. Their study finds that de facto decentralisation has a positive and significant effect on forest cover. De facto decentralisation, in their study, represents the capacity of local governments to gather revenues. Hence, localities with more financial autonomy experience less forest loss as they are more likely to be able to implement effective forest conservation policy and can invest relatively more in forest activities (Andersson et al., 2010). They identify important governance factors affecting local governments’ interest in conservation or deforestation as: NGO pressure, local financial importance of forestry; socioeconomic context; national policy and local institutional performance (Andersson et al., 2010; Andersson and Gibson, 2007). These factors, together with biophysical factors, such as access to forests and topography, influence the change of forest covers in municipalities in Latin American countries. Andersson et al. (2010, p.15) also argue that there is: ‘a plausible link between stronger local capacity to raise taxes and more stable forest cover because stronger taxing capacity is associated with greater emphasis on forestry policy.’

It is evident that ensuring local governments manage forests sustainably (or reduce deforestation) presents more challenges than merely having them deliver forestry related services. Tropical deforestation is a complex event, which varies between regions, driven by synergetic causes of economic factors, institutions, and national policies (Geist and Lambin, 2002). Considering the importance of forest resources for the economy and local livelihoods, Tacconi (2007) proposed additional provisions to Larson’s (2003) model (Figure 2.2). In that model, local people influence local government policies, including forest management. Forests can be perceived as a source of livelihoods that could be exploited or preserved to produce environmental services. The model also incorporates three other governance factors into the legal framework:
tenure arrangements, corruption and patronage. Finally, economic growth and provision of services may arise from decentralisation processes with possible impacts on forests.

**Figure 2.2 Tacconi’s model of decentralised forest management**

The existing literature on decentralised forest management provides a comprehensive picture about the complexity of local forest governance in developing countries. Adding to the complexity, reducing deforestation and forest degradation may compromise national and local economic growth as well as local livelihoods. Deforestation is determined by national policies, local institutions, biophysical and socio-economic conditions. The national government usually has the authority to make the final decision related to policies on permitted or legal deforestation, however the pressure to deforest also come from local stakeholders. A review of the decentralised forest management literature highlights the important link of financial incentives (devolved through fiscal decentralisation) with deforestation. The next section then discusses decentralised forest management specifically from the fiscal decentralisation perspective, which offers a wide range of suggestions on how to allocate financial resources to different government levels.
2.3 Forest management through the fiscal decentralisation lens

Fiscal decentralisation sets out the roles that the government sector should play. Musgrave (1957, p. 5) proposes that the public sector should play a role in three budget functions: ‘the function of providing the satisfaction of public goods and services (allocation); the function of providing for adjustments in the distribution of income (distribution) and the function of contributing to stabilisation (stabilisation).’ There is a consensus that the last two functions should be the responsibility of the central government because a local government has: ‘a limited scope for effective stabilisation or redistributive policies within its jurisdiction’ (Oates, 1972, p. 5). Related to the provision of public services, Oates (1999) contends that public goods that have to be provided to the entire population in the country should be provided by the central government.

Decentralised levels of government are the best level to provide goods and services, where consumption is limited to a particular jurisdiction (Oates, 1999). Local goods and services should be tailored to the preferences and circumstances of the local constituents (Oates, 1999). Musgrave (1959) argues that decentralisation will enable local governments to provide services according to the different circumstances and tastes of individuals in the jurisdictions. This can avoid welfare losses to society caused by the uniform provision of public services in more centralised countries (Oates, 1972). There is, however, no straightforward prescription delineating the specific goods and services to be provided at each level of government. This situation complicates the process of decentralised forest management, where the issue of which functions should be transferred to what level is rather contentious (e.g. Ribot et al., 2006; Larson, 2003; Larson and Soto, 2008).

Fiscal decentralisation theory also provides suggestions on specific fiscal instruments to underpin the delivery of the functions performed by local governments. In a multilevel public sector, it is important to align responsibilities with fiscal instruments at the proper level of government (Oates, 1999). In order to finance the provision of goods and services, local governments need to be provided with the authority to generate local revenues (Bird and Ebel, 2007). Sources of local governments’ revenues are taxes,
direct contributions such as charges, public enterprises’ profits and royalties from natural resources (Bräutigam, 2002). As the role of local governments is to provide local residents with public services for which they are willing to pay, they should, whenever possible, charge for the services they provide (Bird, 2001, p. 11). When charging is not feasible, services should be financed from taxes collected from the residents. As local governments’ tax bases tend to be limited, higher government levels need to share part of their revenues with local governments through IFTs if the latter are important providers of public goods and services (de Mello, 2000).

In most developing and transition countries, IFTs play an important role in subnational government financing (Bahl, 2000). Three of the major purposes of fiscal transfers are (Bird and Smart, 2002; Shah, 2006): i) distributing part of national government’s revenues to close the gap between spending and revenues mobilised locally; ii) correcting spillover benefits of public services to other jurisdictions; and iii) ensuring fiscal equality between local governments in a country. A revenue sharing mechanism usually aims to address the mismatch (fiscal gap) between expenditure needs with public revenues generated at the local level. IFTs can also be implemented to correct spatial externalities that occur when public service provision generates benefits for residents outside a locality. Spatial externalities will create an inefficient outcome as the decision-makers often neglect the benefits accrued to outsiders in the decision-making process (Bird, 1999). To address the spatial externalities, local governments should be provided with a unit subsidy, usually in the form of a conditional/unconditional grant, to correct the externalities (Oates, 1972, p. 66). Local governments are then expected to provide the right amount of public service.

From the fiscal decentralisation perspective, forest management has two broad implications: i) forest resources generate local revenues; and ii) several forest services (e.g. forest protection and conservation) need to be performed by subnational governments. The management of forests as resources can impact on the revenue stream, while forest related services to be provided by local governments have implications for local governments’ expenditures. It is imperative to analyse at what government level revenues from forests should be collected and forest related services should be performed before exploring fiscal instruments that are required for successful decentralised forest management.
In decentralised forest management, national governments mostly retain the power to decide on the utilisation of forest resources to generate revenues (Ribot et al., 2006). This arrangement appears to be a common practice in decentralised countries. Searle (2007, p. 393) contends that national governments have greater capacity to: i) deal with complex royalty schemes for natural resources; ii) prevent cross-border loss of taxes through firms moving their profit to a lower taxing jurisdiction; and iii) arrange revenue distribution between jurisdictions. When national governments collect revenues from natural resources, the fiscal decentralisation literature suggests that a portion of revenues collected by the national government should be distributed back to the local governments where they originated (Searle, 2007; Bahl and Wallace, 2007). The distribution of revenues between government levels can use a vertical revenue sharing mechanism. Governments usually generate public revenues from exhaustible natural resources, including timber extraction, in the form of upfront payments, rent income and back-end payments (Searle, 2007).⁴ The purposes of these revenues are to cover public costs associated with any economic activity exploiting natural resources, and/or to fund specific services and/or to add to general revenues to finance a range of services. Subnational governments should obtain a portion of the revenues if they incur expenses from infrastructure responsibilities and other impacts including environmental impact (Searle, 2007). If a local government owns the assets being exploited then it should receive some additional compensation, although this does not mean other jurisdictions should receive no benefit (Searle, 2007).

To support sustainable forest management and conservation, subnational governments are often required to perform a number of forest services at the local level. The literature on decentralised forest management reports a number of devolved forest related services, such as:

- training of local user groups and setting up databases on municipal forest resources in Bolivia (Andersson, 2003);

⁴An up-front fee is collected, based on either the sale of a right to explore and exploit natural resources. Rent income is the annual revenues generated from the utilization of natural resources; while a back-end payment is the rent income received in the form of public infrastructure built by the firm as part-payment for the extracted material (Searle, 2007, p. 392).
• forest monitoring, illegal logging control, legal logging supervision, and developing forestry plans with popular participation in Guatemala (Gibson and Lehoucq, 2003; Larson, 2003);

• establishing municipal parks, organising campaigns for fire prevention and control, participating in the management of national parks and promoting citizen participation in Nicaragua (Larson, 2003); and

• preventing and controlling fire, environmental education, and promoting agroforestry in Brazil (Larson, 2003).

Subnational governments have an advantage in administering all these services because of their proximity to forest areas and local residents in surrounding forests. If a country devolves the administrative functions (obligations) to perform forest related services, the process should also be accompanied by adequate financial and administrative resources, otherwise decentralisation efforts will fail when the resources are insufficient (Andersson et al., 2006; Larson, 2002; Larson, 2003). Larson (2003) found that local governments in Latin America often feel that they have been given the burden without the benefits of management either in terms of the authority or income.

On the basis of this review, there are four possible relationships between the revenue collection and expenditures assigned to local levels in the forestry sector. First, national governments collect revenues from the forestry sector and they provide forest-related services at the local level. This arrangement can be considered as deconcentration of forest related services through the national government’s field offices. Second, national governments collect revenues, which are then distributed to local governments to finance forest-related services and/or basic public services in other sectors. This pattern transfers policy responsibilities to subnational governments, which remain accountable to the national government. Third, subnational governments collect revenues from forests at the local level and they are responsible for delivering forest-related services. Under this arrangement, local governments are provided with the power to decide on the utilisation of forest resources and the level of forest-related services provided at the local level. Finally, national governments collect revenues, but subnational governments are responsible for providing forest-related services at the local level. There is no direct transfer to finance the services from the national to local levels.
The fourth pattern appears to be common in decentralised forest management in developing countries. Even when the revenues are distributed back to local governments, the distribution is often not allocated directly to finance forest related services performed by subnational governments (e.g. the case of revenue distribution in Indonesia). Local governments often have to use their local budget to finance forest-related activities. As forest services create spillover benefits, local decision makers then neglect the benefits that spill over to other jurisdictions and only provide the services below the efficient level. This situation is obvious in the case of conservation, when the benefits of conservation reach beyond local administrative boundaries (Ring et al., 2010). Decisions on the designation of protected areas are usually made by national governments. However, conservation results in costs for local governments as they are restricted to raising revenues from taxes or charges in forests designated as conservation areas (Ring et al., 2010). To address this situation, fiscal decentralisation theory suggests that the central government should subsidise local governments to provide efficient levels of the activity on their own (Inman and Rubinfeld, 1997).

National governments can consider using IFTs to correct the mismatch between revenues and expenditures and to subsidise local governments for providing efficient levels of forest services. The use of IFTs in environmental management has been explored mostly in relation to pollution control. As polluting activities in one jurisdiction flow across boundaries, the central governments can directly tax the polluting sources or provide a subsidy to local governments so that they will internalise the benefits from interjurisdictional pollution control (e.g. Oates, 2001; Sigman, 2005; Kunce and Shogren, 2005). Some authors have recently suggested the importance of assigning revenues to local governments to pursue biodiversity conservation (Ring, 2002; Ring, 2008b; Ring, 2008a; Ring, 2008c; Ring et al., 2010; Köllner et al., 2002; Kumar and Managi, 2009). IFTs, to support biodiversity conservation, have been applied in Brazil and recently in Portugal. Brazil is the country with the longest standing experience with ecological fiscal transfers, which have resulted in an increase in both public and private protected areas (May et al., 2002; Ring, 2008c). An empirical study conducted by May et al. (2002) reveals that protected areas in Paraná increased by 165 per cent over a period of nine years since the beginning of the program in 1992. IFTs have also been proposed for Switzerland, Germany and India to compensate the forgone opportunity costs by the localities with protected areas (Köllner et al., 2002;
Ring, 2002; Ring, 2008a; Ring 2008b; Kumar and Managi, 2009). In order to understand how intergovernmental fiscal transfers operate, the next section discusses the important aspects of the design of IFTs and provides examples of IFTs to support biodiversity conservation.

2.4 The design of intergovernmental fiscal transfers

To ensure IFTs achieve their policy objectives, policy makers need to pay attention to the design and the conditions in which they operate. The aspects of the design of IFTs are the distribution formula, conditionality and accountability (Bird 1999, p. 24). The distribution formula entails the distributable pool (grant size), which is the vertical dimension of IFTs that determines the total amount of grants or transfers distributed to different government levels, and the horizontal dimension, which is the basis for distributing transfers to eligible local units. Each of the components is discussed in detail below with a specific example of IFTs implemented or proposed to support biodiversity conservation.

2.4.1. The distributable pool and the distribution formula

IFTs are commonly used in decentralised countries to distribute public revenues from national to decentralised levels of government. As previously mentioned, the main purposes of IFTs are to distribute a share of the national government’s revenues to subnational governments (vertical revenue sharing) and to correct for spatial externalities generated from the provision of public services (Bird and Smart, 2002; Shah, 2006). Vertical revenue sharing aims to address the mismatch between expenditure needs with the public revenues generated at the local level. Since the tax base of local governments tends to be narrow, and non-tax revenues such as user charges, rents, royalties, and fees are also limited, revenue sharing is then an option to close the fiscal gap (de Mello, 2002). Spatial externalities create an inefficient outcome of public service provision as local decision makers often neglect the benefits accrued to outsiders beyond local boundaries in the decision-making process (Bird, 1999). Pigou (1932, cited in Oates, 1972, p. 66) proposed that to address such spatial externalities: ‘the economic unit generating the spillover should receive a unit subsidy equals to the value at the margin of the spillover benefits it creates.' By providing a unit of subsidy
equal to the value at the margin of the spillover benefits, local governments are expected to provide the right amount of public service (Oates, 1972).

Related to the amount of the transfers, two key aspects of the design of IFTs are: the size of the ‘distributable pool’ and the basis for distributing transfers to each eligible local government (Bird, 1999, p. 24). The three approaches to determine the size of grant/transfer pool are based on (Bird, 1999; Bahl 2000; Bahl and Wallace, 2007): i) a defined percentage of the national government’s revenues; ii) an ad hoc approach based on a discretionary decision that may vary from year to year; and iii) a cost reimbursement based on the costs of public service delivery at the local level, defined by the national government. Decentralised countries usually use the defined (percentage) approach or the shared-tax approach to vertically distribute revenues that are collected from taxes and fees between government levels (Bird, 1999; Bahl 2000; Bahl and Wallace, 2007). The ad hoc approach is similar to any other budgetary government expenditures, where the parliament or president decides on an allocation to the subnational government on a discretionary basis (Bird, 1999; Bahl 2000; Bahl and Wallace, 2007). Finally, the cost reimbursement approach decides the size of a grant pool based on a proportion of specific local expenditures to be reimbursed by the central government. Central governments usually define a service for which they guarantee to cover the costs incurred by local governments in delivering the service (Bird, 1999; Bahl, 2000; Bahl and Wallace, 2007).

Approaches to the determination of the amount of IFTs to eligible local units (horizontal dimension) are based on (Bahl, 1999; 2000): i) the origin of the collection of the tax (derivation approach); ii) a formula based approach; iii) a total or partial reimbursement of costs; and iv) an ad hoc approach. The derivation approach determines the amount of transfers to local governments based on a share of a national tax, and each local government receives an amount based on the total tax collected within their geographic boundaries (Bahl, 1999; 2000). The formula approach applies objective and quantitative criteria to determine the amount of the IFTs among eligible local government units (Bahl, 1999; 2000). The cost reimbursement approach distributes grants on the basis of reimbursement of costs of specified services (Bahl, 1999; 2000). There is a fine line between determining the amount of the IFT using the formula approach with the cost reimbursement approach (Bahl, 2000). Both approaches
might use an exact equation for the distribution of the IFTs, however, the cost reimbursement approach stipulates the level of services to be provided by the local governments. Finally, the *ad hoc* approach determines the amount of the transfer to the local unit on the basis of the decision makers’ judgment, usually without specific criteria or formula (Bahl, 1999; 2000).

A taxonomy of IFTs that considers both the distributable pool (grant size) and the distribution formula has been developed (Bahl and Linn, 1992; Bahl, 1999; 2000) (Table 2.2). Type A IFTs use a shared tax approach (derivation approach), where subnational governments are allowed to keep a share of the taxes or fees collected within their administrative boundaries (Bahl, 1999; 2000; Bird 1999). The objective of this scheme is to ensure the stability of revenue sources for local governments and also to provide some degree of flexibility on how the funds can be spent at the local level (Bahl and Wallace, 2007; Bahl, 2000). Type B IFTs distribute a portion of the national tax among local governments on the basis of a formula. For instance, in Indonesia and the Philippines, 26 and 40 per cent of national revenue collections respectively is distributed to local governments based on population, land area and other indicators (Bahl, 2000; Kaiser et al., 2006; Fadliya and Mcleod, 2010). Type C IFTs distribute a share of the national tax to cover the costs of providing specific services at the local level, such as the costs of teacher salaries (Bahl 1999; 2000). Type D IFTs are seldom mentioned in the literature where the grant is a share of national taxes that is distributed to eligible local governments based on *ad hoc* decisions.

Types E, F, G IFTs distribute grants amongst local government units objectively with specific criteria, although the distributable pool is decided on the basis of *ad hoc* decisions and without any objective criteria. Type G IFTs is a grant where central governments make all the decisions about who will receive the grant and how much is given to each recipient, without particular criteria. The drawbacks of the *ad hoc* approach include: i) lower transparency as it is subject to political manipulation; ii) leading to uncertainty and affecting fiscal planning and effective budgeting; and iii) no clear link between revenue sources and expenditure responsibilities (Bird, 1999; Bahl, 1999; 2000). On the other hand, this approach provides maximum flexibility for the central government to decide the amount of the transfers distributed to local governments each year, particularly during budget constraints (Bahl, 1999). The *ad hoc*
approach is usually acceptable for the allocation of funds to regions facing special needs, such as during emergencies or natural disasters (Bird, 1999; Bahl and Wallace, 2007; Bahl, 2000).

<table>
<thead>
<tr>
<th>Method of allocating divisible pool among eligible unit (horizontal dimension)</th>
<th>Method of determining the total distributable pool (grant size)</th>
<th>Specified share of national or state government tax</th>
<th>Ad hoc decision</th>
<th>Reimbursement of approved expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Origin of collection of tax</td>
<td>A</td>
<td>N.A.</td>
<td>N.A.</td>
<td></td>
</tr>
<tr>
<td>Formula</td>
<td>B</td>
<td>E</td>
<td>N.A.</td>
<td></td>
</tr>
<tr>
<td>Cost reimbursement approach</td>
<td>C</td>
<td>F</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Ad hoc</td>
<td>D</td>
<td>G</td>
<td>N.A.</td>
<td></td>
</tr>
</tbody>
</table>

N.A. Not Applicable


The cost reimbursement approach (Type H) establishes the amount of the transfer based on a proportion of specific local expenditures to be reimbursed by the central government (Bahl, 2000). The cost reimbursement approach applies quantitative criteria to decide the amount of the IFT based on local expenditures to provide public services. The central government usually defines a public service for which it will guarantee to cover the costs incurred by local government in delivering it (Bird, 1999; Bahl and Wallace, 2007; Bahl, 2000). This approach is normally used to: i) correct spatial externalities associated with public service provision at the local level; ii) provide direct investment to high priority national needs, otherwise some local governments would underspend on services with regional and national benefits; and iii) ensure uniform service provision standards across the country. However, this approach may compromise local choice and can hold back fiscal decentralisation. It also involves higher implementation costs because the central government must monitor the compliance of local governments with national standards (Bahl, 2000)

2.4.2. International experience with the distribution formula for conservation

In the case of biodiversity conservation, type B IFTs are commonly used to distribute public resources to support conservation at the local level. In Brazil, a portion of the ICMS tax, which represents the largest source of state revenues, is distributed back to local governments considering ecological indicators (May et al., 2002; Grieg-Gran

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5ICMS – Impostosobre Circulação de Mercadorias e Serviços
2000; Ring, 2008c). The grant size of the ICMS tax is the total Value-Added Tax (VAT) collected in each state, where 75 per cent of this state-level VAT is redistributed using the derivation approach, while the remaining 25 per cent is distributed based on the formula approach using several indicators, including land area, population, and ecological indicators (May et al., 2002; Grieg-Gran 2000; Ring, 2008c). In Portugal, the grant size is determined based on a certain percentage of the General Municipal Fund, which amounts to 50 per cent of the Financial Equilibrium Fund (Santos et al., 2012). The grant size is then divided based on the formula approach using indicators such as land area (weighted by elevation levels) and protected area, which is according to the share of protected areas in a municipality (Santos et al., 2012) (Table 2.3).

Studies advocating the use of IFTs for biodiversity conservation have mostly focused on the horizontal dimension that determines the amount of the IFTs for each eligible local government area. The formula approach is commonly suggested to derive the amount of the funds to be distributed to eligible localities (Köllner et al., 2002; Kumar and Managi, 2009; Ring, 2008b). Different indicators are used to determine the amount of the IFT allocated for each eligible locality (Table 2.3). The indicators are used as proxies for the local governments’ opportunity and management costs of biodiversity conservation. Hence, one could argue that the formula approach, used to determine the amount of the IFTs for conservation, is rather similar to the cost reimbursement approach. As previously mentioned, both the formula and the cost reimbursement approaches are similar. The main difference is that the cost reimbursement approach stipulates the specific services to be provided by the local governments (Bahl, 1999; 2000).
<table>
<thead>
<tr>
<th>Country (introduction of scheme)</th>
<th>Model</th>
<th>Conservation indicator</th>
</tr>
</thead>
</table>
| Brazil (since 1992) | ICMS Ecológico (state level):  
Size grant: a certain percentage of state value-added tax revenues  
Distribution formula: formula-based lump sum transfers from state to local governments based on ecological indicators | Conservation units:  
- based on designated protected areas in relation to municipal area  
- weighted by management category of protected area accounting for relative land-use restrictions |
| Source: Grieg-Gran (2000); May et al. (2002); Ring (2008c) | | |
| Portugal (since 2007) | Local financing law:  
Size grant: a certain percentage of the General Municipal Fund (FGM), being equal to 50% of the Financial Equilibrium Fund (the latter is made up of 25.3% of the average revenues from personal income tax, corporate profit tax and value-added tax)  
Distribution formula: formula-based lump sum transfers from national to local governments based on ecological indicators | Natura 2000 and other protected areas  
in municipalities with: i) less than 70% of protected areas (PAs) in relation to municipal area, 5% of FGM are allocated for PAs; ii) more than 70% of PAs, 10% of FGM are distributed for PAs. |
| Source: Santos et al. (2012) | | |
| Switzerland (proposed) | Size grant: previous compensation sum for structurally weak cantons and a part of the petroleum tax  
Distribution formula: formula-based integrating biodiversity indicators to the existing fiscal transfer | Biodiversity index:  
- based on the cantonal plant species diversity  
- weighted by the degree of biodiversity integration from low to high scenario |
| Source: Köllner et al. (2002) | | |
| Germany (proposed) | Size grant: depending on model selected  
Distribution formula: formula-based integrating conservation units into general lump sum transfers (considering local fiscal need and capacity)  
distributing a specified amount through unconditional special transfers based on conservation units | Conservation units:  
- based on designated protected areas in relation to municipal area  
- weighted by management category of protected area accounting for relative land-use restrictions |
| Source: Ring (2008b) | | |
| India (proposed) | Size grant: (assumed at) 1,000 billion rupees  
Distribution formula: formula based integrating environmental services in the fiscal transfers that reflects conservation efforts and stock of natural resources | Forest cover  
Geographical area |
| Source: Kumar and Managi (2009) | | |

2.4.3. Conditionality and accountability of IFTs

In terms of conditionality, IFTs can be classified as either specific- or general-purpose transfers (Figure 2.3). A general-purpose transfer, which is also termed an ‘unconditional grant’, is provided without any restrictions on how the recipient can
spend the funds (King, 1984; Shah, 2006). A lump sum general grant is when the amount of the grant is fixed; while an ‘effort-related grant’ is when the amount of the grant depends on the recipient’s revenue effort that is the percentage of the recipient’s revenues from taxes and charges (King, 1984). In contrast, a specific grant, or a ‘conditional grant’, requires the funds to be spent on activities stipulated by the grantor (King, 1984, Shah, 2006). Specific grants can be subdivided into lump sum grants (non-matching grants) and matching grants (King, 1984; Shah, 2006). A lump sum specific grant is where the recipient receives a fixed amount to be spent on a designated service; whereas a matching specific grant is where the amount transferred depends on how much the recipient spends its own revenues on the service concerned. Matching grants require grant recipients to use their own resources to finance a specific percentage of expenditures (Shah, 2006). Two types of matching grants are (King, 1984; Shah, 2006): i) open matching grants, where the grantor matches the level of resources with those provided by the recipient; and ii) closed matching grants, where the grantor matches recipient funds only up to a pre-specified limit.

**Figure 2.3 Types of intergovernmental fiscal transfers**

![Diagram of types of intergovernmental fiscal transfers]

**Source:** King(1984, p. 87).

Conditional transfers usually aim to create incentives for local governments to implement specific programs or activities (Shah, 2006). Conditional transfers require the recipients to provide a particular good or service at a specified level corresponding to the fiscal transfer. Conditional transfers specify the type of expenditures that can be financed (input-based or expenditure conditionality) or focus on the achievement of the
policy objectives in the service delivery (output-based or performance conditionality) (Shah, 2006; Bird, 2001). Matching grants are expected to reduce the price of producing a certain public good so that the consumption level of the good can be at a socially desired level, while lump sum specific grants have no impact on the effective price per unit of public good provision (Oates, 1972; Shah, 2006). Conditional transfers do not provide any freedom for local governments about how to spend the funds as it usually establishes tight conditions.

In contrast, unconditional transfers usually aim to provide general budget support while ensuring local autonomy, by allowing the recipients to manage funds without restrictions (Bird, 1999). Unconditional grants are distributed with the primary objective of ensuring that all regions have adequate resources to provide goods and services at minimum standards. The funds, which can be utilised according to the recipient’s priorities, usually carry no condition except regular financial auditing (Bird, 2001). Unconditional grants only have an income effect, which means that the output of the public good or service will increase because the grant will enrich the community and not because of the change in the price of providing the good or service. Subnational governments receiving a grant are free to select the combination of goods and services according to their preferences under the existing prices structure. The grant does not change the choice between public goods but subnational governments, on behalf of the local residents, can direct their income to purchase other goods (Oates, 1972).

In conservation, debate on whether the transfer mechanism should be based on earmarking or a lump sum transfer remains contentious (Ring, 2008c). To ensure that funding is spent on the management of conservation areas, it is important to prescribe certain goods and services that can be financed by the transfer. In contrast, a lump sum transfer presents the advantage of providing more financial autonomy to local jurisdictions, enabling local decision makers to allocate the funds where they are most needed.

Learning from Brazil’s experience in the implementation of the ICMS-Ecológico, the components of conditionality and quality evaluation criteria need to be included when developing a design for REDD+ revenue distribution. The existing mechanism in most Brazilian states does not pay sufficient attention to the quality of protected areas (Ring,
2008c). Thus far, only two states, Paraná and Minas Gerais, have integrated the quality of protected areas into the indicator for the transfer mechanism (Ring, 2008c). Without giving much attention to the quality of protected areas, there is a tendency to create new protected areas and/or register existing ones, but not necessarily keeping them fully protected.

The design of IFTs should also ensure robust accountability of the recipients both to their citizens and the national government (Bird and Smart, 2002). The accountability aspect of IFTs focuses on the obligation of local governments as the recipient of the funds to render the responsibility conferred. Accountability is associated with a process of being called ‘to account’ to some authority for one’s action (Jones, 1992). Accountability is the key to improved public sector performance, and information is the key to accountability (Bird, 1999). Particularly related to public financial management in decentralised countries, accountability involves the systematic collection, analysis, and reporting of information related to the use of IFTs and how they have achieved their intended purposes. Such information is important to ensure the public and central agencies monitor and supervise how the financial resources transferred are spent at the local level (Bird, 1999). Information should then be disseminated to local constituents to provide an opportunity for them to exercise influence or control over the service delivery system and to ensure transparency in the process of allocating and spending public resources (Bird, 1999). The central government should also monitor and evaluate local performance after distributing IFTs to the local level. The transfers should also be accompanied by some degree of sanction if performance is inadequate.

2.4.4. Criteria of well-designed IFTs

Criteria of well-designed IFTs are suggested in the literature of fiscal decentralisation although each scholar proposes a different set of criteria. Bird (2001, p. 25) suggests a set of criteria that can be used when developing IFTs, including:

1. Objectivity. The fundamental objective of IFTs is to ensure the efficient delivery of public services at the local level.

2. Neutrality. The distribution formula of transfers should not be able to be influenced by the local governments through manipulating their expenditures or their tax
decisions. The transfer mechanism or allocation formula should be easily understandable.

3. Autonomy. Subnational governments should have the independence to set the priorities and manage the service to respond to local needs.

4. Accountability and transparency. Local governments after receiving transfers must be accountable to those who pay for them and to those who benefit from them.

5. Simplicity. IFTs should be easy to administer and should involve the lowest possible administration and transaction costs.

Shah (1994, p. 37-38) suggests a set of criteria that are slightly different to those suggested by Bird (1999). Indicators that are similar to those proposed by Bird (2001) include: autonomy, simplicity, neutrality, and accountability. Two other indicators that are different are: i) equity (the allocated funds should vary directly with fiscal need factors and inversely with the taxable capacity of each province); and ii) predictability (the grant mechanism should ensure predictability of subnational government shares by publishing a five-year projection of funding availability). The equity criterion may not be relevant for IFTs for conservation, which usually do not aim to correct horizontal inequality related to the fiscal capacity of local governments.

These criteria are used to analyse different options of the design of IFTs for REDD+ revenue distribution in Chapter 9.

2.5 Conclusion

In most decentralised countries, national governments control revenues generated from natural resources, including forests. This situation is apparently a common practice in developing countries where national governments are considered to have better capacity in handling complex royalties from natural resources and dealing with revenue distribution to subnational governments. On the other hand, local governments have a comparative advantage to perform forest related services, such as forest protection, fire monitoring and management as well as local forest users’ empowerment, due to their close proximity to forest areas and local people surrounding forests. However, local governments are often not provided with sufficient resources to perform these services. This situation creates a mismatch between the revenues generated and the expenditures
to provide forest-related services. Forest related services also create spatial externalities because the benefits of conservation spill over across local jurisdictions boundaries, while the costs are borne by local stakeholders. The mismatch between revenues and expenditures as well as the spatial externalities discourage local governments from pursuing good forest management and conservation.

To address the issues of the mismatch between revenues and expenditures and spatial externalities, fiscal decentralisation theory suggests assigning greater authority to raise local revenues or increasing transfers from central to local levels. Given the existing situation in decentralised countries in general, the latter option appears to be more feasible; thus, IFTs become a cornerstone of subnational government financing. IFTs can serve the purposes of correcting the mismatch between expenditures and revenues generated locally as well as internalising spatial externalities related to forest management at the local level. In biodiversity conservation, few studies have analysed the different options for the distribution formula to determine the amount of the transfer to each local unit. However, a debate remains related to the conditionality, and thus accountability, of IFTs for biodiversity conservation. Whilst local governments should be provided with the authority to allocate public resources according to local priorities, it is also important to ensure IFTs for conservation are spent to support conservation activities at the local level, hence, earmarking may be necessary. The discussion about the conditionality and accountability are further elaborated in Chapter 6.

The implications of fiscal decentralisation and decentralised forest management theories for the implementation of REDD+ are discussed in the next chapter (Chapter 3).
Chapter 3  The Design of REDD+ and Decentralised Forest Management

Successful implementation of REDD+ requires not only the transfer of funds, but it also requires addressing governance challenges to its implementation (Corbera et al., 2010; Ebeling and Yasué, 2008). In this context, the involvement of local governments in the implementation of REDD+ is important since most countries, which are responsible for emissions from deforestation and forest degradation, have implemented certain forms of decentralisation in public administration and forest management. As discussed in the previous chapters, local governments often have strong interest in exploiting forests to generate revenues from taxes and fees and also from the distribution of relevant national taxes and fees. REDD+ measures may restrict local governments from pursuing productive activities in forests and reduce this revenue stream, which is needed to finance local public services. Moreover, to ensure successful implementation of REDD+, local governments would also have to perform a number of activities to address locally-specific causes of deforestation. Meaningful participation of local governments in REDD+ implementation is therefore imperative, and appropriate distribution of revenues among government levels needs to be carefully considered to compensate the costs of REDD+ at the local level. This chapter analyses the implications of decentralised forest management for REDD+ implementation before further discussing the possible mechanisms of IFTs to distribute REDD+ revenues from central to local levels.

This chapter first summarises key aspects of proposals concerning the design of REDD+. It then considers tasks and activities that could be devolved to local levels in the implementation of REDD+ on the basis of decentralisation theories. REDD+ payment and distribution mechanisms are further discussed prior to scrutinising how the funds would flow from international to national and eventually to local levels. Finally, drawing on the literature on fiscal decentralisation, options for fiscal instruments to distribute REDD+ revenues are discussed.
3.1 REDD+ design

A number of proposals have been put forward regarding the design of REDD+ in the international negotiations. Several key elements of the design of REDD+ are: implementation scale; reference emission levels; measurement, reporting and verification (MRV); and implementation phases (Parker et al., 2008; Meridian Institute, 2009). These elements should be carefully designed particularly to address several technical challenges of REDD+, including the issues of leakage and non-permanence. Leakage occurs when forest protection in one location can cause deforestation or adds more pressure to forests outside the boundary of a certain project or country (Schlamadinger et al., 2005; Meridian Institute, 2009; Myer, 2007). Carbon sequestered in forests is often considered as non-permanent because carbon can be released in to the atmosphere in the future due to human or natural disturbances (Schlamadinger et al., 2005; Meridian Institute, 2009; Myer, 2007). To understand how the key elements of the design would influence the implementation of REDD+ in participating countries, this section discusses in detail each of the elements.

3.1.1. Implementation scale

Two options for the implementation scale of REDD+ are national-based and project-based implementation. National-based implementation requires the national government to develop a national carbon accounting system and a national management system to implement REDD+ projects and to distribute revenues generated to relevant stakeholders within the country (Angelsen et al., 2008). Project-based implementation allows buyers to interact directly with project managers or third-party brokers, with an independent entity verifying the credit generation (Myer, 2007). Pedroni et al. (2009) propose a “nested approach” to combine the national approach with an initial project-based approach. Under the nested approach, project activities can be started independently at project level and then progressively implemented in the larger context of a host country. This approach would enable capacity building and would immediately provide incentives to reduce emissions, while at the same time, accommodating the different capacities of actors within the host countries (Myers, 2007). The nested approach would allow the sub-national, local or project unit to implement REDD+ and
also to obtain carbon credits during the project phase. In this phase, the issue of permanence would be treated more flexibly. Once the total project reaches a given threshold, the country would then move towards a national-based implementation. At the national level, a country baseline and emissions target would be established. Carbon credits generated at the national level would be permanent and transferable with other carbon credits (Pedroni et al., 2009).

Most country submissions to the UNFCCC advocate a national approach to implement REDD+ in order to avoid leakage, reduce transaction costs, and also to address the broader drivers of deforestation (Angelsen et al., 2008). National-based implementation can address the issue of leakage within host countries because it enables a complete measurement and monitoring of emission reductions within a country as a whole. It cannot ensure, however, that international leakage will not occur (Angelsen et al., 2008). Moreover, a national-based approach is more likely to address the underlying causes of deforestation that originate at different levels within host countries including at the national and sub-national levels. The underlying causes of deforestation are usually influenced by social, political, economic, demographic, and cultural factors that occur at different levels within a country (Lambin et al., 2001). These causes operate indirectly but can alter the proximate causes, which are directly caused by local communities and corporations. The underlying causes often cannot be controlled by local stakeholders. Hence, the implementation of REDD+ only at the project level might not lead to a significant reduction of deforestation in a country because it cannot address underlying causes occurring at the district, provincial and national levels. National-based implementation requires the national government to develop national carbon accounting and a national management system to implement REDD+ projects and to distribute the revenues to relevant stakeholders within a country (Angelsen et al., 2008).

3.1.2. Reference Emission Levels

The approach to setting reference emission levels has become one of the most debated issues about the design of a REDD+ mechanism. The reference emission level is the level against which the impacts of REDD+ policies and measures are assessed to determine whether participating countries have reduced emissions and should receive financial rewards (Parker et al., 2008; Meridian Institute, 2009). The most challenging
task in setting reference emission levels is to accommodate the different circumstances found within developing countries. A REDD+ mechanism needs to be attractive enough for countries with high and low deforestation rates to participate. The greater the number of countries participating in the REDD+ mechanism, the greater the expected reduction in international leakage (Santilli et al., 2005).\textsuperscript{6} Mollicone et al. (2007) recommend that the global average deforestation rate be used as a benchmark to accommodate countries with high and low deforestation rates. Under this approach, host countries with deforestation rates above the global average would be compensated for a reduction in the national deforestation rates during the commitment period as compared to the pre-commitment period. Countries with past deforestation rates lower than the global average would be rewarded for not increasing their deforestation rates higher than the pre-commitment level. This proposal also adds the element of forest degradation into the calculation of reference emission levels.

The on-going negotiations on a REDD+ mechanism have not defined what approach to use in determining whether a global reference emission level will be adopted. However, two main directions have been provided: 1) the global reference emission level should ensure additionality as compared to the business as usual level without REDD+; and 2) national reference emission levels need to be developed based on national factors such as: historic emissions and removal rates, forest cover, expected future trends and capacity for emission reductions such as GNP per capita (UNFCCC, 2009a).

3.1.3. Measurement, reporting and verification

Measurement, reporting and verification (MRV) is an important activity for REDD+ because it will determine whether a country has achieved significant and credible reductions in emissions and enhancement of carbon stocks. Following such processes, the financial benefits can be granted to participating countries based on performance. The MRV system requires national coordination and a cooperation mechanism to link forest carbon MRV and national policy for REDD+ (Herold and Skutsch, 2009). A national body would collect and analyse data based on the stipulated protocols to estimate emission reductions or enhancement of carbon stocks at national and subnational levels. Two variables to be measured and estimated under the REDD+

\textsuperscript{6}International leakage occurs when the implementation of REDD policies and measures in one country causes an increase in emissions from deforestation and forest degradation in another country.
scheme are (UNFCCC, 2009b): 1) forest area change (deforestation and re-growth of forest); and 2) carbon stock change estimation (emission factors). Data and information gathered should be well documented and reported to a designated international body based on the Intergovernmental Panel on Climate Change (IPCC) methodologies and in compliance with UNFCCC guidelines. Finally, an independent framework is required to verify the long-term effectiveness of REDD+ actions at different levels and by different actors (UNFCCC, 2009b).

3.1.4. Implementation phases

In order to ensure an effective and result-based mechanism, a REDD+ mechanism should be implemented in successive phases (UNFCCC, 2009a). The parties to UNFCCC have proposed three phases of the implementation of REDD+. Phase one would focus on strategy development and core capacity building. Phase two would provide support for the implementation of national policies and measures together with compensation for proxy-based results for emission reductions. Phase three would be a fully result-based compensation mechanism for emission reductions and removals from the forestry and land-use sectors. A number of criteria need to be met and specific activities are to be performed by participating countries to be eligible for the financial benefits provided for each phase (Table 3.1) (UNFCCC, 2009a).
### Table 3.1 Eligibility criteria and activities of REDD+ implementation phases

<table>
<thead>
<tr>
<th>Phase</th>
<th>Eligibility Criteria</th>
<th>Activities</th>
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| Phase 1 | Must be a Party to the Convention and in compliance with its commitment               | 1) Establish policies and measures for measuring, monitoring, analysing, reporting and verifying emission reductions from the forestry sector;  
2) Develop an initial institution to address the reduction of emissions and identify necessary adjustments in forest law and governance |
| Phase 2 | Demonstrate commitment to implement REDD+ by ensuring:  
1) transparent, rule-based forest governance;  
2) multi-stakeholder consultations and cooperation including with indigenous peoples and local communities;  
3) safeguards against the conversion of natural forests to plantation forests; and  
4) biological diversity protection | 1) Develop a comprehensive legal framework including land tenure related to collective land rights, land-use planning, forest governance and law enforcement;  
2) Establish Measurement Reporting and Verification (MRV) institutions and capacities; and  
3) Develop action plans within the framework of a national low carbon development strategy |
| Phase 3 | Remain in compliance with the criteria of phases 1 and 2 and demonstrate that previously received compensation has been spent according to agreed guidelines | Implement a national inventory of greenhouse gases.                                                                                     |

**Source:** Adapted from UNFCCC (2009a, p. 128-129).

REDD+ funding would be granted based on performance. Measurable, reportable and verifiable indicators need to be developed for the implementation of REDD+ policies and measures. Subject to *ex post* verification, upfront financing may also be granted based on spending plans and stated commitment (UNFCCC, 2009a). After receiving compensation, distribution of REDD+ benefits among all stakeholders, including indigenous peoples and local communities, should be fair, efficient, transparent and equitable (UNFCCC, 2009a).

### 3.2 Local governments’ involvement in REDD+ implementation

Negotiations have also acknowledged the importance of subnational level involvement in the implementation of REDD+. Successful implementation requires effective forest governance at all governmental levels; and national strategies for REDD+ should include subnational actions and strategies that are consistent with national development goals (UNFCCC, 2009a). National governments would need to develop subnational reference emission levels, where appropriate, to calculate changes in emissions from deforestation and forest degradation. Due to wide variations in regional situations across
a country, local reference emission levels would vary from one locality to another depending on, *inter alia*, the total forest area, opportunity costs and capacity to implement policies and measures at the local level.

Most countries responsible for emissions from deforestation and forest degradation have implemented certain forms of decentralisation in public administration and forest management. Bolivia has devolved the power to manage important forest areas to municipalities (Larson, 2003). In Cameroon, ‘the 1994 Forestry Law transfers to councils ownership rights over the forests within their jurisdiction’ (Oyono et al., 2007, p. 3). In Ghana, a number of key functions have been devolved to the District Forestry Offices (Sasu, 2005). The Democratic Republic of Congo in 2008 issued a decentralisation law, which devolves the management of forest programmes to the provincial level (Africa Research Bulletin, 2008). In Brazil, although no specific policy regulates the transfer of powers over forest resources to the local level, municipal governments, which control important infrastructure development programmes, have an important role in forest management (Larson, 2003). A similar situation has also occurred in Indonesia, with district governments playing a greater role in the management of forest resources following the introduction of decentralisation laws in 1999.

A number of scholars are concerned about REDD+ encouraging recentralisation of forest management. As REDD+ revenues would increase the value of standing forests, central governments have incentives to retain control over forests and carbon credits (Sandbrook et al., 2010; Phelps et al., 2010). Particularly under national-based implementation, the national government would be responsible for implementing national carbon accounting systems, to control leakage and to distribute REDD+ revenues to local stakeholders. Other scholars (i.e. Toni, 2011; Wunder, 2010) argue, however, that decentralised forest management is likely to benefit from REDD+ implementation. In the case of Brazil, Toni (2011) argues that the central government would need help from the states, which have been actively involved in the creation of protected areas, in the implementation of REDD+. Despite being set by laws, decentralisation in forest management is rarely implemented well and local governments are more likely to be given powers when they actively seek them (Larson and Ribot, 2009). Thus, with the considerable financial resources that may be generated
by REDD+, local governments could be expected to demand greater roles and power in forest management in general and REDD+ implementation in particular.

In order to ensure the successful implementation of REDD+ in decentralised countries, it is important to consider which tasks could be devolved to what level in these countries. The basic principle of subsidiarity in decentralised public administration is that: ‘tasks and powers should rest at the lower level subunit unless allocating them to a higher central unit would ensure higher comparative efficiency or effectiveness in achieving them’ (Føllesdal, 1998, p. 190). Based on this principle, this chapter discusses REDD+ activities that could be performed by countries and their possible allocation to the various levels of government as summarised in Figure 3.1.

**Figure 3.1 REDD+ implementation activities within decentralised countries**

In the implementation of REDD+, several activities are best handled by the national government, while others would be best devolved to the local level. Based on the ongoing negotiations, national governments need to develop national carbon accounting, monitor the implementation of REDD+ policies and measures, receive and distribute REDD+ credits and assume liability after the payment has been received. This study suggests that local governments are in a better position to develop local policies and measures at the local level. Local authorities are considered to have better specific information related to local resources, which results in better-targeted policies and lower transaction costs (The World Bank, 1997; Ribot et al., 2006). Several benefits of
having local governments involved in the implementation of REDD+ can be summarised as follows:

- to ensure greater participation of subnational groups in the decision-making process where the decision making process of land-use has been devolved;
- to increase the efficiency of REDD+ implementation through internalising costs and reducing transaction costs;
- to tackle the specific causes of deforestation at the local level as the drivers vary from one location to another within a country depending on the economy and the needs of local people.

In order to develop national and subnational reference emission levels, an analysis of land-use change patterns at the local level is necessary. Macroeconomic models, which are often considered the appropriate approach to forecast national reference emission levels, fail to take into account the causes of deforestation originating from land-use changes triggered by local factors (Bird, 2005). Even when the drivers of deforestation are identified, predictions, using national models, are of limited use in understanding the strength of the drivers, the influence of the drivers across time and space and the inter-relationship between the drivers. Understanding the social process influencing the decision to pursue land-use change at the local level is necessary to assess forest cover changes at the national level (Mascia et al., 2003, Dalle et al., 2006).

The sub-national level also plays an important role in ensuring the implementation of sustainable forest management to reduce forest degradation. Local governments need to support the enforcement of environmental laws, which is one of the requirements of sustainable forest management (Ros-Tonen et al., 2008). Their close geographical proximity with forest areas enables local governments to monitor and detect violation of forest practices within their localities. The involvement of local governments could therefore lower the transaction costs for monitoring land use (Toni, 2011). Decisions regarding the transfer of REDD+ funds to local levels can then be made on the basis of the tasks and mandates given to subnational actors (Irawan and Tacconi, 2009; Larson and Ribot, 2009). The next section discusses a possible design for the distribution of REDD+ revenue distribution from the international to the national and then to the local level in decentralised countries.
3.3 REDD+ and Elements of Payment Distribution

Participating countries in a REDD+ scheme would be eligible for financial benefits when they reduce emissions. The financial benefits would need to be further distributed among all stakeholders, including indigenous peoples and local communities, efficiently, transparently and equitably (UNFCCC, 2009a). In order to determine how the revenues should be distributed to different stakeholders within a country, it is important to understand the distribution of costs across groups (Pagiola and Bosquet, 2008). As different land users face different costs in reducing emissions, the distribution of incentives could then be based on the marginal costs of reducing emissions (Boucher, 2008; Wertz-Kanounnikoff, 2008; Cattaneo, 2008; Strassburg et al., 2009). The cost of pursuing REDD+ can be described by a supply curve (Boucher, 2008; Wertz-Kanounnikoff, 2008; Cattaneo, 2008) (Figure 3.2). Any given producer incurs costs that vary according to the amount produced (Boucher, 2008). Some producers could reduce emissions inexpensively, while for others it would be more costly.

Assuming that local governments act as economic agents, they would have a supply curve similar to that depicted in Figure 3.2. This assumption is based on the fact that local governments often obtain (a share of) revenues from timber extraction and agricultural development, as discussed later in Chapter 7. It is in the interest of local governments, and that of the citizens to whom they are accountable in a democratic country, in maximising the revenues from resource utilisation. Local governments may be interested in participating in REDD+ if they receive a payment that at least equals the costs of REDD+ at the local level.
Figure 3.2 Supply curve of REDD+ producers

![Graph showing the supply curve of REDD+ producers with equations and notes.

Note: Price is considered as an independent variable, hence, it is placed on the X axis.
Source: Adapted from Boucher (2008).

The costs of implementing REDD+ include opportunity costs, management costs and transaction costs. Opportunity costs are the benefits of the best alternative land use that are foregone as a result of reducing deforestation and forest degradation to derive REDD+ payments (Pagiola and Bosquet, 2008; Grieg-Gran, 2008; Wertz-Kanounnikoff, 2008). Management costs of REDD+ arise from activities such as, inter alia, illegal logging prevention, research for agricultural intensification and land titling, to provide traditional and indigenous communities with incentives to safeguard forests (Pagiola and Bosquet, 2008; Wertz-Kanounnikoff, 2008; Nepstad et al., 2009). Transaction costs relate to the process needed to identify and negotiate REDD+ activities, usually between a buyer and seller, as well as to perform monitoring, reporting, verifying and certification of carbon emission reductions (Milne, 1999; Cacho et al., 2005).

Several proposals have been put forward regarding the design of a REDD+ mechanism at the international level. For instance, Strassburg et al. (2009) and Cattaneo (2008) propose the creation of a global pool of all revenues generated for REDD+. Participating countries would receive a share from the global pool only when there is a positive difference between global reference emission levels with total emission reductions achieved by all participating countries, as a group, within a given time frame. The distribution of incentives, at a minimum, should compensate the costs of REDD+ implementation, including opportunity costs and management, as well as transaction costs (Cattaneo, 2008; Boucher, 2008; Strassburg et al., 2009). As the price of carbon in
the market is expected to be higher than the costs of REDD+ implementation, the net benefits of REDD+ would be the difference between the payments for emission reductions and the costs of achieving the reductions (Boucher, 2008; Cattaneo, 2008; Meredian Institute 2009; Pagiola and Bosquet, 2009). The distribution of incentives to participating countries could be based, for example, on the marginal costs of reducing emissions, the standing carbon stocks sustained in the countries or a combination of these two methods (Cattaneo, 2008; Strassburg et al., 2009). In decentralised countries, local governments could then be requested to make bids for unit reductions or, alternatively, all local governments could be paid the same amount per ton of reduction, irrespective of the costs.

3.3.1. Financing options and the flow of funds

Having discussed the components of REDD+ payments that would need to be distributed to local stakeholders, it is important to understand how REDD+ funds could flow from the international to national and then local levels. The flow of funds could depend on the financing options approved in the international REDD+ negotiation. The financing options to implement REDD+ can be categorised as either market or non-market approaches. Market approaches enable developing countries to generate credits from REDD+ measures and sell them to Annex I (developed) countries of the Kyoto Protocol, which may purchase and use the credits to meet their emission reduction commitment. Non-market or fund-based approaches propose a fund created by Annex I countries to reward developing countries for their efforts to reduce emissions from deforestation and forest degradation (Johns et al., 2008). Many parties to the ongoing negotiations propose that REDD+ should not be linked to the quantified emission reduction objectives of developed country parties. This exclusion is suggested because of the concern that REDD+ could undermine the environmental integrity of global emission reduction goals. REDD+ credits, which are considered cost effective, might flood the carbon market and overwhelm efforts aimed at reducing emissions from fossil fuels (Schlamadinger et al., 2005). It has been proposed that a REDD+ mechanism be supplementary to the emission reduction objectives of developed countries (UNFCCC, 2009a). Funding for this approach could be provided through official development assistance and also market-linked revenues, such as the taxation of carbon in developed countries.
Different financing options could be used in the different phases. As previously discussed, three phases of REDD+ implementation have been proposed at the international negotiation (UNFCCC, 2009a). During Phase 1, an initial financing instrument is required to enable countries to access immediate international funding to develop national REDD+ strategies and to finance activities such as public consultations, capacity building in MRV and REDD+ demonstration activities (Vatn and Angelsen, 2009; Meridian Institute, 2009). In the second phase, a fund-based instrument can be created to enable countries to access predictable REDD+ finance, which is distributed based on agreed criteria (Vatn and Angelsen, 2009; Meridian Institute, 2009). Phase 3 is where participating countries are compensated solely based on their reduced emissions and enhanced carbon stocks relative to agreed reference emission levels. The source of funds for each phase would also come from different sources. Voluntary (bilateral and multilateral) contributions are likely to be the main funding source for Phase 1, while funding for Phase 2 could be from bilateral and multilateral donors and/or the convention mandated fund-based finance, such as a global forest facility (Vatn and Angelsen, 2009; Meridian Institute, 2009). In Phase 3, certified carbon credits can be sold in international carbon markets.

Several studies have discussed the options for REDD+ financial mechanisms at the national level (Eliasch Review, 2008; Vatn and Angelsen, 2009). The Eliasch Review (2008) suggests two possible mechanisms to distribute REDD+ funds from the national to subnational levels: 1) national coffers, where the revenue is treated as any other sovereign revenue; or 2) a special fund, which is earmarked to finance forestry or non-forestry programmes. The second option allows the involvement of international actors as the funds would be managed outside the state administrative system. Vant and Angelsen (2009) further discuss four possible mechanisms to channel the flow of funds from the national to subnational levels (Figure 3.3):

- Project based fund, which is carried out under project-based implementation; hence, revenue distribution is directly channelled to the project areas.
- Separate national fund, which is established outside state administration and governed by a board of representatives and stakeholders.
- National fund within state administration, which is administered by an independent board with members from the relevant states and public
administrations and possibly civil society. The board can allocate money to specific programmes, sector administrations and individual projects.

- Specific budget support, which is channelled through existing budget systems in the form of general budget support or earmarked funding.

These studies assume that irrespective of the agreed global financing, national governments could choose one of these mechanisms (Figure 3.3).

**Figure 3.3 Options for national REDD+ funding architecture**

![Diagram showing options for national REDD+ funding architecture](image)

**Source**: Vatn and Angelsen (2009, p. 64).

At the national-subnational level, however, research on the design of revenue distribution is still lacking. Noordwijk et al. (2008) provide a number of possible alternatives to distribute revenues to the local level including: 1) central governments receive payments and distribute revenues to the local level; and 2) subnational governments collect the payment directly, while, national governments benefit from taxes or levies. Similar options are also mentioned by UN-REDD (2010) for possible mechanisms to distribute REDD+ revenues in Vietnam. Since this thesis assumes that national-based implementation would be agreed in international negotiations, this chapter explores the first option, where payments would be received by national governments and distributed to the local level. As previously discussed in Chapter 2, it
is common for national governments in developing countries to collect revenues from the forestry sector and distribute them to subnational governments. The next section discusses the possible use of intergovernmental fiscal transfers (IFTs) to distribute REDD+ revenues from the national to the local level.

3.3.2. IFTs for the distribution of REDD+ revenues

Distribution of REDD+ revenues from the national to the local level can utilise IFTs that are commonly applied within decentralised countries. IFTs could be used to distribute REDD+ revenues vertically to local governments or to compensate spatial externalities of conservation. REDD+ credits can be considered as a forest commodity that can be traded in the market, resembling other forest products such as timber. Similar to the revenues generated from timber extraction, REDD+ benefits can then be returned to the regions that generate carbon credits, using a revenue-sharing mechanism. Moreover, forest conservation can be perceived as a public service provided by local governments to support the national commitment. Forest conservation creates spatial externalities as it involves local opportunity costs but it generates benefits far beyond municipal boundaries (Ring et al., 2010). If local governments are compensated for the spatial externalities of forest conservation, they are expected to provide a sufficient amount of forests, including setting aside a significant amount of land under their jurisdiction for conservation.

A shared-revenue system is usually implemented to distribute revenues generated from the extraction of natural resources between the national and producing local governments. In the implementation of REDD+, the central government could keep a portion of the revenues to perform REDD+ related measures at the national level. These measures might include: assuming liability; monitoring and reporting; performing law enforcement related to the implementation of REDD+; and financing national policies required to address the drivers of deforestation. A portion of the revenues would also need to be returned to the producing areas, and local governments would have the liberty to decide how they spend the revenues. The amount of the revenues distributed across government levels is usually determined on the basis of political negotiations between the national and local governments. This process would benefit, however, by
an assessment of the opportunity and transaction costs faced by local stakeholders and various government levels.

A conditional or unconditional grant can also be used when REDD+ is considered a public service to be provided by local governments to support a national commitment to reduce emissions from deforestation and forest degradation. The grant can be designed to compensate the benefits of REDD+ implementation that spill over to other jurisdictions. Hence, the grant could help in internalising the spatial externalities associated with the provision of forest related services at the local level. The value of grants for REDD+ could be determined on the basis of the costs of providing services related to REDD+ implementation at the local level (Irawan and Tacconi, 2009).

In relation to the conditionality of IFTs to distribute REDD+ revenues, it is important to ensure flexibility for local governments to set the priorities and manage the service to respond to local needs. If the local governments were not constrained by the centrally pre-determined obligation to sustain forest conservation, they would derive earnings from other land-use activities. Based on this argument, REDD+ payments would merely have the objective to increase the income of local governments, hence, they would be treated as an unconditional transfer. In contrast, funding for management activities that should be implemented at the local level needs to be transferred with a set of prescribed activities such as purchasing equipment or building necessary infrastructure, performing monitoring activities or pursuing community development activities. This would ensure that the funds would be further channelled to finance conservation policies and activities as part of the efforts to avoid deforestation at the local level.

The accountability mechanism of IFTs for REDD+ revenue distribution needs to be linked to the MRV system. Any compensation for REDD+ actions, including through IFTs to local governments, could be tied to a national MRV system. Any particular subnational activity would need to be assessed in terms of the amount of forest carbon preserved. Subnational data, including the emission reductions achieved and the amount of the funds disbursed, would be provided to the national system so that it could be included in national estimates and reports (Herold and Skutsch, 2009). The data collected should also be made available to local constituents so that they can exercise some real influence or control of the service delivery system to ensure transparency in
the process (Bird, 1999). The public should be aware of what is done, how well it is done, how much it costs and who pays for it to ensure effective monitoring by the local constituency, while the central government should also monitor and evaluate local performance. The transfers should also be accompanied by sanctions if performance is inadequate (Bird, 1999).

3.4 Conclusion

National governments can devolve or delegate some of the implementation tasks of REDD+ to subnational actors. REDD+ implementation activities that can be devolved to local levels include: developing baselines, identifying REDD+ targets and measures, and monitoring REDD+ implementation and/or project development. Local governments can ensure greater participation and consider local specific situations and causes of deforestation in developing REDD+ baselines, setting targets for carbon reductions and identifying innovative REDD+ measures (Irawan and Tacconi, 2009; Larson and Ribot, 2009). As REDD+ measures would limit the revenue stream of local governments due to restrictions on pursuing productive activities in forestlands, meaningful participation of local governments in REDD+ implementation is important. Local governments should be allowed to assess the social costs and benefits of REDD+ implementation. They could then decline to participate if the REDD+ mechanism was not considered beneficial for their localities. This may eventually lead to a higher level of participation and acceptance from local stakeholders. Participation of local communities in the development of REDD+ strategies or policies is possible when the planning process is conducted at the lowest governmental level. Local stakeholders, who will be directly impacted by REDD+ policies and measures, are often geographically distant from national authorities. When the planning process is devolved to the local level, local voices and socio-economic conditions are more likely to be taken into consideration in the development and implementation of REDD+. Furthermore, local governments have a comparative advantage to perform monitoring and law enforcement due to their close proximity to forests and local communities living surrounding forests.

This chapter has also discussed the possible application of IFTs to distribute REDD+ revenues in decentralised countries. A revenue sharing mechanism and a conditional
grant could be considered to make REDD+ payments to local governments. These mechanisms entail different characteristics in terms of distribution formula, conditionality as well as monitoring and evaluation mechanisms. There is no one-fits-all solution. The options for REDD+ implementation in decentralised countries need to be assessed on the basis of the political and administrative structures as well as the existing capacity of a country. Next, this study aims to explore the design of mechanisms to distribute REDD+ revenues in Indonesia, based on the perspectives of the stakeholders and the existing situation in the country. The next chapter discusses the research methodology applied (Chapter 4).
Chapter 4  Research Design

Since this study aims to develop a design for IFTs to support conservation, the researcher faced the complexity of solving an environmental problem. Developing environmental policies is often complicated by issues such as scientific and technical uncertainty, the trans-boundary nature of environmental problems that requires coordination amongst countries, and also the need to include a multiplicity of actors, such as regulatory officials, non-governmental actors and businesses (Vogel and Kun, 1987). The complexity of environmental problems calls therefore for problem-solving methods beyond traditional scientific enquiry. The concept of post-normal science (PNS) proposed by Funtowicz and Ravetz (1993; 1994) attempts to address the wicked characteristics of environmental problems, where the stakes are high and decisions urgent but the facts are uncertain and corresponding values are disputed. PNS advocates an interdisciplinary approach in policy formulation that results in a complex relationship between experts, policy makers and other stakeholders due to the need to involve pluralist participation in problem definition and solving. Science should not be limited to a conventional approach to understand the world, such as experimental results or predictive models, but instead, needs to rely on different forms of evidence, knowledge and data (Funtowicz and Ravetz, 1993; 1994). Due to these complexities, the research design was developed to ensure rigor and to prevent undue simplification of the policy problem.

The interest to embark on this study was fuelled originally from the researcher’s exposure to a policy problem during her engagement as a policy analyst in Indonesia’s National Development Planning Agency. Local governments in Indonesia are restricted to pursuing productive activities to generate public revenues in forestlands designated by the national government as protection and conservation areas. These restrictions reduce public revenues that are required to provide basic public services at local levels. This policy problem called for the National Development Planning Agency to explore a
policy instrument to provide local governments with incentives to support conservation at the local level. Not long after this initiative, climate change negotiations under the UNFCCC began to include REDD+, which would provide financial incentives to reduce deforestation and forest degradation in developing countries. In response to international negotiations on REDD+, the government of Indonesia quickly started to prepare itself to participate in REDD+. REDD+ has since become an important issue on the Indonesian policy agenda. As put by Kingdon (1995, p. 45), a policy agenda is: ‘the list of subjects or problems to which government officials and people outside the government closely associated with those officials, are paying some serious attention to at any given time.’ The researcher then started her doctoral research with the intention of developing a design for IFTs to distribute REDD+ revenues from the national to local governments in Indonesia.

The chapter first discusses the adopted epistemology, which has underpinned what can be known about the realities observed in this study. A thorough discussion related to the epistemology is expected to reduce any misunderstandings about the objectives of the research and the expected results that are presented in later chapters. Following the discussion about the epistemology, this chapter details the research questions that were developed to achieve the study’s objectives and the phases of the study, which were guided by the policy analysis framework. Finally, the research strategy and data collection methods and analysis are discussed.

4.1 The paradigms

This section discusses the knowledge traditions, including the ontology and epistemology in general, prior to discussing the views adopted by the researcher. Ontology is a theory of ‘being’ (Furlong and Marsh, 2010). The ontological question is ‘what is the nature of reality?’ (Guba and Lincoln, 1994; Creswell, 2006), or in other words, it addresses issues surrounding: ‘whether there is a “real” world ‘out there’ that is in an important sense, independent of our knowledge of it’ (Furlong and Marsh, 2010, p. 185). Epistemology deals with the question of: ‘what is the relationship between the researcher and that being researched?’ (Guba and Lincoln, 1994; Creswell, 2006). Furlong and Marsh (2010) further elaborate on two key questions related to epistemology: ‘can an observer identify ‘real’ or ‘objective’ relations between social
phenomena and if so, how?’ The first question relates closely to the ontological position, while the second question deals with the relationships that can be established between the researcher and social phenomena that exist in the context of the area that is under investigation. A detailed explanation on the relationship between ontology and epistemology is provided below.

Two broad philosophical orientations are the positivist and the constructivist/interpretivist. The positivist approach posits that there is a single reality out there, independent of our knowledge of it. Positivists view ‘truth’ as absolutely independent of our knowledge of it (Grbich, 2007; Robson, 2002; Furlong and Marsh, 2010). Researchers adopting a positivist position think they can objectively observe social phenomena based on facts to develop universal causal laws and predictive models. The dominant features of positivism include scientific principles, regularity, order, deductive logic, laws of nature, observation and experience, causality and statistical analytical approaches (Grbich, 2007, p. 5). Positivist science is largely based on quantitative data derived from the use of strict rules and procedures, which are also known as quantitative methods (Robson, 2002). In contrast, constructivist/interpretivist researchers see the world as socially constructed (Furlong and Marsh, 2010; Tashakkori and Teddlie, 1998). The constructivist/interpretivist approach is the obvious ‘other’ option to positivism (Furlong and Marsh, 2010). The ontological view of constructivism/interpretivism is known as ‘relativism’, which posits that multiple social realities are products of human intellect and these may change as their constructors change (Guba and Lincoln, 2005). These realities are changing and knowledge is constructed jointly in interaction by the researcher and that which is being researched, through consensus, guided by qualitative methods (Grbich, 2007).

Another paradigm that rejects the forced choice between positivism and constructivism with regard to methods, logic and epistemology is pragmatism (Tashakkori and Teddlie, 1998). Pragmatism combines both objective and subjective points of view. Pragmatists consider that the knower and the known are inseparable and that values play a large role in interpreting results (Tashakkori and Teddlie, 1998). Their ontological position is based on transcendental realism, which believes that social phenomena exist in the objective world and that there are some ‘lawful and reasonably stable relationships’ among them.
(Miles and Huberman, 1994, p. 429). The pragmatist orientation uses both qualitative and quantitative methods.

The pragmatism paradigm is adopted for this research as it best suits the development of a policy design aimed at distributing REDD+ revenues using IFTs. There is a growing demand for policy analysis to bridge the gap between the positivist and interpretivist approaches (Fischer, 1998; Lin, 1998; 2003). Bobrow and Dryzek (1987, p. 150) contend that: ‘policy problems have no respect for the boundaries of paradigms or frames of reference.’ Policy analysis should emphasise therefore the integration of normative and empirical modes of discourse, where the empirical approach is situated in a larger set of normative concerns, to find solutions to policy problems that must be addressed (Fischer, 2003). To develop a design of IFTs, this study integrates the rationalist approach to policy analysis with the interpretivist approach. The rationalist approach involves forecasting and predicting the potential impacts of policy alternatives, based on an explicit theoretical assumption and/or the extrapolation of current and historical trends into the future (Dunn, 1981; 2007). In contrast, the interpretivist approach involves the evaluation of existing conditions and explores alternatives to these conditions, so that a set of criteria about a better condition can be obtained through: ‘an interchange between the frames of reference of analysts and actors’ (Dryzek, 1982, p. 322). In order to design IFTs that create incentives to reduce deforestation and forest degradation, it is important to consider the political, economic and administrative situation in the country. Hence, the approach chosen by this study to design IFTs for REDD+ revenue distribution is a blend of empirical data, facts, normative assumptions, interpretive judgments, opinion and evaluation. The stages implemented in this research are discussed in the next section.

4.2 Policy Analysis Framework Guiding the Study’s Stages

To develop the design of IFTs to distribute REDD+ revenues, a policy analysis framework is used to guide the study’s stages. The policy analysis framework involves (Dunn, 1981; 2007): 1) structuring policy problems to define their nature; 2) outlining policy alternatives to produce information on: ‘a potentially available course of action that may contribute to the attainment of values and the resolution of a policy problem’ (Dunn, 1981, p. 44); 3) recommending a policy action to: ‘produce information about
the likelihoods that particular courses of action will result in the consequences that are valuable to the society’ (Dunn, 1981, p. 219-220).

Guided by this policy analysis framework, three research questions were developed to achieve the study’s objective to design IFTs to distribute REDD+ revenues (Table 4.1). The first research question aims to identify and structure the policy problem by understanding the role of financial incentives in improving decentralised forest management and reducing deforestation and forest degradation. The second research question examines the technical details of the design of IFTs, where two sub-questions are explored: i) What are the purposes of IFTs for REDD+ revenue distribution? ii) What are the stakeholders’ views on the distribution formula, conditionality and accountability of IFTs to distribute REDD+ revenues? These sub-questions aim to gather the perspectives of government stakeholders on the options for the design of IFTs that can be implemented to finance REDD+ implementation at the local level. The third research question intends to estimate the amount of the transfers to local governments by focusing on different options for the distribution formula, using empirical data from Riau and Papua. Finally, no specific research question was developed for recommending the design of the IFTs for REDD+ revenue distribution during the final stage of the policy analysis. This study combines all the results of the analyses previously mentioned to recommend a design for IFTs to distribute REDD+ revenues in Indonesia. The concluding chapter, Chapter 9, provides the recommendations and discusses the consequences that may be produced by the design of IFTs for REDD+ revenue distribution, based on the analysis conducted previously to answer the three research questions.
Table 4.1 Research questions in each stage of policy analysis

<table>
<thead>
<tr>
<th>Stage of Policy Analysis</th>
<th>Research Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structuring policy problems</td>
<td><strong>Research question 1</strong>: what are the roles of financial incentives and other factors in influencing local governments’ interest in and commitment to conservation?</td>
</tr>
</tbody>
</table>
| Outlining policy alternatives | **Research question 2**: what are governments’ perspectives about the design of IFTs to distribute REDD+ revenues from the national to local governments?  
**Sub-question 1**: What are the purposes of IFTs in REDD+ revenue distribution?  
**Sub-question 2**: What are the stakeholders’ views on the distribution formula, conditionality and accountability of IFTs to distribute REDD+ revenues?  
**Research question 3**: what are the distribution formula options for determining the amount of IFTs for REDD+ revenue distribution to local governments? |

In the first stage, the study intended to identify and structure the policy problem to provide a direction throughout the policy analysis process (Dunn, 1981; 2007). Understanding the policy problem requires information about the antecedent conditions of the problem and information about the stakeholders’ values and views on the problem that may result in problem solutions (Dunn, 1981). Defining the policy problem together with the stakeholders is important particularly when consensus on values among stakeholders is lacking, as stakeholders may not accept the definition of a problem and the normative position adopted by a policy analyst in the analytical framework (Dryzek, 1982). In developing a design for an IFT to distribute REDD+ revenues, little consensus on problem definition can be expected, since there is no well-defined policy agenda. Hence, the first question guided the researcher to define the policy problem together with the government stakeholders, particularly local governments as the recipients of the IFTs.

During this first stage, the study explored the roles of financial incentives in subnational governments’ interest in and commitment to conservation. A number of studies have attempted to understand the factors influencing local governments’ interest in land-use change (Andersson and Gibson, 2007; Andersson et al., 2010). However, a number of deep structures influence local governments’ interest in land-use change and conservation that are not easily observable. In order to understand how different factors influence local governments’ interest, a causal analysis was then conducted in this study (Robson 2002). ‘Causal analysis consists of identifying the mechanism that underlies and generates empirical regularities and outcomes’ (Mahoney, 2001, p. 578), whilst a
causal mechanism can be defined as: ‘an unobserved entity that generates an outcome of interest’ (Mahoney, 2001, p. 580). A causal mechanism should be able to explain why different variables are empirically correlated with a phenomenon of interest. Chapter 5 discusses the method used in identifying the causal mechanism of how financial incentives and other factors influence the interest of local governments in reducing deforestation and forest degradation.

The second stage of this study explored possible alternatives of IFTs to distribute REDD+ revenues. Studies that develop IFTs to support conservation suggest that several alternatives are available related to the design of IFTs, however, the final decisions often remain political in nature (i.e. Köllner et al., 2002; Ring, 2008b). A number of technical issues related to the designs for IFTs remain contentious as stakeholders have different perspectives toward issues such as the distribution formula; conditionality of the funds transferred, the political and administrative allocation process, and the accountability mechanism. In order to understand the perspectives of different government stakeholders on the design of IFTs, the study did not aim to find a universal truth about a social situation. Instead it sought to identify details related to the preferences of stakeholders and combine those details in a sensible and coherent manner (Furlong and Marsh, 2010). To address the second research question, an interpretivist policy analysis was applied. An interpretivist approach to policy analysis advances a ‘practical’ conception of reason as an alternative methodological framework to the traditional form of scientific rationality (Fischer, 2003). When conducting interpretive policy analysis, policy analysts have to become immersed in the beliefs (ideas, values, feeling and meaning) of the participants (Yanow, 2000). Stakeholders’ perspectives about the design of IFTs were not to be discovered, but rather constructed socially (Guba and Lincoln, 1994). To answer the second research questions, qualitative data were collected through interviews with government stakeholders and then analysed through a process of constant comparison involving coding, categorising and giving meaning to data (Grbich, 2007).

Considering the perspectives of stakeholders, this study then estimated the amount of REDD+ transfers to local governments. To answer the third research question, a rational decision-making process, which involves ‘procedures for decision making to select the most efficient means of achieving policy goals’ (Howlett and Ramesh, 1995, p. 140),
was conducted. Methodologically, the science of public decision-making, rooted in welfare economics and public finance principles, was applied to estimate the amount of IFTs for REDD+ revenue distribution. The study collected relevant data on alternative land use of REDD+ to estimate the opportunity costs and to forecast the amount of the transfers to district governments, using a basic fiscal simulation analysis. Details on the data collection and analysis methods are provided in Chapters 7 and 8, which present the results of the opportunity cost analysis and fiscal simulation analysis respectively.

After conducting these analyses, the results are brought together in the final stage of this study to recommend policy action. Recommending policy action aims to ‘produce information about the likelihoods that particular courses of action will result in the consequences that are valuable to the society’ (Dunn, 1981, p. 219-220). To select the preferred alternative, the study combined the results of the quantitative and qualitative analyses. The recommendations for the design of IFTs for REDD+ revenue distribution are provided in Chapter 9.

4.3 Case Study as the Research Strategy

The research strategy adopted in the study is a multiple case studies approach. A case study is defined as: ‘a strategy for doing research, which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence’ (Robson, 2002, p. 178). To select the cases, this study used purposeful sampling (Seawright and Gerring, 2008). One of the many important uses of purposeful sampling is to capture adequately the heterogeneity in a population (Maxwell, 1997). ‘Cases are selected where theory would suggest either that the same result is obtained or that predictably different results will be obtained’ (Robson, 2002, p. 183). Since this study applies a mixed (qualitative and quantitative) method and involves different government levels as the respondents, a multilevel mixed-method sampling is applied to achieve the purpose of the study (Teddlie and Yu, 2007). The sampling process started at the provincial level, before further samples were selected at the district level in the sampled provinces. Although administratively the function to provide public services is devolved to the district level, the researcher aims to understand the overall dynamics between national, provincial and district levels because each government level plays an important role in forest management.
Two provinces were selected on the basis of diverse cases to answer the research questions. The first research question requires the researcher to develop a causal argument about the roles of financial incentives in local forest governance. Hence, the study aimed to obtain the greatest possible amount of information through, within- and cross-case investigation. A diverse case strategy therefore suited the first research question because atypical cases often reveal more information as they activate more actors and more basic mechanisms in the situation studied (Flyvbjerg, 2006). The researcher avoided focusing on a representative case, which is usually selected through a random sampling process, since the typical or average case often does not provide the richest information. The diverse case strategy also suited the second research question, as it also aimed to obtain the richest information related to the perspectives of government officials on the design of IFTs. The researcher conducted an in-depth analysis of stakeholders perspectives on the preferred design of IFTs covering detail, richness, and completeness of variance provided by respondents responses (Gerring, 2004). Finally, the diverse case approach was considered suitable for the third research question, to achieve maximum variance along the dependent and independent variables. This study selected a set of cases based on several technical indicators that need to be considered when calculating REDD+ opportunity costs and IFTs to local governments.

Two provinces were then selected, representing: ‘the full range of values characterising the independent and dependent variables’ (Seawright and Gerring, 2008, p. 300). The variables are: 1) local governments’ commitment to and interest in conservation (or reducing deforestation) (dependent variables); 2) fiscal capacity (independent variables); 3) special autonomy status (independent variables). The commitment and interest of local governments in reducing deforestation in a locality were observed through interviews with local government officials and verified further through local policy documents and regulations as well as the actual deforestation rates. Fiscal capacity is considered an important indicator. The literature suggests that the interest of local governments in exploiting forest resources or pursuing land-use change is driven by the necessity to increase local public revenues to finance essential public services (Barr et al., 2006; Andersson et al., 2010). According to Ministry of Finance Decree 224/2008, fiscal capacity is calculated based on the local revenues generated to finance governmental functions after being subtracted by routine expenditures and divided by
the total poor population within a jurisdiction. Data on fiscal capacity included in the
Decree were used in the study as the preliminary reference, particularly in the selection
of the samples. Furthermore, as discrete power or secure domain of autonomous
decision making is suggested for successful decentralised forest management (Ribot,
2003; Ribot et al., 2006), this study then observed the impact of the authority devolved
to local level on local governments’ commitment and interest in reducing deforestation
and forest degradation. Based on these considerations, the selected provinces were Riau
and Papua. The characteristics of these provinces are described below.

Riau currently has the highest deforestation rate in Indonesia. Uryu et al. (2008)
estimate the total loss of Riau’s forests between 1982 and 2007 at around 4.2 million
hectares or approximately 65 per cent of its original forest cover. The remaining forests
in 2007 were reported at 2.5 million hectares. Annual deforestation between 1982 and
1988 was slightly higher than 150,000 hectares (Uryu et al., 2008). The rate dropped
dramatically between 2000 and 2002 to below 100,000 hectares, but then increased
again, reaching about 286,000 hectares annually between 2005 and 2006. Data from the
Ministry of Forestry (2008b) show that annual deforestation within the forest zones in
Riau between 2003 and 2006 was 157,689 hectares, consisting of 59,560 hectares in
protected and conservation forests, 45,559 hectares in production forests and 52,569
hectares in conversion forests. This total annual deforestation is lower than the figure
reported by Uryu et al. (2008), which is around 198,000 hectares annually between
2003 and 2006.

Papua is home to the largest area of remaining tropical forests in Indonesia, with
currently the lowest rate of deforestation in the country. The FWI and GFW (2002)
estimate that 1.8 million hectares were deforested between 1985-1997 representing 5
per cent of Papua’s total forest cover. Andrianto et al. (2008) report that in the period
1997-2000, total forest loss was roughly 2.9 million hectares in Papua.7 However,
deforestation slowed between 2001 and 2005, with the total forest loss at 0.57 million
hectares (Andrianto et al., 2008). Tropenbos International (2010) reports a lower figure
of total deforestation between 2000 and 2005 (430,620 hectares). The total annual
deforestation within forest zones in Papua province alone between 2003 and 2006 was

7Soon after decentralization in 2003, Papua was divided into two provinces; Papua and West Papua
provinces. Data published on Papua’s forests, even after the separation, still mostly include both
provinces.
19,481 hectares (The Ministry of Forestry, 2008b). The difference between figures reported by the Ministry of Forestry (2008b) and Andrianto et al. (2008) as well as Tropenbos International (2010) is because the latter two studies also included data from West Papua province.

Fiscal capacity of Riau and Papua varies significantly. Riau province is one of the richest local governments in Indonesia. The provincial government of Riau generates revenues mainly from local own-source revenues and revenue sharing from natural resources. Riau is one of the few oil and gas producing regions. On the other hand, Papua has low fiscal capacity. Papua province is highly dependent on unconditional transfers and a special autonomy fund, which is distributed only to regions that have special autonomy status such as Papua and Aceh provinces. In addition, the special autonomy fund plays a significant role in the overall revenue composition and accounted for about 55 per cent of the total revenues in 2008.

The three provinces that have obtained special autonomy status are Papua, Aceh and West Papua. According to Law 21/2001 on Special Autonomy Status, the provincial government of Papua is provided with authority within all sectors of administration, except for the five strategic areas of foreign affairs, security and defence, monetary and fiscal, religion and justice. The provincial government is authorised to issue local regulations to further stipulate the implementation of the special autonomy, including regulating the authority of districts and municipalities within the province. Due to its autonomy status, Papua province is provided with a significant amount of special autonomy funds, which can only be spent for the benefit of the indigenous peoples.

Following the selection of the provinces, the study then proceeded with the selection of two districts within each province. Riau province consists of 11 districts, while Papua province has 21 districts. Ideally the selection of districts would consider the rate of deforestation at the district level, as it could differ between localities within the same province. However, due to the paucity of deforestation data at the district level, it is assumed that the rates of deforestation of all districts within a province are similar to the rate at the provincial level. The selection of districts within the case study province is

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8Based on 2008 data. The 2008 data were used to ensure consistency with forest data as the most recent forest data were updated in 2008. Since several districts were formed after 2008, using earlier fiscal data would create variation in terms of the total district governments particularly in Papua province.
based on: i) the fiscal capacity; ii) distance from the provincial capital city; iii) access to any convenient form of transportation; and iv) access to government officials to ensure availability of data. The characteristics of the selected districts are detailed in Table 4.2.

### Table 4.2 Case study districts

<table>
<thead>
<tr>
<th>Province</th>
<th>District</th>
<th>Characteristics</th>
</tr>
</thead>
</table>
| Papua    | Sarmi    | Fiscal capacity: High  
Main regional economic activity: Agriculture and plantation  
Deforestation rate: low |
| Jayapura |          | Fiscal capacity: Low  
Main regional economic activity: Agriculture  
Deforestation rate: low |
| Riau     | Siak     | Fiscal capacity: High  
Main regional economic activity: oil and gas  
Deforestation rate: high |
|          | Pelalawan| Fiscal capacity: Low  
Main regional economic activity: timber  
Deforestation rate: high |

### 4.4 Data Collection and Analysis

Having discussed the paradigm and research strategy adopted to achieve the study’s objective, this section turns to the approach to data collection and analysis. This section summarises the overall methods adopted, while the details of each method are presented in the chapters reporting the results (Table 4.3).

### Table 4.3 Methods and Sample

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Method</th>
<th>Sample</th>
<th>Type of data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research question 1 (Chapter 5)</td>
<td>Process tracing (within case analysis) and nominal comparison (cross case analysis)</td>
<td>25 subnational (provincial and district) officials</td>
<td>Qualitative data</td>
</tr>
<tr>
<td>Research question 2 (Chapter 6)</td>
<td>Constant comparison analysis</td>
<td>36 national, provincial and district officials</td>
<td>Qualitative data</td>
</tr>
<tr>
<td>Research question 3 (Chapter 7) (Chapter 8)</td>
<td>Opportunity cost analysis</td>
<td>5 companies operating in Riau and Papua respectively</td>
<td>Quantitative data</td>
</tr>
<tr>
<td>Research question 3 (Chapter 7) (Chapter 8)</td>
<td>Fiscal simulation analysis</td>
<td>All districts in Riau and Papua</td>
<td>Quantitative data</td>
</tr>
</tbody>
</table>
4.4.1. Qualitative data collection and analysis

Qualitative data were collected through interviews with government stakeholders. The interview process, with representatives from relevant agencies, can be categorised as ‘nonschedule standardised interviews’ (Williamson et al., 1977) or ‘unstructured interviews’ (Robson, 2002). Williamson et al. (1977) define the nonschedule standardised interview as: ‘a process where a list of questions are asked to each respondent, but the questions may be asked in different ways and in different sequences’. The list of questions serves as a guide about the set of questions to be asked, but not verbatim as written (Loftand and Lofland, 1995). The interview process involved the explanation and clarification of the questions. This nonschedule standardised interview approach also allows the researcher to probe a particular topic via supplementary questions (Williamson et al., 1977, p. 165). This approach is expected to reduce the chance of misunderstanding between the interviewer and interviewees as compared to the structured interview approach. The interviewer has the opportunity to clarify the questions by asking the respondents the same question in different ways to ascertain if there is inconsistency in the respondents’ answers.

Prior to data collection, the researcher identified relevant agencies at national, provincial and district levels. As this study focuses on designing IFTs for REDD+, the relevant stakeholders are the government agencies involved in the development of a REDD+ payment mechanism from the national to local levels. A number of government agencies were selected for the interviews, including the Finance Department, the Forestry Department, and the Planning Bureau at national, provincial and district levels. The researcher also conducted scoping work by conducting informal discussions with a number of parties involved in REDD+ initiatives in Indonesia, including experts, non-governmental organisations and several donor partners. Consideration was also given to the use of the snowballing technique to identify further officials associated with development of the payment mechanism. However, the concept

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9 An Intergovernmental fiscal transfer is an instrument to ensure local governments in a decentralised country to have sufficient financial resources to finance public services they should provide. The selection of government actors as the key informant was therefore intentional, because IFT designs will impact mostly government actors. It will also have indirect implications to local residents as the users of public services provided. However, it is beyond the scope of this research to analyse the effectiveness of the services provided from the perspectives of local residents.
of REDD+ was still immature during the course of the interviews, and none of the interviewees suggested additional institutions.\(^\text{10}\)

After identifying the relevant agencies, individuals holding formal decision-making powers for the respective institutions were contacted. At the national level, most interviews were conducted at the director level, which is usually responsible for making technical decisions. At the provincial and district levels, interviews were conducted with the heads of agencies (forestry, finance and planning). Each of the interviews lasted 45 to 60 minutes. All interviews were conducted in the Indonesian language and took place mostly in the interviewees' offices. Several interviewees refused to give permission to tape the interviews; in such instances, the researcher took notes and revisited them after some time after the interview in order to ensure each point had been captured accurately. Questions were tailored specifically for each governmental level. Some questions were applicable at all levels, including the perspectives of stakeholders on the fiscal transfer design while, questions such as incentives that may be created by REDD+ to pursue conservation at the local level were only relevant to stakeholders at the district and provincial level. The list of questions is reported in Appendix 1.

Following the interviews, the qualitative data were analysed to answer the first research question. The responses were analysed using within case (process tracing) and crossed case (nominal comparison) analysis. To infer causality, process tracing was conducted to identify and verify the observable, within-case implications of the causal mechanisms (Mahoney, 2001). Within-case implications of a causal mechanism try to identify traces for every step between the cause and the outcome (Blatter and Blume, 2008). Moreover this study employed nominal comparison analysis to discover the causal mechanism across cases. Nominal comparison involves summarising a causal argument or different values of explanatory outcome variables into categories, where each of the cases is then classified either as a member or non-member to the categories (Mahoney, 2000). A cross-case comparison is conducted to eliminate potential causes that are not sufficient to produce the observed outcome (Mahoney, 1999). A detailed discussion about the causal mechanism is also provided in Chapter 5.

\(^{10}\) Due to the immature concept of REDD+, questions asked during interviews that were related to REDD+ were hypothetical. This has not changed until today since there is no money available to local governments for REDD+. However, this hypothetical question is important to understand local governments' perspectives about their preferences on the design of REDD+ payment mechanism.
To analyse the qualitative data, a process of coding, analysing categories and assigning meanings was conducted (Glaser, 1992). The stages of this analysis were as follows.

1. Developing interview transcripts: the researcher developed summary transcriptions of all interviews, capturing the views of interviewees. Atkinson and Heritage (1984) suggest that the production and use of transcripts involve close and repeated listening to recordings, which often reveal features that were unnoticed previously. The transcripts of the interviews were developed in the Indonesian language. The translation to English was not conducted until the words or lines or paragraphs were included in the thesis to prevent a loss of the meaning of the interview data.

2. Coding data: started with a list, which was developed on the basis of the list of research questions. Coding plays an important role in analysing the qualitative data because it aims to highlight relevant phenomena in order to find commonalities, differences, patterns and structures. Coffey and Atkinson (1996) argue that codes link between sets of ideas and concepts in the sense of heuristic devices that enable the researcher to go beyond the data. The researcher attached codes to different chunks of phrases, sentences or paragraphs obtained from the semi structured interviews. During the initial coding, fragments of data were studied closely for their analytic import. During the iterations, coding gradually became more focused and the most useful initial codes were selected and tested against extensive data (Glaser, 1992; Gribich, 2007).

3. Aggregating codes into categories of meaning: these categories help in the formation and production of concepts through constant comparisons of categories throughout the analysis phase of the research. Categorising is a process of making decisions about organising data so that they are useful for the analysis, taking into account how this category fits into the wider analytic context (Dey, 1993). In this study, the process was assisted by reading and re-reading transcriptions and carefully checking recorded interviews against these transcriptions to ensure accuracy.
4.4.2. Quantitative data collection and analysis

In order to answer the third research question, this study estimated the opportunity costs of REDD+ from alternative land-use activities. The estimation focused on the opportunity costs of REDD+ accruing to government stakeholders, particularly to the provincial and district governments in Riau and Papua. Three land-use activities that are the major causes of deforestation and forest degradation in Indonesia are examined: commercial logging, timber and oil palm plantations. Data from private companies operating in Papua and Riau were collected to obtain financial data. A detailed discussion of the method applied in the opportunity costs analysis is provided in Chapter 7. Based on that estimation, the amount of REDD+ transfers to local governments was assessed. The amount of REDD+ revenues allocated to the district level, using different distribution formula, was then simulated, and a detailed discussion of the method applied is provided in Chapter 8.

4.4.3. Combining the results of qualitative and quantitative analysis

The results of the qualitative and quantitative analyses were then combined to offer recommendations for the design of REDD+ revenue distribution, using a complementarity approach. This approach is different from triangulation, which aims to achieve convergence of different methods on the same conceptual phenomenon (Greene et al., 1989). This approach assesses different levels of a phenomenon so that during the final analysis, the researcher seeks to elaborate, enhance, illustrate and clarify the results from one method with the results from other methods. This is expected to increase the interpretability and meaningfulness of the constructs and results (Greene et al., 1989). As argued by Johnson et al. (2007), during the data analysis stage, qualitative data can play an important role in interpreting, clarifying, describing and validating quantitative results. The findings of the quantitative and qualitative analysis enable the researcher to recommend policy action using a descriptive approach which aims to capture and incorporate the multiplicity of theoretical perspectives and explanations of a particular event and also integrate ethics and values as the result of reasoning (Dryzek, 1992; Fischer, 1998). The combined results are presented in Chapter 9, the concluding chapter.
4.5 Rigour

4.5.1. Qualitative data

As this study uses both qualitative and quantitative data, the approaches to ensure rigor differ. The idea of rigour has been conceptualised by qualitative researchers in a variety of ways (Creswell and Miller, 2000; Creswell, 1994). This study refers to the concept of trustworthiness put forward by Lincoln and Guba (1985), which consists of credibility, dependability, transferability and confirmability (Lincoln and Guba, 1985; Graneheim and Lundman, 2004).

Credibility refers to the idea of internal consistency, where the core issue is: ‘how we ensure rigour in the research process and how we communicate to others that we have done so’ (Gasson, 2004, p. 95). In order to ensure credibility, this study employed the member checking and thick description strategies.

Member checking shifts the validity procedure from the researcher to the participants in the study (Morrow, 2005). Lincoln and Guba (1985, pg. 314) describe member checks as: ‘the most crucial technique for establishing credibility’ in a study. Data and interpretations are brought back to the participants in a study during member checking so that they can confirm the credibility of the information. One of the procedures to facilitate this is by asking the participants to view the raw data (e.g. transcriptions or observational field notes) and provide comments on their accuracy (Creswell and Miller, 2000). Member checking was conducted in a national workshop held in Indonesia on 29 April 2011, to which some of the respondents interviewed in this study were invited. In the workshop, the researcher asked participants if the results made sense, whether they were developed with sufficient evidence, and whether the overall account was realistic and accurate. Participants’ comments were further incorporated into the final narrative.

Thick description explains the setting, the participants, and the themes of a qualitative study in rich detail (Morrow, 2005). According to Denzin (1989, p. 83), ‘thick descriptions are deep, dense, detailed accounts, whereas thin descriptions by contrast, lack detail and simply report facts.’ Thick descriptions allow readers to experience the events being described in a study (Creswell and Miller, 2000). In addition to ensuring
that the process of writing provides as much detail as possible, Chapter 5 is also
dedicated to providing meticulous details about the two cases selected for this study.

Transferability is the extent to which a study can be generalised with the core principle
of: ‘how far a researcher may make claims for a general application of their theory’
(Gasson, 2004, p. 98). Qualitative data are, however, not generalisable in the
conventional sense due to the usually small sample sizes and absence of statistical
analyses. This study develops a design of IFTs based on the responses provided by
government stakeholders at all levels in the two selected provinces. The perspectives of
stakeholders are often locally specific, hence, the researcher does not aim to find a
universal truth about the preferred design. Instead, details related to the perspectives of
government officials interviewed in this study are identified and combined in a coherent
manner for the specific cases.

Dependability ensures that: ‘the way in which a study is conducted should be consistent
across time, researchers, and analysis techniques’ (Gasson, 2004, p. 94). Dependability
involves a process that warrants and encourages findings to be both replicable and
explicit. Guba and Lincoln (1985) contend that dependability can be achieved by
documenting the logic of process and setting up of an ‘audit trail’.

An audit trail is established by researchers documenting the inquiry process
through journaling and memoing, keeping a research log of all activities,
developing a data collection chronology and recording data analysis procedure
clearly (Creswell and Miller, 2000, p. 128)

In establishing an audit trail, this study ensured clear documentation of all research
activities. A journal was maintained by the researcher to record reflections and insights
on the process and content of the various activities that took place.

Finally, confirmability addresses the issue that: ‘findings should represent, as far as is
(humanly) possible, the situation being researched rather than the beliefs, favourite
theories, or biases of the researcher’ (Gasson, 2004, p. 93). Morrow (2005) also
suggests an audit trail as one of the main procedures used to accomplish the goal of
confirmability, which was employed for this study
4.5.2. Quantitative data

Rigour in quantitative studies usually includes the external validity and transferability of results (Tashakkori and Teddlie, 1998). External validity can refer to the approximate validity where the findings can be generalised across setting, times and measures (Rosnow and Rosenthal, 1996). However, this study did not involve statistical analysis, but rather a cost benefit analysis was performed. Thus, to ensure rigour reliable financial assumptions are used in the study (Hanley and Clive, 1993, Sinden and Thampapillai, 1995).

Cost benefit analysis usually involves the process of converting all costs and benefits into aggregate measures such as net present value (NPV). Hence, data inputted into the calculation determine the result obtained from the NPV test and changes of data input will clearly lead to different results for the NPV. In all ex ante analyses of cost benefit analysis, the analyst must make predictions concerning various data, which caused some uncertainty in this study. As none of these predictions is made with perfect foresight and knowledge, it is thus important to also conduct a sensitivity analysis (Hanley and Clive, 1993). A sensitivity test assists the researcher in discovering to which parameters the NPV outcome is most sensitive (Hanley and Clive, 1993). The following procedures are adopted in this study (Sinden and Thampapillai, 1995):

- recalculation of the net benefits by inserting different data into the NPV formula, such as various values for prices and discount rates;
- identification of the critical variables and a description of the sources of uncertainty;
- reinterpretation of relative desirability with all the net social benefit data.

The findings of the analysis described in this chapter are reported in Chapters 5 to 8. Each of the chapters also provides further details on the methods applied to answer the corresponding research questions.
Chapter 5  The Role of Financial Incentives in Local Forest Governance: the Cases of Riau and Papua

This chapter addresses the first research question: what are the roles of financial incentives and other factors in influencing local governments’ interest in and commitment to conservation. This research question aims to uncover the causal mechanism of how different factors, particularly financial incentives, influence local governments’ interest in and commitment to conservation and/or land-use change in their localities. A causal statement is important in developing a public policy to ensure that the policy has an accurate theory of how to bring about change (Sabatier and Mazmanian, 1980; Sabatier, 1988; Sabatier, 1991; Parsons, 1995; Sabatier and Mazmanian, 1979). This chapter attempts to provide a possible explanation of how the behaviour of subnational governments as the target group could be influenced by financial incentives to achieve the desired end-state, which is to reduce deforestation.

The decentralised forest management literature suggests a number of important factors to ensure that local governments pursue good forest management. As discussed in Chapter 2, several empirical studies point to important factors for successful decentralised forest management, including: sufficient resources and capacity, financial incentives, upward accountability, discretionary power, demands from NGOs and pressure from local people (Andersson et al., 2006; Andersson et al., 2004; Andersson, 2004; Andersson, 2003; Larson, 2002; Larson, 2003; Ribot et al., 2006). These studies, however, do not specifically examine deforestation (or conservation) as the dependent variable; instead, they use ‘good forest management’, which is defined generally as the interest of local governments in undertaking forest initiatives and services. Reducing deforestation is more complex than simply delivering forest related services at the local level. Although forest services provided by local governments, such as forest rehabilitation, would lead to reducing deforestation and forest degradation; REDD+ measures would also require the avoidance of legal deforestation. Two studies that
specifically examine factors influencing local governments’ interest in avoiding deforestation find a number of important attributes, including: NGO pressure, local financial importance of forestry, socioeconomic context, national policy, local institutional performance and biophysical factors (i.e. access to forests and topography) (Andersson and Gibson, 2007; Andersson et al., 2010). These factors appear to put more emphasis on the financial and economic aspects of forest resources.

Deforestation can be perceived as either good or bad by local stakeholders, including local communities and government officials, since legal land-use changes and forest exploitation generate public revenues. In a situation where values are conflicting, a policy that is developed without considering the perceptions of the different stakeholders is doomed to fail (Dryzek, 1982; Bobrow and Dryzek, 1987). This chapter seeks therefore to understand how financial incentives and other factors influence local governments’ interest in reducing deforestation based on their perspectives towards deforestation, forest conservation and a hypothetical REDD+ scheme. This analysis is important when designing IFTs to distribute REDD+ revenues as financial incentives alone may not be sufficient for shifting local governments’ interest without being accompanied by other factors, such as authority devolved and pressure from NGOs.

This chapter first discusses the methods applied, to clarify the approach adopted in the data collection and analysis. The existing decentralised public administration and forest management framework in Indonesia is then reviewed to provide a comprehensive picture of the forest governance setting and the relationship between the national and local governments in forest management. This chapter also provides a thick description of the case studies, Riau and Papua, and the perspectives of provincial and district governments on factors influencing their commitment to deforestation or conservation. It then presents the findings from the case studies and discusses the results of the qualitative data analysis. Finally, the possible causal mechanism of local governments’ commitment to forest management is discussed.

5.1 Causal mechanism analysis

Qualitative data collected through interviews with local governments are analysed using a causal mechanism approach. To explain the complex view of a social situation, a case
study approach with small-N usually applies a mechanism approach to causation to understand how causes interact in the context of a particular case or a few cases to produce an outcome (Bennett and Elman, 2006). This study adopts the definition proposed by McMullin (1984, p. 210), who describes a causal mechanism as: ‘entities, properties, processes, relations... that are held to be causally responsible for the empirical regularities to be explained.’ Mahoney (2001) contends that causal mechanism analysis is different from correlational analysis. Correlational analysis identifies: ‘antecedents regularly conjoined with outcomes’; consequently, increasing or decreasing of a causal variable has the probability of generating higher or lower values on an outcome (Mahoney, 2001, p. 580). In contrast, a causal mechanism consists of identifying: ‘the process that underlies and generates empirical regularities and outcomes’, where the activation of a mechanism is sufficient to produce the outcome of interest (Mahoney, 2001, p. 580). Causal mechanisms are useful to explain why correlations exist in the first place and/or to suggest new correlations that have not been previously discovered (Mahoney, 2001).

In order to answer the first research question, the causal mechanism of how financial incentives and other factors influencing the interest of local governments in reducing deforestation and forest degradation, is examined. Qualitative data were collected from in-depth interviews with 25 individuals, who were selected through purposeful sampling. All respondents held formal decision-making power from several government agencies (Finance Department, Forestry Department, and Development Planning Agency) at provincial and district levels. The two common techniques to uncover a causal mechanism applied in this study are: 1) process tracing, which attempts to link a hypothesised explanatory variable to an outcome through a within-case analysis, and 2) nominal comparison to validate the hypothesis and provide a cross-case argument at a more disaggregated level (Mahoney, 2000). Nominal comparison involves summarising a causal argument or different values of explanatory outcome variables into categories. Each of the cases is then classified either as a member or non-member to the categories. Whilst process tracing can help identify possible factors that may influence the interest and commitment of local governments to reduce deforestation and pursue conservation, nominal comparison eliminates factors that may not be sufficient to affect local governments’ interest.
Causal mechanism analysis is common in political science scholarship that seeks to explain a complex social world (Bennett and Elman, 2006). A causal mechanism can however be considered speculative particularly when relatively little is known about the causal relationship between variables, and for this reason, research on causal mechanisms is best governed by more established theories (Gerring, 2010). Mahoney (2000), for instance, suggests that explanatory variables should not be randomly selected for consideration, rather, they should be chosen on the basis of the theoretical literature relevant to the research questions. This study considers therefore the established theories of decentralised forest management to select the explanatory variables and to reduce the uncertainty of the proposed causal mechanism.

5.1.1. Within-case analysis: process tracing

Causal process tracing is used to identify and verify within-case implications of causal mechanisms. Process tracing is: ‘a technique to locate the causal mechanism by linking a hypothesised explanatory variable to an outcome’ (Mahoney, 2000, p. 409). Process tracing is an operational procedure for identifying and verifying the observable within-case implications of causal mechanisms through examining traces for every step between the cause and the outcome (Blatter and Blume, 2008). Causal process tracing requires a full storyline with density and depth of events within their contexts. In order to make the explanations, it is important to describe the finest level of events and realities that are observed (Blatter and Blume, 2008).

In small-N research, within-case analysis is a tool specifically designed to compensate for limitations associated with cross-case methods (Mahoney, 2000). This tool is useful to avoid mistaking a spurious correlation for a causal association, which arises when: ‘two correlated variables appear to be causally related but in fact are the product of an antecedent variable’ (Mahoney, 2000, p. 412). Causation is not established through small-N comparison alone but through: ‘uncovering traces of a hypothesised causal mechanism within the context of an historical case or cases’ (Bennett and Elman, 2006, p. 262). The within-case analysis attempts to specify the beginning and ending of the temporal context in which the causal process plays out, because social processes, such as the commitment to conservation, do not occur instantly (Falleti and Lynch, 2009).
In each of the cases, Riau and Papua, this study attempts to identify: 'temporal unfolding situations, actions and events, traces of motivations, evidence of interactions between causal factors, and detailed features of a specific outcome' (Blatter and Blume, 2008, p. 319). To achieve this objective, information was gathered not only through direct interviews with stakeholders but also from published materials such as local regulations, reports, academic papers, magazines, and online databases. The published materials can complement the qualitative data collected through direct interviews to understand the perceptions and motivations of the actors related to deforestation and forest conservation. The rich qualitative data are then analysed to identify the causal structures behind the existing situation of forest management in each locality.

5.1.2. Cross-case analysis: nominal comparison

Following the within-case analysis, a cross-case comparison is conducted by applying nominal comparison analysis. Nominal comparison involves the use of categories that are mutually exclusive (cases cannot be classified in terms of more than one category) and collectively exhaustive (one of the categories applies to each case) (Mahoney, 2000). Nominal comparison involves giving vivid labels in the format of nominal categories (Table 5.1). Unlike ordinal comparison that: 'entails the rank ordering of cases into three or more categories based on the degree to which a given phenomenon is present' (Mahoney, 2000, p. 399); no specific rank or degree is assigned to the nominal categories. A causal argument or different values of the explanatory outcome variables are summarised into categories, where each of the cases is classified either as a member or non-member to the categories.

Although often considered unsophisticated as it does not involve the ranking or ordering of cases, nominal comparison is highly appropriate to conceptualise certain kinds of phenomena (Mahoney, 2000). It can be used to identify sufficient or necessary causes of an outcome (Mahoney, 2000, p. 392).

When a sufficient cause is present, the outcome will always also be present. However, if a sufficient cause is absent, the outcome could be either present or absent. If a necessary cause is absent, the outcome will always be absent. However, if a necessary cause is present, the outcome could be either present or absent.
To eliminate potential necessary causes, the method of agreement can be used; whilst, the sufficient causes can be eliminated using the method of difference (Mahoney, 1999; 2000). The method of agreement requires that the outcome of interest is present in all cases, thus, any hypothesised cause that is not shared by all cases cannot be considered as a necessary cause. In contrast, with the method of difference, the outcome is present in some cases and not present in others, hence a hypothesised cause that is shared by all cases cannot be a sufficient cause (Mahoney, 1999; 2000).

Mahoney (1999; 2000) provides an example of nominal comparison used by Skocpol (1979) in identifying the causes of state and social revolutions. Potential causes were first divided into four explanatory variables: i) conditions for state breakdown; ii) conditions for peasant revolt; iii) relative deprivation and; iv) urban worker revolt. She further assessed whether or not each of the causes existed in her study cases (France, Russia 1917, China, England, Russia 1905, Germany, Prussia and Japan). Mahoney (1999) explains how Skocpol (1979) eliminated the potential causal factor of social revolution (Table 5.1). Using the method of difference, the factor of relative deprivation was eliminated as it presents in both positive and negative cases of revolution. The factor of urban worker revolts was eliminated using the method of agreement since the factor was not present in all three cases (France, Russia 1917, and China), where a social revolution occurred (Table 5.1).

Table 5.1 Nominal comparison: Skocpol's use of the methods of agreement and difference

<table>
<thead>
<tr>
<th></th>
<th>Conditions for State Breakdown</th>
<th>Conditions for Peasant Revolt</th>
<th>Relative Deprivation</th>
<th>Urban Worker Revolts</th>
<th>Social Revolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Russia 1917</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>China</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>England</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>...</td>
<td>No</td>
</tr>
<tr>
<td>Russia 1905</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>...</td>
<td>No</td>
</tr>
<tr>
<td>Germany</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>...</td>
<td>No</td>
</tr>
<tr>
<td>Prussia</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>...</td>
<td>No</td>
</tr>
<tr>
<td>Japan</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>...</td>
<td>No</td>
</tr>
</tbody>
</table>


This study first identified potential factors that may influence the interest of local officials in reducing deforestation using the within-case (process tracing) analysis. The method of the difference was then applied to eliminate causes that are not sufficient to
influence the interest of local officials in conservation (or deforestation). Two cases selected in this study, Riau and Papua, have the opposite values in terms of the interest in conservation (or deforestation). With the method of difference, possible factors, with similar values, that are found in both cases can be eliminated because they are not sufficient causes to generate the outcome.

The results of the within-case and cross-case analysis are reported at the provincial level, although an analysis at the district level was also conducted. This approach avoids repetition, considering that the findings of this study show that district governments within the same province usually have similar characteristics. When specific variations are found between the provincial and district levels, then explanations are provided in the discussion. Before discussing the findings, the framework of decentralised forest management based on the existing regulations is presented in the next section to provide the background about local forest governance in Indonesia.

5.2 The role of local governments in forest management

The Forestry Law 41/1999 stipulates that the state is responsible for the management of forests. All forested lands in Indonesia are categorised into two classifications: state forests (Kawasan Hutan Negara) and private forests (Hutan Hak), where private rights are attached to the lands. State forests, which are also known as ‘forest zones’, were established through a ‘harmonisation’ process, which:

involved the Department of Forestry and local governments, combining the results of a “forest land use by consensus” exercise completed in 1994 (TGHK desk studies that resulted in forest zone maps based on remote sensing images) and provincial spatial developments plans (RTRWP) of 1999. (Contreras-Hermosilla and Fay, 2005, p. 2)

As a result of this process, approximately 120 million hectares of forest zones, 62 per cent of total land areas in Indonesia, were formally established, although only approximately 87 million hectares of forest zones have actual forest cover (Contreras-Hermosilla and Fay, 2005).

Decentralisation in Indonesia started with the issuance of Law 22/1999 that transferred the authority to provide a number of public services to the district/municipality level.
Eleven important public services were devolved to the local level, including education and culture, health, agriculture, industry and trade, communications, capital investment, public works, cooperatives and labour, environment and land management. To finance public service provision at the local level, Law 25/1999 regulates the fiscal relationship between the national and subnational governments by providing the regions with an authority to generate their own revenues and the shared revenues generated from major taxes and natural resources.

Following decentralisation in 1999, local governments, based on the Forestry Ministerial Decree 05.1/2000, were granted the authority to allocate large commercial timber concessions up to 50,000 hectare in a single district or province. District governments were also allowed to issue small-scale forest product exploitation rights and timber exploitation and utilisation permits for areas up to 100 ha in conversion forest or in production forest areas (Barr et al, 2006). Following the authorities provided to local governments, most of the forest rich districts have aggressively issued permits (Barr et al, 2006). District governments used their new mandate beyond what they were authorized (Yasmi et al, 2006), where the distribution of large numbers of small-scale timber permits may have facilitated illegal logging in some regions (Resosudarmo et al, 2006). In 2002, the Ministry of Forestry revoked the authorities of district and provincial governments to issue large commercial timber concessions and small logging concession permits.

There are two main reasons behind the massive issuance of the permits. First, most of the districts saw timber extraction as an important source to generate local revenues (Barr et al, 2006). Timber extraction is preferable because forests are easily converted to cash without requiring investment on capital and technological inputs, therefore, it can generate revenues more quickly (Resosudarmo, 2006). Second, there was a political pressure from forest-dependent communities to claim over land and forest resources following decentralisation (Barr et al, 2006). The people that had been displaced or marginalised during the previous regime demanded rightful share or benefits generated from forest resources. There was a considerable political pressure from the local stakeholders to make forests available for exploitation. These two factors persisted after decentralisation in 1999 and have not receded, as discussed in Section 5.3 and 5.4 below.
Law 22/1999 was further revised by Law 32/2004. Several adjustments introduced by the Law 32/2004 include: i) introducing the direct election of sub-national heads; ii) providing clarity on the obligatory functions of the local governments, and iii) reaffirming the role of provinces as representatives of the central government in the regions. The Regional Autonomy Laws do not specifically regulate the forestry sector. Santoso (2008) argues that based on Law 32/2004, the forestry sector is not a mandatory affair or a minimum public service to be performed by local governments. This means that local governments can choose whether or not to partake in the forestry sector to increase the welfare of the people within their jurisdictions.

The issuance of Government Regulation 34/2002 on Forest Management reduced the authority of local governments to issue licenses. Under the Regulation 34/2002, which was further revised by Regulation 06/2007, the local governments can only issue the non-commercial timber collection permits, which only allow a maximum harvest of 20 m$^3$ annually, and permits for the collection of non-timber collection for a maximum volume of 20 tons annually.

The implementation of the Forestry Law was detailed by Government Regulation 06/2007, which stipulates that the management of forests in Indonesia would be divided into a Forest Management Unit (FMU). The Minister of Forestry has the authority to designate a forest zone as an FMU with a specific function including protection, conservation or production forest. On the other hand, the authority to establish an organisation to manage the FMU is the responsibility of different governmental levels. If the forest boundaries fall under one district only, the district government will have the responsibility to establish the FMU's organisation. When the forest unit stretches across districts, the provincial government will be responsible for establishing the organisation to manage the FMU, while, if the forest area crosses the boundaries of one province, it will be under the authority of the Ministry of Forestry. The organisation to manage the FMU has the following tasks and responsibilities: i) to manage the forest area, including developing a forest management plan, forest utilisation, forest zones utilisation, forest rehabilitation and reclamation, forest protection and conservation; ii) to detail the national, provincial and district policies to be implemented by local forest plans; iii) to implement the management of forests in their location, including planning, organising,
implementing and monitoring and evaluation; and iv) to promote investment to support the achievement of forest management objectives.

The authority of local governments was narrowed, however, following the issuance of Government Regulation 03/2008, which revised the Government regulation 06/2007. The new regulation removed most clauses related to the authority of local governments over forest management. The establishment of FMU organisations, which was under the authority of local governments, is now under the control of the Ministry of Forestry. Local governments only have authority to provide a proposal for the organisation of an FMU. Moreover, the development of forest management plans, both short- and long-term, no longer requires the involvement of the local governments. The regulation stipulates that the development of forest management plans is entirely under the jurisdiction of the head of the FMU, which is now appointed by the Minister of Forestry. The mandate to formalise the long-term forest management plan is no longer under jurisdiction of the local government but directly under the Ministry of Forestry.

A number of production activities are currently allowed by law to exploit Indonesia’s forests. Productive activities that can take place in the production forests include: commercial timber utilisation, commercial non-timber forest product utilisation, environmental services utilisation, commercial forest estates utilisation, timber exploitation, and non-timber forest product exploitation (Table 5.2). Following decentralisation, the subnational levels are authorised to issue: Environmental Service Utilisation Permits, Timber and Non-Timber Exploitation Permits to collect a limited amount of timber and non-timber products, Commercial Forest Estate Utilisation Permits and Commercial Non-timber Forest Product Utilisation Permits (Table 5.2). The authority to issue a utilisation permit for commercial timber in production forests, which is the most lucrative activity in the forestry sector, is maintained by the national government. The financial importance of the activities that are currently under the authority of local governments is less significant compared to commercial logging. Local authorities are required, therefore, to cooperate with the central authority if they wish to maximise timber revenues (Barr et al., 2006). Local governments only have the authority to provide recommendations to the Ministry on the issuance of commercial timber utilisation permits.
<table>
<thead>
<tr>
<th>Permit Type</th>
<th>Maximum Area/Volume/Duration</th>
<th>Activities</th>
<th>Issuing Authority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Timber</td>
<td>No maximum volume/area</td>
<td>All activities related to the harvesting, processing, marketing, planting, and management of timber species in designated areas.</td>
<td>Ministry of Forestry based on recommendations from Head of Districts or Provinces.</td>
</tr>
<tr>
<td>Utilisation Permit</td>
<td>55 years for natural forest</td>
<td></td>
<td>- Head of District/Municipality for forest areas within one district or municipality</td>
</tr>
<tr>
<td></td>
<td>100 years for plantation forest</td>
<td></td>
<td>- Governor for areas crossing district or municipality boundaries</td>
</tr>
<tr>
<td>Commercial Non-Timber Forest Product</td>
<td>No maximum volume/area</td>
<td>All activities related to the harvesting, processing, marketing, planting, and management of non-timber forest products (NTPPs) in designated areas.</td>
<td>- Ministry of Forestry for areas crossing provincial boundaries</td>
</tr>
<tr>
<td>Utilisation Permit</td>
<td>10 years for natural forest</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 years for plantation forest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Services Utilisation Permit</td>
<td>1,000 hectares 10 years</td>
<td>Activities that utilise an area to provide environmental services without damaging its natural ecosystem (incl. ecotourism, water use, carbon trading and biodiversity conservation)</td>
<td></td>
</tr>
<tr>
<td>Commercial Forest Estate Utilisation Permit</td>
<td>50 hectares 5 years</td>
<td>Activities that utilise a living space without disrupting the area’s principal function.</td>
<td></td>
</tr>
<tr>
<td>Timber Exploitation Permit</td>
<td>20m$^3$ 1 year</td>
<td>Activities involving timber harvesting to meet individual needs and/or public facilities of communities in forested areas</td>
<td></td>
</tr>
<tr>
<td>Non-Timber Forest Product Exploitation Permit</td>
<td>20 tonnes 1 year</td>
<td>Activities involving non-timber harvesting to meet individual needs and/or public facilities of communities in forested areas</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Resosudarmo et al. (2006, p. 49-50).

Under the recent regulations, local governments have limited authority in forest management. In practice, local governments have *de facto* control over forest resources as the national government has no capacity to properly manage all areas classified as forest zones due to its geographical distance from the forests. Even when the national government retains the authority to issue permits for commercial activities in production forests, local support is important to ensure the companies’ operational activities on the ground. High resistance from local stakeholders can hinder the implementation of
licenses issued by the national government as reported in a number of regions in Indonesia.\textsuperscript{11}

Municipal and district governments are authorised by Law 26/2007 on Spatial Planning to develop local spatial plans according to guidelines and norms established by the national government. Spatial plans, according to Law 26/2007, regulate the purpose of a specific zone. The purposes of an area include those allocated for cultivation, protected areas, and for infrastructure development. The Spatial Plan approach is a hierarchically and complementary system, starting at the national level down to provincial and district/regency level. National plan is a long-term strategic plan with a time line of 25-50 years. Provincial plans are a medium-term strategic plan with a period of 15 years. District and Regency plans are short-term operational plans with a time period of 5-10 years. Spatial plans can be revised every 5 years at all levels to adjust the function of an area in accordance with its physical condition.

Based on local spatial plans, local governments can submit proposals for land-use change to the Ministry of Forestry within lands classified as conversion forests. A change in forest status can take place in conversion forests if the proposal for land-use change meets all of the following criteria: i) the activity has strategic importance; ii) it does not have negative impacts on the environment (an environmental impact assessment is required to accompany the proposal); iii) it does not cause enclaves or cut the forest into mosaic; iv) it does not affect river flow; and v) the proposal obtains consent from the local parliament. An application for forest conversion must be submitted to the Minister of Forestry, which will then approve the change in forest status with a ministerial decree. In the case of forest clearance for oil palm plantations, local governments have the authority to issue a business permit, which is required before the final decision on forest clearance can be made by the Minister of Forestry (Colchester et al., 2006).

Having clarified the existing arrangement for forest governance in Indonesia, it is then interesting to observe the perspectives of local officials on factors that influence their

interest in and commitment to conservation in each locality. Two cases in this study, Riau and Papua, portray different characteristics in terms of the interest of local officials in forest conservation and/or land-use change and also the deforestation rates. Each of the cases is first presented in detail, including the biophysical situation, fiscal capacity and forest conditions, before discussing the cross-case comparison.

5.3 Riau: is deforestation bad?

Riau province in Sumatra is one of the richest regions in natural resources in Indonesia. It is one out of five oil and gas producing provinces (The World Bank, 2007). However, revenue inequalities between districts in Riau are high. The two districts selected as the cases in this study, Siak and Pelalawan, provide good examples of the inequalities issue. Siak District, for instance, enjoys considerable benefits generated from the involvement of the local government enterprise in managing an oil field in the district. In contrast, the major source of revenues in Pelalawan District is revenue sharing from the forestry sector, which is trivial compared to the revenues from oil in Siak District. Unlike Pelalawan District, the Siak government no longer depends on transfers from the national government.

Generally, the topography of Riau Province, and the case study districts, is lowland with a slope of 0-2 per cent and is about 10 meters above sea level. Siak District is suitable for agriculture and plantations.\textsuperscript{12} In Pelalawan District, most of the land area is lowland with an altitude between 3 and 6 meters above sea level. The low lands are usually peat land and alluvial rivers.\textsuperscript{13} Riau also has a good road system of about 22,130 kilometres in 2008.\textsuperscript{14} These biophysical conditions allow an easy access to most land areas, including forests.

Riau has the highest deforestation rate in Indonesia. Two major causes of deforestation in Riau are the expansion of oil palm plantations and timber plantations to supply the pulp and paper industry. Between 1982 and 2007, 1.1 million hectares (28.7 per cent) of

\textsuperscript{13}http://www.bkpmd-pelalawan.go.id/topografi.htm. accessed on 18 November 2010.
\textsuperscript{14}http://riau.bps.go.id/publikasi-online/riau-dalam-angka/bab-9-transportasi-komunikasi.html-1. accessed on 18 November 2010.
Riau’s forests were replaced by oil palm plantations, while 0.95 million hectares (24.4 per cent) were cleared for acacia plantations (Uryu et al., 2008). By 1998, 534,094 hectares of commercial logging concessions had been converted to timber plantations (FWI and GFW, 2002). Logging concessions within production forests are being replaced by acacia plantations (Figure 5.1). Uryu et al. (2008) also report that 659,200 hectares (17 per cent) of forest areas were deforested but had not yet been planted; the remaining lands were cleared for smallholder oil palm plantations (7.2 per cent) and other purposes (18.1 per cent), such as infrastructure, rubber, coconut and other plantations.

**Figure 5.1 Logging concessions and timber plantations in Riau’s production forests (total area)**

![Graph showing logging concessions and timber plantations](image)


### 5.3.1. Context: local forest governance and deforestation

Since early 1990, Riau has experienced tremendous growth in the pulp and paper industry. The expansion of large-scale timber plantations has come at the expense of natural forests. It is important to note however that Riau forests were already in dire conditions even prior to decentralisation in 2001, although greater authority provided to local government soon after decentralisation also contributed to more forest destruction (See Uryu et al., 2008). Barr (2000, p. 6) reported that:
Because the increases in processing capacity have far outpaced HTI (timber plantation) development, all of Indonesia’s pulp producers have until now been dependent on mixed tropical hardwoods (MTH) obtained through clearing of natural forests… Indonesia’s pulp industry has accounted for approximately 835,000 hectares of deforestation over the past 12 years. It is notable that virtually all of this area was cleared to supply wood to four large mills and that a single mill –Indah Kiat Pulp and Paper owned by Sinar Mas/APP- accounted for over one-third of the total area deforested.

Similar to every forest-rich region in Indonesia, local governments in Riau took advantage of the greater authority in forest management provided to them following decentralisation. The issues reported from Riau were specifically related to the expansion of timber plantations instead of the issuance of small-scale commercial logging extraction permits as in other regions of Indonesia.

Probably the longest standing claims of illegal activities in the pulp and paper sector have focused on the allocation of small-scale conversion concessions (known as IPPK or Izin pemungutan dan pemanfaatan kayu) to RAPP (Riau Andalan Pulp and Paper) and APP (Asia Pulp and Paper).(Singer, 2009, p. 163) Both RAPP and APP took advantage of the loophole in decentralisation legislation by expanding their areas of operation until 2003 to carry on receiving Timber Extraction and Utilisation Permits, which allowed companies to clear cut the remaining forest. Most timber plantations were established at the expense of natural forests, which resulted in a growing environmental campaign (Singer, 2009).

Another cause of forest destruction in Riau comes from the oil palm plantations. In 1982, the area devoted to oil palm was 40,000 hectares and this reached 1.5 million hectares at the end of 2006 (Singer, 2009). The Governor of Riau is supportive of the establishment of oil palm plantations particularly for smallholders to combat poverty. 15 The Governor was re-elected for a second term in 2008. During the election campaign, he promised to launch a poverty eradication program through the promotion of oil palm plantations at the smallholder level by allocating an additional 50,000 hectares to poor families (Singer, 2009). Oil palm plantations provide rapid and reliable income for poor families. Due to the crumbling timber industry in early 2000, the Ministry of Forestry

15 Based on Local Regulation 2/2006.
approved the designation of certain areas within the forest estate for oil palm plantations (Singer, 2009). Due to the existing trend of deforestation, Riau has been a target of major environmental NGO campaigns, which have been supported mostly by Greenpeace and Jikalahari (a local NGO network established in 2002 and funded initially by Conservation International). In November 2009, a Greenpeace protest, where some activists chained themselves to cranes at a paper mill of Asia Pulp and Paper, marked the peak in tension between local governments and NGOs.

In late 2008, the former head of Pelalawan District was convicted of corruption in the forestry sector. He was found guilty of issuing fraudulent licenses to companies that did not have technical capacity in forestry, several of which were affiliated with his close associates and many of these were then traded to a subsidiary of RAPP (Barr et al., 2009). Corruption has caused losses to the state estimated at 1.2 trillion rupiah (US$ 136 million), including from the losses of the timber harvested and the companies’ failure to pay timber royalties and reforestation fees (Barr et al., 2009). In 2010, a former head of the provincial forestry agency was also charged with corruption due to the illegal issuance of logging and land-clearing permits. Indonesia’s Anti Corruption Commission is investigating a number of other corruption cases related to forest conversion to oil palm plantations in Indonesia.¹⁶

On the surface, both corruption prosecutions and NGO’ protests/campaigns appear to have had a strong influence on local governments’ interest in forest management in Riau following decentralisation. However, it is important to trace local governments’ perceptions about deforestation and land-use change in their localities, which is discussed in the next section.

5.3.2. Tracing local governments’ perceptions and motivations
Interviews with local officials in Riau reveal factors that influence local governments’ interest in and commitment to reduce deforestation and pursue conservation. Responses provided by local government officials can be categorised into four factors: beliefs and values towards forest resources, pressure from local people, authority devolved, and


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financial incentives. These four factors were consistently mentioned throughout interviews with district and provincial officials in Riau. Each of these factors is discussed below and supported by direct quotes from local officials.

Local officials do not consider deforestation to be a problem. According to Riau’s forest classification, almost half of the forestland is classified as conversion forests. Hence, land-use change in this forest category is legal. In areas classified as production forests, logging activities are also permitted by law, although local officials also pointed out that a number of silvicultural practices contribute to forest degradation. Moreover, local officials perceive deforestation as a change of forest classification (from forest zone to non-forest zone). Thus, the conversion of natural (or logged-over) forests to timber plantations (monoculture timber species) is not considered to be deforestation since timber plantations are still classified as production forests.

Lands classified as forest zones in Riau are 8.5 million hectares. Only 4.3 million hectares are maintained as forests, while the rest has been allocated as forest conversion therefore they will be converted to other purposes such as agriculture and housing (infrastructure). Forest conversion in those locations is legal. In the permanent production forests, degradation is mostly caused by silviculture practices that are currently not regulated properly. This has negative impacts to natural forests(Riau Forest Agency Interviewee #2, 2009).

Local officials believe that land-use change and forest exploitation are required to increase people’s welfare and to pursue regional economic development. The belief and values of local officials can be linked to the pressure of local people, who mostly seek lands to pursue their livelihoods. Local governments also think that the needs of local people are not similar to those of outsiders (environmental activists or NGOs), who want to see more forest conservation. In the end, local officials in Riau admitted that they are more responsive to the pressure from local people than to the environmental activists’ demands for more forest protection.

(Conservation) is their (NGOs’) need, then they try to change us. Reports about deforestation and forest degradation in Riau are being exaggerated…. According to Greenpeace and Jikalahari (local environmental NGO), forests in Riau are currently in a dire state however local people think the opposite.(Riau Provincial Forest Agency Interviewee #1, 2009)
Interviews with local officials in both Pelalawan and Siak Districts revealed similar views to those of the provincial level officials. District officials placed even greater emphasis on the need to cater for local people’s needs. Since districts offices are located within close proximity to local people, when people have issues related to forest resources, they put their complaints to the district officials. Local people often do not realise that most decisions about forests are made by the national government.

When there are problems, then we have to be responsible because we are here. If there is illegal logging, we are the first line facing the protests. (Pelalawan District Forest Agency Interviewee, 2010)

Respondents consistently noted that local communities need to be allowed to pursue their livelihoods in forests even if their activities result in forest destruction. If the national government or outsiders are interested in conservation, sufficient financial resources need to be provided to compensate what local people are currently gaining from forest conversion. As stated by an official from Riau Provincial Forestry Agency: ‘if now we are told to stop cutting trees, people should be compensated.’

Interviews with provincial and district officials revealed discontent related to the power devolved under the existing decentralisation setting. Local governments think that that basically no authority is provided to the local level in terms of forest management and they currently only act as the implementers of national policies. Moreover, many national policies and programs cannot be implemented at the local level because of a lack of resources transferred to the local level. Local officials believe that limited financial resources constrain the implementation of national policies in the forestry sector at the local level. The national government often instructs local governments to implement national policies or programs without providing sufficient resources.

I had a discussion with the Minister (of Forestry) one time about the program ‘one man one tree.’ I told the Minister “Sir, you tell me to plant trees but you allow them (logging operators) to cut trees”. Also I said “you tell everybody to plant trees, but who will provide the seeds?” So, they keep asking us to do things but they don’t provide resources. (Riau Provincial Forest Agency Interviewee #1, 2009)
When resources are transferred to local governments, they are usually inflexible in terms of how the funds can be spent. Activities to be implemented at the local level vary depending on the local situations, which is often neglected during policy formulation at the national level.

The regions should be provided with the authority to implement funds for the purposes that are deemed necessary for forest protection. Currently the regulations from the national government are too inflexible.... The national government decides many of the activities to be implemented at the local level. In reality regions do not need those activities, while the needs of local governments cannot be financed from those funds. For instance, forest rehabilitation funds cannot be used to tackle illegal logging. (Riau Forest Agency Interviewee #2, 2009)

District officials also mentioned that they often have to bear the costs of conservation at the local level. The costs not only include the forgone benefits from production forests allocated for conservation but also from supporting conservation management at the local level. Lack of financial resources has constrained the implementation of conservation at the local level. The following is a comment provided by an official from the Forestry Agency at the district level.

We have supported the extension of a national park by giving up our production forests. At first, we allocated 30,000 hectares to the national park. We hoped that we would not be burdened again because our funds are limited. However, the staff of the national park also needs funds. When they don’t have sufficient funds from the national government, they complain to us. If we don’t attend to the problem, then we are accused of not being environmentally friendly. If we knew that this would happen, we would rather have not allocated our production forests to conservation. Not long after that there was another initiative to extend the conservation area by another 100,000 hectares so that elephants can survive. For that, they need our production forests again. This has caused a burden to us (Pelalawan District Forest Agency Interviewee, 2010).
5.3.3. Within case analysis

From the outside, a number of factors seem to play a role in shaping local governments' interest in and commitment to forest management in Riau (Figure 5.2). Two events that appear to be influential in forest management are: i) NGO protests and ii) corruption prosecution as a form of law enforcement (coercion) performed by the national government. However, these two factors are important only when a violation of law related to land-use activities occurs. Local officials were reluctant to talk about these issues particularly about corruption cases as some investigations were still being carried out during the interview phase of this study. Instead, local officials attempted to justify deforestation by explaining that forest conversion in Riau is legal and it is required to support local people’s livelihoods.

Figure 5.2 Timeline and context of forest management in Riau

Tracing further the motivations of local officials behind their interest in supporting land-use change revealed four other important factors (Table 5.3). First, local officials perceive deforestation as necessary for economic development and people’s livelihoods. Second, all respondents noted that local governments must take into account local people’s needs in developing policies. Local people require land to grow oil palm for their livelihoods, thus, forest conversion is considered important for local people in Riau. Since forest conservation always comes with the restriction to pursue productive activities in forests, local officials argued for the importance of financial resources to compensate the livelihoods of local people that would be restricted by forest conservation. Third, related to forest services to be provided by local governments, many national policies cannot be implemented at the local level due to limited financial resources and authority. Fourth, limited authority and power devolved to local
governments is considered a constraint to pursuing good forest management, because even if local officials were committed to conservation or reducing deforestation, they would not have the power and resources to do so unless they obtained the blessing from their national counterparts.
<table>
<thead>
<tr>
<th>Beliefs and values</th>
<th>Pelalawan District</th>
<th>Siak District</th>
<th>Riau Province</th>
</tr>
</thead>
<tbody>
<tr>
<td>“We are the medicine for others’ diseases... If we support the (conservation) initiative, we don’t have income from timber plantations and commercial logging as the consequences.”</td>
<td>“Following decentralisation, we are requested to think of improving people’s welfare within our locality. In order to increase the welfare, we need space, while currently available space has been parted and limited.”</td>
<td>“Forests supply raw material for the pulp and paper industry. These productive activities also have multiplier effects including to employment, business and others...”</td>
<td></td>
</tr>
<tr>
<td>Pressure from local people</td>
<td>“I suggested that we can allow local people (to plant oil palm within forest areas) if it is less than 4 hectares, but beyond 50 hectares, this should not be allowed (referring to big businesses).”</td>
<td>“For instance, in order to increase people welfare, we need to allow communities to plant oil palm... We understand the interest of developed countries that want us to conserve forests. We also know how NGOs are influencing those countries. However simply put it this way, if the people can eat then they will concern about environment.”</td>
<td>“People need to survive – so if they are restricted in pursuing their livelihoods, they should be compensated. You need to ensure the people have food then you can ask them to be concerned about the environment... If you want to stop the people from planting oil palm, give them income higher than what they currently get.”</td>
</tr>
<tr>
<td>Authority devolved</td>
<td>“We are being circumcised now. When there is a case like RAPP and Greenpeace, people come to us. We are not involved in the survey or anything. Everything is done by Jakarta (the capital).”</td>
<td>“Forests are under the control of the national government. Even if the forests are within the administrative boundaries of Siak government, we cannot do anything unless we are permitted by the Department (referring to the Ministry of Forestry).”</td>
<td>“There is no local regulation that can be issued related to forestry. All regulations and norms are issued by the centre. We are here just to implement regulations issued by central.”</td>
</tr>
<tr>
<td>Financial Incentives</td>
<td>“We have supported the extension of national park by giving up our production forests. At first, we allocated 30,000 has for the national park. We hoped that we would not be burdened again because our funds are limited.”</td>
<td>“If now local people are told to stop cutting trees, there should be compensation as much as timbers or oil palm..”</td>
<td>“For forest protection activities, for instance, yesterday there was a request from the Ministry of Forestry asking the provincial government to ‘protect’ or ‘guard’ commercial logging areas where the licenses have been revoked. However, because the central government did not provide funds, we could not do it and just ignored the request.”</td>
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17 The quotes are not attributed to any organization because organizations within the same district/province provide similar responses therefore information about their organization is not necessary.
5.4 Papua: commitment to conservation

Following decentralisation, Papua obtained special autonomy status in 2001. The provincial government is authorised to issue local regulations to stipulate the implementation of special autonomy, including regulating the authority of districts and municipalities within the province. Due to its autonomy status, Papua province also receives a significant amount of a special autonomy fund, which can only be spent for indigenous peoples. In 2003, Papua province was divided into two provinces, West Papua and Papua. Following separation, the special autonomy fund was divided between the two provinces. Papua currently receives 70 per cent of the special autonomy fund because its total land area is larger than West Papua. Since 1999, a number of laws have been issued to create 25 new districts in both Papua and West Papua. The last six new districts in Papua were created in 2008, with most of the districts located within protected and conservation forest areas. Despite its rich natural resources endowment, Papua province currently has low fiscal capacity. The province currently depends highly on transfers from the national government, including from the special autonomy fund. The fund plays a significant role in the overall revenue composition and accounted for about 55 per cent of the total revenues in 2008.

In terms of total land area, Papua’s land area represents 21 per cent of the total land area in Indonesia. Papua’s topography varies from lowland with peat to highland with tropical forests, savanna and hills. The two districts selected as the cases in this study vary in terms of their biophysical conditions. Geographically, Sarmi District is located on the north coast of Papua Province. Around half of Sarmi is lowland (52.3 per cent), and it is less than 100 metres above sea level.\(^\text{18}\) Jayapura District borders Jayapura Municipality, the capital city of Papua. The topography of Jayapura also varies but it is generally steep with around 5-30 per cent and it is 0.5-1,500 metres above sea level. The alluvial land along north coast has a 0-10 per cent slope. Jayapura District is a rice and sago producer and also depends on forest products.\(^\text{19}\) Papua has considerable mining potential that includes natural gas, coal and gold.

\(^\text{19}\) http://jayapura.bpk.go.id/web/?page_id=936 accessed on 18 November 2010.
Pressure on Papua’s forests mostly comes from logging activities that cause forest degradation. Between 2001 and 2005, nearly 1.49 million hectares of production forests in Papua and West Papua provinces were degraded by logging (Andrianto et al., 2008). Tropenbos International (2010) reports that between 2000 and 2005 the change of forest cover from primary to secondary forest reached 1.11 million hectares in both Papua and West Papua provinces. Specific data on forest degradation data in Papua province alone are however lacking.

5.4.1. Context: local forest governance and conservation

After obtaining its special autonomy status, the Papuan provincial government issued a number of decrees to allow the local population to gain access to timber production benefits, including:

- Timber Logging Permit for Customary Communities, which enabled local people to carry out timber extraction in small concessions (from 250 to 1,000 hectares) for one year through a community-based or participatory community cooperative.\(^{20}\)
- Permit to Manage Customary Forests, which was a timber extraction permit in larger concessions (up to 2,000 hectares) for a maximum of 20 years.
- Logging companies to pay compensation to local communities in addition to all other fees and taxes collected by the national government.

Local governments’ aggressiveness in issuing local regulations related to timber had occurred not only in Papua. Generally, all forest-rich district governments in Indonesia had taken advantage of their expanded authority to issue district-level timber concessions since decentralisation. Between 1999 and 2002, district governments issued large numbers of small-scale timber extraction and forest conversion permits (Barr et al., 2006). Many local regulations contradicted however the national government’s forestry laws and district governments also showed little capacity for regulating the activities of the timber companies receiving the licenses. This situation was described as ‘legalising’ illegal logging (Barr et al., 2006). In 2002, the Ministry of Forestry restricted the authority of local governments to issue new logging and forest conversion permits in state forests.

\(^{20}\) Governor Decree 522.2/3386/SET 22 August 2002.
In 2005, a Telapak and EIA report noted that the community logging rights in Papua had been subverted by illegal logging. A number of opportunistic individuals and companies took advantage of the confusion and proliferation of legal loopholes following decentralisation to set up a complex international network of timber smuggling from Papua to China and extract as much timber as possible (Singer, 2009). Many operations focused almost exclusively on Merbau species (Intsia sp.), a type of hardwood used for top-end construction and furniture. Responding to this situation, the national government revoked the decrees issued by the provincial and district governments related to all community right licenses,\(^{21}\) including: Licenses under the Timber Logging Permit for Customary Communities and the Permit to Manage Customary Forests were revoked (Barr et al., 2006; Singer, 2009). Furthermore, participatory community cooperatives were dismantled.

Moreover, the President instructed the police to conduct an operation “Sustainable Forests Operation” to combat illegal logging.\(^{22}\) The operation seized large amounts of timber across Papua due to the lack of legal documents such as transport permits (Singer, 2009). More than 400,000 cubic metres of logs and sawn timber were seized together with a host of trucks, ships and logging equipment (The Ministry of Forestry, 2005). Furthermore, ‘more than 170 people were arrested, including police, army and forestry officials’ (Telapak and EIA, 2006, p. 2). In May 2010, another operation was launched seizing 5,300 cubic metres of illegal Merbau. The operation was fuelled by information provided by the Chinese government related to illegal Merbau entering China.\(^{23}\)

In 2006, Mr. Barnabas Suebu, the first directly elected Governor of Papua, took office. Mr. Suebu has since made plans to declare a moratorium on log exports and recommends no more new logging concessions be granted to timber companies (Tedjasukmana, 2007). There has been no clear evidence that the moratorium failed to achieve its objectives. Luttrel et al (2011) reported that the level of timber extraction fell, where half of the logging concessions were inactive. However the inactivity was associated to reasons such as administrative and financial problems or social conflict.

\(^{21}\)Ministerial Decree P.07/Menhut-II/2005.
\(^{22}\)Presidential Instruction No. 4/2005.
with local communities. The Papuan government has had some success with limiting the extent of the forest that can be legally converted to plantations. (Luttrell et al, 2011). In 2008, a Local Special Regulation on Sustainable Forest Management was issued. The main features of this regulation are: 1) allowing indigenous people (local community groups) to manage forests; and 2) banning log exports outside Papua; 3) revoking commercial logging licenses unless the companies have timber processing facilities and/or community logging programs and; 4) supporting forest conservation to generate environmental services.

In 2008, the Governor signed a Memorandum of Understanding with New Forests, an Australian firm specialising in environmental markets, to deliver carbon credits to the voluntary market. Mr. Suebu was named a ‘Hero of the Environment’ in 2007 by Time magazine for his role in pursuing forest conservation in Papua. Time Magazine reported in an interview with Mr. Suebu:

Why would we cut down trees if people are going to pay us to protect them?" he asks. "We can prevent deforestation and also use the money to reforest the areas in critical condition." Suebu says that the legal autonomy the province has when it comes to resource management will help him take on Jakarta. "Pressure on our forests is coming from the forestry department because they are still operating with an old mindset," he explains. "They need to realise that there is a new paradigm now and we are not going to repeat the mistakes of the past.(Tedjasukmana, 2007)

The Governor appears to be playing a strong role in Papua’s commitment and initiatives in conservation. However, it is also important to gather the perspectives of local officials on forest conservation.

5.4.2. Tracing local governments’ perceptions and motivations

Local officials revealed that forest conservation had become the top priority of the Governor. The provincial government intends to set aside 60-70 per cent of the total land area in Papua Province as conservation areas. Conservation and protection of forests, designated by the Ministry of Forestry, currently account for 45 per cent of the total forestland in Papua. Although it is important to consider that some forests are
geographically isolated, this target is significantly higher than the national minimum standard, which is 30 per cent.

From 31 million hectares, we have identified 61.48 per cent of locations for conservation areas. The Governor has now asked for 70 per cent from the total area of Papua to be conserved, while the national regulation is only 30 per cent of the total areas of a locality. (Papua Provincial Planning Agency Interviewee, 2010)

The commitment of the Papuan provincial government to conservation has resulted in a number of concrete actions in forest-related services:

The Governor has now implemented a number of policies to manage forests in Papua. First, he strengthened the institutional setting in the region. He established five regional implementation units dealing with forest protection and monitoring. Besides that, the Governor also realised that one of the weaknesses in terms of forest protection is the human resource. We only have 200 personnel to guard 31 million hectares of forests and most of them are about to retire. In order to back up the existing personnel, we use the local budget to train police personnel, mostly putra daerah (local sons), with a specific curriculum related to forestry. (Papua Provincial Forest Agency Interviewee, 2010)

At the district level, the commitment to forest conservation is associated, however, with delivering forestry services such as forest rehabilitation, planting and reforestation. Officials at the district level do not seem to completely understand the idea of avoiding deforestation, as they are more project or activity oriented.

The head of district instructed us to plant trees together with communities in every sub-district... For forest protection, we have also allocated our local budget to support the implementation of the conditional transfer for the forestry sector, including for infrastructure, purchasing vehicles and others. (Jayapura District Forest Agency Interviewee, 2010)

Provincial officials perceive that conservation has a positive impact on their localities. Local officials are aware of the need to prevent forest destruction by learning from the mistakes of their counterparts in other parts of Indonesia. Their beliefs and values
towards conservation and forest protection came out strongly in every interview, for example:

We have learned from Sumatra and Kalimantan that the disaster caused by forest destruction is significant... The Governor has instructed that Papua will manage the forest sustainably. In the future, we will pursue sustainable development. If we don’t start protecting forests now, we can see disasters such as erosion and flood. This is the commitment presented by the Governor ten days ago. (Papua Provincial Planning Agency Interviewee, 2010)

Moreover, strong leadership from the governor and the heads of districts also contributes to the way local officials perceive the need for conservation and forest protection.

The pressure of communities in Papua related to deforestation varies between districts. Local officials in Jayapura District revealed that they currently must deal with forest encroachment conducted by local people who migrated from other districts. The migrants are already causing destruction in one of the nature reserves in Jayapura District. Upton (2009) reported that Jayapura District has the lowest numbers of non-indigenous residents. At the provincial level, the pressure is generally considered low because most of the indigenous Papuans reside in the central highland area, which is located in the middle of Papua province (BPS Papua, 2009). Many indigenous people have not been exposed to the outside world, consequently there is less pressure to deforest.

Some of our people are still living in *jaman batu* (or stone-age, referring to people who have not been exposed to outside world)... If they are asked to maintain their forests, they are very motivated. (Papua Provincial Planning Agency Interviewee, 2010)

Local officials expressed less frustration about the distribution of power compared to their counterparts in Riau district, previously discussed. They seem to have more bargaining power with the national government in terms of policy implementation due to Papua’s special autonomy status. However, district officials noted some issues related to the management of conservation areas. The officials expressed their willingness to become more involved in conservation activities, which are currently managed directly by the national government.
Nature reserves are under the authority of the national government, so they are under the management of a management unit at the local level but reporting directly to the Ministry of Forestry at the national level. I have already asked them to coordinate all the activities with us (district forest agency). The nature reserve is the authority of the national government, but situated in our administrative boundaries. I have so many times asked and requested to be involved but we get no response. (Jayapura District Forest Agency Interviewee, 2010)

Local officials in Papua did not express specific concerns about financial resources for forest management; however, they pointed out that those resources are important to ensure the quality of services provided by subnational governments. For instance, local officials argued that forest protection has not been optimal due to the low fiscal capacity of local governments. Most of the local units in forest management funded by the local budget are only equipped with a motorcycle and a limited number of staff. The official noted that:

The local management units cannot be compared with those financed by the national budget. If we ignore this issue, it can cause conflict. We have attempted to request the national government to support these local units. The support from the national government is required because of our limited funds. (Papua Provincial Forest Agency Interviewee, 2010)

An official from the Provincial Planning Agency stressed that with financial assistance provided by developed countries, Papua could reduce carbon emissions generated, including in the forestry sector:

Now, we are waiting for Australia, England and America whether they want to assist us achieving our targets to reduce emissions. The Governor is very committed and we have already conducted socialisation with the local people. (Papua Provincial Planning Agency Interviewee, 2010)

5.4.3. Within case analysis

Based on the context of historical forest governance in Papua, one can draw a preliminary assessment that Mr Suebu’s leadership and the special autonomy status of
local governments influence local governments’ interest in and commitment to pursuing forest conservation at the local level. It is difficult to assess the effect of the “sustainable forest operation” as it occurred before Mr. Suebu came to office and for a short period of time (Figure 5.3).

**Figure 5.3 Timeline and context of forest management in Papua**

![Timeline diagram](image)

*Note: the star (*) sign reveals the exogenous shock that spans considerably in a short period of time.*

Interviews with local officials in Papua highlight similar factors that influence their interest in conservation to those in Riau but with the opposite values. Local officials appear to have strong beliefs and values related to forest conservation because: i) they have sufficient authority to make decisions related to forest management due to their special autonomy status; ii) there is low pressure from local people as a considerable amount of the land is not easily accessible for productive activities and local indigenous people live in the forests, performing basic and non-destructive living styles; and iii) there are potential financial incentives for supporting conservation (Table 5.4).

In general, the situation at the district level is similar to the provincial level, but there are some small differences. In several areas at the district level, for instance in the Cycloop Nature Reserve in Jayapura District, local people are trying to encroach the forest. Jayapura and Sarmi districts are located mostly in the lowland areas with easy access to forest areas. These districts are also home to the majority of migrants living in Papua province. Moreover, strong leadership and commitment at the provincial level have not translated properly however at the district levels, where local officials are
mostly concerned about performing forest services such as rehabilitation, planting and community development (Table 5.4).

The special autonomy status also enables local officials to bargain with the national government to prioritise local policies. The provincial government can take decisions according to its local priorities and negotiate with the national government whenever there are contradicting policies. For instance, As a response to the national policy of opening forests for agricultural activities (including the Meruake Integrated Food and Energy Estate), the local government only allows 800,000 hectares to be converted, and they need to be in degraded lands.\textsuperscript{24} At the district level, local officials generally have no major concerns about the authority devolved for forest management. They did, however, mention problems with the management conservation areas, which come under the authority of the national government. They noted that improved coordination is required between the national governments’ staff located at the local level and district officials. Finally, local officials in Papua noted that lack of financial resources has hindered the implementation of forest management at the local level. Local governments at provincial and district levels in Papua have also anticipated financial assistance that might be provided by bilateral and multilateral donors to support conservation in their localities. This anticipation appears to play a role in influencing local governments perspectives towards conservation.

\textsuperscript{24} Merauke, one of the districts in Papua, has been designated as a food and energy producer. Merauke Integrated Food and Energy Estate (MIFEE) is a program proposed by the national government to cultivate areas for an industrialized agriculture system that is based on the enhancement of science and technology, capital and organization as well as modern management. Around 1.2 million hectare will be allocated for the program consisting of 10 clusters agriculture production centers. In the short term (2011-2014), MIFEE will cultivate 228.023 hectare. This program, however, has been not materialized due to strong resistance from local stakeholders.
<table>
<thead>
<tr>
<th>Beliefs and values</th>
<th>Jayapura District</th>
<th>Sarmi District</th>
<th>Papua Province</th>
</tr>
</thead>
<tbody>
<tr>
<td>“We are committed to ensure that the forests are in good quality, we have conducted socialisation with local communities, rehabilitation and others.”</td>
<td>“We have implemented a number of policies including protecting forests and pursuing sustainable forest management.”</td>
<td>“We have learned from Sumatra and Kalimantan that the disaster caused by forest destruction is significant... If we don’t start protecting forests now, we can see disasters such as erosion and flood.”</td>
<td></td>
</tr>
</tbody>
</table>

| Pressure from local people | “The Cycloop nature reserve is currently under pressure because of migrants from Wamena, who encroach the forest... I think the indigenous people love their forests more than the migrants.” | “We need to accommodate local communities. We need to give a leeway for local communities as the district government is responsible to ensure people welfare.” | “If they (indigenous people) are asked to maintain their forests, they are very motivated.” |

| Authority devolved | “If possible, we request every activity in conservation area is conducted in close coordination with us. Conservation areas are under the authority of the national government, however, they are also under our administrative boundaries.” | “The relationship with province and central in the management of forests is good.” | “The national government’s policies often are not in line with the province’s... From the total forest conversion lands (around 5 million hectares designated by the national government), we only allow 800,000 hectares to be converted, and they need to be in degraded lands.” |

| Financial Incentives | “We have allocated our budget for forest rehabilitation. However if we only depend on the local budget, we can only rehabilitate 50 hectares out of 200,000 hectares of degraded forests per year.” | “Currently, the financial resources cannot be used. So, we have to allocate local budget to support conservation although it is the responsibility of the national government.” | “We are waiting for Australia, England and America whether they want to assist us achieving our targets to reduce emissions.” |

| Leadership | “Bupati is very concerned with rehabilitation and forest protection. He even got an award from the Minister of Forestry in 2008.” | “Sarmi received an award for conserving forests from the Ministry of Forestry in 2009. The head of district provides support for all forest officials at the local level.” | “The Governor has given special attention to conservation particularly in the past few years.” |

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25 The quotes are not attributed to any organization because organizations within the same district/province provide similar responses therefore information about their organization is not necessary.
5.5 Cross-case analysis

Having analysed the responses provided by local governments, at least seven factors are identified in all cases. Five factors mentioned by local officials are: local governments’ beliefs and values, pressure from local people, authority devolved, financial incentives and leadership. Two other factors were not specifically mentioned but found in both provinces: corruption prosecution and NGO protests and campaigns. In order to select factors that have sufficient influence on local governments’ interest in and commitment to deforestation or conservation, a nominal comparison between cases is conducted to eliminate potential causal factors that are not sufficient to result in the interest of local governments in reducing deforestation and pursuing conservation (Table 5.5). Both cases, Riau and Papua, have the opposite values in terms of the interest and commitment of local governments to reducing deforestation and pursuing conservation (as the dependent variable). The interest and commitment of local governments were assessed from the responses provided by local officials during interviews and were also verified from the implementation of local policies and the enactment of local regulations on forest conservation. For instance, the interest and commitment of local officials in Papua to conservation have been further supported by the issuance of local regulations on sustainable forest management as discussed previously. With the method of difference, factors (with similar values) that are found in both cases can be eliminated because they are not sufficient causes to generate the outcome (see Section 5.1). The two factors found in both cases, but with similar values that can be eliminated, are the influence from NGOs and corruption prosecution.

| Table 5.5 Factors influencing local governments’ interest in conservation |
|-----------------|-----------|-----------|
| **Factor**      | **Papua** | **Riau**  |
| Dependent variable |           |           |
| Interest in and commitment to forest conservation | High | Low |
| Independent variable |           |           |
| Beliefs and values towards conservation | Generally high | Generally low |
| Pressure from local people | Generally low | Generally high |
| Authority devolved | High | Low |
| Financial incentives | Exists | Not exist |
| Leadership | Exists | Not exist |
| Eliminated independent variable |           |           |
| NGOs | Exists | Exists |
| Corruption prosecution | Occurs | Occurs |
Local officials in Riau and Papua showed contrasting beliefs and values. Local officials in Papua province perceive forest protection and conservation as an important priority for their localities. This message emerged through all the interviews with local officials at the provincial level regardless of which institution they worked for. Conservation has also become the Governor’s vision, which has apparently been communicated to all officials at the provincial level. The Governor of Papua’s commitment to pursuing conservation has influenced the commitment of local officials. This commitment has also been translated to local regulations on sustainable forest management, which allows the indigenous people to benefit from forests and also from the log-export ban. At the district level, this vision is however translated as the need to perform forest-related services such as reforestation, planting and rehabilitation.

In contrast, the Governor of Riau perceived the need to support oil palm plantations for local people’s livelihoods. Local officials in Riau believe that forests are important resources to sustain their livelihoods. At the provincial level, local officials are candid about the fact that the deforestation occurring in Riau is legal, therefore it is not a problem. At the district levels, local officials emphasised that the actions on forest management were mostly driven by the need to cater for local people’s needs. Officials stressed that local people shape their beliefs and values about forest management, rather than NGO protests, as their main responsibility is to improve people’s welfare. A study by Singer (2009) also reports that the pressure from local people is significant in Riau, and sometimes lead to:

conflicts between logging companies and local populations had greatly escalated in violence. There were several reports of lynching and even murders of company staff in the field as well as villagers themselves. Even staff members of Riau forestry service (Dinas Kehutanan Riau) witnessed violence and feared for their safety. (Singer, 2009, p. 158)

District officials in Jayapura and Sarmi also perceive their important role to cater for local people’s needs. Jayapura District officials noted that they are currently facing pressure from local people particularly in one of their nature reserves. However, because these people are migrants from other districts, local officials consider that forest encroachment is illegal and the activity should be stopped. The magnitude of local
people’s pressure is generally low at the provincial level because most of the indigenous people are living in the forests and their life is far from destructive.

Another contrast between Riau and Papua is the extent of power and authority devolved to the local level. In Riau, officials at provincial and district levels think that there is basically no power devolved to the local level in terms of forest management. All forestry officials interviewed at the district and provincial levels in Riau stressed their frustration about the distribution of authority in forest management. They think that it is their role to cater for local people’s voices and needs in forest management, however, they have no authority except to implement the national government’s instructions. This arrangement puts them in a difficult situation. In contrast, the Papua provincial government has the advantage of greater authority in forest management. The provincial government has a strong bargaining position with the national government and it can pressure the national government to take local situations into account in the decision making process.

Local officials in Riau and Papua noted that financial incentives are important to enable them to pursue good forest management and to reduce deforestation and forest degradation. The provincial and district governments in Papua are also anticipating financial assistance that might be provided by bilateral and multilateral donors to support conservation. In an interview conducted in 2007, the Governor of Papua had already proclaimed his interest in pursuing forest protection because it may generate income from carbon credits (Tedjakusuma, 2007). Local officials also pointed out that there is potential support from international donors to preserve forests in Papua. Forest conservation is therefore considered as a source of income for local governments and communities. Moreover, local governments in Riau generally pointed out how the lack of financial resources is one of the main reasons for their limited intervention in forest management. Unlike their counterparts in Papua, they were not convinced about the feasibility of REDD+, or financial support for conservation. In particular, officials from the Forestry Provincial Agency generally took a strong stance against REDD+ because their view is that it is simply a concept and there is no concrete plan for its implementation. Although an official further elaborated that:

If the money is ready to be distributed to local people, I will be in the frontline asking the people to stop any destructive activities. If REDD+ can provide more
than what people are currently getting from oil palm, I will ask them to cut all oil palm and plant trees for REDD+. (Riau Forest Agency Interviewee #1, 2009)

Two eliminated factors are corruption prosecution, or coercion from national government, and NGO protests. These factors are not sufficient to influence the interest of local officials to pursue conservation, however they could be necessary factors, particularly when a legal law violation has occurred. The experience from the Sustainable Forest Operation implemented in Papua, for instance, had an effect on many local officials in the provincial forestry agency. Singer (2009) reports that local officials, who are responsible for delivering annual logging permits, were too afraid of being arrested should they issue them without careful examination. In the case of Riau, these two factors seem to be relevant to prevent local governments from pursuing illegal activities.26 Moreover, local officials in Riau noted that the pressure from NGOs does not impact on local governments’ beliefs and values since the demands of NGOs are different from those of the local people. However, in reality, a number of actions or policies were made in response to the demands or protests from environmental NGOs as described by Singer (2009, p. 168):

In 2002, faced with intense criticism from environmental NGOs, a moratorium was imposed on the issuance of APKPs (areas for the development of the plantation estates) and APLs (areas for other development), which by 2007 had yet to be lifted.

5.6 The causal mechanism

Following the within- and cross-case analysis discussed in this chapter, this section presents a possible causal mechanism of local governments’ interest in and commitment to conservation (or reducing deforestation) (Figure 5.4). While the within-case analysis has identified the causal factors that may influence the interest of local governments in pursuing conservation, the cross-case analysis has helped eliminate factors that are not sufficient to influence the interest of local officials.

26 From the interviews with local governments, these two factors were not mentioned, although a number of published reports have confirmed that they have a strong influence on local governments’ actions related to forest management. See, for example, Singer (2009) and Barr et al (2006).
Local governments’ beliefs and values contribute to their commitment towards forest conservation or exploitation. These beliefs and values are heavily influenced by the pressure of local people. Local governments, particularly district governments, perceive their role as the frontline of bureaucracy that has to cater for the needs of local people. Deforestation and forest conversion can therefore be perceived as either good or bad. The provincial government of Papua considers the need to conserve more forests and reduce deforestation. This commitment is then put into action by allocating more forestland for conservation, which is beyond the national minimum standard, and issuing necessary regulations to better manage forest resources. However, when deforestation is considered necessary and good for people and regional development, deforestation and forest degradation can be expected to continue.

Figure 5.4 The causal mechanism of local governments’ commitment and actions to reduce deforestation and forest degradation

The variables included in the proposed causal mechanism are not exhaustive. This study does not exclude other variables that may influence the beliefs and values of local governments towards conservation. Beliefs and values are complex mental events. They are not only influenced by NGO protests and corruption prosecution, but they: ‘entail thought, which can be differentiated according to their ascending levels of generality e.g. specific programmes, issues-area doctrines or policy paradigms, ideologies or
public philosophies and cultures' (Yee, 1996, p. 69). Sabatier (1988, 1991) argues that the policy making process particularly related to agenda setting is dominated by elite opinion: as a result, the impact of public opinion is at best modest. On the other hand, Kingdon (1995) suggests that the process of defining issues and agendas is shaped by public opinion. Specifically in forest management, the commitment to the long-term sustainable use and protection of forest resources can be influenced by local governments' 'social and environmental ideology' (Larson, 2003) and the personal characteristics of the heads of local governments, including their education (Andersson et al., 2006).

Local governments' beliefs and values would, however, have less impact if they have limited or no authority in the decision making process. Transfer of meaningful powers and sufficient resources to autonomous local authorities is considered imperative for the implementation of decentralised forest management (Ribot et al., 2006; Ribot, 2003). Moreover, Ribot et al. (2006) argue that local governments need to have discretionary powers in forest management that offer a secure domain for autonomous decision making. Central governments in developing countries however often devolve obligations rather than meaningful powers to enable forest services at the national level to maintain control (Ribot et al., 2006).

Leadership of district heads or governors influence the interest and commitment of local officials to conservation. Research on the impact of leadership on the interest and commitment of local governments towards conservation and/or deforestation is however limited. A study by Nagendra (2007) analysing the relationship between leadership and forest change in Nepal found an insignificant association between the two variables. However, the author explained that the insignificant relationship may have been caused by the difficulty in measuring leadership and that the effectiveness of leadership can vary over time. Furthermore, NGO protests and coercive actions, such as corruption prosecution, by the national governments are effective as corrective action to prevent wrongdoing and punish legal violations (Larson 2002; Andersson 2003; Andersson et al., 2006; Gibson and Lehoucq, 2003). These factors need to be noted although they can be eliminated through nominal comparison, as previously argued.
Finally, financial incentives play a significant role in influencing local governments’ interest in and commitment to conservation. REDD+ funds could be distributed to influence local governments’ beliefs and values particularly for those who do not see deforestation as problematic. Sabatier (1988) suggests that elites’ belief systems, particularly related to decisions in the policy implementation stage, can be altered through a process known as policy orientated learning. Policy orientated learning is defined as a process involving alteration of thoughts or behavioural intentions that results from experience (Sabatier 1988). Local governments could be expected to change their beliefs and values as they experience positive responses from local people related to REDD+ implementation.

The important determinants of successful decentralised forest management suggested by Larson (2003) and Tacconi (2007) are similar to the factors influencing local governments’ interest in and commitment to conservation (and reducing deforestation) found in this study. Authority and resources devolved to the local level are similar to the “legal structure” and “capacity” referred to by Larson (2003) in her model of successful decentralised forest management. Pressure from local people has also been highlighted by Tacconi (2007) as “livelihoods” in his model. Local government values and beliefs, however, receive less attention in the successful decentralised forest management literature. Larson (2003) briefly mentions the importance of long-term commitment towards sustainable development. Leadership is the only factor not mentioned in their models.

5.7 Conclusion

The successful decentralised forest management models in the literature can also be applied as a reference for reducing deforestation and forest degradation at the local level, however several adjustments are required. This chapter confirms that financial incentives play an important role in influencing local governments interest in and commitment to conservation and reducing deforestation. Financial incentives are important to finance forest services at the local level, but also to compensate livelihoods and revenue loss at the local level that is used to provide services, including health and education. Financial incentives need to be present, together with a number of other factors such as sufficient devolved authority in forest management, local leadership in
conservation, and incentives for local communities to prefer conservation to land-use change. Local governments need to be provided with the decision making power related to forest resources under their administrative boundaries and they need to be allowed to pursue local priorities according to the demands of their electorates. More authority does not always lead to more conservation (or reduced deforestation) because of the influence of the values and beliefs held by local governments and the pressure of local people; however, a policy that is developed without considering the perceptions of the different stakeholders is doomed to fail. Reducing pressure from local people on land-use change can be conducted through creating incentives for local communities to prefer conservation to land-use change. Finally, coercive measures should also be pursued when violations occur.

In order to design IFTs to distribute REDD+ revenues to the local levels, it is therefore important to consider the factors that need to exist, together with the financial incentives to reduce deforestation. This study now turns to government stakeholders’ perspectives on the design of IFTs, taking into consideration the existing administrative and political situation in Indonesia.
Chapter 6  Government Officials’ Perspectives on the Design of IFT Mechanisms

This chapter addresses the second research question: what are government officials’ perspectives about the design of IFTs, including the distribution formula, conditionality and accountability, to distribute REDD+ revenues from national to local governments. It focuses on how the financial incentives could be distributed using IFTs according to the perspectives of the government officials who would be involved in the planning and implementation of the IFTs. The literature on IFTs for biodiversity conservation suggests that political processes as well as community lobbying will influence the final design of the IFTs, although different options could be developed on the basis of scientific justification (Ring, 2008b; Köllner et al., 2002). Understanding the stakeholders’ perspectives is therefore important, particularly because the decision making process related to REDD+ needs to involve a multiplicity of actors, who may have different values and little consensus about the problem definition and solutions.

IFTs should be designed to ensure efficient service delivery and need to be modelled according to country-specific conditions (Bird and Smart 2002; Bird 1999). Based on the perspectives of government stakeholders, this chapter explores the purposes of IFTs for REDD+, with the focus on the role and responsibilities of local governments. Moreover, three aspects of the design are explored: (i) the distribution formula (the basis for distributing transfers), (ii) conditionality of IFTs, and (iii) the accountability mechanism of IFTs to distribute REDD+ revenues (Bird and Smart 2002; Bird 1999). Conditionality of IFTs, which regulates how the transfers are being used at the local level, also determines the accountability mechanisms of the IFTs. Research on IFTs for biodiversity conservation has mostly focused on the distribution formula, while conditionality of IFTs has thus far received inadequate attention (Grieg-Gran, 2000b; May et al., 2002; Köllner et al., 2002; Ring, 2002; Ring, 2008c; Ring, 2008b; Kumar and Managi, 2009). Although the distribution formula is important, attention needs to be paid to the conditions in which it operates to ensure that IFTs achieve their policy
objectives (Bird 1999). The debate on the conditionality of IFTs in biodiversity remains contentious (Ring, 2008c). Whilst it is important to ensure that local governments spend the transfer on conservation related activities, financial autonomy for local governments to allocate the funds where they are most needed is equally important. Hence, this chapter aims to contribute to the literature by examining the design of IFTs comprehensively, including conditionality of IFTs and the corresponding accountability mechanisms.

The distribution of REDD+ revenues involves logistical complexity and high transaction costs (Elbiasch Review, 2008), which are influenced by country-specific administrative and political situations. In Indonesia, several studies have attempted to highlight policy challenges that may constrain the distribution of REDD+ revenues (e.g. van Noordwijk et al., 2008; Ministry of Finance, 2009; Ministry of Forestry, 2008d). For instance, low capacity in financial management and weak governance at all government levels have been found to hinder the successful implementation of IFTs in the forestry sector (Barr et al., 2009; Subarudi and Dwiprabowo, 2007). For this reason, the perspectives of government officials on the preferred design of IFTs for REDD+ revenue distribution should also be analysed considering the technical capacity of local governments in managing public resources transferred to the local level.

The Ministry of Finance Green Paper proposed a mechanism called a Regional Incentive Mechanism (RIM) for climate change. Using the intergovernmental fiscal transfer system, the mechanism aims to provide incentive for regional governments to pursue climate mitigation actions. The Green Paper suggested that a payment would be made to district governments based on the achievement of milestones and outcomes in activities to reduce emissions, where the participation in RIM programs would be entirely voluntary (Ministry Finance, 2009). However, the paper has not provided details of the design of RIM. This chapter contributes therefore to the development of the design of RIM.

The chapter first discusses various IFTs implemented in Indonesia to provide a background of the existing fiscal decentralisation. The suitability of the existing IFTs to distribute REDD+ revenues in Indonesia is then presented. This discussion is followed by presentation of the stakeholders’ perspectives on the design of IFTs and the analysis
of the technical capacity of local governments in managing IFTs. The chapter concludes with a discussion of the implications of the findings to the development of REDD+ payment mechanisms. The discussion of the findings is then enriched by the lessons learned from the implementation of the Reforestation Fund in Indonesia.

6.1 IFTs under fiscal decentralisation in Indonesia

Fiscal Balancing Law 33/2004 provides local governments with the authority to generate their own revenues. Following decentralisation, local governments quickly exercised this authority mostly by enacting local taxes and fees (Table 6.1). District own-source revenues remain low, whilst, the provincial level has a wider tax basis which allows it to have greater fiscal autonomy. Taxes collected at the provincial level include: taxes on vehicles, fuels, and ground water, while taxes that can be collected at the district level include: advertising, hotels, restaurants, and sand mining. To enable district governments to perform their administrative functions, the Fiscal Balancing Law has also introduced several IFTs to balance the revenues and expenditures assigned at the local level. The IFTs account for a major portion of the regions’ revenues (Ministry of Finance, 2008a). The three IFTs currently implemented in Indonesia are: an unconditional grant (Dana Alokasi Umum - DAU), conditional grants (Dana Alokasi Khusus - DAK), and shared revenues from taxes and natural resources (Dana Bagi Hasil - DBH). The importance of each revenue source varies widely (Table 6.1).

<table>
<thead>
<tr>
<th>Table 6.1 Subnational governments’ public revenue sources in 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Province</strong></td>
</tr>
<tr>
<td>Own-source Revenues</td>
</tr>
<tr>
<td>Unconditional Grant</td>
</tr>
<tr>
<td>Shared Revenues from Taxes and Natural Resources</td>
</tr>
<tr>
<td>Conditional Grants</td>
</tr>
<tr>
<td>Other Revenues</td>
</tr>
<tr>
<td>Total Revenues</td>
</tr>
</tbody>
</table>

*Source: Ministry of Finance (2008b).*

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The objective of the unconditional grant (UG) is to address the imbalance between local expenditures and revenues. The funds (grant size) for UG are drawn from net national revenues, on the basis of a fixed share (currently 26 per cent). Districts receive 90 per cent of the allocated funds, while the remaining 10 per cent is distributed across provinces. The distribution formula for the UG is intended to cover civil servant wages of sub-national governments (basic allocation) including the base salaries, family assistance and other allowances, with the remaining portion distributed, using the following formula (The World Bank, 2007; Kaiser et al., 2006; Fadliya and McLeod, 2010):

\[ UG = BA + (FN - FC) \]

Where:
- BA = base allocation (personnel spending)
- FN = fiscal needs
- FC = fiscal capacity

The remaining amount (FN-FC) is referred to as the fiscal gap. Fiscal capacity (FC) is defined as the sum of a local government’ own source revenues and its entitlement to revenue sharing from taxes and natural resources. Fiscal need (FN) is calculated on the basis of the average level of spending of all local governments, which are then weighted through five indices: population, area, cost index, the level of ‘human development’, and the level of per capita Gross Regional Domestic Product (GRDP). Spending is defined as the sum of spending on personnel, goods and services, and capital goods (Fadliya and McLeod, 2010). The definition of fiscal capacity in the UG formula is different to the one discussed in Chapter 4, which refers to the Ministry of Finance Decree 224/2008. According to that Decree, fiscal capacity is calculated based on the local revenues generated to finance governmental functions, after being subtracted by routine expenditures and divided by the total poor population within a jurisdiction. This thesis refers to the latter definition provided by the Ministerial Decree whenever the terminology of fiscal capacity is used hereafter, unless otherwise specified.

Shared revenues (SR) aim to distribute taxes and natural resources (fees and royalties) from the national government to the producing local governments. Taxes that are returned to the producing regions using the revenue sharing mechanism include: personal income taxes, land and building taxes, and the transfer fees from land and
buildings. The shared revenues from oil and gas, mining, fisheries, forestry and geothermal energy are known as revenue sharing from natural resources. The Fiscal Balancing Law also updated the percentage of shared-revenues from taxes and natural resources distributed between governmental levels (Table 6.2). Shared revenues from taxes and natural resources are the second largest transfers to the subnational levels. Since decentralisation in 2001, the distribution of the revenues from natural resources was mostly concentrated in a few oil-producing regions (The World Bank, 2007).

Table 6.2 Percentage allocations for shared-revenue from taxes and natural resources

<table>
<thead>
<tr>
<th>Revenue Source</th>
<th>Central</th>
<th>Provincial</th>
<th>Producing districts</th>
<th>Other districts in the same province</th>
<th>All districts in Indonesia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining - Land-rent</td>
<td>20</td>
<td>16</td>
<td>64</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mining – Royalty</td>
<td>20</td>
<td>16</td>
<td>32</td>
<td>32</td>
<td>0</td>
</tr>
<tr>
<td>Land &amp; Building Tax</td>
<td>9</td>
<td>16.2</td>
<td>64.8</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Land/Building Transfer Fee</td>
<td>0</td>
<td>16</td>
<td>64</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Personal Income Tax</td>
<td>80</td>
<td>8</td>
<td>12</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Forest License Fee</td>
<td>20</td>
<td>16</td>
<td>64</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Forest Resource Rent</td>
<td>20</td>
<td>16</td>
<td>32</td>
<td>32</td>
<td>0</td>
</tr>
<tr>
<td>Reforestation levy</td>
<td>60</td>
<td>0</td>
<td>40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Oil</td>
<td>84.5</td>
<td>3.1</td>
<td>6.2</td>
<td>6.2</td>
<td>0</td>
</tr>
<tr>
<td>Gas</td>
<td>69.5</td>
<td>6.1</td>
<td>12.2</td>
<td>12.2</td>
<td>0</td>
</tr>
<tr>
<td>Geothermal - central share deposit</td>
<td>20</td>
<td>16</td>
<td>32</td>
<td>32</td>
<td>0</td>
</tr>
<tr>
<td>Geothermal - Land rent and production</td>
<td>20</td>
<td>16</td>
<td>32</td>
<td>32</td>
<td>0</td>
</tr>
</tbody>
</table>


In the forestry sector, the distribution of the reforestation levy to the district level, known as the reforestation fund, is used to finance forest rehabilitation. The levy is collected from logging extraction in natural forests, where as much as 40 per cent of the total levy collected is distributed to the producing districts, while the remaining 60 per cent is retained by the Ministry of Forestry at the national level. The latter portion is used to finance GERHAN.\(^{27}\) Prior to 2004, the reforestation fund distributed to the district governments was treated as a conditional grant. Currently, the fund is transferred together with other components of the shared-revenues from the forestry

\(^{27}\) GERHAN is Gerakan Nasional Rehabilitasi Hutan dan Lahan or the national movement for land and forest rehabilitation. The Ministry of Forestry implements GERHAN through local bureaus of watershed control and forest resources conservation in collaboration with the provincial and district forestry services (Barr et al., 2009).
sector, including the forest license fee and the forest resource rent (Subarudi and Dwipraborowo, 2007). While the funds from the license fee and forest resources rent are unconditional in nature, the reforestation fund distributed to the local level is specifically earmarked for forest rehabilitation with stringent guidelines issued by the national government. Discussion on the guidelines related to the reforestation fund is presented in Section 6.4.

The contribution of conditional grants (CGs) to local governments’ revenues is modest compared to other transfers (Table 6.1). According to Law 33/2004, the CGs aim to finance activities that are determined by the central government, based on national priorities to be implemented at the local level. Several sectors are financed by the CGs, including education, health, fisheries, agriculture, environment, and infrastructure (including roads, irrigation and water supply). The Law 33/2004 regulates the allocation of CG on the basis of three criteria:

- General criterion, which gives priority to districts with fiscal capacity lower than the national average. The definition of fiscal capacity in the general criteria of CGs is similar to the distribution formula of the UG.

- Specific criterion, which considers specific regional characteristics to choose the eligible regions, including: all districts in Papua province and poor regions, coastal areas, international bordering regions, regions that are vulnerable to disasters, and regions with food insecurity.

- Technical criterion, which integrates technical considerations developed by a sectoral ministry. For instance, the technical criterion for environment related funding is the combination of the length of rivers, the level of river pollution, total land area, and population. The CG for Environment should be spent on activities related to water quality monitoring, water pollution prevention, water resources protection and the development of environmental quality information.

The allocation of CG funds involves two stages: i) determining regions that are eligible to receive the funds, using the criteria previously mentioned; and ii) calculating the amount of the funds allocated to each district (Ministry of Finance, 2009b). The distribution formula CGs varies significantly between sectors as the formula is decided by the national government together with the parliament every year, based on proposals put forward by the technical ministries.
After detailing the design of the three IFTs that are currently implemented in Indonesia, the next section discusses their suitability for distributing REDD+ revenues.

6.2 Suitability of existing IFTs for the distribution of REDD+ revenues

The analysis of the suitability of IFTs to distribute REDD+ revenues focuses on the purpose of the transfer, the source of funds and the distribution formula, as well as the eligibility of regions to receive the transfers. The distribution of REDD+ revenues is best carried out within an existing regulatory framework, since implementation using the existing framework could reduce transaction costs that might accrue from setting up a new system (Vatn and Angelsen, 2009). Moreover, it is important to ensure that IFTs for the distribution of REDD+ revenues would not distort existing IFTs, while at the same time achieving the intended purpose of REDD+.

The UG is inappropriate for REDD+ revenues distribution as it aims to finance routine spending at the local level and to address the imbalance between expenditures and revenues generated locally (Figure 6.1). As noted earlier, the source of the UG is the national government’s net income and a major portion of the transfer finances the civil servant wage bill at the local level. If the distribution of REDD+ revenues were to be transferred to local governments using the UG, it would require integrating REDD+ considerations into the distribution formula of the UG. Integrating REDD+ considerations into the transfer could therefore distort the original purpose of the UG transfer and the transfer cannot be directly linked to policies or activities of reducing deforestation at the local level. Another drawback of using the UG to transfer REDD+ revenues is that the source of the UG is not directly linked to revenues generated by a specific sector, nor the allocation of UG is intended to finance a specific public service at the local level. A change in the regulation would be required since the existing distribution formula does not allow the insertion of technical indicators linked to a particular sector or public service.

The existing shared-revenue (SR) mechanism could be appropriate for the distribution of REDD+ revenues if REDD+ carbon credits are considered similar to revenues generated from other forest commodities. As discussed earlier, an SR mechanism is
usually utilised to distribute taxes and revenues from natural resources extraction collected by the national government to the producing regions. Although an SR could be considered as an unconditional transfer because the funds can be spent at the local level without restrictions, the distribution formula for an SR is based on the total taxes and fees collected from goods or services produced by a particular sector at the local level. The existing formula for an SR thus allows the insertion of REDD+ considerations. In the implementation of REDD+, a local government could be considered to be eligible on the basis of its participation in a REDD+ scheme and on the achievement of emission reductions from the forestry sector in the locality.

The CG has the potential to be used to distribute REDD+ revenues. As previously mentioned, CGs finance national priorities and commitment at the local level. If local governments need to perform activities or forest related services to support the implementation of REDD+, the national government needs to transfer the necessary financial resources. As previously discussed, without providing sufficient resources, local governments would have no incentive to provide forest related services due to the issues of spatial externalities. The goals of CGs include the achievement of minimum service standards and the correction of spatial spillovers (Usman et al., 2008). The existing design of a CG also allows the insertion of REDD+ considerations into the technical criterion. For instance, the technical criterion for the existing CG for forest rehabilitation is the degraded forests/lands and degraded mangroves. In the case of the distribution of REDD+ revenues, the technical criteria for the CG could be the costs of providing REDD+ related services at the local level. Finally, the eligible regions are determined taking into consideration both general and specific characteristics, including fiscal capacity and regional characteristics (Figure 6.1).
6.3 Government officials’ perspectives of the design of IFTs for the distribution of REDD+ revenues

After the assessment of the suitability of the existing regulatory framework for the distribution of REDD+ revenues, this section discusses the perspectives of government officials about the different options for IFTs. In providing their responses, the government officials interviewed first considered a possible financing mechanism to be agreed on in the international negotiations. According to the existing negotiations on REDD+, the financial flow could either be channelled through a carbon market or a global fund (See Chapter 3). Moreover, the officials took into account the possible roles and responsibilities of different government levels and the capacity of local governments in the implementation of REDD+. The perspectives of government officials are presented first before the capacity of local governments in financial management is discussed in the next section.

6.3.1. The implementation design of REDD+ at the national down to the local level

Five national and local officials thought that if REDD+ was going to be implemented through a global fund, the national government should be entirely responsible for the implementation of the scheme. Under this model, reducing deforestation and forest degradation is perceived as part of the national commitment to an international
agreement. In return, the national government would receive financial benefits to support its efforts to implement REDD+. The financial flow could then be managed under a grant or a loan mechanism.

Revenues from REDD+ compensate our commitment to forest conservation. The developed countries would provide the support in the form of grants or loans. If this were the case, then the mechanism of international grants and/or loans regulated by the law would need to be implemented. (Finance Ministry Interviewee #1, 2009)

Five other national and local respondents believed that a market would be created to trade carbon credits generated from REDD+. Under this mechanism, the national implementation of REDD+ could be performed either by a public or private entity. One official from the Ministry of Finance believed that if forests were under active concessions, then it would be the responsibility of the private sector to implement REDD+. However, it would be the responsibility of the government to implement REDD+ in state forests, without active concessions. In contrast, an official from the Ministry of National Development Planning thought that the state should not be involved in business or profit-making activities because it does not have a comparative advantage.

The government is not supposed to be involved in carbon trading. The government can obtain benefits from taxes. But to ensure efficiency, the national government should not be involved in trading activities. If they want to be involved, then they can form state-owned companies at the national and local levels. (National Development Planning Ministry Interviewee, 2009)

At the district level, all respondents from the forestry agencies suggested that the implementation of REDD+ could be ‘outsourced’ to a third party, including private, non-government organisations or local communities:

Local governments need not to implement REDD+. Local governments should only conduct facilitation and programming. The implementation can be outsourced to a third party. (Siak Forestry Agency Interviewee, 2009)

The rationale behind their preferences is: i) local governments should play the role of a regulator that issues the necessary guidelines and monitors implementation (Siak Forestry Agency Interviewee, 2009); ii) local governments have no (or low) capacity to
implement REDD+ (Siak Forestry Agency Interviewee, 2009; Pelalawan Forestry Agency Interviewee, 2010); and iii) local communities can obtain direct benefits from the implementation of REDD+ (Sarmi Forestry Agency Interviewee, 2009; Jayapura Forestry Agency Interviewee, 2010).

6.3.2. Government’s roles and responsibilities in the implementation of REDD+
Government officials interviewed at all levels generally thought that more authority is required for local governments in forest management, particularly in the implementation of REDD+. Although the Ministry of Forestry retains control over most forest zones, a national government official pointed out that the national government should only provide guidance and standards, as well as approve and assess REDD+ proposals put forward by local governments. The latter should be allowed to decide on how to reduce emissions at the local level:

As much as possible, we (center) should dictate less, we should just provide guidance since the national government has its own responsibilities, such as proving that we can reduce emissions nationally and deserve to receive compensation. At the subnational level, local governments could pursue whatever they consider important to achieve emission reduction. For instance, if poverty is the cause of deforestation, they should be allowed to pursue poverty alleviation. Of course, there will be criteria or guidance, however, the guidance should not be too strict, otherwise, the same problems currently constraining forest management in Indonesia will happen again. (Forestry Ministry Interviewee #2, 2009)

At the local level, government officials also consistently argued for to have greater authority over forest management and in REDD+ implementation. They argued that local governments have the role of ensuring that local people can pursue their livelihoods and increase their welfare. Hence, local governments need to have power to decide on their participation in a REDD+ scheme on behalf of the local people. Moreover, local officials thought that they needed to have greater authority to allow them to be creative and innovative in developing REDD+ measures.

We welcome REDD+, however, we also have the responsibility to improve people livelihoods. We can take care of the environment when there is no
problem with people’s livelihoods. Hence, we need to be allowed to address the needs of the people while pursuing REDD+. (Siak Forest Agency Interviewee, 2009)

The implementation of REDD+ is best managed at the provincial level. Because the provincial government knows best which regions have more potential and forest cover. The national government usually doesn’t understand the situation and constraints that we are facing at the local level. (Sarmi Forest Agency Interviewee, 2010)

Irrespective of the mechanism agreed at the international-national level, all government officials agreed that local governments should perform a number of responsibilities to ensure the successful implementation of REDD+. These responsibilities are mainly related to ensuring local people gain the most benefits out of REDD+ activities and monitoring and evaluation of REDD+ implementation. Consistently, all respondents emphasised that local governments should ensure the needs of local people are taken into account at all implementation stages of REDD+. Specific roles and activities that local governments should play in the implementation of REDD+ include:

1. Ensuring local community welfare i.e. alternative livelihoods, village infrastructure and community development. (Riau Provincial Forestry Agency Interviewee #3, 2009)

2. Developing community forestry programmes, strengthening governance at the community level and rehabilitating critical lands. (Papua Provincial Forestry Agency Interviewee, 2010)

3. Monitoring and evaluation of REDD+ implementation. (Pelalawan Forestry Agency Interviewee, 2010)

4. Facilitating, programming, monitoring, providing guidelines and building community forestry assisted by a third party. (Siak Forestry Agency Interviewee, 2009)

5. The roles of the provincial government are: i) providing direction, being a coordinator; and ii) ensuring harmonisation of relationships between the national and local governments. The province can work together with the producing districts and ensure that activities meet buyers’ expectations (Riau Provincial Forestry Agency Interviewees, 2009).
6.3.3. The preferred design of an IFT mechanism

Following the questions on REDD+ activities to be performed by local governments, the respondents were encouraged to discuss their preferences related to the IFT mechanism to distribute REDD+ revenues to the local level. During the interviews, not all respondents were comfortable providing their views on this question. Some, who perceived the question as too technical, refused to answer. Some respondents also provided more than one preferred mechanism.

Nine out of 36 respondents thought that a revenue sharing mechanism would be preferable to distribute REDD+ revenues to provincial and district governments (Table 6.3). Their rationale was that a revenue sharing mechanism entails clearer guidelines on the collection and distribution of the funds compared to other mechanisms:

The government can obtain benefits from taxes. Once the taxes are collected, they should be immediately distributed to local governments. For instance, 50 per cent from the tax collected is distributed directly to local governments. The remaining 50 per cent, for example, can be used for surrounding communities. (National Development Planning Ministry Interviewee, 2009)

As soon as the payment is received from the buyer, local governments’ portion can be directly distributed, similar to PBB (the land and building tax). As soon as a company pays the tax to the bank, local governments’ portion would be distributed directly every Wednesday. (Papua Provincial Finance Agency Interviewee, 2010)

The existing revenue sharing mechanism usually transfers funds to local governments unconditionally. Respondents, who preferred the revenue sharing mechanism, had however different perspectives on the conditionality of the transfer, which is discussed in the next section.
### Table 6.3 Preferred IFT mechanism for REDD+ revenue distribution

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Supporting Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue-sharing</td>
<td>1. Papua Provincial Finance Agency</td>
</tr>
<tr>
<td>(unconditional</td>
<td>2. Riau Provincial Finance Agency</td>
</tr>
<tr>
<td>transfer)</td>
<td>3. Papua Provincial Forestry Agency</td>
</tr>
<tr>
<td></td>
<td>4. Siak Forestry Agency</td>
</tr>
<tr>
<td></td>
<td>5. Sarmi Forestry Agency (#2)</td>
</tr>
<tr>
<td></td>
<td>6. The Ministry of National Development Planning</td>
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<tr>
<td></td>
<td>7. The Ministry of Forestry (#1)</td>
</tr>
<tr>
<td></td>
<td>8. The Ministry of Finance (#2)</td>
</tr>
<tr>
<td></td>
<td>9. Jayapura Development Planning Agency</td>
</tr>
<tr>
<td>Conditional grant</td>
<td>1. Jayapura Finance Agency</td>
</tr>
<tr>
<td></td>
<td>2. Pelalawan Finance Agency</td>
</tr>
<tr>
<td></td>
<td>3. The Ministry of Finance (#1)</td>
</tr>
<tr>
<td></td>
<td>4. The Ministry of Finance (#3)</td>
</tr>
<tr>
<td>Other mechanism</td>
<td>1. The Ministry of Forestry (#2) – trust fund/grant</td>
</tr>
<tr>
<td></td>
<td>2. The Ministry of Finance (#1) – trust fund/grant</td>
</tr>
<tr>
<td></td>
<td>3. Riau Provincial Forestry Agency (#2) – Deconcentration fund</td>
</tr>
<tr>
<td></td>
<td>4. Jayapura Forestry Agency – GERHAN</td>
</tr>
<tr>
<td></td>
<td>5. Sarmi Forestry Agency (#1) – funds managed by the provincial government</td>
</tr>
<tr>
<td></td>
<td>6. Pelalawan Provincial Forestry Agency – funds managed by local state-owned company</td>
</tr>
<tr>
<td></td>
<td>7. Riau Provincial Forestry Agency (#3) – channelled directly to local communities</td>
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</tbody>
</table>

Four respondents favoured a conditional grant to distribute REDD+ revenues to local governments. These respondents were mostly from finance agencies at the national and district levels, whilst finance officials at the provincial level preferred revenue sharing to a conditional grant. The finance agencies at the national and district levels are usually responsible for the timely disbursement of funds, thus, are more concerned with the management (budgeting and accounting) of the fund and less with the technical performance of service delivery. The preference for the adoption of a conditional grant is due to its ease in administration and clear instructions on how the funds should be spent:

Currently the best transfer mechanism is a conditional grant in terms of the spending of the fund. There is also a sanction when problems are found with spending, where the next transfer can be suspended. (Jayapura Finance Agency Interviewee, 2010)
The distribution mechanism can use a conditional grant because it is simpler compared to other transfers such as deconcentration funds.\(^{28}\) In the case of revenue sharing, there are certain formulas, while a conditional grant only requires criteria so it is easier to be managed and understood. (Finance Ministry Interviewee #1, 2009)

Six other mechanisms were also suggested to distribute REDD+ revenues to the local level (Table 6.3). These were: trust fund/grants, deconcentration fund, GERHAN, funds managed by provincial governments or funds administered by a local government enterprise, and funds directly channelled to local communities. While the first three mechanisms currently exist in the country and are regulated by law, the latter three mechanisms do not exist and the respondents did not provide detailed descriptions of their suggested mechanisms. Hence, discussions below focus on the three mechanisms: grants/trust funds, a deconcentration fund and GERHAN.

Grants from a foreign source could be distributed from the national to local budgets. According to Government Regulation 02/2006, foreign grants can be transferred to local governments to: i) implement local administrative functions, basic service provision and capacity building of the local bureaucracy; and/or ii) conserve natural resources, the environment, and culture; and/or iii) support research and technology; and/or and iv) provide humanitarian assistance. The use of grants needs to be accounted for in the local budgeting document and activities should be reported in the budget implementation document. Project activities financed by foreign grants are agreed in the grant documents. Currently, funds provided by international donors for climate change related activities in Indonesia are pooled into a trust fund mechanism managed by the Ministry of National Development Planning, known as the Indonesia Climate Change Trust Fund (ICCTF). The ICCTF is an example of a nationally based fund that is currently implemented under the foreign grant modality. Under this mechanism, sectoral ministries and local governments can obtain funds after proposing activities that are eligible for financing by the ICCTF to the Ministry of National Development Planning.\(^ {29}\) Once a project is approved, a project management unit (PMU), within sectoral ministries or local governments, will then implement the project, including

\(^{28}\)A deconcentration fund is usually distributed to finance deconcentrated functions, delegated by the national government to the provincial government.

developing an execution plan and delivering project activities. The implementation activities can also be sub-contracted to a third party. The flow of foreign grants is usually outside the state treasury. Moreover, foreign grants can be channelled to a Public Service Unit (PSU). A PSU aims to improve service delivery to the public by applying the principles of efficiency and productivity. According to Government Regulation 23/2005, the work plan and budget of a PSU are to be proposed and implemented as part of the sectoral ministries or local governments working plan, thus, the Ministers or District Heads/Governors take full responsibility for a PSU’s management. The unit is linked to the state treasury, thus, it can receive funds transferred from the state budget.

Deconcentration funding is usually distributed to support functions deconcentrated to provincial governments (as the representative of the national government at the local level) or to district governments. The functions are strictly determined by the national government and this funding provides no flexibility for local governments. Activities funded are usually the national government’s functions that are carried out by local government.

The role of provincial governments in the implementation of REDD+ would be to ensure coordination, control and stimulate districts to manage forest properly.

We could therefore use deconcentration funds, however the funds should reach the district level. (Riau Forest Agency Interviewee #2, 2009)

GERHAN is an example of a deconcentration programme that is implemented by the Ministry of Forestry. Local governments are responsible as an implementer of GERHAN at the local level to perform activities such as: determining sites within their areas to be rehabilitated, making seeds and seedlings available, providing technical information, and conducting evaluation and monitoring. These activities are financed directly by the national budget, hence, there is no direct transfer to the local budget.

### 6.3.4. Conditionality of IFTs

Only two respondents thought that REDD+ funds should not be earmarked. Two different rationales were provided. First, earmarking would constrain local governments in pursuing local priorities. Second, earmarking could cause a mismatch between revenues and expenditures in the forestry sector at the local level. The expenditures of
the forestry agency are often higher than the revenues generated from the forestry sector (Jayapura Finance Agency Interviewee, 2010). The district government of Jayapura, for example, often has to subsidise public service provision in the forestry sector because of the imbalance between revenues and expenditures.

The remaining respondents thought that earmarking is preferable, although there were different perspectives about whether funds should be earmarked to a specific sector or to finance particular activities. REDD+ funds could be allocated to a specific sector, for instance the forestry sector, however, local governments should have the autonomy to propose and decide activities. This arrangement could prevent the national government from issuing too stringent guidelines that cannot be implemented at the local level.

Funds could be allocated to the forestry sector, but we shouldn’t be told that we have to build this or that or finance this or that, this approach simply cannot be implemented. (Jayapura Planning Agency Interviewee, 2010)

This type of conditionality currently does not exist in Indonesia as conditional grants are usually earmarked to finance specific activities. Local agencies cannot use funds for activities other than those prescribed by the national government. When local officials want to use funds for other activities that are considered necessary for their regions, they need to propose to the national government a revision or alteration of the items to be financed. However this process is usually long and cumbersome.

There is no particular difference in the responses provided by the national and local officials in relation to conditionality of IFT’s (Table 6.4). Rather, perceptions varied across institutions. The finance agency would prefer strict conditionality. Earmarking funds for particular activities are considered taking into consideration the existing capacity of local governments.

A conditional grant is easier to be implemented and the disbursement is not complicated as we only implement activities instructed by the national government. The purpose of the funds is clear. Currently we are terrified about funding that carries some flexibility because we are afraid of making mistakes. This also relates to regions’ low capacity in financial management. (Pelalawan Finance Agency Interviewee, 2010)
On the other hand, the technical ministry, in this context the forestry agency, would prefer funding to be assigned to a particular sector, but local agencies should have flexibility to decide activities implemented at the local level. Earmarking to a specific sector is considered preferable, as it would allow local governments to decide activities that are most needed in their localities. Two local forestry officials thought GERHAN and the deconcentration fund could also be used to finance REDD+ related activities at the local level. These two mechanisms are strictly conditional in nature, and funds are not transferred to the local budget. Their preferences are because the deconcentration fund (including GERHAN) could still be used at the local level, whilst the reforestation fund currently cannot be spent in their regions (See Section 6.4).

Table 6.4 Preferences about the conditionality of IFTs

<table>
<thead>
<tr>
<th>Conditionality</th>
<th>Supporting Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bloc grant to specific sector but no specific condition</td>
<td>1. Jayapura Local Planning Bureau</td>
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<tr>
<td></td>
<td>2. Papua Provincial Forestry Agency</td>
</tr>
<tr>
<td></td>
<td>3. Pelalawan Forestry Agency</td>
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<tr>
<td></td>
<td>4. Sarmi Forestry Agency</td>
</tr>
<tr>
<td></td>
<td>5. Siak Forestry Agency</td>
</tr>
<tr>
<td></td>
<td>6. The Ministry of Forestry (#2)</td>
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<tr>
<td></td>
<td>7. The Ministry of National Development Planning</td>
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</tbody>
</table>

| Specific purpose grant or lump sum specific grant (assigned to a specific sector with specified activities to be financed) | 1. The Ministry of Finance (#1)                        |
|                                                                                                           | 2. The Ministry of Finance (#3)                        |
|                                                                                                           | 3. Pelalawan Finance Agency                            |
|                                                                                                           | 4. Jayapura Finance Agency                             |
|                                                                                                           | 5. Jayapura Forestry Agency (GERHAN)                   |
|                                                                                                           | 6. Riau Provincial Finance Agency – channelled to local community |
|                                                                                                           | 7. Riau Provincial Forestry Agency (#3)– channelled to local community |
|                                                                                                           | 8. Riau Provincial Forestry Agency (#2) (Deconcentration fund) |

| No condition or earmarking (not assigned to specific sector or activity) | 1. The Ministry of Finance (#2)                        |
|                                                                        | 2. Papua Provincial Finance Agency                     |

6.3.5. Accountability of IFTs

Respondents were also requested to provide their perspectives on the accountability of IFTs for the distribution of REDD+ revenues. The responses provided can be categorised into: i) upward accountability, where local governments as the recipients should be accountable to the national government and to REDD+ buyers and; ii) an internal financial control mechanism, which is conducted by relevant public institutions at the local level, including oversight by the local inspectorate body and the finance agency.
The measures suggested for an upward accountability mechanism were: performance monitoring conducted by technical ministries and oversight function performed by the finance agencies. In order to ensure a robust accountability system, it is important first to ensure clarity of powers, roles and responsibilities distributed amongst government levels (Riau Forest Agency Interviewee #2, 2009). Then, a regular and structured performance reporting system implemented by the technical ministry is required. The disbursement of REDD+ funds needs to be linked to the national carbon accounting system. The Ministry of Forestry would have to provide information on emissions reductions achieved by each locality before the Ministry of Finance transferred the funds (Finance Ministry Interviewee #3, 2009). Finally, the finance agency would need to be involved in the monitoring and evaluation of the fund management. Under the existing arrangements for conditional transfers, local governments are required to submit quarterly reports to the Ministry of Finance. When there is an issue concerning financial management, including delays in the disbursement, the subsequent transfer can be suspended by the national government.

Local officials in Jayapura District also provided an example of an internal financial control mechanism in public financial management implemented in the district. The process involves a number of institutions:

Every month, we [Local Inspectorate, Local Development Planning Bureau, Finance Agency] meet and review how much money has been received by each sector and how much has been disbursed. We then report the findings to the District Head. The Local Development Planning Bureau is more concerned on the achievement of the activities financed. When there is any problem, the inspectorate will investigate. In the next meeting, we will ask for improvement. If after an agreed period of time, the improvement has not materialised, it will be considered as an infringement. At the end of the year, we will meet again to monitor the overall disbursement rate. (Jayapura Planning Bureau, 2010)

6.3.6. Distribution formula for IFTs

This section discusses respondents' views about the distribution formula for IFTs for REDD+. A quantitative analysis of the distribution formula for the case study provinces
is provided in Chapter 8. The distribution formula was seen as a very technical issue by some respondents and only a few of them were willing to address this topic (Table 6.5).

Respondents thought that REDD+ revenues should be distributed to compensate at least the revenues from alternative land-use activities, such as agriculture, that would be forgone by subnational governments. Two officials from the Ministry of Forestry argued that it is also important to consider the downstream economic activities of forest exploitation and land-use change in the estimation of the opportunity costs of REDD+:

It is important to know not only the opportunity costs but also the forward linkages to employment, the supply of raw materials… for example oil palm has impacts on energy, cosmetics and fertiliser production. (Forestry Ministry Interviewee #2, 2009)

We need to cover the whole economic chain. For instance, if timber is not harvested, there is no raw material for pulp and paper. If we only estimate the timber, it is not fair. (Forestry Ministry Interviewee #1, 2009)

Two local officials thought that local governments’ share of REDD+ revenues should be higher than the amount they currently receive from alternative land-use activities. For instance, a forest official from Papua Province argued that the provincial level should also obtain a share of the revenues from the reforestation fund, which is currently only distributed between the national and district governments. Moreover, a local official in Siak District thought that districts should obtain a higher portion of the reforestation fund since many activities related to forest management should be implemented at the local level. In addition, respondents argued for a specific share of REDD+ revenues to be allocated to local people and communities residing around and in the forests. Under the existing revenue distribution arrangements in the forestry sector, there is no specific allocation for local communities from productive land-use activities.

A national official from the Ministry of Finance also suggested that the distribution of revenues could be based on the services performed by local governments to support REDD+. The distribution formula could be based on REDD+ related activities to be
implemented at the local level, rather than on the amount of emission reductions achieved by the localities.

### Table 6.5 Preferred distribution formula of IFTs for REDD+

<table>
<thead>
<tr>
<th>Formula</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current (existing) arrangement</strong></td>
<td>1. Riau Provincial Forest Agency (#2)</td>
</tr>
<tr>
<td></td>
<td>2. Sarmi Forest Agency</td>
</tr>
<tr>
<td></td>
<td>3. The Ministry of Finance (#2) (according to Law Regional Financing)</td>
</tr>
<tr>
<td></td>
<td>4. The Ministry of Development Planning</td>
</tr>
<tr>
<td></td>
<td>5. The Ministry of Forestry (#1) – include downstream economic impact into the calculation of the opportunity costs</td>
</tr>
<tr>
<td></td>
<td>6. The Ministry of Forestry (#2) – include downstream economic impact into the calculation of the opportunity costs</td>
</tr>
<tr>
<td><strong>Need to include local people</strong></td>
<td>1. Papua Provincial Forest Agency</td>
</tr>
<tr>
<td></td>
<td>2. Jayapura Forest Agency</td>
</tr>
<tr>
<td></td>
<td>3. Riau Provincial Forest Agency (#3)</td>
</tr>
<tr>
<td><strong>Higher portion for regions</strong></td>
<td>1. Siak Forest Agency (#2)</td>
</tr>
<tr>
<td></td>
<td>2. Papua Provincial Forest Agency – at least there should be allocation from the reforestation fund to the provincial level</td>
</tr>
</tbody>
</table>

To summarise the views on the design of IFTs, government officials’ preference on conditionality of IFTs for REDD+ vary depending on the mandates of the institutions they work for. For instance, finance agencies prefer a conditional transfer with clear guidance from the national government on how the funds should be spent, whilst technical agencies favour a revenue sharing mechanism that carries more flexibility in terms of spending at the local level. Related to the distribution formula, however, there is a consistent pattern of responses provided by local governments, which argue for a higher portion of the revenues to be allocated to the local level.

The responses provided by interviewees on their preferred mechanisms also consider the existing capacity of local governments in managing public resources transferred to the local level. For instance, due to low capacity in financial management, conditional grants are preferred since they are transferred with clear guidance from the national government so that any mistake in spending within the fund can be prevented. Hence, it is interesting to understand the existing capacity of local governments in financial management to provide a background for the administrative and institutional setting of public financial management in Indonesia. Before analysing the perspectives of government officials on their preferred design of IFTs, the next section discusses the present capacity of IFT implementation particularly in the forestry sector.
6.4 The capacity to manage IFTs at the local level

The capacity of local governments in managing public resources at the local level can be assessed from the management of the reforestation fund distributed to the local level. The current circumstances encountered by local governments and their perspectives on the issues, which impede the use of the reforestation fund, are considered below.

In Riau, representatives of the Forestry agency reported that the reforestation fund had not been spent and was now accumulating in the local account. Approximately 50 trillion rupiah (US$ 5.6 million) and 67 trillion rupiah (US$ 7.5 million) had not been spent in Siak and Pelalawan districts respectively (Siak Forestry Agency Interviewee, 2009; Pelalawan Forestry Agency Interviewee, 2010). The officials of the forestry agencies in Siak and Pelalawan districts mentioned that the low spending of the reforestation fund was due to the fact that the guidelines provided by the national government are not applicable at the local level. According to Ministerial Decree 14/2008, the use of the reforestation fund transferred to the local level are as follows: i) 60 per cent from the fund should be used for rehabilitation within the forest zone, while 40 per cent should be used outside the forest zone; ii) rehabilitation within the forest zone should be conducted within protection forests, managed by district forest agencies, and in production forests currently without active concessions; iii) rehabilitation outside the forest zone should be focused on water catchment, dams, lakes and water flows and river banks. These criteria currently constrain the use of the fund, which leads to under-spending. An official noted that:

The guidelines state that reforestation should be implemented inside and outside forest zones. Reforestation inside forest zones cannot be conducted within areas under active concessions. In reality, almost all forest zones in Pelalawan are currently within logging concessions. As a result, most of the activities can only be conducted outside forest zones, which leads to low spending. (Pelalawan Forestry Agency Interviewee, 2010)

In 2010, a new ministerial decree was issued revising the regulation. Two new features were introduced by the new decree. First, when district governments have difficulties in finding a location within the forest zone, the use of the reforestation fund can be used
according to local conditions. Second, the use of the reforestation fund outside the forest zone can also be allocated for rehabilitating peat land and peat swamp. However, as the interviews were conducted prior to the issuance of the Decree, the impact of this new regulation cannot be assessed.

The Decree on the use of the reforestation fund also stipulates that activities financed by the fund should be conducted by a third party, such as local communities. However, in reality local communities have low capacity to implement rehabilitation activities. ‘The reforestation activities need to be conducted by local communities, however, they are not technically ready to conduct forest rehabilitation’ (Siak Forestry Agency Interviewee, 2009). Hence, building the capacity of local people is necessary before they can become actively involved in the rehabilitation activities. Furthermore, the national government stipulates standard prices, for instance, for seedlings and wages for every rehabilitation activity pursued at the local level. In reality, the standard prices do not reflect the local situations. Local governments faced problems in using the fund as the standard prices are often too low and local communities refused to participate in the rehabilitation activities.

In Papua too, officials from the Forestry Agency reported that the reforestation fund had not been used for rehabilitation activities, although for reasons that are different from those reported in Riau. As previously mentioned, the distribution of the reforestation levy is now labelled as a “shared revenue”. This label misled local governments in Papua to consider the reforestation fund similar to other shared-revenues in the forestry sector, such as the forest license fee and the forest resource rent. Shared-revenues are generally unconditional in nature and can be used for any activity or local priority approved by local parliaments during the budgeting process.

In both Jayapura and Sarmi districts, local governments perceive that use of the reforestation fund is unconditional. Hence, the use of the fund is decided by the local parliaments each year. If the forestry agency intends to use the fund for rehabilitation, the head of the forestry agency should propose and negotiate this during the budgeting process with the district head and local parliament. A local forest official in Jayapura District suspected that the fund cannot be used because the head of the forestry agency is often reluctant to negotiate the use of the fund for forest rehabilitation with the head
of the district as it could potentially create tensions with his superior. Forest officials in Sarmi District revealed a similar situation. When the finance agency in Jayapura District was asked about this issue, the following explanation was provided:

The revenue sharing from the forestry sector is transferred in one package including the forest resource rent, the forest license fee and the reforestation fund. We do not know the amount of each fund as only forest officials know about it. As soon as the transfer is received in the local account, we treat them all as one package. We don’t consider the source of transfers anymore and we treat them all as general funds. The spending of general funds should be negotiated in the local budgeting process. So, in the distribution of funds, we no longer consider the source of funds. (Jayapura Finance Agency Interviewee, 2010)

As a result, the reforestation fund transferred to the local level cannot be automatically used for forest rehabilitation in Papua, although the guidelines provided by the national government state that the fund should be spent on forest rehabilitation, with clear criteria from the national government. Local governments have different interpretations of the guidelines provided by the national government, which impede the use of the fund.

The existing situation of IFT implementation, particularly in the forestry sector, emphasises the importance of considering local characteristics and situations in designing IFTs to distribute REDD+ revenues. Since local capacity in public financial management varies between regions, the guidelines related to the fund transferred by the national government need to take into account the voice of local governments as the recipients and the implementers.

6.5 Discussion

The perspectives of government officials on the design of IFTs for REDD+ revenue distribution reveal three main themes. First, the perspectives of government stakeholders on the national design of REDD+ implementation vary depending on financing options agreed to at the REDD+ international negotiations. The national design of REDD+ implementation would further determine the roles and responsibilities that needed to be assumed by different government levels in the implementation of
REDD+. Second, government officials’ perspectives on the three main elements of the design of IFTs for REDD+ revenue distribution also differ according to the purpose of the IFTs. Third, when discussing the preferred mechanisms of IFTs, government officials considered the technical capacity of local governments in managing public resources and IFTs in the forestry sector. The analysis of the perspectives of government officials on the design of IFTs for REDD+ revenue distribution is further divided into three sub-sections according to these three themes.

6.5.1. The national design of REDD+ implementation based on government officials’ perspectives

Government officials’ perspectives on the national design of REDD+ implementation vary depending on the mechanism to be agreed in the international negotiations. If the financial benefits of REDD+ were to be transferred through a global fund, REDD+ is perceived as a scheme created to support the efforts of developing countries to reduce emissions under a climate change convention. Respondents thought that this implementation mode placed more responsibility on the national government to carry out REDD+ at the national level. Financial compensation was considered similar to foreign grants that would be distributed from the global to a national fund. In contrast, if REDD+ was implemented through a market mechanism, the scheme is considered an economic activity, similar to alternative land-use activities to REDD+. This view, consequently, shifts the responsibility from the public sector to private entities because the state, which is believed by government officials interviewed, should be less involved in market activities. The state can obtain revenues from REDD+ from taxes or fees, similarly to other economic activities.

In the case of the global fund model, REDD+ national implementation would need to use the foreign grant modality. According to Government Regulation 02/2006, the foreign grant modality is to be implemented when the country receives funds from bilateral or multilateral donors. Under the foreign grant modality, a project management unit (PMU) administers the funds outside the state treasury, although use of the funds will need to be reported in the state budget document. The use of a foreign grant is strictly earmarked for specific activities predetermined in the grant agreement document. Once the foreign grant agreement is signed, sectoral ministries are then
responsible for administering the project.\textsuperscript{30} Foreign grants can also be channelled to a Public Service Unit (PSU), where the relevant Ministers or District Heads/Governors take full responsibility for a PSU's management.

If REDD+ was implemented under a market mechanism, stakeholders perceived it as a profit making activity, similar to natural resource extraction or international trading. In the case of natural resource extraction, for instance, the state can invite private companies or establish state-owned enterprises to manage the resource and trade the products (Searle, 2007). Under a market mechanism, the state is not usually involved in profit-making activities and dealing directly with international buyers, instead it should create a conducive environment by issuing necessary regulations to encourage the participation of the private sector (Box, 1999; Parsons, 1995; Bradbury and Waechter, 2009). An official from the Ministry of National Development Planning argued that it is not the comparative advantage of government to be involved in profit making activities, if the state decides to become involved in REDD+ implementation, a state-owned enterprise could be established to deal with international buyers and carry out REDD+ implementation. Moreover, most respondents at the local level considered the need to outsource the implementation of REDD+ to third parties such as local communities, private entities or non-government organisations.

Understanding government officials' perspectives about the roles and responsibilities of different actors in the implementation of REDD+ is important prior to determining the appropriate mechanism to distribute REDD+ revenues. Government officials interviewed at all levels generally perceived that more authority was required for local governments in forest management, particularly in REDD+ implementation. Although providing local governments with greater power does not always lead to better forest management and conservation (Tacconi, 2007), local stakeholders need to be allowed to pursue policies according to local people's needs (Cheema and Rodinelli, 1983). Since REDD+ would require additional forest conservation that may not necessarily yield additional environmental services for local residents, local governments need to be provided with authority to decide their participation in a REDD+ scheme on behalf of their constituents. Assessment of the costs and benefits of REDD+ and local target measures of emission reductions need to be conducted, taking into account local

\textsuperscript{30}Government Regulation No 2/2006.
situations. In the implementation of REDD+, local governments can be expected to work better together with the national government through voluntary interactions because of mutual benefits and similar goals and objectives (Oliver, 1990; Levine and White, 1961; Parsons, 1995).

After a locality decides on their participation in the implementation of REDD+, local governments can decide to outsource implementation activities to a third party. Respondents interviewed at the district level, particularly from the forestry agencies, suggested that REDD+ could be outsourced to private companies, non-government organisations or local communities. Private companies could be invited to develop REDD+ projects and also perform necessary transaction (including dealing with buyers) and management activities. Respondents also argued that the implementation of REDD+ can be outsourced to forest community groups to allow local people to obtain direct benefits from REDD+. Although many REDD+ activities could be outsourced, respondents also believed that local governments would still be required to provide a number of forest related services to ensure successful implementation of REDD+, including issuing the necessary guidelines, monitoring and evaluation, and forest protection. Furthermore, the state, including local governments, has an obligation to ensure that local people obtain the benefit they deserve from the economic activity (Box, 1999; Bradbury and Waechter, 2009). These roles and responsibilities of local governments in the implementation of REDD+ are further considered in determining the purposes of IFTs for REDD+ revenue distribution as discussed in the next subsection.

The difference between the national designs of REDD+ implementation discussed above is how government stakeholders would obtain REDD+ benefits. The foreign grant modality might not provide the flexibility to use the fund for general budget support for government. Foreign grants are usually earmarked to finance specific activities, which can therefore be allocated to finance REDD+ management activities within a specific sector or at local levels. For instance, the government can implement an agricultural policy financed by foreign grants, however, the flow of funds would not be channelled to the agricultural ministry budget, but would be disbursed through a PMU or a PSU. In contrast, under a market mechanism, the government can collect taxes or fees from the transaction of REDD+ credits in the market. Taxes and fees can
then be used to provide general budget support and finance policies through the state budget. The revenues collected, through taxes and fees, can also be transferred to local governments using IFTs.

The advantages and disadvantages of the different payment mechanisms are discussed further in Chapter 9. The perspectives on the three main elements of the design of IFTs for REDD+ revenue distribution are analysed below before considering the technical capacity of local governments in managing IFTs.

6.5.2. The elements of the design of IFTs for REDD+ revenue distribution

The implementation of REDD+ would have impacts on local governments’ fiscal capacity both on the expenditure and the revenue streams. On the expenditure side, local governments require sufficient financial resources to perform the devolved roles and responsibilities in REDD+ implementation, previously discussed. Moreover, as forest exploitation and land-use change generate revenues, REDD+ measures could limit the revenues of local governments because of the restrictions on pursuing productive activities in forestlands (see Chapter 7). Impacts on the expenditure and revenue streams of local governments would then reduce local governments’ capacity to deliver public services.

Considering the impacts of REDD+ on the expenditure and revenue streams, IFTs to distribute REDD+ revenues need to serve two important purposes. First, IFTs need to ensure REDD+ measures do not affect fiscal capacity of local governments to deliver public services to their citizens. Second, IFTs need to finance specific services to be performed by local governments to ensure the successful implementation of REDD+.

The first objective of IFTs for REDD+ revenue distribution is to ensure that sufficient compensation is provided for local governments to offset the opportunity costs from the forgone benefits due to restrictions on pursuing alternative land-use activities. The second objective is to transfer resources to finance the management of REDD+ activities and measures at the local level, hence, it deals mainly with the management and transaction costs of REDD+. The perspectives of government officials on the purpose of IFTs for REDD+ revenue distribution are aligned with the objective of IFTs suggested in the literature, to finance subnational expenditures for public service
provision and to create incentives that affect fiscal management, efficiency and equity (Shah, 2006; Bird and Smart, 2002; Bahl 2000).

The responses provided by the interviewees about the preferred mechanism vary widely, although the two most mentioned mechanisms were revenue sharing and conditional grants. If REDD+ were to be implemented as an economic activity, the government would obtain a share of REDD+ revenues from taxes or fees, which could be returned to local governments using a revenue-sharing mechanism. In addition, conditional grants can be used to provide recipients with a fixed amount of funds to be spent on a designated service (King, 1984; Shah, 2006). The conditional grants can then be used to finance services related to the implementation of REDD+ at the local level.

Almost all respondents thought that some conditionality is preferable in IFTs for the distribution of REDD+ revenues. Government officials’ preferences are rather aligned with the theoretical argument made by Bird (1999), who contends that some conditionality seems desirable particularly when subnational governments should provide identifiable services to local residents in developing countries. The respondents, who prefer earmarking of IFTs for REDD+, mostly argue that it is administratively easier to be implemented when funds are earmarked, particularly considering the limited capacity of local governments in financial management and public service delivery. Earmarking is also preferable since the use of unconditional grants usually depends on political negotiations during the budgeting process, which can shift a particular sector’s programme fund toward other sectors. A lump sum conditional grant could ensure that the fund is spent in a department’s area of interest, such as in the forestry sector. Shah (2006) argues that the advantage of this type of transfer is that it will not distort local priorities and induce inefficient allocation in the targeted expenditure area. This type of IFT conditionality is expected to leave some flexibility for the technical agency to decide on activities to be carried out for REDD+ implementation at the local level. Learning from the experience of the implementation of IFTs in the forestry sector, it is important to strike a balance between flexibility and conditionality of funding. This is important because each region has specific characteristics and the causes of deforestation vary between locations in a country (Geist and Lambin, 2002).
Local governments, after receiving the transfers, must be accountable to those who pay for them and those who benefit from them. Bird (1999) argues that sufficient information to local constituents and the opportunity to exercise some real influence or control of the service delivery system are important to ensure transparency in the process. The accountability mechanisms suggested by the interviewees involve: an internal financial control performed collectively by local public institutions and upward accountability. Upward accountability measures can include: i) oversight by the Ministry of Finance to ensure public managers comply with the guidelines of the budget process; ii) performance assessment by the technical ministry, which includes dissemination of information to the public related to the government’s performance in delivering goods and services; and iii) regular auditing of public institutions involved in the implementation of REDD+.

Finally, there appeared to be a common pattern in the responses related to the distribution formula of IFTs for REDD+. REDD+ revenues could be distributed to local governments, based on: i) the existing opportunity costs of alternative land-use activities, or ii) a higher portion should be provided for the local levels. Respondents also argued for the importance to assign specific amounts of revenues to local people. A discussion about the distribution formula is detailed further in Chapter 8.

6.5.3. The technical capacity of local governments to implement IFTs
The implementation of IFTs in the forestry sector has been constrained by limited capacity in financial management at the local level. The findings of this study are similar to those reported by Barr et al. (2009), who identified several issues constraining the implementation of the reforestation fund, such as: late disbursement of the fund by the national government; relatively small numbers of technically trained personnel to carry out rehabilitation projects according to national government guidelines; and the absence of effective mechanisms for oversight and accountability. Furthermore, Lewis and Oosterman (2009) conclude that the capacity of local governments in financial management and service delivery is generally low in Indonesia.

Considering the present capacity of local governments, respondents interviewed, particularly from the finance agencies, thought that conditional grants are the easiest to
administer because they are transferred with clear guidelines on how the funds should be spent. It is however important to note that, even with clear guidelines, conditional grants are currently underspent in Indonesia (Lewis and Oosterman, 2009; The World Bank, 2007). In the forestry sector, local government officials noted that the stringent guidelines provided by the national government prevent local governments from spending the reforestation fund. Hence, learning from the experience of the implementation of IFTs in the forestry sector, striking a balance between flexibility and conditionality of IFTs is necessary, where the instructions on how the fund can be spent should ensure flexibility and consider local characteristics and situations. For instance, local governments can be allowed to identify rehabilitation activities that are most needed taking into consideration the condition of forests in the localities.

If the REDD+ revenues were distributed using the revenue-sharing mechanism, the challenge would not be about spending the fund transferred to the local level; rather the collection of taxes and fees related to REDD+ could be problematic for local governments. Using the revenue sharing mechanism to distribute REDD+ revenues, the transfer would need to be made only when recipients had achieved the prescribed emission reduction targets, known as output conditionality (Shah, 2006). The transfer of REDD+ shared-revenue to local governments would be conducted after emission reductions at the local level are measured, reported and verified. The present capacity of subnational governments to collect data related to emission reductions is, however, absent (Masripatin, 2009). This situation requires capacity development prior to implementation of the revenue sharing mechanism, which could be used during the full implementation of REDD+.

The existing capacity of local governments in the implementation of IFTs, and in REDD+ in general, would require the REDD+ fund to be first transferred using a conditional grant that carries specific prescriptions on how the fund should be spent. The conditional grant can be used to finance management activities and specific forest-related services at the local level to ensure successful REDD+ implementation (or the second purpose of IFTs for REDD+ revenue distribution as previously discussed). Local governments are then required to report the disbursement of the fund regularly to the national government. The subsequent transfer might be suspended if the reports are delayed. This accountability mechanism allows the transfer to be conducted at the
beginning of the implementation (or the readiness phase) of REDD+ (See Chapter 3). As local governments are ready to fully implement REDD+, then the revenue-sharing mechanism can be used to distribute REDD+ revenues once local emission reduction targets are achieved. This mechanism can be used to serve the first purpose of the IFTs for REDD+ revenue distribution, which is to ensure REDD+ measures do not affect the fiscal balance and autonomy of local governments to deliver public services to their citizens.

6.6 Conclusion

Government officials have different perspectives about the mechanisms for the distribution of REDD+ revenues from the national to the local level. The officials’ perspectives vary depending on the type of mechanism agreed at the international-national level, the roles and responsibilities of local governments in the implementation of REDD+, and the capacity of local governments to manage public resources. If REDD+ is to be implemented under a global fund, the financial flow is perceived to be similar to a foreign grant provided by developed countries. In contrast, if a REDD+ market were created, the scheme would be considered to be an economic activity where the government can obtain revenues out of REDD+ from taxes or fees that can be further distributed using shared-revenues and conditional grants. Overall, respondents believe that local governments should play a regulator role and should ensure that local people obtain the benefits they deserve from REDD+. Local officials also thought that most activities related to the implementation of REDD+ could be outsourced to a third party, such as non-government organisations, private companies or local communities.

The findings of this chapter suggest that some sort of conditionality for REDD+ IFTs is important. In developing countries, it would be unlikely for an unconditional transfer to be spent on activities related to conservation because local governments’ priorities are mostly concerned with improving people’s livelihoods. In addition, the conditionality and accountability of IFTs for REDD+ should be assessed on the basis of the purpose of the transfers. The revenue sharing mechanism can be used to ensure that REDD+ does not affect fiscal capacity of local governments to deliver public services, by compensating the opportunity from forgone taxes. Shared-revenue is usually transferred without conditions, however, in the case of REDD+, the transfer should carry
performance accountability (or output accountability), where the fund can only be disbursed following the achievement of local emission reduction targets.

A conditional grant can usually be used to finance specific services related to the implementation of REDD+ at the local level. A conditional transfer requires the recipients to provide a particular good or service at a specified level corresponding to the fiscal transfer. The use of the fund is earmarked to finance specific activities to support successful implementation of REDD+. It is however important to provide local governments with flexibility to pursue activities that are best suited to their localities. Conditional grants can specify the type of expenditures that can be financed (input-based or expenditure conditionality) and the disbursement usually requires local governments to produce a regular reporting system to the national government. Hence, conditional grants allow for upfront financing to invest in REDD+ activities during the readiness phase.

In depth discussion of the distribution formula of IFTs is provided in the following chapters. Chapter 7 assesses the existing incentive structure currently influencing the interest of local governments in pursuing deforestation and forest degradation (the opportunity costs of REDD+), whilst Chapter 8 further simulates the amount of the IFT to local governments, using different distribution formulas.
Chapter 7  Incentive Structures Influencing Subnational Governments’ Decisions on Land-use Change

This chapter presents the incentive structure influencing different stakeholders, particularly local governments, in pursuing land-use change and forest exploitation. Chapter 6 has established that the purposes of IFTs to distribute REDD+ revenues need to: i) ensure that REDD+ measures will not affect the fiscal capacity of local governments to provide public services and ii) finance services that need to be performed by local governments to ensure the successful implementation of REDD+.

This chapter focuses on the first objective of IFTs for REDD+, which is to estimate the forgone benefits as a result of the restrictions on pursuing alternative land-use activities due to REDD+, or known as the opportunity costs. The opportunity costs may affect the fiscal capacity of local governments to provide public services; and they are also considered the most important category of costs that provides a fair assessment of the causes of deforestation (Pagiola and Bosquet, 2008). The estimation of opportunity costs in this chapter is further used for the fiscal simulation to determine the specific amount of the IFT to be distributed to local governments as presented in Chapter 8.

Research on the economics of REDD+ has focused on estimating the costs of REDD+ and the required flow of funds at the global, national, and sectoral levels (for example: Boucher, 2008; Butler et al., 2009; Grieg-Gran, 2008; Kindermann et al., 2008; Pagiola and Bosquet, 2008; Wertz-Kanounnikoff, 2008). Depending on the methods used, global reviews of the opportunity costs of REDD+ estimate them to lie between US$2.51/tCO₂ (Boucher, 2008) and a range of US$10 to US$21/tCO₂ (Kindermann et al., 2008). These studies of opportunity costs have focused on private stakeholders – namely, companies and smallholders. However, the legal framework determining the rights over forests also needs to be considered in estimating the opportunity costs of REDD+ and the associated incentives at the national level. The legal framework regulates who owns forests, who bears the costs of the implementation of REDD+ activities and, therefore, who should receive appropriate incentives to change deforestation-related behaviour (Gregersen et
al., 2010). When the state claims ownership of forests – a situation common in many of the top deforesting countries (Tacconi et al., 2010) – the opportunity costs it faces in reducing emissions from forests is equal to the revenue stream it forgoes for not issuing permits for income-generating activities in forests (Gregersen et al., 2010). The costs and incentives faced by governments in the implementation of REDD+ should also be considered, including local level governments – as most countries responsible for emissions from deforestation and forest degradation have implemented some degree of decentralisation in public administration and forest management (Irawan and Tacconi, 2009), but these costs and incentives have not yet been addressed.

Local governments often obtain (a share of) revenues from timber extraction and agricultural development. It is in the interest of local governments and their citizens, to whom they are accountable in a democratic country, in maximising the revenues from resource utilisation (Tacconi, 2007). As REDD+ policies and measures might restrict local governments’ capacity to generate those revenues, compensation to reconcile local costs with the benefits that reach beyond local boundaries may be required for local governments to support the implementation of REDD+.

This chapter estimates the opportunity costs of REDD+ accruing to the national, provincial and district governments and companies in the provinces of Riau and Papua. The estimation of opportunity costs is based on taxes, fees and charges generated by the alternative land-use activities, taking into account the implications of adopting alternative discount rates, an issue that has not been clearly addressed by previous studies on REDD+. This chapter also assesses the implications for forest management and REDD+ of the distribution of benefits from deforestation and forest degradation across the private sector and the various government levels.

The chapter first summarises the literature on the estimation of REDD+ opportunity costs to provide a background for the cost analysis conducted later. The methods used are discussed before presenting the results of the estimation of opportunity costs and their distribution. This is followed by a discussion of the implications for REDD+ and the conclusion.
7.1 Methods

7.1.1. Opportunity cost analysis

The costs of implementing REDD+ include opportunity costs, management costs and transaction costs. Opportunity costs are the benefits of the best alternative land use that are forgone as a result of reducing deforestation and forest degradation (Grieg-Gran, 2008; Pagiola and Bosquet, 2008; Wertz-Kanounnikoff, 2008). Management costs arise from activities such as illegal logging prevention, research for agricultural intensification and land titling to provide traditional and indigenous communities with incentives to safeguard forests (Nepstad et al., 2009; Pagiola and Bosquet, 2008; Wertz-Kanounnikoff, 2008). Transaction costs relate to the processes to identify and negotiate REDD+ activities as well as to perform monitoring, reporting, verifying and certification of carbon emission reductions (Cacho et al., 2005; Milne, 1999). This study focuses on the opportunity costs, as they are thought to account for the largest share of the costs (Pagiola and Bosquet, 2008). It should be noted, however, that the other costs could be significant. The transaction costs reported in the literature are in the range of US$0.01–16.40 per tCO₂ (Wertz-Kanounnikoff, 2008), while the management costs, in the Brazilian Amazon for instance, were estimated at US$1–3 per hectare per year (Nepstad et al., 2009). Moreover, it is problematic to predict the transaction costs faced by local governments at this point in time since the role of local governments in the implementation of REDD is still uncertain.

To obtain relatively reliable estimations of the opportunity costs of REDD+, two contextual issues to be considered are the legal framework, determining the rights of forest owners, and the methodology used for the calculation of the opportunity costs. ‘In trying to understand the real costs required to change deforestation behaviour, it’s important to start with the question of what rights the forest owner, or user has’ (Gregersen et al., 2004, p.4). When the removal of forest cover is permitted by law, the opportunity cost approach is a good approximation of the real costs of reducing deforestation incurred by a country. On the other hand, if deforestation is forbidden by law, the opportunity cost from the next best alternative of land use is not an appropriate measure, and the cost of improving law enforcement is the relevant cost (Gregersen et al., 2010).
Government stakeholders claim the majority of forestlands in Indonesia. When forests are state-owned, the opportunity costs it faces in reducing deforestation and forest degradation are equal to the revenue stream forgone by the state for not issuing permits for income-generating activities in the forests (Gregersen et al., 2010). Companies, which could obtain licenses to operate in forests, would also bear a portion of the opportunity costs from the forgone private benefits of commercial logging or plantation activities, but they do not necessarily have a right to compensation unless they have established rights to the forest in question.

Methods used in the calculation of carbon sequestration costs, including REDD+ opportunity costs, vary widely, resulting in a wide range of estimations. In their review of carbon sequestration cost studies since the 1990s, Richards and Stokes (2004) found that the studies had: i) made diverse assumptions about carbon yields, ii) focused on distinct geographical areas and scales, and iii) applied different time horizons and discount rates. They also observed that methods used by carbon sequestration cost studies can be further categorised into (Richards and Stokes, 2004): 1) bottom-up engineering studies, which determine the value of inputs to production and derive the estimate of costs, using observed prices from agricultural land rental; 2) sectoral models, which account for the impact of landowners’ profit-maximisation behaviour to agricultural and land markets in the calculation of costs, by using spatial equilibrium models; 3) econometric studies, which analyse how landowners have historically allocated land use between agriculture and forests in response to differences in market prices.

To estimate the opportunity costs of REDD+, approaches that are commonly used in the literature are summarised by Wertz-Kanounnikoff (2008). The approaches include local as well as global empirical models and global simulation models. Local-empirical models estimate REDD opportunity costs, using data collected directly within a confined or particular location, mostly through surveys. Based on the amount of carbon that would be lost should deforestation take place in the studied area, benefits accrued from the next best alternative land uses per area ($/ha) are then converted to per-ton carbon stocks ($/tCO2eq). Local empirical models can be further aggregated to obtain global per area opportunity costs of REDD+, which usually ignore the variation of
carbon density across space (Wertz-Kanounnikoff, 2008). Finally, global simulation models, also referred to as dynamic ‘partial equilibrium’ models, estimate the costs incurred to global REDD+ suppliers using dynamic models of the world economy. The models often include important sectors that affect land use such as the forestry sector, the agriculture sector and the energy sector (Kindermann et al., 2008; Wertz-Kanounnikoff, 2008). Local and global empirical studies usually apply the bottom-up engineering approach to estimate the forgone benefits from REDD+ alternative land-use activities, while the global simulation models are similar to the sectoral approach discussed by Richards and Stokes (2004).

It is important to emphasise that even when the same method is applied (for example, the local empirical method), the estimates of REDD+ opportunity costs – even those in the same country – can vary as a result of different data sources and, importantly, the discount rate used. For instance, the opportunity costs of oil palm in Indonesia have been estimated at US$9.85–33.44 per tCO$_2$ on mineral soil and US$1.63–4.66 per tCO$_2$ on peat soil by Venter et al. (2009), and US$7.66–19.24 per tCO$_2$(without reference to soil types) by Butler et al. (2009).$^{31}$ Differences in the estimates appear to be due to the sources of data and the assumptions used, as follows.

- **Profit data for oil palm plantations**: Butler et al. (2009) assessed the profitability of a hypothetical oil palm plantation by calculating year-by-year yields and applying alternative pricing scenarios, whereas Venter et al. (2009) used profit data from the published materials of several companies operating in Indonesia. The profit data used by Venter et al. (2009) were the net profits (after taxes) of companies operating in Indonesia. Butler et al. (2009) did not consider government taxes in their estimation of companies’ net profits.

- **The prices of palm oil**: Butler et al. (2009) used price data and forecasts through to 2020 from The World Bank. They assumed that, under a high-price scenario, the price was constant at US$749 per ton from 2009 to 2039. Under a low-price scenario, they used the price of USD643 per ton in 2010, which decreases to US$510 in 2020 and remains at that level until 2039. Venter et al. (2009) did not state the price of palm oil used, as they used net profit data from the company reports.

$^{31}$ Butler et al. (2009) report REDD+ opportunity costs from oil palm plantations are US$3,835–9,630 per hectare, while the net carbon saving of avoided conversion is 149 tons/ha.
- Carbon stock data: Butler et al. (2009) used an average amount of avoided emissions of 682.92 tCO2/ha, while Venter et al. (2009) spatially estimated the avoided emissions in mineral and peat soil forests at 389 tCO2/ha and 2,249 tCO2/ha respectively.
- Discount rates: Butler et al. (2009) used a 10 per cent discount rate, whilst Venter et al. (2009) applied an 8 per cent discount rate.

As this study assesses the opportunity costs faced by different national stakeholders, it uses the local empirical approach. The assumptions for discount rate, financial data and carbon stocks used in the analysis are discussed below before the estimations of the opportunity costs for different stakeholders are presented in the next section.

7.1.2. Discount rate
According to Smith (2011), the choice of discount rate depends on whether: i) the policy question is marginal or non-marginal; ii) the social or private preferences should be considered; and iii) the country is developed or developing (that is, the relative level of income). A policy aimed at implementing REDD+ over large areas for a long period of time is a non-marginal policy. Non-marginal policies are evaluated using a social discount rate, rather than a market rate, which reflects private preferences (Smith, 2011). Social discount rates are lower than private ones because, inter alia, social preferences place greater value on the welfare of future generations compared with private preferences. In relation to the development stage of a country, the Garnaut Review (2011) suggests that discount rates applied in developing countries should be higher than those in developed countries. This is due to the fact that the present generation in developing countries can be expected to be significantly poorer than future generations, whereas the gap in welfare between generations is more limited in developed countries.

The social discount rates used by major assessments of climate change policies, such as the Stern Review and the Garnaut Review, were as low as 1 to 2 per cent (Smith, 2010). However, the most common rate used by studies of the opportunity costs of REDD+ has been 10 per cent (Grieg-Gran, 2008). To account for the gap between the wealth of different generations in a developing country such as Indonesia, this study used a social
discount rate of 5 per cent, which is significantly higher than that used in the Stern and Garnaut Reviews. A positive rate (determined from observation of market data) could also be considered to approximate social preferences, with the most appropriate being the yield of long-term government bonds (Smith, 2010). For Indonesia, this rate currently is about 7 per cent.  

International practice recommends discount rates, varying from 1 to 15 per cent, in the assessment of the value of projects (Harrison, 2010). To enable consideration of the different social and business issues that arise in assessing land-use options, this study presents opportunity costs, calculated using discount rates of 5, 10 and 15 per cent with a 30-year time horizon. The rate of 10 per cent is slightly higher than the rate for long-term government bonds, but it presents a useful mid-point between the lower social discount rate and the higher private discount rate.

7.1.3. Case studies: provinces and data on land-use activities

This study focuses on the two provinces of Riau and Papua, which vary in terms of deforestation rates and causes of deforestation. As discussed in Chapter 5, Riau currently has the highest rate of deforestation, while Papua has the lowest rate of deforestation in Indonesia. In Riau, two major causes of deforestation are the expansion of oil palm plantations and timber plantations to supply the pulp and paper industry (Uryu et al., 2008). In contrast, pressure on Papua’s forests mostly come from logging activities that cause forest degradation (Andrianto et al., 2008; Tropenbos International, 2010).

Commercial logging extraction is considered the most lucrative activity in the forestry sector (Barr et al., 2006). Public revenues collected by the national government from commercial logging come from license fees, forest rents, the reforestation fund, the land and building tax and the personal and corporation income taxes. All public revenues generated from commercial logging extraction, except the corporation tax, are distributed amongst governmental levels, using a revenue-sharing mechanism. A license fee is paid when a timber concession is issued or renewed. The amount of fees charged

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depends on the size of the concession area and whether it is a new license or a renewal. The forest rent is a timber royalty, which is collected on the basis of volume and type of species harvested. The reforestation fund is non-refundable and is based on the type of species, grade and location of the wood harvested. Revenues are allocated across governmental levels according to percentages established in Law 33/2004 and Government Regulation 55/2005. The national government retains the corporate tax entirely.

Conversion of forests to crop plantation activities also generates revenues for government from other taxes and charges. Taxes applied to plantation activities are the land and building transfer fee, the land and building tax, the personal and corporate income taxes, and the value-added tax on plantation products. The value-added tax on plantation products and corporate income tax are retained entirely by the national government. Similar to logging activities, the land and building tax from plantation activities are distributed back to districts and provinces sustaining the activities within their administrative boundaries, using a revenue-sharing scheme. Government regulation 48/1997 stipulates that the tax on plantations of 25 hectares or more is up to 40 per cent of the value of the land at the selling point in the market. Other revenue sources for local governments related to plantation activities are local ‘fees’ charged by local governments on agricultural products. The form and amount of local fees on oil palm products varies between localities. A few districts in Riau charge a ‘third party contribution’ on oil palm products, particularly on the fresh fruit bunches (FFB). Other districts also apply user charges on the transportation of agricultural products within their administrative boundaries.

The opportunity costs of REDD+ in this study are estimated by using data from companies currently operating in Riau and Papua provinces. The analysis focuses on three major land-use activities: commercial logging operations, timber plantations and oil palm plantations. First, the net benefits derived by companies from land-use activities are estimated using a Net Present Value (NPV) analysis. Then, the forgone earnings per hectare of land accruing to the governments at all levels, including national, provincial and district governments, are estimated. The opportunity costs for all stakeholders are then converted from $/ha to $/tCO₂eq. Due to the paucity of carbon stock data for Riau and Papua provinces, the analysis uses data on the time-averaged
carbon stocks of different land-use activities in Indonesia that are currently available in the literature.

Financial data for logging and timber plantations were derived from the working plans of five commercial logging operations in Papua and five timber plantations in Riau (Appendices 2 and 3). Every company granted a licence to operate in state forests for commercial logging or a timber plantation is required to submit a working plan document at the beginning of its operation. The document includes a harvesting plan, information on expected timber yields, and a financial analysis. Data on commercial logging activities were obtained from companies in Papua because only one active logging company is currently operating in Riau, where the remaining commercial timber stock is limited. Data on timber plantations were from Riau only, due to the lack of information on timber plantation companies operating in Papua. According to Indonesia’s regulatory framework, only unproductive forests can be converted to timber plantations (Kartodihardjo and Supriono, 2000; Pirard, 2008). This arrangement therefore forbids timber plantations from legally opening intact primary forests. This study recalculated the NPV for all companies using standard financial assumptions – particularly for the discount rate – and the timber prices obtained from the average of timber prices used by all companies.\footnote{The average prices of acacia and mixed tropical hardwood used in the working plan documents of timber plantations in Riau were US$38.9/m$^3$ and US$33.3/m$^3$ respectively. The average prices of dipterocarpaceae and mixed tropical hardwood used in the working plan documents of commercial logging companies in Papua were US$161/m$^3$ and US$72.2/m$^3$ respectively.}

For oil palm plantations, this study drew on data from Butler et al. (2009) and Rötheli (2007). The model presented by Butler et al. (2009) is recalculated to: i) apply the discount rates discussed above; ii) adjust financial and yield assumptions, including oil extraction and palm kernel ratios and crude palm oil price (Appendix 4); iii) estimate public revenues from taxes and fees for national, provincial and district governments based on the existing regulatory framework (Table 7.1); and iv) carry out a sensitivity analysis for changes in the price of palm oil. In June 2011, the price was reported at US$800 per ton (which is used to derive the results presented in Tables 7.2 and 7.3) and it is assumed that this would remain constant for the following 30 years. On the basis of the World Bank’s price forecasts, Butler et al. (2009) developed: i) a high-constant price scenario of US$749 per ton from 2009 to 2039, and ii) a low-variable price scenario
with a price starting at 643 US$ per ton in 2010 and decreasing to US$510 per ton by 2020, to remain at that level until 2039. This study reports the sensitivity analysis by using a low price for palm oil of US$680 per ton (which is the average of the prices used by four companies in Indonesia in 2010) and a high price of US$1,000 per ton.

Logging income estimated by Butler et al. (2009) is also recalculated to accommodate different conditions of the forests cleared at the beginning of the oil palm plantations. Natural forests cleared for oil palm plantations are assumed to have a timber potential of 16 m³/ha in logged-over forests and 90 m³/ha in intact primary forests respectively. This assumption is based on the actual timber harvested by timber plantations during land clearing at the beginning of operations in Riau.

Assessment of the opportunity costs accruing to governments is based on taxes and fees collected from each land-use activity (Table 7.1). As the precise rate of taxes and fees depends on the price of land and products, the average rates used in the working plan documents are used to calculate the opportunity costs faced by the government. Personal income and export taxes are excluded in the calculation of the opportunity costs of all land-use scenarios. The exclusion of personal income tax is due to data paucity related to the amount of labour required for each land-use activity. The export tax is ignored because the analysis focuses on the farm gate value.
Table 7.1. Tax and fee rates related to logging and plantations

<table>
<thead>
<tr>
<th></th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oil Palm Plantations</strong></td>
<td></td>
</tr>
<tr>
<td>Land and Building Tax</td>
<td>0.5 x 40% x determined value of the land</td>
</tr>
<tr>
<td>Value-Added Tax</td>
<td>10% x Price of Crude Oil and Kernel Oil x Yield</td>
</tr>
<tr>
<td>Corporation Income Tax</td>
<td>25% x Net Profit of Companies</td>
</tr>
<tr>
<td>Land and building transfer fee</td>
<td>5% x determined value of the land</td>
</tr>
<tr>
<td><strong>Commercial Logging and Timber Plantations</strong></td>
<td></td>
</tr>
<tr>
<td>Reforestation Levy</td>
<td></td>
</tr>
<tr>
<td>- Dipterocarpaceae</td>
<td>USD 16/m³ (Riau); US$ 13/m³ (Papua)</td>
</tr>
<tr>
<td>- Mixed tropical hardwood</td>
<td>USD 13/m³ (Riau); US$ 10.5/m³ (Papua)</td>
</tr>
<tr>
<td>- Superior (prime) species</td>
<td>USD 18/m³ (all regions)</td>
</tr>
<tr>
<td>Forest Licence Fee</td>
<td>USD 0.289 x Total Area (Timber Plantations in Sumatra)</td>
</tr>
<tr>
<td></td>
<td>USD 1.67 x Total Area (Commercial Logging in Papua)</td>
</tr>
<tr>
<td>Forest Resource Rent</td>
<td>10% x Volume of timber harvested x Timber Price</td>
</tr>
<tr>
<td>- Dipterocarpaceae</td>
<td>USD 7.1 x Volume of timber harvested (Riau)</td>
</tr>
<tr>
<td></td>
<td>USD 6 x Volume of timber harvested (Papua)</td>
</tr>
<tr>
<td>- Mixed tropical hardwood</td>
<td>USD 4 x Volume of timber harvested (Riau)</td>
</tr>
<tr>
<td></td>
<td>USD 2.94 x Volume of timber harvested (Papua)</td>
</tr>
<tr>
<td>- Superior (prime) species</td>
<td>USD 10.05 x Volume (all regions)</td>
</tr>
<tr>
<td>- Acacia</td>
<td>USD 0.31 x Volume (all regions)</td>
</tr>
<tr>
<td>Land and Building Tax</td>
<td>0.5 x 40% x value of object at the selling point</td>
</tr>
<tr>
<td>Corporation Income Tax</td>
<td>30% x Net Profit of Companies</td>
</tr>
</tbody>
</table>

**Source:** Government Regulation No. 59/1998; Government Regulation No. 74/1998; Government Regulation No. 92/1999; Ministerial Decree No. 859/Kpts-II/1999.

7.1.4. Carbon stock data

Carbon stock data reported by Palm et al. (2004; 1999) were used as they are the most comprehensive time-averaged data for all types of land use in Indonesia. Those authors do not, however, provide information on carbon stocks in peat swamp forests. Venter et al. (2009) provide the estimate of carbon emissions in peat and mineral forests related to forest conversion to oil palm plantations, but not for other land-use activities. In order to provide a comparison of opportunity costs in peat versus mineral forests, a sensitivity analysis was conducted using carbon stock data from Venter et al. (2009).

Potential total carbon losses are converted from ton of carbon per hectare (tC/ha) to metric ton of carbon dioxide equivalent per hectare (tCO₂eq/ha) by multiplying by the molecular weight conversion factor of 3.66 (IPCC, 2006).

7.2 Results: the opportunity costs of REDD+ and their distribution

Oil palm and timber plantations generate the highest NPVs per hectare for all stakeholders compared to commercial logging (Table 7.2) which, in the case of oil
palm, is some 20 times that of logging. It has already been noted by other studies that logging of primary or degraded forests often generates additional benefits for timber and oil palm plantations (Butler et al., 2009; Fisher et al., 2011; Grieg-Gran, 2008) and cannot be seen simply as the low-hanging fruit of opportunity costs for REDD+ activities. In the short term, there may be situations, however, in which logging is not going to be followed by plantations (given that the extent of the areas being logged is larger than those being planted) and the opportunity costs for REDD+ activities focused on degradation would then be that of logging.

In addition to the benefits obtained by companies, which have normally been considered by studies of the opportunity costs of REDD+ (for example, Butler et al., 2009; Venter et al., 2009) the various levels of government also receive revenues from taxes and fees applied to land-use activities. Under all scenarios of discount rates, companies obtain a higher portion of the NPV than the government from the land-use activities considered, with the exception of commercial logging (Table 7.2).

The central government currently retains the largest shares of revenues from land-use activities compared with local governments. In the case of logging, the producing districts derive about half as much as the central government. The benefits derived by the districts from commercial logging come mostly from the reforestation tax, given that 40 per cent of those revenues collected by the national government are returned to the producing regions. For the other land-use activities, local governments retain a small share of the revenues. Although the portion of benefits received by district governments is meagre in comparison to the national level, in absolute terms they derive more from oil palm and timber plantations than from logging. Therefore, they too have a financial incentive to seek the conversion of forests to plantations.
Table 7.2 Average opportunity costs (NPV USD/ha) for private and public stakeholders (percentage allocation in brackets; 10% discount rate; palm oil price USD800/ton)

<table>
<thead>
<tr>
<th>Alternative land-use activities</th>
<th>Company</th>
<th>Government Total</th>
<th>National</th>
<th>Provincial</th>
<th>Producing District</th>
<th>Other Districts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial logging</td>
<td>206</td>
<td>235</td>
<td>140</td>
<td>6</td>
<td>69</td>
<td>21</td>
</tr>
<tr>
<td>(46.68)</td>
<td></td>
<td>(53.32)</td>
<td>(31.71)</td>
<td>(1.29)</td>
<td>(15.58)</td>
<td>(4.74)</td>
</tr>
<tr>
<td>Timber plantations without prior logging</td>
<td>1,037</td>
<td>568</td>
<td>536</td>
<td>7</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>(64.62)</td>
<td></td>
<td>(35.38)</td>
<td>(33.41)</td>
<td>(0.44)</td>
<td>(0.90)</td>
<td>(0.63)</td>
</tr>
<tr>
<td>Timber plantations with prior logging in degraded forests</td>
<td>1,507</td>
<td>1,058</td>
<td>767</td>
<td>29</td>
<td>213</td>
<td>49</td>
</tr>
<tr>
<td>(58.75)</td>
<td></td>
<td>(41.25)</td>
<td>(29.92)</td>
<td>(1.14)</td>
<td>(8.29)</td>
<td>(1.90)</td>
</tr>
<tr>
<td>Oil palm plantations without prior logging</td>
<td>6,355</td>
<td>4,608</td>
<td>4,587</td>
<td>3</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>(57.97)</td>
<td></td>
<td>(42.03)</td>
<td>(41.85)</td>
<td>(0.03)</td>
<td>(0.15)</td>
<td>(0)</td>
</tr>
<tr>
<td>Oil palm plantations with prior logging in degraded forests</td>
<td>6,458</td>
<td>4,782</td>
<td>4,678</td>
<td>10</td>
<td>82</td>
<td>13</td>
</tr>
<tr>
<td>(57.45)</td>
<td></td>
<td>(42.55)</td>
<td>(41.62)</td>
<td>(0.09)</td>
<td>(0.73)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>Oil palm plantations with prior logging in primary forests</td>
<td>7,099</td>
<td>5,502</td>
<td>5,057</td>
<td>34</td>
<td>350</td>
<td>61</td>
</tr>
<tr>
<td>(56.34)</td>
<td></td>
<td>(43.66)</td>
<td>(40.13)</td>
<td>(0.27)</td>
<td>(2.78)</td>
<td>(0.48)</td>
</tr>
</tbody>
</table>

To assess whether the opportunity costs of REDD+ are competitive with the costs faced by developed countries to reduce emissions domestically, this study considers the opportunity costs of carbon emissions. The opportunity costs of REDD+ current carbon prices are compared because the idea underlying the establishment of REDD+ is that it is supposed to be an early and relatively cheap way of reducing carbon emissions (Stern, 2006).

If only companies were to be compensated, it would be appropriate to consider the costs resulting from the application of either the 10 or the 15 per cent discount rates. At these rates, the opportunity costs of REDD+ for all land uses, except for oil palm plantations on mineral soil with logging in degraded forests (Table 7.3), are competitive with the current price of carbon on the European market (EUA), which is in the range of US$16–17.\(^{34}\) The establishment of oil palm plantations on peat soils has considerably larger carbon emissions than the other oil palm plantation types and presents, therefore, significantly lower opportunity costs.

From the government’s perspective, the case of the 5 per cent discount rate may be more appropriate, however, for the reasons discussed earlier. In this scenario, commercial logging and oil palm plantations on peat soil with prior logging in primary forests (which is not supposed to take place according to the regulatory framework)

have a total break-even cost well below current carbon prices (Table 7.3). Oil palm plantations on mineral soil with prior logging in primary forests (which is also not supposed to take place) have a total break-even cost similar to current carbon prices. The other two land uses present prohibitive costs (Table 7.3). It should be noted that while the opportunity costs of logging are competitive with current carbon prices, it is the first commercial activity that can take place in primary forests and, after years of logging, when forests become degraded, timber plantations are allowed, according to existing regulations, to clear-cut and replace the degraded forests. Therefore, the opportunity costs of commercial logging cannot be considered in isolation.
<table>
<thead>
<tr>
<th>Land-use activities</th>
<th>Carbon loss(^*) (tCO(_2)/ha)</th>
<th>Company</th>
<th>Government Total</th>
<th>National Gov</th>
<th>Provincial Gov</th>
<th>Producing District</th>
<th>Other Districts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial logging in primary forests</td>
<td>779.58</td>
<td>0.18</td>
<td>0.21</td>
<td>0.12</td>
<td>0.01</td>
<td>0.06</td>
<td>0.02</td>
</tr>
<tr>
<td>Timber plantations with prior logging in degraded forests</td>
<td>135.42</td>
<td>6.59</td>
<td>5.14</td>
<td>3.33</td>
<td>0.17</td>
<td>1.34</td>
<td>0.29</td>
</tr>
<tr>
<td>Oil palm plantations:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- with prior logging in degraded forests on mineral soil</td>
<td>197.64</td>
<td>13.84</td>
<td>12.52</td>
<td>12.08</td>
<td>0.04</td>
<td>0.34</td>
<td>0.05</td>
</tr>
<tr>
<td>- with prior logging in primary forests on mineral soil</td>
<td>977.22</td>
<td>3.37</td>
<td>3.21</td>
<td>2.84</td>
<td>0.03</td>
<td>0.30</td>
<td>0.05</td>
</tr>
<tr>
<td>- with prior logging in primary forests on peat soil</td>
<td>2249</td>
<td>1.34</td>
<td>1.37</td>
<td>1.20</td>
<td>0.01</td>
<td>0.13</td>
<td>0.02</td>
</tr>
<tr>
<td>Commercial logging in primary forests</td>
<td>779.58</td>
<td>0.26</td>
<td>0.30</td>
<td>0.18</td>
<td>0.01</td>
<td>0.09</td>
<td>0.03</td>
</tr>
<tr>
<td>Timber plantations with prior logging in degraded forests</td>
<td>135.42</td>
<td>11.13</td>
<td>7.81</td>
<td>5.67</td>
<td>0.22</td>
<td>1.57</td>
<td>0.36</td>
</tr>
<tr>
<td>Oil palm plantations:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- with prior logging in degraded forests on mineral soil</td>
<td>197.64</td>
<td>32.67</td>
<td>24.20</td>
<td>23.67</td>
<td>0.05</td>
<td>0.41</td>
<td>0.06</td>
</tr>
<tr>
<td>- with prior logging in primary forests on mineral soil</td>
<td>977.22</td>
<td>7.26</td>
<td>5.63</td>
<td>5.17</td>
<td>0.03</td>
<td>0.36</td>
<td>0.06</td>
</tr>
<tr>
<td>- with prior logging in primary forests on peat soil</td>
<td>2249</td>
<td>2.95</td>
<td>2.39</td>
<td>2.20</td>
<td>0.02</td>
<td>0.16</td>
<td>0.03</td>
</tr>
<tr>
<td>Commercial logging in primary forests</td>
<td>779.58</td>
<td>0.45</td>
<td>0.50</td>
<td>0.30</td>
<td>0.01</td>
<td>0.14</td>
<td>0.04</td>
</tr>
<tr>
<td>Timber plantations with prior logging in degraded forests</td>
<td>135.42</td>
<td>21.79</td>
<td>12.06</td>
<td>9.40</td>
<td>0.30</td>
<td>1.89</td>
<td>0.48</td>
</tr>
<tr>
<td>Oil palm plantations:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- with prior logging in degraded forests on mineral soil</td>
<td>197.64</td>
<td>77.55</td>
<td>50.31</td>
<td>49.64</td>
<td>0.06</td>
<td>0.52</td>
<td>0.08</td>
</tr>
<tr>
<td>- with prior logging in primary forests on mineral soil</td>
<td>977.22</td>
<td>16.45</td>
<td>11.09</td>
<td>10.52</td>
<td>0.04</td>
<td>0.45</td>
<td>0.08</td>
</tr>
<tr>
<td>- with prior logging in primary forests on peat soil</td>
<td>2249</td>
<td>6.76</td>
<td>4.71</td>
<td>4.46</td>
<td>0.02</td>
<td>0.19</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Legend. # Emissions from primary and degraded forests on mineral soil based on Palm et al. (2004); emissions from forests on peat soil based on Venter et al. (2009).

The sensitivity analysis (Table 7.4) shows that a lower price for palm oil would not make the opportunity costs of oil palm plantations in degraded forests competitive with current carbon prices if the government chose to use the 5 per cent discount rate. At the other extreme, oil palm plantations in peat soil present a break-even price for carbon
that is lower than current carbon prices – even with a higher palm oil price and a 5 per cent discount rate.

Table 7.4 Sensitivity of minimum REDD payments to changes in the price of palm oil (USD/tonCO₂eq)

<table>
<thead>
<tr>
<th>Land-use activity and price of palm oil per ton</th>
<th>5%</th>
<th>10%</th>
<th>15%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>Government Total</td>
<td>Company</td>
<td>Government Total</td>
</tr>
<tr>
<td>Plantations with prior logging in degraded forests – mineral soil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USD 680</td>
<td>56.56</td>
<td>40.51</td>
<td>22.49</td>
</tr>
<tr>
<td>USD 800</td>
<td>77.55</td>
<td>50.31</td>
<td>32.67</td>
</tr>
<tr>
<td>USD 1,000</td>
<td>112.54</td>
<td>66.64</td>
<td>49.65</td>
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<tr>
<td>Plantations with prior logging in primary forests – mineral soil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USD 680</td>
<td>12.23</td>
<td>9.11</td>
<td>5.22</td>
</tr>
<tr>
<td>USD 800</td>
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<td>7.26</td>
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<td>USD 1,000</td>
<td>23.49</td>
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<td>10.67</td>
</tr>
<tr>
<td>Plantations with prior logging in primary forests – peat soil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USD 680</td>
<td>4.93</td>
<td>3.85</td>
<td>1.56</td>
</tr>
<tr>
<td>USD 800</td>
<td>6.76</td>
<td>4.71</td>
<td>2.95</td>
</tr>
<tr>
<td>USD 1,000</td>
<td>9.82</td>
<td>6.14</td>
<td>4.43</td>
</tr>
</tbody>
</table>

7.3 Discussion

Previous estimates of the minimum REDD+ payment for oil palm plantations in Indonesia were in the range of US$9.85–US$33.44 per tCO₂ in mineral soil forests and US$1.63–US$4.66 per tCO₂ in peat areas (Venter et al., 2009) and US$7.66–US$19.24 per tCO₂ (Butler et al. 2009; without reference to soil types). Venter et al. (2009) assumed a carbon stock lower than other studies (for example, Butler et al., 2009; Palm et al., 2004; Palm et al., 1999) resulting in a higher estimate of the opportunity costs.

This study demonstrates that, at current palm oil prices, using the higher carbon stocks reported in the literature, and a mid-range discount rate of 10 per cent, the minimum REDD+ payment to compensate for the opportunity costs amounts to about US$57 per tCO₂ for the case of plantations on mineral soils and logging in degraded forests (the legal option). This estimate is well above those previously reported and, similar to the other estimates, does not include other costs, such as the management of REDD+ activities and transaction costs. Given that large areas of forests have been degraded –
55.6 per cent and 49.4 per cent of secondary forests in areas classified as production forests and in all areas classified as forests respectively (Ministry of Forestry, 2008b) – it seems that the establishment of REDD+ activities in those areas may be too costly if the development of oil palm plantations is an option.

The good news from this analysis is that all the other land-use activities (including oil palm on peat soil) present minimum REDD+ payments that are competitive with current carbon prices at the discount rates of 10 and 15 per cent. The minimum REDD+ payment to offset the opportunity costs of oil palm plantations on peat soil are always rather cheap, including in the case of a 5 per cent discount rate.

In relation to the distribution of the revenues for the different land-use activities, the analysis shows that the total revenues derived by the various government levels is large, and in the case of commercial logging, exceeds that retained by the companies (Table 7.2). The national government obtains a large share of the benefits, so it has a strong interest in promoting all types of land-use change. Going below the surface, each of the national level ministries (sectors) has different interest in the pursuit of alternative land-use activities. The Ministry of Forestry has an interest in commercial logging in (natural) production forests to generate the lucrative reforestation levy. The Ministry of Forestry retains as much as 60 per cent of the fund and controls its utilisation to support nationally-based forestry programmes and policies (Barr et al., 2009). In contrast, the Ministry of Agriculture, which is responsible for the promotion of agricultural development, promotes oil palm plantations and/or other agricultural activities in conversion forests, which total 22 million hectares. Revenues generated from oil palm plantations – which have reached 5.2 million hectares (Ministry of Agriculture, 2009 cited by Rist et al., 2008) – mostly from the value-added tax and corporate income tax, contribute to the national government's general income to finance a wide range of services.

As for local level governments, they receive a small share of the revenues from the various land uses. However, they (particularly the producing districts) do receive benefits from timber and oil plantations. This explains the fact that forest agencies at the district level are interested in promoting timber plantations similar to their counterparts at the national level. The permits for commercial logging and timber plantations are
issued by the Ministry of Forestry, although district governments can submit a proposal for activities at the district level (Resosudarmo et al., 2006). Local government support is also important for licences issued at the national level, as strong resistance from local stakeholders can hinder companies’ operations, as reported in a number of regions in Indonesia.\(^{35}\)

Local governments are also interested in expanding oil palm plantations in their localities (McCarthy and Cramb, 2009; Rist et al., 2010; Sandker et al., 2007; Zen et al., 2005). In the case of oil palm plantations, local governments have the authority to issue a business permit, which is required before the final decision on forest clearance can be made by the Ministry of Forestry (Colchester et al., 2006). Therefore, district governments have more influence in this decision-making process compared with commercial logging and timber plantations. Although district governments obtain a small portion from the total benefits of oil palm, some regions apply a local fee, which is called a third-party contribution to oil palm products.

The district governments’ interest in supporting proposals for natural forest conversion to productive land-use activities could also be due to other economic and political benefits. Heads of districts might have a greater chance of maintaining their popularity if they attract investment and generate local revenues. Oil palm plantations, for instance, also generate employment and livelihoods for local people (McCarthy and Cramb, 2009; Rist et al., 2010; Sandker et al., 2007; Susila, 2004; Zen et al., 2005). Susila (2004) claims that oil palm activities can contribute as much as 63 per cent of smallholder household incomes in two locations in Sumatra. Sandker et al. (2007) simulated the impact of conversion of forests to oil palm in Malinau district (Kalimantan) and found that the total number of formal jobs created by oil palm development (22,000–120,000) could exceed the employment opportunities generated by mining, logging, and the civil service together (10,000). Moreover, Rist et al. (2010) reported that local elites obtained financial support during electoral campaigns by giving their support to the establishment of oil palm plantations.

7.4 Conclusion

This chapter demonstrates the interest of all stakeholders, including companies and various government levels, in land-use change. It is shown that REDD+ might not be able to compete with some alternative land uses associated with high opportunity costs, such as oil palm plantations in degraded forests on mineral soils. REDD+ activities should first target activities that present low opportunity costs, such as the opening of natural forests. Oil palm and timber plantation companies are keen to operate in natural forests so that they can obtain additional logging income prior to their operations. When converted to US dollars per tCO₂, the additional benefit from logging income is low, as logging in natural forests results in high emissions. Therefore, REDD+ payments could, for instance, be allocated to compensate stakeholders for relocating proposals for oil palm expansion from natural forests to non-forested areas or degraded forests. REDD+ would not halt oil palm expansion, but would help incentivise stakeholders to keep natural forests intact. Furthermore, REDD+ payments could also prevent the conversion of peat forests, as it results in extremely high emissions and it is therefore associated with low opportunity costs.

Previous studies of the opportunity costs of REDD+ have not considered the influence of the discount rate on their results. This study demonstrates that the competitiveness of some avoided deforestation activities in terms of the opportunity costs of reduced emissions can be significantly affected by the choice of discount rate. Both governments and those conducting further studies of the opportunity costs of REDD+ should therefore consider which discount rate might be most appropriate to their specific conditions, and carry out a detailed sensitivity analysis.

A design for the distribution of revenues generated from REDD+ activities should consider the specific incentives of the different government levels and across sectors, which have specific interest in promoting certain land-use changes. National REDD+ schemes should therefore consider the loss of public revenues at the subnational level arising from the restrictions on pursuing productive activities in forestlands. Without proper compensation, subnational governments will have little incentives to support REDD+, as they would face forgone taxes, fees and shared-revenues, while the benefits of REDD+ reach beyond their administrative boundaries (Ring et al., 2010). REDD+
payments, at a minimum, should compensate the costs of REDD+ implementation, including the opportunity costs (Boucher, 2008; Cattaneo, 2008; Strassburg et al., 2009). However, REDD+ payments based simply on the opportunity costs incurred by district governments may not result in changing local governments’ behaviour. District governments also see other benefits from the support of land-use change activities, such as job creation and other institutional benefits as mentioned before. Therefore, REDD+ schemes should provide a revenue stream that is higher than the alternative land-use activities in order to demonstrate that this is a superior option to the latter activities. The relevant government levels could therefore use those REDD+ payments to provide improved services to their citizens.

This chapter argues that it is problematic to use opportunity costs as the basis for REDD+ revenue distribution to local governments. Opportunity costs have not considered that institutional and political (including informal) benefits may no longer be obtained if local governments choose to pursue REDD+ in their localities. These benefits however are difficult to capture properly in an opportunity cost analysis. This finding therefore confirms the argument made by Gregersen et al. (2010, p. 1):

while in theory and under certain real-world conditions opportunity cost provides a useful indicator of payment needed, we see a number of problems in using it in the main political, social and economic context faced in the tropical countries.

In order to determine the specific amount of the IFT to be distributed to local governments for REDD+ revenue distribution, different approaches to the distribution formula are therefore tested. The next chapter discusses different options for the distribution formulas to determine the amount of the IFT to distribute REDD+ revenues in Riau and Papua.
Chapter 8  The Distribution Formulas of IFTs for REDD+

Following the assessment of REDD+ opportunity costs incurred by local governments from alternative land-use activities in Chapter 7, this chapter estimates specifically the amount of IFTs to compensate district governments to pursue REDD+. This chapter aims to answer the research question: what are the distribution formula options for determining the amount of IFTs for REDD+ revenue distribution to local governments. Two important aspects of the distribution formula of IFTs are explored: (i) the grant size to be allocated to different levels of government; and (ii) the amount of IFTs allocated for each eligible locality to pursue REDD+. The grant size, or distributable pool, is the vertical dimension of IFTs that determines the total amount of grants or transfers distributed to different levels of government; whilst, the horizontal dimension decides the amount of transfers allocated to each eligible local government unit (Bird, 1999; Bahl, 2000).

As discussed previously in Chapter 2, IFTs for biodiversity conservation can help reconcile local costs with the spillover benefits of conservation that reach beyond local boundaries. Brazil and Portugal use IFTs to support biodiversity conservation by transferring a portion of the national or state governments’ taxes (e.g. in Brazil state-level value-added tax) to the local levels on the basis of conservation and ecological indicators (Grieg-Gran, 2000; May et al., 2002; Ring, 2008c; Santos et al., 2012). Several studies have also suggested transferring a portion of the national or state governments’ revenues to the local levels to compensate for the management and forgone opportunity costs borne by localities with protected areas (Köllner et al., 2002; Ring, 2008b; Kumar and Managi, 2009). To determine the amount of transfers for conservation at the local level, several indicators, including conservation units, a biodiversity index, and land area protected, have been proposed (e.g. Ring et al., 2010; Ring 2008a, 2008b, 2008c; Köllner et al., 2002; Kumar and Managi, 2009; Santos et al., 2012).
Using IFTs to channel REDD+ payments to local governments requires a new approach to the determination of the amount of transfers. As discussed in Chapter 7, using the opportunity costs as the basis for REDD+ revenue distribution to local governments could be problematic as the opportunity cost analysis usually does not consider other economic, institutional and political benefits, which may no longer be obtained if local governments choose to pursue REDD+ in their localities. Moreover, as a REDD+ scheme would involve the transfer of financial resources from developed to participating developing countries, the purpose of IFTs would not simply be to correct the spatial externalities of conservation but also to distribute that revenue, which could exceed the opportunity costs, vertically between government levels. REDD+ revenues can therefore be distributed using a vertical revenue sharing scheme, which is commonly used to distribute taxes and fees collected by the national government. The amount of the vertical revenue sharing is usually determined based on a share of a national tax and the amount of taxes collected within certain administrative boundaries (Bird, 1999; Bahl and Wallace, 2007).

It is assumed that REDD+ would be implemented using a nationally-based implementation approach in which the national government would receive REDD+ payments and there would be no direct payments from the international level to local governments (Angelsen et al., 2008). Scholars have also proposed a nested approach to the implementation of REDD+ in which sub-national projects could be allowed to receive payments directly from international buyers (e.g. Pedroni et al., 2009). Busch et al. (2011) assume that the nested approach would be adopted and estimate the incentive structure required for local governments in Indonesia to participate in REDD+. Their approach ignores, however, the existing political economy of land-use change in Indonesia including the distribution of power between the central and local governments and the existing incentive structures influencing different stakeholders in the pursuit of forest exploitation and land-use change. The national government currently retains most of the revenues from land-use alternatives to REDD+ as discussed previously in Chapter 7. This situation is also common in other decentralised countries, where the higher level of government collects the largest share of public revenues and distributes part of this to local governments using IFTs (de Mello, 2000).
This chapter first simulates the reference emissions levels (REL) in Riau and Papua. RELs determine the business as usual scenario of carbon emissions that would be released from deforestation and forest degradation in the future without REDD+ (Meridian Institute, 2009). Different possible approaches to calculate RELs result in different amounts of emission reductions achieved by a locality, which in turn would affect the amount of REDD+ incentives to be allocated to the subnational level (Cattaneo, 2011; Busch et al., 2009). The methods adopted to estimate the grant size for different government levels and the amount of IFTs for eligible district governments are then discussed. After presenting the results of the analysis, the chapter discusses the advantages and disadvantages of the cost reimbursement and derivation approaches for the design of the IFTs and the implications of the findings for designing REDD+ payment distribution.

8.1 Determining reference emission levels in Riau and Papua

8.1.1. Historical and future deforestation

Whilst Chapter 5 has discussed the role of local governments in forest management and the deforestation rates in Riau and Papua, this section summarises the historical deforestation rates and future land-use changes that may take place, based on the spatial plan and forest classifications in Riau and Papua. Based on Forestry Law 41/1999, state forestlands in Indonesia are classified into production, protection, and conservation forests. The main function of production forests is to produce forest commodities, mainly timber. Some production forests are also classified as conversion forests, which can be legally converted to other non-forest land-use activities. Exploitation activities cannot, however, take place in protected and conservation forests as the Law stipulates that those forests are intended to provide environmental services and to conserve biodiversity. In order to determine the RELs, this section focuses mainly on the legal deforestation that can take place in the production and conversion forests, which still have forest covers (Table 8.1 and Table 8.2).

Approximately 120 million hectares of forest zones (62 per cent of total land area in Indonesia) were formally established based on the combination of desk studies, remote sensing images and provincial spatial developments plans of 1999 (Contreras-
Hermosilla and Fay, 2005). The quality of forests in the areas designated as ‘forest zones’ varies between high, medium and low-density planted and non-planted forests. Only 87 million hectares of the forest zones were reported to have actual forest cover (Contreras-Hermosilla and Fay, 2005). All provinces in Indonesia have a certain amount of state forestlands that are classified as production, conversion or conservation forests.

The total areas classified as state forestlands in Riau are 8.6 million hectares. Approximately 89 per cent of the total areas are classified as production forests, where 50 per cent can be converted to other land-use activities and the remaining 39 per cent is classified as permanent production forests. Both commercial logging and timber plantations can operate in permanent production forests, however, as commercial logging is no longer feasible in Riau, the expansion of timber plantations replaces the logged-over production forests. The issuance of licenses for timber plantations in Riau was approximately 106,625 hectares/year between 2001 and 2008, although the actual conversion of forests to acacia plantations was reported at 37,943 hectares/year between 1982 and 2007 (Ministry of Forestry, 2008a).36 Forests that are currently not under concession are mostly secondary forests with no potential for commercial logging, and can be converted to timber plantations. The total production forest area, with and without active licenses, that could be further converted to timber plantations amounts to 1,517,306 hectares (Ministry of Forestry, 2008a). Assuming the continuation of the current annual land-use change, all the remaining production forests would be converted to timber plantations over the next 40 years (Table 8.1).

Another major cause of deforestation is the expansion of oil palm plantations, which can take place in conversion forests. The total forest loss, due to oil palm plantations, was estimated at 1,113,090 hectares (around 44,000 hectares/year) between 1982 and 2007 (Uryu et al., 2008). In Riau, the remaining area of conversion forests with tree covers was estimated at 620,100 hectares (The Ministry of Forestry, 2008) (Table 8.1). Should the existing annual land-use change for oil palm plantations persist, Riau is expected to lose all the remaining forest covers in areas designated as conversion forests during the next 14 years.

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36 This rate is obtained based on the total area designated for timber plantations between 2000 and 2008, totalling 746,563 hectares (The Ministry of Forestry, 2008c).
<table>
<thead>
<tr>
<th>Forest Classification</th>
<th>Total area (ha)</th>
<th>Area with Tree cover (ha)*</th>
<th>Activities permitted by law</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production forests without active concessions</td>
<td>712,614</td>
<td>712,614</td>
<td>Timber plantations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Actual forest cover change to timber plantations was 37,943 ha/year between 1982 and 2007 (Uryu et al., 2008)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Timber plantation licenses issued were 106,625 ha/year (The Ministry of Forestry, 2008a)</td>
</tr>
<tr>
<td>Production forests under commercial logging concessions</td>
<td>1,207,003</td>
<td>804,692</td>
<td>Oil palm plantations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Forest cover change to oil palm plantations was 44,000 ha/year between 1982 and 2007 (Uryu et al., 2008)</td>
</tr>
<tr>
<td>Conversion forests</td>
<td>4,107,500</td>
<td>620,100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6,027,117</strong></td>
<td><strong>2,137,406</strong></td>
<td></td>
</tr>
</tbody>
</table>

* Source: Ministry of Forestry, 2008c.

In Papua, around 31 million hectares are designated as forest zone, where 10 million hectares are classified as production forests and an additional 6 million hectares as conversion forests. Moreover, approximately 14 million hectares are protected as conservation and protection forests. The main productive activity taking place in Papua’s forests is commercial logging. If the current trend continues in Papua province, all the remaining production forests currently without active concessions would be allocated to logging concessionaires over the next 30 years (Table 8.2). Commercial logging usually results in severe forest degradation. The areas degraded and deforested within the commercial logging concessions between 2000 and 2005 were reported at 709,968 hectares and 71,666 hectares respectively (Andrianto et al., 2008). At the existing annual rate of degradation (65,231 hectares/year), 1.96 million hectares of forests currently under logging concessions would be degraded over the next 30 years. Furthermore, between 1992 and 2008, the issuance of licenses to convert forests to oil palm plantations in Papua reached 318,550 hectares, or around 19,909 hectares annually (Ministry of Forestry, 2008c). Land-use change from forests to crop plantations in Papua and West Papua was reported at 7,510 hectares and 25,201 hectares between 2000 and 2005 and 2005 and 2008 respectively (Tropenbos International, 2010). With the current annual rate of expansion of oil palm plantations, which is 2,520 hectares in Papua province alone, deforestation would amount to 75,000 hectares over the next 30 years.

Table 8.2 Remaining production and conversion forest areas in Papua

<table>
<thead>
<tr>
<th>Total area</th>
<th>Area with</th>
<th>Activities permitted by law</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(ha)</td>
<td>tree cover</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td>Production forests</td>
<td>3,845,902</td>
<td>3,845,902</td>
</tr>
<tr>
<td>without active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>concessions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production forests</td>
<td>6,173,980</td>
<td>4,386,857</td>
</tr>
<tr>
<td>under commercial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>logging concessions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conversion forests</td>
<td>6,568,816</td>
<td>4,795,236</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16,588,698</td>
<td>13,027,995</td>
</tr>
</tbody>
</table>

* Source: Ministry of Forestry, 2008c.

8.1.2. Comparing different approaches to determine reference emission levels

RELs for Riau and Papua may be developed using the different approaches being proposed in the literature at the global level, including: i) average emissions from deforestation over a recent historical reference period (Santilli et al., 2005); ii) a combined incentives mechanism, which combines higher reference emission levels for countries with historically low deforestation rates and lower reference emission levels for countries with historically high deforestation rates (Strassburg et al., 2009); and iii) the annualised fraction of the volume of terrestrial carbon stocks estimated to be at risk of emission in the long run, based on biophysical, economic and legal considerations (Ashton et al., 2008).

When determining a REL for a locality, it is important to consider the remaining carbon stocks in standing forests and alternative land-use activities. A locality with a historically high deforestation rate, such as Riau, normally only has a small amount of carbon stocks in the remaining standing forests. Thus, even if the historical deforestation rate persists, the trend of carbon emissions from deforestation and forest
degradation is declining due to diminishing carbon stocks in standing forests. The approach to determine RELs proposed by Ashton et al. (2008) considers the remaining forest areas that are currently at risk. However, the approach ignores the existing practice of deforestation and uses only time as the indicator to estimate the total area of forests that will be deforested. Furthermore, in the case of Indonesia, certain alternative land-use activities can only legally take place in a particular forest classification. This study assumes that forest classifications would not be changed, unless the existing regulations were amended. Hence, estimation of the RELs needs to examine the historical deforestation rates caused by particular land-use activities and the remaining forests in forest classifications that could be converted to the land uses in question.

This study examined another approach to establishing the REL by combining three important indicators: i) the historical deforestation rate at the local level; ii) the remaining carbon stocks in standing forests that can be legally converted; and iii) alternative land-use activities that can legally take place in particular forest classifications. The following formulae formally describe the four approaches to calculating reference emission levels simulated in the paper:

1. Approach 1: historical reference emission levels (Santilli et al., 2005 cited in Busch et al., 2009)

\[ B_i = H_i \]

where, \( B_i \) = reference emission level (baseline) for locality i (t\( \text{CO}_2\text{eq} \));

\( H_i \) = historical emission level (business as usual) for locality i (t\( \text{CO}_2\text{eq} \));

2. Approach 2: reference emission level is weighted average of national and local historical rates (Strassburg et al., 2009 cited in Busch et al., 2009)

\[ B_i = [\alpha \times D_i + (1 - \alpha) \times \text{GAD}] \times CD_i \times 3.67 \]

\( D_i \) = historical deforestation rate for locality i (ha/yr);

\( \alpha \) = weight placed on the national historical deforestation rate;

\( \text{GAD} \) = national average deforestation rate (ha/yr);

\( CD_i \) = carbon density for locality i (tC/ha);

3.67 is the atomic ratio of carbon dioxide to carbon;
3. Approach 3: the reference emission level is the annualised fraction of forest carbon at risk of emission (Ashton et al., 2008 cited in Busch et al., 2009)

\[ Bi = \frac{Ai}{T} \]

\[ Ai = \text{forest carbon stocks at risk of deforestation over the long term in locality } i \] (tCO\(_2\)eq);

\[ T = \text{time over which forest carbon stocks is at risk (year);} \]

4. Approach 4: reference emission level is based on a combination of the historical deforestation rate and the remaining carbon stocks in forests that can be legally converted to other land-use activities.

\[ Bi = \frac{(Fi \times Gi)}{Di} \]

\[ Fi = \text{areas that can be converted to other land-use activities in locality } i (\text{ha}); \]

\[ Gi = \text{carbon emissions released due to land-use change from forest to other land-use activities (or emission factors) (tCO2eq/ha).} \]

Using the historical rate of deforestation (Approach 1) results in the highest estimate of carbon emissions (Table 8.3) since it does not consider the remaining forest areas that can actually be converted to other land-use activities. For instance, the annual deforestation from oil palm plantations in Riau is around 44,000 hectares. Should the existing rate persist, total deforestation over the next 30 years would amount to 1.32 million hectares. However, the remaining forests that can be legally converted to oil palm plantations in Riau are only 620,100 hectares. Thus, carbon emissions from deforestation and forest degradation could be expected to decrease due to the diminishing forest stocks. Approaches 3 and 4 consider the remaining forests that can be legally converted to other land-use activities. As previously mentioned, this study assumes that the present forest classifications stipulated by regulations would not be amended.

Approach 2 assigns weights for both the historical deforestation rate and the carbon stocks in standing forests (Strassburg et al., 2009). The assumptions used in this study are similar to those of Busch et al. (2009), where the national average deforestation rate for Indonesia is 0.47 per cent, while the weight assigned to the historical deforestation rate and to the total carbon stocks in standing forests is 0.85 and 0.15 respectively. Assigning a weight to the total carbon stocks in standing forests within the
administrative boundaries results in lower total carbon emissions compared to Approach 1.

Approach 3 assumes that the carbon stocks in forests at risk is emitted during the next 50 years (similar to the assumption made by Busch et al., 2009). Under this assumption, all forest areas that are currently classified as conversion forests in Papua (totalling 2.87 million hectares) will be converted to oil palm plantations over the next 30 years. In contrast, Approach 4 assumes that carbon stocks in standing forests at risk (or forests that can be legally converted to other land uses) will be deforested based on the historical rate. Using this approach, the total deforestation caused by oil palm plantations in Papua would only be 378,015 hectares over the next 30 years.

<table>
<thead>
<tr>
<th>Approach</th>
<th>Annual emissions (tCO2eq)</th>
<th>Emissions over 30 years (tCO2eq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papua</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>247,324,581</td>
<td>7,419,737,416</td>
</tr>
<tr>
<td>2</td>
<td>210,425,660</td>
<td>6,312,769,804</td>
</tr>
<tr>
<td>3</td>
<td>165,565,144</td>
<td>4,966,954,314</td>
</tr>
<tr>
<td>4</td>
<td>113,390,197</td>
<td>3,401,705,907</td>
</tr>
<tr>
<td>Riau</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>11,096,721</td>
<td>332,901,632</td>
</tr>
<tr>
<td>2</td>
<td>9,439,922</td>
<td>283,197,648</td>
</tr>
<tr>
<td>3</td>
<td>7,447,380</td>
<td>223,421,391</td>
</tr>
<tr>
<td>4</td>
<td>9,223,460</td>
<td>276,703,796</td>
</tr>
</tbody>
</table>

Applying different approaches results in varying amounts of RELs, which will eventually determine the assessment of performance achieved by each locality in reducing carbon emissions. Using the historical rate approach would result in an overestimate of the reduction in total emissions. Thus, this study argues that the remaining forests that can be converted to other land-use activities should be considered in the estimation of REL. Whilst Approach 3 considers the remaining forests (forests at risk), it ignores the historical deforestation rate. This study used therefore Approach 4 in the simulation of the amount of IFTs to distribute REDD+ revenues, which considers
both the remaining forests (carbon stocks) within the administrative boundaries and the historical deforestation rate.

Following estimation of the REL, the amount of IFTs allocated to Riau and Papua is simulated. It was assumed that all localities in Indonesia had reduced emissions by 50 per cent from the business as usual (BAU) level in the next 30 years. This figure is set in proportion to Indonesia’s commitment to reduce emissions by 26 per cent (without international support) or 41 per cent (with international financial support) from the BAU level by 2020 as stipulated in Presidential Decree 61/2011. In order to determine the RELs and total carbon emissions reduced at the district level, the average deforestation rate of all districts is assumed to be similar to the provincial level one. Hence, the amount of carbon emissions released by each district will vary depending on the total production forests that can be legally converted to other land-use activities (Figure 8.1). Data on forests, classified as conversion forests, at the district level in Riau are currently unavailable. For this reason, the fiscal simulation analysis for districts in Riau focuses on production forests with and without active concessions.
8.2 Distribution formulae of IFTs for REDD+ in Indonesia

This study assumes that the central government would obtain a portion of REDD+ payments through taxes and fees collected from REDD+ projects implemented by
private companies. The involvement of the private sector in REDD+ should be encouraged in forest areas that are currently under active concessions. On the other hand, the benefits generated by REDD+ projects operating in forest areas without active concessions could be retained entirely by the state since private companies do not need to be compensated. To determine the amount of REDD+ revenues to be distributed to local government levels, the derivation approach (Option 1) and the (opportunity) cost reimbursement approach (Option 2) are simulated.

The derivation approach (Option 1) determines the total grant size and the amount of IFTs for each district government based on a specified percentage of the total taxes or fees collected from REDD+ within a locality. Calculation of the grant size and the amount of IFTs allocated to eligible district governments under Option 1 applies the following formula:

$$IFT_i = \alpha_d \times P \times Q_i$$

$$GSIFT_D = \sum_{i=1}^{z} IFT_i$$

where, $IFT_i$ is the amount of IFT for district $i$;

$\alpha_d$ is the percentage of revenues distributed to the district level;

$P$ is the price ($$/tCO_2$) of carbon;

$Q_i$ is the total carbon emission reduction in district $i$ ($tCO_2eq$);

$GSIFT_D$ is the grant size for the district level using the derivation approach.

To decide the percentage of revenues distributed to the district level, this study refers to Ministerial Decree 36/2009 on REDD+ Implementation (Table 8.4). Ministerial Decree 36/2009 sets the portions of REDD+ revenues allocated to different stakeholders, including companies, various governmental levels and local communities. The decree has been criticised by some stakeholders, as it does not appear to be based on a detailed quantitative assessment of the share to be allocated to each stakeholder group.

Moreover, it was considered as beyond the mandate of the Ministry of Forestry to regulate the benefit sharing of REDD+ as it will have crossed sectoral implications. When an issue has an implication beyond a certain sector, it should be regulated by a government regulation. This study, however, uses the portions regulated by the Decree
only to simulate the impact of distributing revenues between different stakeholders, using the proposed percentages. Ministerial Decree 36/2009 allocates the largest share of the revenues to companies, the second largest share to the local community and the remainder is shared between government levels, with the central government receiving a significantly smaller share of the total revenues than the private and public revenues arising from current land-use activities (Table 8.4). The distribution stipulated in the Decree differs significantly from the existing allocation of revenues to different stakeholders from land-use alternatives to REDD+, which sees the central government receiving the largest share of revenues as discussed in Chapter 7. The Decree appears, therefore, to provide incentives to the various stakeholders (except for the central government) to choose REDD+ activities compared to land-use alternatives, as long as the absolute value of the former is not lower than the latter. The non-producing districts are the only stakeholder, who would not receive a share of REDD+ revenues.

Table 8.4 Revenue distribution between stakeholders (per cent)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Company</th>
<th>Total Government</th>
<th>National</th>
<th>Provincial</th>
<th>Producing District</th>
<th>Other District</th>
<th>Local community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial logging in primary forests</td>
<td>45.4</td>
<td>54.6</td>
<td>31.9</td>
<td>1.4</td>
<td>16.7</td>
<td>4.6</td>
<td></td>
</tr>
<tr>
<td>Timber plantations in degraded forests</td>
<td>59.2</td>
<td>40.8</td>
<td>29.8</td>
<td>1.1</td>
<td>8.0</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>Oil palm plantations in degraded forests</td>
<td>54.1</td>
<td>45.9</td>
<td>44.7</td>
<td>0.1</td>
<td>1.0</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Oil palm plantations in primary forests</td>
<td>55.3</td>
<td>44.8</td>
<td>39.9</td>
<td>0.4</td>
<td>3.8</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>REDD+ in production forests</td>
<td>60.0</td>
<td>20.0</td>
<td>8.0</td>
<td>4.0</td>
<td>8.0</td>
<td>0.0</td>
<td>20.0</td>
</tr>
</tbody>
</table>


Option 2 determines the grant size and the amount of IFTs to eligible units based on the cost reimbursement approach (the costs of REDD+ at the local level). Ideally, the cost reimbursement approach should include the estimation of all costs of REDD+, including

37 Local community probably refers to local stakeholder groups, however the Decree does not provide a clear definition.
opportunity, management and transaction costs. However, this study focuses only on the opportunity costs due to the paucity of data related to REDD+ management and transaction costs. It draws on the analysis of REDD+ opportunity costs reported in Chapter 7, which discusses the share of revenues accruing to the various stakeholders on the basis of ongoing land uses, the taxation framework, and allocation of revenues among the different government levels. The distribution formula for the cost reimbursement approach is as follows:

\[ \text{IFTCR}_i = (OC_{\text{Doil}} \cdot Q_{\text{oil}}) + (OC_{\text{dtimber}} \cdot Q_{\text{timber}}) + (OC_{\text{dlogging}} \cdot Q_{\text{logging}}) \]

where, IFTCR, is IFT for District i based on the cost reimbursement approach;

- \( OC_{\text{Doil}} \) is the opportunity cost accruing to the district level from palm oil (\$/tCO\text{2eq});
- \( OC_{\text{dtimber}} \) is the opportunity cost accruing to the district level from timber plantations (\$/tCO\text{2eq});
- \( OC_{\text{dlogging}} \) is the opportunity cost accruing to the district level from commercial logging (\$/tCO\text{2eq});
- \( Q_{\text{oil}} \) is the total carbon emission reductions in District i from avoided oil palm plantations (tCO\text{2eq});
- \( Q_{\text{timber}} \) is the total carbon emission reductions in District i from avoided timber plantations (tCO\text{2eq});
- \( Q_{\text{logging}} \) is the total carbon emission reductions in District i from avoided commercial logging (tCO\text{2eq}).

### 8.3 Results: grant size and the amount of IFTs

Using the cost reimbursement approach, the size of grants allocated to provincial and district governments will be similar to the opportunity costs incurred to reduce deforestation and forest degradation. The distribution of REDD+ revenues considers therefore the cost curve of reducing emissions in each province and district, which varies depending on the condition of the forests and land-use alternatives. If all provinces had to reduce deforestation and forest degradation by 50 per cent below the BAU level, the total emission reductions would be 138 million tCO\text{2eq} and 1,700 million tCO\text{2eq} in Riau and Papua respectively. Reducing emissions in Riau would involve a cost of US$ 18.94/tCO\text{2eq} for the first 154 million tCO\text{2eq} (mainly from
preventing the conversion of degraded forests to timber plantations). Reducing an additional 122 million tCO₂eq would cost US$ 56.34 per tCO₂eq, which arises from preventing the conversion of degraded forests to oil palm plantations (Figure 8.2). In Papua, reducing the first 2,998 million tCO₂eq would cost only US$ 0.56 per tCO₂eq (from preventing commercial logging in primary forests), whilst an additional reduction of 328 million tCO₂eq and 74 million tCO₂eq would cost US$ 12.9 per tCO₂eq (from preventing the conversion of degraded forests to timber plantations) and US$ 18.9 per tCO₂eq (from preventing the conversion of primary forests to oil palm plantations) respectively (Figure 8.3).

**Figure 8.2 The cost curve of reducing emissions from deforestation and forest degradation in Riau**
Using the derivation approach, the distribution of REDD+ revenues is based on the assumed price of carbon and the shares of revenues allocated to local levels. Hence, the derivation approach in the distribution of benefits from REDD+ would set a flat rate per ton of carbon emissions reduced and ignore the opportunity costs of local governments from alternative land-use activities. Using the existing carbon price in the European market (EUA), which is in the range of US$16–17, the grant size for Papua would be significantly higher than the actual opportunity costs (Table 8.5). In contrast, the grant size for the district level in Riau, determined by the derivation approach, would be lower than that decided by the cost reimbursement approach. Furthermore, the provincial level in Riau could obtain a higher transfer when determining the amount of IFTs using the derivation approach than the cost reimbursement approach, because the share of revenues allocated for the provincial level is significantly higher under Ministerial Decree 36/2009 compared to the actual opportunity costs (Table 8.5).
Table 8.5 Grant size for each government level using Approach 4 to determine RELs (US $ million)

<table>
<thead>
<tr>
<th>Options</th>
<th>National</th>
<th>Provincial</th>
<th>Producing District</th>
<th>Other District</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Riau</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost reimbursement Derivation</td>
<td>784</td>
<td>30</td>
<td>217</td>
<td>50</td>
</tr>
<tr>
<td>Ministerial Decree 36/2009¹</td>
<td>188</td>
<td>94</td>
<td>188</td>
<td>0</td>
</tr>
<tr>
<td>Papua</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost reimbursement Derivation</td>
<td>305</td>
<td>12</td>
<td>150</td>
<td>46</td>
</tr>
<tr>
<td>Ministerial Decree 36/2009²</td>
<td>2,313</td>
<td>1,157</td>
<td>2,313</td>
<td>0</td>
</tr>
</tbody>
</table>

Legend:
2. Additional US$ 5.8 billion for local communities.

If all districts in Papua were required to reduce emissions by 50 per cent from the BAU level, most districts could reduce their emissions at a cost of US$ 0.56 per tCO₂eq (from preventing commercial logging in primary forests. Some districts, such as Sarmi and Boven Digoel Districts, would have higher opportunity costs to reduce 50 per cent of the emissions from the BAU level, as they would also need to prevent the conversion of primary forests to oil palm plantations (or agricultural activities), which would cost US$ 12.89 per tCO₂eq. In Riau, the cost of reducing 50 per cent of the emissions from the BAU level is approximately US$ 18.96 per tCO₂eq (from preventing the conversion of degraded forests to timber plantations), except in a few districts such as Pekan Baru, Kuantan Singgingi and Dumai Districts. In these districts, reducing 50 per cent of the emissions from the BAU level would also require preventing the conversion of degraded forests to oil palm plantations, which would cost US$ 56.34 per tCO₂eq.

Using the cost reimbursement approach, districts with logged-over forests, such as in Riau, would receive higher revenues compared to their counterparts with intact primary forests, such as in Papua. Avoiding further conversion of logged-over areas is associated with higher opportunity costs compared to preventing the conversion of intact primary forests as discussed in Chapter 7. The conversion of logged-over forests is associated with higher opportunity costs because the alternative land-use activities in those areas are mainly timber plantations and oil palm plantations. These activities generate higher revenues compared to commercial logging that can only take place in
primary forests. Additionally, the total carbon stocks retained in logged-over forests are much lower compared to the intact primary forests, which further increase the opportunity costs per unit carbon reduction (Palm et al., 1999).

Using the derivation approach, districts with more intact primary forests, which have not been exploited, would benefit more from REDD+ compared to their counterparts with more logged-over areas. Districts in Papua would receive approximately 10 times the actual opportunity costs (Figure 8.4), whilst districts in Riau would receive transfers lower than the opportunity costs (Figure 8.5). With the assumed price of carbon, Riau might not be interested in REDD+, particularly in forests currently under active concessions, although REDD+ may compete economically with other land-use activities in forest areas, currently without active concessions, as the government can retain all benefits that may accrue from REDD+. In forests currently without active concessions, the portion of benefits for companies can be retained by the government entirely and distributed to different levels. For this reason, the government may want to conserve forests currently without active concessions and focus on maximising revenues from productive activities in forests with active concessions. A total of 712,614 hectares and 3,8 million hectares of forests are currently without active concessions in Riau and Papua respectively.

Figure 8.4 The amount of IFTs allocated to district governments in Riau (US$)
Using both approaches, assuming that REDD+ would not provide compensation for the existing protected and conservation forests, districts such as Boven Digoel, Mappi, Merauke, Sarma, Mamberamo and Asmat Districts in Papua (Figure 8.4), would obtain higher transfers compared to their counterparts that do not have production forest areas such as Pegunungan Bintang and Puncak Jaya Districts. Most districts with extensive conservation and protection forests in Papua are fiscally poor (i.e. Pegunungan Bintang and Puncak Jaya) due to their lower access to forests and limited alternative land-use activities. In Riau, there is no clear relationship between fiscal capacity and the area of conservation and protected forests. The main income source in Riau is oil and the forestry and agricultural sectors do not play a significant role in the revenue composition (that is, fiscal capacity) of local governments. Districts that would obtain high revenues from REDD+ implementation in Riau are Bengkalis, Pelalawan and Indragiri Hilir (Figure 8.5). Bengkalis is one of the districts in Riau with high fiscal capacity, while Pelalawan has low fiscal capacity.

8.4 Discussion: the derivation vs. the cost reimbursement approach

This chapter has demonstrated that it is possible to use both the derivation and the cost reimbursement approaches to determine the amount of IFTs to distribute REDD+
revenues. Using the cost reimbursement approach, the amount of IFTs allocated to
district governments is just enough to cover the costs of reducing carbon emissions at
the local level. The payment per ton of carbon for each district will vary depending on
the alternative land-use activities and the carbon stocks retained in the forests. Local
governments with low opportunity costs would receive a lower amount of IFTs per ton
of carbon compared to their counterparts with higher opportunity costs. The cost
reimbursement approach results in higher transfers to districts with more degraded
forests than those with more primary forests.

Determining the amount of IFTs using the cost reimbursement approach would avoid an
excessive producer surplus allocated to districts with low opportunity costs. The
producer surplus is the area above the cost curve and below the price line (Hanley and
Spash, 1993). At the international level, Cattaneo (2008), for instance, suggests that the
producer surplus could be used to compensate for carbon stocks in standing forests to
reduce leakage (Cattaneo, 2008). Leakage, which occurs when the pressure of
deforestation shifts from one location to others within a country, can result in no
significant emission reductions from deforestation in the country overall. Providing
incentives for all standing forests in a country could be expected to reduce leakage
(Cattaneo, 2008). At the local level, a producer surplus can also be allocated to offset
more emissions from deforestation and forest degradation in other localities with higher
opportunity costs. However, localities with low opportunity costs would rather keep the
producer surplus (as net profits), rather than allow the national government to keep it for
offsetting more carbon (or the opportunity costs) in other locations. When deciding on
the land-use allocation of a unit of land within their administrative boundaries, local
governments would prefer to generate the highest return (profit) from the land, and
would be less concerned about the total reductions of emissions achieved in the country.

The derivation approach to determine the amount of IFTs for local governments sets a
flat rate per unit of avoided carbon emission, irrespective of the costs of REDD+ borne
by local stakeholders. The amount of IFTs is decided based entirely on the defined
percentage of revenues to be distributed to local levels and the price of carbon credits in
the market. When the price of carbon is low, REDD+ can only attract the participation
of low-cost districts, while a high carbon price would generate a producer surplus for
low-cost producing districts. Hence, using the derivation approach, local governments
should be allowed to decide voluntarily their participation in REDD+ based on the assessment of cost-benefit of REDD+. Voluntary participation would allow the government to allocate lands for land-use activities that generate the highest return, either for productive activities or conservation (REDD+), to maximise society’s welfare as a whole.

Using the derivation approach, the grant size of IFTs allocated to the local levels is decided based on a fixed percentage. In the case of Indonesia, Ministerial Decree 36/2009, for instance, stipulates that the district level obtains as much as 8 per cent of the total revenues generated from REDD+. In contrast, according to the opportunity cost analysis presented in Chapter 7, the revenue distribution from oil palm plantations is currently centralised, with district governments obtaining a meagre portion of the total revenues captured by the government. Given the existing fiscal decentralisation in Indonesia, it is thus important to question whether distributing the revenues based on the existing incentive structure is sufficient to shift the interest of local governments in conservation. Increasing the portion of revenues allocated for local governments would provide more incentives for local stakeholders to pursue REDD+, however, it would also compromise the total revenues retained by the national government. Thus, if the national government is committed, then a larger portion needs to be assigned to local stakeholders at the expense of the national government’s portion of revenues.

According to the literature on fiscal decentralisation, the distribution formula of IFTs should be easily understood and cannot be influenced by local governments by manipulating their expenditure and tax decisions (Shah, 2006). Both the derivation and cost reimbursement approaches cannot be influenced by local governments. Using the derivation approach, the amount of transfers allocated to local governments is based entirely on the percentage assigned for local levels, which is usually regulated by government legislation, and also on the amount of the tax collected within localities (Bahl, 2000; Bahl and Wallace, 2007; 2005; Bird, 1999). Moreover, the cost reimbursement approach cannot be influenced by local governments through lobbying with the national government as the amount of IFTs is decided based on a set of quantitative criteria, consequently it is less likely to be manipulated through political negotiations (Bahl, 2000; Bird, 1999). Finally, the derivation approach is usually used to determine the amount of transfers for the revenue sharing mechanism, while the cost
reimbursement approach is often used to decide the amount of conditional or unconditional grants (Bahl, 1999; 2000; Bird 1999). However, to compensate the opportunity costs of REDD+, an unconditional transfer is suggested, as discussed in Chapter 6. An unconditional transfer will ensure that REDD+ will not compromise the capacity of local governments to provide public services.

Using the derivation approach, the fluctuation of carbon prices will have no particular impact on the portion of transfers allocated to different levels vertically and between districts horizontally. The vertical distribution is influenced mainly by the percentage of revenue distribution, which is usually formalized by a government regulation; while, the horizontal allocation of IFTs amongst districts is only influenced by the total carbon emissions avoided from deforestation and forest degradation in respective district. The changing carbon prices however will influence the willingness of local governments to participate in REDD+ (which is determined by the costs of REDD+).  

The carbon price of US$ 10 (the price of EU allowance as of the start of 2012) can offset the opportunity costs of reducing the first 2,998 million tCO₂eq emissions from preventing commercial logging in primary forests in Papua. To offset the additional 328 million tCO₂eq and 74 million tCO₂eq (from preventing the conversion of degraded forests to timber plantations) would cost US$ 12.9 per tCO₂eq. Therefore only when the price is around US$ 17 (European Carbon Market price in June 2011), REDD+ could offset all carbon emissions from REDD+ in Papua. In contrast, with the carbon price of US$ 17, only two districts in Riau, namely Pekan Baru and Kuantan Singingi, may be interested for REDD+. Only when the price of carbon is according to the price set by the Australian Government, which is AU$ 23, REDD+ can offset the opportunity costs of reducing 154 million tCO₂eq emissions in Riau mainly from preventing the conversion of degraded forests to timber plantations. Reducing an additional 122 million tCO₂eq would cost US$ 56.34 per tCO₂eq, which cannot be offset under the existing price scenarios of carbon credit.

39 The average price for offsets across the primary forest carbon markets rose from US$3.8/tCO₂e in 2008 to US$5.5/tCO₂e in 2010 (Diaz et al, 2011). Prices for EU allowances were trading at approximately €7/ton at the start of 2012, down more than 50 per cent from €15/ton at beginning of the 2011. CERs EU ETS were trading at just €3/ton at the beginning of January, down from €10/ton at the start of 2011. New Zealand carbon prices have similarly dropped to NZ $7/ton at the start of 2012, compared to NZ$20/ton at the beginning of last year. While stable for most of 2011, prices in North America’s California carbon market at the end of 2011 have ended at US$16/ton (Terra Carbon, 2012). Moreover, the level of the proposed Australian carbon tax is AU$23.
8.5 Conclusion

The importance of assigning sufficient financial resources to support conservation, and specifically REDD+, to local governments in decentralised countries has been argued in this thesis. To determine the amount of IFTs related to the distribution of REDD+ revenues, both the cost reimbursement and the derivation approaches can be used. Using the cost reimbursement approach, the revenues distributed to local governments for pursuing REDD+ is determined entirely based on the opportunity costs, which vary depending on the land-use alternatives and conditions of the forests within a locality. Hence, there is an equity issue associated with this approach, as districts that have degraded their forests will receive higher revenues using this approach than those that have not pursued deforestation and forest degradation. Using the cost reimbursement approach would also require estimating the costs of REDD+ for all localities, which may involve high transaction costs.

The distribution of REDD+ revenues amongst eligible district governments using the derivation approach ignores the opportunity costs faced by local governments from alternative land uses. This approach considers only the market price of carbon and the share of revenues allocated to local levels. Localities with opportunity costs higher than the price of carbon should be allowed to opt out of participating in REDD+, while localities with low opportunity costs would be allowed to keep the producer surplus arising from reducing emissions. Voluntary participation of local governments is therefore a prerequisite for this approach to succeed because districts with high opportunity costs may not be interested in participating if the price of carbon is low. Furthermore, using the derivation approach does not require an estimation of REDD+ costs for all districts, which would reduce the transaction costs of implementation of REDD+.

Designing IFTs for channelling REDD+ revenues to local governments requires ecological indicators that differ from those that are normally used to determine the amount of IFTs for biodiversity conservation, such as total areas of protected forests and a biodiversity index. On the other hand, REDD+ focuses on additional forest conservation to avoid carbon emissions. The distribution of REDD+ revenues should
consider therefore indicators such as the historical deforestation rate, forestland that can be legally converted for other land-use activities (the remaining carbon stocks in forests), and alternative land-use activities.

Existing conservation and protected areas may not be eligible for compensation under REDD+ as compensation is only justifiable when REDD+ projects or measures can be proven to contribute to the additional reduction of emissions and/or enhancement of carbon stocks. However, if there is no compensation for existing conservation forests, there will be an inequality implication for districts sustaining protected and conservation areas. With limited forest resources that can be legally exploited, districts with protected and conservation forests are often poorer than their counterparts with abundant production forests. If all the easily accessible forests are closed for exploitation, the pressure for deforestation could shift to the protected and conservation forests. For this reason, financial allocations to support the latter forest categories is required. When deforestation is prohibited by law, the opportunity costs from the next best alternative land use is not appropriate as the cost of improving the enforcement of law should be the relevant cost for the government (Gregersen et al., 2010b). To support the existing conservation and protected forests, localities can then be compensated on the basis of the costs of managing forests at the local level.

Following the discussion of the results of the analyses conducted in this study, next chapter summarises the findings into the proposed design of IFTs for REDD+ revenue distribution in Indonesia and reflects further on the theoretical implications of the findings, particularly on IFTs for conservation in developing countries.
Chapter 9 Conclusion

Conservation restricts local governments from generating public revenues from forests. Local governments obtain a portion of the revenues from land-use change and forest exploitation to finance the provision of local public services. Spatial externalities created by conservation result in local governments being reluctant to set aside their productive lands for conservation, particularly when local people demand forest conversion to pursue their livelihoods. Intergovernmental fiscal transfers (IFTs) play therefore an important role in creating incentives for local governments to pursue conservation at the local level.

This study has considered important elements of the design of IFTs for conservation, using the case of REDD+ revenue distribution in Indonesia. This study is novel in three ways. First, it proposes a design of IFTs for REDD+ revenue distribution in Indonesia. The findings can provide a concrete example of a mechanism to distribute revenues of REDD+ to subnational governments in developing countries. Second, the study has analysed: i) all elements of the design of IFTs for conservation, including the distribution formula, conditionality and accountability; and ii) the technical capacity and other important factors that need to exist when transferring IFTs for conservation. Studies on IFTs for conservation have focused mainly on the distribution formula (Köllner et al., 2002; Ring, 2008c; Kumar and Managi, 2009), while conditionality and accountability of IFTs have received less attention. Moreover, research on IFTs for conservation, particularly in developing countries, has not considered the complex setting of government bureaucratic structures (Ring, 2008c; Kumar and Managi, 2009). Hence, the findings of this study are expected to contribute to the growing body of literature on IFTs for forest conservation, particularly in developing countries. Finally, the methodological discussion on the importance of combining both rational and interpretivist policy analysis when developing options to address an environmental
problem contributes to the literature on environmental policy. Applying the suggestion made by public policy scholars (i.e. Fischer, 1998; 2003; Lin, 1998; Bobrow and Dryzek 1987), this study has provides a practical application for bridging between the gap between the positivist and interpretivist approaches in policy formulation to address environmental problems.

The study has examined the role of financial incentives and other factors in influencing local governments' interest in and commitment to conservation in Indonesia (Chapter 5). It has also analysed the perspectives of government officials on the design of IFTs for REDD+ revenue distribution, including the distribution formula, conditionality and accountability (Chapter 6), and the options for IFT formulas to distribute REDD+ revenues to district governments (Chapter 7 and Chapter 8). To address these issues, the theory of decentralised forest management was examined from the fiscal decentralisation perspective (Chapter 2), before considering some of their implications for the implementation of REDD+ and the possible role of IFTs in distributing REDD+ revenues (Chapter 3). The overall methodological approaches to the study were discussed in Chapter 4.

Local governments in Indonesia obtain a small portion of the revenues from forest exploitation and land-use change, which is transferred through the revenue sharing mechanism. As discussed in Chapter 7, the national government that retains a major portion of the revenues also shares its total income with local governments using an unconditional grant. The amount of the unconditional grant is determined without considering economic activities pursued at the local levels, as it is distributed based on the total number of civil servants, the population and local governments’ fiscal capacity (Chapter 6). Local governments in Riau, for instance, revealed their reluctance to pursue conservation, as they have to finance forest related services at the local level using limited resources, whilst local people often demand forest conversion to pursue their livelihoods (Chapter 5). Interviews with government officials reveal that a dynamic interaction between actors and their different interests determines final decisions on land-use activities. Financial incentives play an important role in influencing local governments interest in and commitment to conservation and reducing deforestation and forest degradation. Financial resources are also important for financing forest related services at the local level and for compensating revenue loss at the local level. Although
local level governments only receive a small share of the revenues from land use activities, however, they do receive benefits from timber and oil palm plantations. This provides a basis for the need to compensate the forgone benefits from productive activities, which is imperative to provide compensation for conservation to local governments. Thus, IFTs can be used to create incentives for local governments in conservation. However they should be designed considering not only the technical criteria of well-designed IFTs, but also the wider political and administrative setting of a decentralised country.

Bringing together the findings presented in the previous chapters, this chapter reflects on their theoretical and practical implications for the design of IFTs for REDD+ revenue distribution and the criteria of well-designed IFTs for conservation. The chapter first summarises the design of IFTs for REDD+ revenue distribution and situates it in the different phases of the implementation of REDD+ in Indonesia. As discussed in Chapter 3, REDD+ may be implemented in three phases; strategy development, readiness and full implementation phases. Different funding mechanisms may be involved in each phase (Vatn and Angelsen, 2009; Meridian Institute, 2009), hence, it is important to explore when to use IFTs for REDD+ revenue distribution within the different implementation phases. The discussion then proceeds with the contribution of the findings of this study to the literature on IFTs for conservation and the policy analysis framework for developing environmental policy. Finally, the chapter concludes with a discussion of the limitations of the study and makes recommendations for future research.

9.1 The proposed design of IFTs for REDD+ revenue distribution in Indonesia

9.1.1. Options of IFTs for REDD+ revenue distribution

This study has presented the perspectives of government officials, who would be involved in the development and implementation of IFTs in Indonesia, about the options for IFTs for REDD+ revenue distribution. As discussed in Chapters 6, the first consideration when developing options for IFTs for REDD+ revenue distribution is the purpose of the transfers. IFTs for REDD+ revenue distribution need to serve two main purposes: i) ensuring that REDD+ measures will not affect local governments' fiscal
capacity to deliver public services; and ii) financing forest related services at the local level to ensure the successful implementation of REDD+. Based on the perspectives of government officials, the two preferred mechanisms to distribute REDD+ revenues were the revenue sharing mechanism and conditional grants. Each of the mechanisms can serve different purposes of IFTs for REDD+ revenue distribution as discussed below.

A revenue sharing mechanism can be used to ensure that REDD+ measures will not affect local governments' fiscal capacity to deliver public services. An alternative to the revenue sharing mechanism is an unconditional grant. Government officials interviewed in this study did not specifically mention unconditional grants as their preferred mechanism because the unconditional grant mechanism currently implemented in Indonesia (known as the General Allocation Fund) is not considered suitable for REDD+ revenue distribution. Using the existing unconditional grant mechanism to transfer REDD+ revenue would distort the purpose of the grant, which mostly aims to finance the wages of civil servants at the local level, and may not create a strong and direct link between the funds transferred with activities for reducing deforestation implemented at the local level (Chapter 6). The unconditional grant proposed here is a specific lump sum transfer created for REDD+ revenue distribution, which is separate to the existing unconditional grant already being implemented.

Both the revenue sharing mechanism and unconditional grant carry similar conditionality, as they are distributed to local stakeholders without any specific conditions, although they are different in terms of the distribution formula as discussed below. Both mechanisms can be used to compensate the forgone taxes and fees, which are important to finance routine expenditures and public services in other sectors, as discussed in Chapters 7 and 8. Local governments can then decide the use of the funds based on activities that are considered important for the localities. If these mechanisms were to be used to distribute REDD+ revenues, the transfer would have to carry output conditionality (or performance-based accountability), where the transfers can only be made when recipients have achieved the prescribed targets (Shah, 2006). In the case of REDD+, a transfer could be disbursed once emission reductions have been measured, reported and verified (Table 9.1).
The revenue sharing mechanism usually applies the derivation approach, while the amount of an unconditional grant can be determined using the formula approach (Chapter 8). In the case of REDD+, determining the amount of IFTs for local governments, using the derivation approach, means setting a flat rate of compensation per unit emission reduction. Thus the amount of IFTs depends on the total emission reductions achieved in a locality and the percentage of revenues allocated to the local level. Using the formula approach, the amount of transfer for local governments is decided based on the costs of local governments to pursue REDD+. Local governments with low opportunity costs would receive a lower compensation per unit emission reduction compared to their counterparts with higher opportunity costs. This approach also needs to consider the alternative land-use activities and condition of the forests in localities.

The financing of specific forest-related services at the local level to ensure successful REDD+ implementation could use a conditional grant. The use of the funds to finance specific activities for the implementation of REDD+ at the local level needs to be earmarked. The national government could provide prescriptions on activities that need to be financed at the local level, however, local governments should also be provided with the flexibility to pursue activities that are most required in their localities. Conditional grants can specify the type of expenditures that can be financed (input-based or expenditure conditionality) and the disbursement usually requires local governments to report to the national government on a regular basis. Conditional grants allow therefore for upfront financing to invest in REDD+ activities during the initial period of implementation (Table 9.1).

This study, however, did not estimate the amount of IFTs required to finance specific services at the local level related to REDD+ implementation, due to lack of data available on REDD+ management and transaction costs at the subnational level. The national government could use a cost reimbursement (formula) approach to determine the grant size to finance specific services at the local level (Bird, 1999; Bahl, 2000; Bird and Smart, 2002; Shah, 2006). The formula approach can apply quantitative criteria to estimate the amount needed to provide REDD+ related services to eligible local government units. In the case of REDD+, estimation of the transaction and management
costs would require a clear definition of roles and responsibilities to be performed by local governments in its implementation.

<table>
<thead>
<tr>
<th>Purpose of IFTs</th>
<th>Revenue Sharing</th>
<th>Unconditional Grant</th>
<th>Conditional Grant</th>
</tr>
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<tbody>
<tr>
<td>Ensuring that REDD+ measures will not affect local governments' fiscal capacity to deliver public services</td>
<td>Ensuring that REDD+ measures will not affect local governments' fiscal capacity to deliver public services</td>
<td>Financing forest related services at the local level to ensure the successful implementation of REDD+</td>
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</tr>
<tr>
<td>Grant size</td>
<td>Percentage of national taxes or fees</td>
<td>Formula approach based on the opportunity costs</td>
<td>Distribution formula based on costs of providing services at local levels</td>
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<tr>
<td>Distribution formula</td>
<td>Percentage of revenues allocated to district level, total emission reduction, and the price of REDD+ carbon credit</td>
<td>Opportunity costs per ton of carbon and total emission reduction</td>
<td>Cost elements of providing related services (incl. physical indicators, regional characteristic population)</td>
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<tr>
<td>Conditionality</td>
<td>Unconditional</td>
<td>Unconditional</td>
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<tr>
<td>Accountability</td>
<td>Performance accountability (based on emission reductions achieved)</td>
<td>Performance accountability (based on emission reductions achieved)</td>
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</tr>
</tbody>
</table>

Officials from the forest, finance and planning agencies at the national, provincial and district levels were interviewed in this study. As presented in Chapter 6, each agency has a different mandate, thus, their views on the options for the design of an IFT mechanism differ. It was found that differences in perspectives are more significant between agencies rather than between government levels. Officials from forest agencies are mostly concerned with generating revenues from forest resources and implementing forest related services, hence, they favour a revenue sharing mechanism for REDD+ revenue distribution. They also prefer flexibility in terms of the use of the funds. Chapter 6 noted that the guidelines about the use of the reforestation fund pay no attention to local conditions, hence, many rehabilitation activities are not implementable. In contrast, the finance agencies found that a conditional transfer is preferable to revenue sharing. Those officials are responsible for the timely
disbursement of funds, thus they are more concerned with the administration of the fund and less with the technical performance of the service delivery. Conditional grants are considered easy to administer. Clear guidelines about how funds transferred to the local level should be spent can prevent any mistakes in using the funds, particularly when capacity in financial management is generally low at the local level (Chapter 6). Officials from the planning agencies at all levels appear to be mostly concerned about overall economic development, particularly the welfare of local communities. Therefore, they favour a revenue sharing mechanism to ensure that REDD+ benefits could also be spent for basic service provision. The main difference in views between officials at different government levels is about the distribution formula and the grant size of REDD+ revenues. Local government officials think, as could be expected, that the share of REDD+ revenues to be distributed to the local governments should be higher than the existing share from taxes on resource extraction.

In discussing the preferred mechanisms of IFTs for REDD+, government officials consider the existing capacity of local governments to manage public revenues at the local level. As previously mentioned, conditional grants are considered easy to administer as they are transferred with clear prescriptions on how they can be spent. In contrast, it was noted that using revenue sharing to distribute REDD+ revenues requires certain capacity of local governments to be involved in the data collection and monitoring of emission reductions or carbon stock enhancement. The use of revenue sharing mechanisms for REDD+ revenue distribution can be constrained by the existing capacity of local government. Hence, it is important to situate IFTs within different implementation phases of REDD+ in Indonesia and this is considered in the next section.

9.1.2. Situating IFTs within the phases of REDD+ in Indonesia

As discussed in Chapter 3, parties to UNFCCC propose a phase-based approach considering the technical capacity to implement REDD+ in developing countries. In each of the phases, several funding options are available (Vatn and Angelsen, 2009; Meridian Institute, 2009). Phase One focuses on strategy development and core capacity building, where voluntary (bilateral and multilateral) contributions are likely to be the main funding source. Phase Two is when national REDD+ policies and measures are
implemented. During this phase, compensation for proxy-based results of emission reductions is proposed, with funding from bilateral and multilateral donors and/or the convention mandated fund-based finance, such as a global forest facility (Vatn and Angelsen, 2009; Meridian Institute, 2009). Phase Three is a full implementation of emission reductions and removals from the forestry and land-use sectors. Funding for this phase would be obtained from the selling of certified carbon credits in international carbon markets.

The perspectives of Indonesian government officials about how REDD+ funds could be channelled from the national to local levels vary depending on the financing options of REDD+ agreed at the international level (Chapter 6). If REDD+ revenues were channelled through a global fund, the distribution of funds to the subnational level would need to use a foreign grant modality. Under a functioning carbon market, the government could generate revenues from taxes or fees; hence, the distribution of revenues to subnational governments could use IFTs. Each of these financing options is discussed below.

The foreign grant modality allows sectoral ministries to distribute grants to local governments. According to Government Regulation 02/2006, grants distributed to local governments need to consider fiscal capacity and obtain a recommendation from the Ministry of Home Affairs. Local governments can propose activities to be financed by foreign grants, particularly for infrastructure investments, to the Ministry of National Development Planning, which will then develop a priority list of foreign grant projects. The distribution of foreign grants to local governments requires a grant agreement between the relevant ministry and the local government. The agreement details the amount, the purpose and the conditions of the grant.\(^{40}\) Thus, use of the grants is usually earmarked for particular activities, and the implementation is usually carried out under a project management unit (PMU). A foreign grant can also be implemented through a Public Service Unit (PSU), which is an institution within the state administration to supply public goods and services. Although a PSU is a non-profit organisation, staff can be drawn from the private sector and private sector institutions may be engaged to administer the funds. Hence, they operate similar to semi-privatised institutions (Barr et

\(^{40}\) Government Regulation 02/2006.
A PSU is linked to the state treasury, thus it can receive funds from the state budget.

Implementation through a PMU or a PSU would have both advantages and disadvantages. A PSU is considered part of the sectoral ministries therefore stronger ownership and coordination than a PMU could be expected. However, implementation may be constrained by a number of administrative issues causing delays in implementation activities, particularly when a PSU receives funds from the state budget (see Barr et al., 2009; Yuliastuti, 2009). A transfer of funds from the state budget would have to follow the yearly government budget cycle, which has to follow guidelines set by the national government. In contrast, a PMU can be implemented outside the state administration, where an independent financial institution can be assigned as a trustee to manage and disburse funds. This arrangement can allow a more efficient disbursement process compared to a PSU. In November 2011, REDD+ finance received by Indonesia was around $42 million approved and $40 million disbursed (Nakhooda et al., 2011). The Government of Indonesia, as the main recipient of REDD+ finance in Asia, has managed REDD+ finance through PMUs in respective government agencies.

A functioning carbon market could allow greater involvement of the private and non-profit sectors in REDD+ implementation. If performance can be specified and effective contract oversight maintained, the involvement of private and non-profit sectors is preferable because government programme delivery is usually less efficient and effective (Bradbury and Waechter, 2009; Hogde, 2000; Box, 1999). According to the existing REDD+ negotiations, a country authorising private or public entities to participate in REDD+ measures shall remain responsible for the fulfilment of its obligations under the convention (UNFCCC, 2009a). A national certification body would therefore be required to perform activities such as establishing a measurement, reporting and verification (MRV) system, assuming liability and law enforcement, which are the responsibility of the national government (Vatn and Angelsen, 2009; Eliesch Review, 2008). However, this body should not interfere with the market. With a functioning carbon market, the government could levy taxes and fees on REDD+ carbon credits.
As discussed in Chapter 6, the difference between using a fund-based mechanism and a functioning carbon market is how government stakeholders would obtain REDD+ benefits. Foreign grants usually carry conditions and the government may not be able to use the grants for general budget support. When the grants are allocated to a specific sector, the flow of funds would not be channelled into the ministry’s budget, but through a PMU or a PSU, which is outside the state treasury. Following the state financial reforms in Indonesia after the fall of Soeharto, off-budget accounts within sectoral ministries were abolished and most government funds are managed through a unified budget (The World Bank, 2007). In this context, although a PSU is linked to the state treasury, it is authorised to manage and use directly all income and contributions provided by other parties, including from foreign donors. On the contrary, under a market mechanism, taxes or fees can be collected from trading of REDD+ credits. The taxes can then be used to provide general budget support and to finance policies within sectoral ministries or at the local levels through the state treasury. Vatten and Angelsen (2009) argue that it is important to prevent REDD+ funds from being used for other purposes, such as to balance the state budget during a fiscal crisis. This argument is valid for REDD+ payments to finance management activities to deliver the objectives of REDD+. However, REDD+ opportunity costs of government stakeholders would need to be delivered to the general budget, including for the provision of public services in other sectors. Government revenues from taxes and fees is important to support routine expenditures such as civil servants’ wages and to provide basic public services, such as education and health.

If REDD+ were implemented in successive phases, the first and second phases would most likely be implemented under a foreign grant modality in Indonesia (Figure 9.1). Under this mechanism, there would be no direct fiscal transfer to subnational levels; instead activities would be carried out under a project managed by a PMU or a PSU. In the early phases of REDD+, a foreign grant modality provides an opportunity to develop the capacity of government officials particularly in the technical aspects of REDD+ implementation, such as developing a measurement, reporting and verification (MRV) system and establishment reference emission levels. This is because a PMU or a PSU can involve stakeholders from outside the government system, including donor partners, non-governmental organisations, universities and the private sector. Thus, the transfer of capacity and knowledge would be enabled if REDD+ were implemented
using foreign grant modalities at the beginning of the implementation. The distribution of REDD+ funds using a foreign grant modality is implemented outside the state treasury, hence, it can avoid delays in the disbursement of funds since an independent financial institution could be assigned as a trustee to manage and disburse the funds. Management of the funds does not need to go through the yearly government budget planning. Thus a foreign mechanism is expected to be more flexible.

As a country becomes ready and moves to a functioning carbon market, REDD+ payments would then be linked to the achieved emission reductions. Under a functioning carbon market, the national government could involve the private and non-profit sectors in the implementation of REDD+. The government would obtain benefits from taxes or fees collected from the transactions on carbon credits in the market (Figure 9.1). A portion of the tax collected by the national government could then be distributed to local governments in the form of revenue sharing (RS) and conditional grants (CG). The revenue sharing mechanism could be used to ensure that REDD+ measures do not affect the capacity of local governments to finance public services. The amount of the shared-revenue could be determined using the percentage (derivation) approach or the formula (cost reimbursement) approach (Chapter 8). A separate mechanism could also be created to distribute funds to finance REDD+ related services at the local level using a conditional grant, where the amount of transfer could be determined using the cost reimbursement approach (Figure 9.1).

**Figure 9.1 The possible flow of funds from REDD+**
The accountability mechanism of IFTs for REDD+ would need to be linked to the national measurement, reporting and verification (MRV) system. Performance conditionality (or output-based accountability) could be applied to the component of IFTs aimed at compensating opportunity costs, where the transfer should only be made when the recipients have achieved the prescribed targets and performance (Shah, 1994). Transfers to finance specific activities or services to be performed by local governments could use a conditional grant with an input-based accountability mechanism (Bird, 1993), where the disbursement can be monitored each fiscal year. A transfer using a conditional grant enables robust monitoring. Disbursement of a conditional grant usually requires local governments to report each quarter to the national government.

9.2 Criteria for well-designed IFTs for conservation

Designing IFTs for forest conservation requires several considerations concerning: i) the characteristics of the distribution formula, conditionality and accountability mechanisms; ii) the technical capacity of local governments, which will implement the IFTs; and iii) the local forest governance conditions that influence the interest and commitment of local governments to forest conservation. Summarising the analysis of the previous chapters, this section provides some reflections on the technical considerations for the design of IFTs, while the other two aspects, the technical capacity of local governments and local forest governance, are discussed in the next section.

The first consideration for designing IFTs for conservation is to clearly define the objectives to be achieved. Second, the distribution formula of IFTs should be neutral, understandable and not able to be influenced by the local governments manipulating their expenditure or their tax decisions. Third, IFT mechanisms should ensure the autonomy and independence of local governments to set the priorities, responding to local needs. Fourth, the design of IFTs should ensure accountability and transparency in the process of allocating transfers from the national to local level as well as in the implementation at the local level. Finally, the design of IFTs should also be simple, easy to administer and involve the lowest possible administration and transaction costs. These technical considerations are also relevant to those suggested by Bird (1999) and Shah (2006). The relevance of these criteria to the development of the design of IFTs for conservation is summarised below.
In relation to the objectives of IFTs, the literature suggests that they should improve the effectiveness and efficiency of the provision of public services at the local level (Bird, 1999; Bird and Smart, 2002; Shah, 2006). This study suggests two main objectives for IFTs for REDD+, which can be applied to IFTs for conservation in general: i) ensuring that conservation will not compromise local governments’ fiscal capacity to provide basic public services; and ii) financing conservation or forest related services at the local level. These objectives correspond to the cost elements of conservation incurred by local governments: opportunity, management and transaction costs (Naidoo and Ricketts, 2006; Naidoo et al., 2006). The first objective of IFTs for conservation is in line with the compensation for the opportunity costs of conservation. If the opportunity costs are not compensated properly, the revenue stream of local governments is affected which impacts on their capacity to provide basic public services. The second objective relates to the management and transaction costs of conservation. The IFTs should be allocated to ensure local governments have resources to finance specific conservation activities.

For the first purpose of IFTs for conservation, two approaches can be used to determine the amount of IFTs to local governments, namely the cost reimbursement and the derivation approaches. The cost reimbursement approach has been used in Brazil and Portugal and proposed in a number of other countries to correct the spillover effect of conservation (e.g. Ring, 2008b; Köllner et al., 2002; Ring 2008c; Santos et al., 2012; Grieg-Gran, 2000; May et al., 2002). The cost reimbursement approach can be used to correct spillover effects of the provision of public services, by providing a unit subsidy to local governments as much as the value at the margin of the spillover benefits they create (Oates 1972, p. 66). Although these studies do not estimate the actual spillover costs or benefits per locality, they use ecological indicators as a proxy for determining the costs of conservation, such as the extent of protected areas, the ecological functions of forests, species diversity, and the total land area (Grieg-Gran, 2000b; May et al., 2002; Köllner et al., 2002; Ring, 2008b; Kumar and Managi, 2009). In the case of REDD+, the determination of opportunity costs can use some indicators, including alternative land-use activities, the historical rates and practices of deforestation and the unit of environmental services that can be generated (carbon emissions reduced and
carbon stocks enhanced). These indicators are also relevant for determining the amount of IFTs for additional forest areas designated as conservation areas.

Since environmental services from conservation may now generate payments, such as in the case of REDD+ and other types of payments for environmental services (PES), environmental services can be regarded to be similar to forest commodities such as timber and other non-timber forest products. This new perspective requires a different approach to determine the amount of IFTs to support conservation. Similar to other forest products, the amount of IFTs for local governments to support conservation can be decided, using the derivation approach. This approach allocates a portion of benefits to local governments based on a specified percentage of taxes or fees collected from conservation activities and their corresponding environmental services, such as carbon emissions reduced and carbon stocks enhanced. Using this approach, the amount of IFTs allocated to local governments ignores the costs of conservation incurred at the local level. In the case of REDD+, for instance, local governments could be expected to be interested in participating when the costs of conservation are lower than the revenues from REDD+. Local governments should then be allowed to decide their participation based on their assessment of the costs and benefits of conservation.

For the second purpose, the cost reimbursement (or formula) approach can be used to determine the amount of IFTs to finance public services related to conservation and forest management at the local level. Using quantitative criteria, the distribution formula can be developed based on the estimation of costs to provide forest related services to local government units. Management and transaction costs can be estimated based on activities that should be performed by local governments to support the implementation of REDD+ at the local level, such as hiring staff, building necessary infrastructure and community development for people living surrounding forests. The management costs of forest conservation may also need to take into account regional disparities, such as fiscal capacity.

Both the cost reimbursement and the derivation approaches are neutral, as local governments cannot influence the amount of IFTs by manipulating their expenditure or tax decisions. The cost reimbursement approach can be used when local governments are obliged to provide a certain amount of conservation at the local level as part of the
minimum service standard (usually the existing conservation areas). Using this approach, the national government can reimburse the costs of conservation borne by local governments. On the other hand, when local governments are requested to provide additional conservation areas beyond the existing ones (regulated by law), then the derivation approach could be used.

The findings of this study also enhance our understanding of conditionality of IFTs in conservation, an issue that has not received sufficient attention in the existing literature (e.g. Ring, 2008b; Köllner et al., 2002; Ring 2008c; Santos et al., 2012; Grieg-Gran, 2000; May et al., 2002). Conditionality is one element of the design of IFTs that is rather contentious. While flexibility to spend funds at the local level is important to allow local governments to pursue local priorities, a degree of conditionality is also required to ensure that spending takes place on the services in question (Ring, 2008c). Similar to the distribution formula, the conditionality of IFTs should also consider the different cost elements of conservation: opportunity, management and transaction costs. The component aimed at compensating the opportunity costs should be transferred with flexibility for local governments to decide the activities and policies to be pursued. This should also allow local governments to use IFTs for general budget support and to finance basic public services in other sectors.

On the other hand, funding for the management costs of conservation should therefore be transferred with conditions to ensure that the funds are used to finance conservation activities. Interviews with government officials at all levels reveal that some earmarking of IFTs is preferred in conservation for political and administrative reasons. Without being specifically earmarked, IFTs to finance the management costs of conservation could be diverted to other development priorities because local governments need to address the immediate needs of local people.

Accountability of IFTs should consider the purpose and conditionality of the transfers. After receiving REDD+ payments, local governments must be accountable to those who pay for them and those who benefit from them (Shah, 2006; Bird, 1999). Bird (1999) argues that the provision of sufficient information to local constituents is important to ensure transparency in the process. The accountability aspect discussed in this study focuses on the obligation of local governments as the recipients of IFTs to perform the
responsibilities conferred. Output-based accountability can be applied to the component of IFTs aimed at compensating for the opportunity costs, where the transfer can only be made when the recipients have achieved the prescribed targets and performance. In addition, transfers to finance specific services to be performed by local governments (related to transaction and management costs of conservation) can use a conditional grant with an input-based accountability mechanism. This accountability measure can include the monitoring of local governments’ spending on specific forest related activities and services. Disbursement of the funds can be conducted at the beginning of conservation activities and monitored at the end of the fiscal year or other relevant period. To ensure that technical performance is achieved, the agencies responsible for conservation could monitor conservation activities implemented at the local level.

Finally, in order to ensure that IFTs are implemented with the lowest possible administration and transaction costs, it is important to consider the existing capacity of local governments to manage public resources at the local level. This is addressed in the next section together with factors relating to the effectiveness of IFTs.

9.3 Capacity and effectiveness considerations

9.3.1. The capacity of local governments

In designing IFTs for conservation the political and administrative factors that influence the implementation of IFTs within a complex bureaucratic environment, particularly the technical capacity of implementing agencies need to be considered (Williams, 1975, p. 558). If international payments for conservation were to flow from the international to the local level, a sharp increase in financial resources could occur. This could be problematic considering the limited capacity of local governments in managing financial resources. For instance, local governments in Indonesia have accumulated substantial unspent balances due to their low capacity in public service delivery (Alisjahbana, 2005; Lewis and Oosterman, 2009).

The technical capacity to implement IFTs, including the capacity to collect taxes and fees and/or to spend the funds transferred differs across local governments. In terms of revenue sharing, the amount of IFTs allocated to the local level depends on taxes and fees collected in relation to conservation and environmental services generated at the
local level. Although the national government can collect taxes and fees without the involvement of local governments, local government participation is important to ensure ownership and transparency in the revenue distribution. In the case of REDD+ implementation, for instance, transfers could be made based on the emission reduction and carbon stock enhancement achieved by a locality. The involvement of local governments in the collection of data related to emission reduction and carbon stock enhancement would be necessary to ensure transparency in the allocation of IFTs to the local level. In the case of payments for environmental services, local governments need to be aware of the services provided by their localities and the amount of compensation they are entitled to. Hence, the use of revenue sharing in conservation would require new skills for governments at all levels, not only in the management of funds but also in data collection and monitoring related to the environmental services produced. Alternatively, an unconditional grant could be implemented as an option to the revenue sharing mechanism. The unconditional grant does not require the participation of local governments in the collection of taxes and fees. The amount of the transfer is decided by the national government, based on quantitative criteria monitored directly by the national government.

Similar to an unconditional grant, a conditional grant does not require any involvement of local governments in collecting taxes or fees. A conditional grant to finance management activities related to conservation at the local level can be implemented without new skills being required, except the routine management activities of conservation. Due to a low capacity in financial management, clear guidance from the national government is preferable to prevent mistakes in the spending of the funds transferred, which could lead to corruption charges. However, guidelines developed by a national government on how funds should be spent at the local level need to take into account the local situations and leave some flexibility for local officials to pursue activities that are important for their localities. The conditions of forests in each locality vary widely, as do the economic and social situations. Without considering the variations between localities, guidelines provided by the national governments are often not implementable as discussed in Chapter 6.
9.3.2. Factors for effective IFTs

In order to design IFTs for conservation, it is important to consider the wider political economy of land-use change, as ultimately IFTs aim to change the behaviour of local public actors in order to achieve improved conservation outcomes. Legal land-use change and forest exploitation generate income for national and local governments in developing countries. These activities also provide employment and other economic benefits that are important for local people’s livelihoods. People in different localities might have different beliefs and values towards deforestation and forest degradation. The beliefs and values of local government officials seem to be heavily influenced by the local people in Indonesia, as demonstrated by the fact that local officials considered themselves as the first line of bureaucrats who cater for local people’s needs. Moreover, within a decentralised country, public officials at different government levels may not have common interest concerning forest resources and conservation. Development policies developed at the national level might also not reflect the priorities of local decision makers. This implies that there is a multiplicity of values around forest resources, not only between local governments with local communities but also between local governments with their national counterparts.

Due to the multiplicity of values and beliefs around land-use change, several factors need to exist together with IFTs to ensure their successful implementation at the local level. First, local governments should have the authority to decide voluntarily whether to allocate additional forests for conservation. Providing greater authority to local levels would not always lead to forest conservation (Tacconi, 2007). However, as discussed in Chapter 5, local decision makers should be allowed to decide on behalf of the local constituents whether to allocate productive lands within their administrative boundaries for conservation. Since additional conservation may not necessarily lead to additional environmental services, particularly for local residents (Pattayanak et al., 2010), government officials in developing countries need to assess the costs and benefits of allocating more land for conservation as discussed in Chapter 7. Second, IFTs for conservation should be accompanied by mechanisms to create incentives for local communities to favour conservation, since the beliefs and values of local government officials concerning land-use allocation are influenced by the local people’s demands. For instance, a specific portion of benefits could be assigned to local communities from
the distribution of payments generated from conservation or payment for environmental services. Third, upward and downward accountability measures are required to prevent the misuse of funds. NGO protests and coercive action by national governments can also help prevent the misuse of funds transferred to the local level. In the case of Indonesia, for instance, prosecution of corrupt activities has caused some local officials to be more cautious in managing public resources.

### 9.4 Methodology for environmental policy analysis

This study also offers methodological messages related to conducting environmental policy analysis in developing countries. Development of environmental policy is constrained by a number of factors (Vogen and Kun, 1987): i) environmental problems often transcend national boundaries therefore require the coordination of policies among different countries; ii) environmental problems are complicated by the interaction of regulatory officials and industrialists (non-governmental actors); and finally iii) environmental problems are surrounded by scientific and technical uncertainty.

As discussed above, there are differences in government officials’ beliefs and values about environmental problems. Deforestation, for instance, can be perceived as either bad or good. Due to this multiplicity of beliefs and values, definition of a policy problem and finding solutions need to be conducted jointly with stakeholders (Bobrow and Dryzek, 1987). An interpretivist approach to the development of environmental policy is therefore suggested. Using this approach, a policy analyst needs to immerse himself or herself into the beliefs and values of the stakeholders involved in the decision-making process (Yanow, 2000), because the stakeholders may not accept the definition of the problem and the normative position adopted by the policy analyst (Dryzek, 1982).

Deforestation and forest degradation are caused by a number of forces so that it is possible to make a causal statement about the drivers of deforestation and forest degradation. However, several studies that have attempted to understand the drivers of deforestation (i.e. Geist and Lambin, 2002; Rudel et al., 2009; Rudel, 2007) report that a number of deep structures causing deforestation and forest degradation are not easily observable. Researching deforestation and policies to reduce deforestation, using a
positivist approach, may offer a false picture of those phenomena/structures and their effects. To explain the complex view of deforestation, a causal mechanism approach can be used to understand how causes interact in the context of a particular case, or a few cases, to produce an outcome (Bennett and Elman, 2006). The causal mechanism approach allows this study to consider how financial incentives, together with a number of other factors, influence the interest of local governments in pursuing conservation or deforestation. Based on this causal statement, a design of IFTs can then be developed to create incentives for local governments to pursue conservation.

Finally, environmental management is often challenged by a number of technical matters that require a rationalist approach to policy analysis. For instance, in the case of REDD+ and conservation, decision makers need to rationally estimate the costs and benefits of conservation, including the economic impacts of conservation on local communities. The potential donors and buyers of environmental services, such as carbon credits of REDD+, also require information related to the potential of environmental services generated, such as carbon emissions reduced or carbon stock enhanced from a country or a project. The scientific aspects of environmental problems require therefore a certain degree of rationalist analysis in developing environmental policies (Chapter 4). For this reason, this study confirms the need to bridge the gap between the positivist and interpretivist approaches in policy analysis (Fischer 1998; 2003; Lin 1998), particularly in the formulation of environmental policies.

9.5 Limitations of the study

This study aimed to cover all elements of well-designed IFTs for conservation, which in turn reduced somewhat the depth of analysis of the individual elements. For instance, using a larger sample may help understand the impacts of IFT distribution formulas to other localities with characteristics that are different from the two sample provinces selected in this study.

Another issue is that a single-country case study approach was used. Caution must therefore be applied as generalisation of the findings could be problematic. Particularly related to the qualitative part of the analysis, there is no attempt at finding a universal
truth, rather the focus is on identification of the stakeholders’ preferences, which are case-specific.

In relation to the opportunity costs analysis, the study applied a local empirical approach, which has the advantage of being transparent, yielding accurate estimates and being simple to interpret. However, extrapolation should be done cautiously since the results are specific to a particular region (Richards and Stokes, 2004; Wertz-Kanounnikoff, 2009). Moreover, as discussed in Chapter 7, the financial assumptions used in the estimation of the opportunity costs can result in wide variations, therefore, extrapolation needs to pay attention to these assumptions. Finally, the analysis relied, to a certain extent, on secondary data, particularly on carbon stocks. An extensive literature review was conducted to obtain the most reliable data and a sensitivity analysis was also performed. However future analyses, using data from ground measurements of forest carbon stocks in Papua and Riau, would improve the accuracy of the cost estimates. Spatial information would also improve the estimates of the opportunity costs by contributing to a more accurate assessment of the land-use activities for a specific location and the total carbon emitted due to such activities.

Furthermore, this study has focused on estimating the opportunity costs of conservation using REDD+ without considering management and transaction costs. Addressing these costs would therefore improve the accuracy of the findings of the study in relation to the overall costs of REDD+ and, among other aspects, improve the estimates of the funds required by local governments to implement REDD+.

9.6 Future research

This study has presented considerations that should be taken into account when designing IFTs for conservation. Broad challenges related to the design and implementation of IFTs for conservation in general and for REDD+ revenue distribution specifically have also been identified. This provides some directions for future research.

There is a need to implement performance-based IFTs where the transfers can be made, based on the performance of local governments in implementing conservation policies.
In the public finance literature, several studies analyse performance-oriented IFTs in public service delivery, where result-based accountability is applied to measure the success of IFT implementation. Result-based accountability is advocated in order to move from monitoring local governments spending to monitoring the results achieved in efficient delivery of public services (Shah, 2006). However, there is currently no research on performance-based IFTs for conservation. This type of IFT will have implications for the transfer schedule of IFTs to eligible local units as performance can only be assessed after a certain period of time. The amount of the transfers would change when the discounting factor (or the interest rate) is considered, particularly when a payment is disbursed after localities achieve certain performance in conservation policies. Future research could therefore examine the possible application of performance-based IFTs for conservation and their designs, including the payment schedule and criteria used to assess performance of local governments in conservation.

Specifically on the distribution formula of IFTs for REDD+ revenues, this study has only focused on the empirical analysis of the opportunity costs due to the paucity of data on transaction and management costs in Indonesia. Although some studies have researched the management and transaction costs of conservation (Naidoo and Ricketts, 2006; Naidoo et al., 2006), the implementation of REDD+ may involve specific management activities, such as collecting and monitoring data on carbon emission reductions and carbon stock enhancement. Although some studies have examined the management and transaction costs of REDD+ (Nepstad et al., 2009; Pagiola and Bosquet, 2008), the estimation of REDD+ transaction and management costs specifically incurred by local governments will require a clear definition of their roles and responsibilities in the implementation of REDD+. However less attention has been given to understanding the specific management activities that should be performed by local governments in the implementation of REDD+. The transaction costs reported in the literature are in the range of US$ 0.01–16.40 per tCO₂ (Wertz-Kanounnikoff, 2008), while the management costs, in the Brazilian Amazon for instance, were estimated at US$ 1–3 per hectare per year (Nepstad et al., 2009). Without the analysis of a specific location at the local level, it is problematic to determine whether the transaction and management costs of REDD+ depend on the total CO₂ produced or the total land areas included in the REDD+ scheme. The magnitude of the transaction costs may be different between regions, particularly in Indonesia, depending on the political situation,
capacity and leadership. Therefore, without a specific place-based analysis (which is beyond the scope of this research), it is not possible to establish how transaction and management costs might affect the total transfers for local governments to pursue REDD+. It is an issue requiring further research. Research on estimating these costs can also be completed with determining the distribution formula for IFTs to compensate for transaction and management costs. Such research could therefore enhance knowledge about the economic feasibility of REDD+ for localities in developing countries.
## Appendix 1 List of Interview Questions

<table>
<thead>
<tr>
<th>No</th>
<th>Question</th>
<th>Purpose of Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do you think that forest protection status in your locality is satisfactory? <em>(This question will only be asked to officials at provincial and district level)</em></td>
<td>Opening question related to forest conservation – can be further verified with quantitative data on forest cover (if any)</td>
</tr>
<tr>
<td>2</td>
<td>What are the drivers of land-use change (alternative land uses) in your locality? <em>(This question will only be asked to officials at provincial and district level)</em></td>
<td>To understand the causes and drivers of land-use change in selected localities</td>
</tr>
<tr>
<td>3</td>
<td>Who will benefit mostly from land-use change activities? Please explain.</td>
<td>To understand the financial implication of forest conservation at the local level</td>
</tr>
<tr>
<td>4</td>
<td>Do you think that government spending and fiscal allocations from the national government are sufficient to support forest conservation?</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>If the national government instructs you to allocate additional 20 per cent of forests for conservation in your administrative boundaries, do you think it is feasible? <em>(This question will only be asked to officials at provincial and district level)</em></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>What will make you interested is setting aside additional conservation areas in your locality? <em>(This question will only be asked to officials at provincial and district level)</em></td>
<td>To understand the current interest of local governments towards forest conservation prior to REDD+</td>
</tr>
<tr>
<td>7</td>
<td>Have you heard about REDD+? Do you think it is feasible to be implemented in your locality? <em>(It is important to introduce REDD+ at this stage if the respondent has not heard of REDD+)</em></td>
<td>Indication of respondents’ knowledge of REDD+ and their interest in conservation induced by REDD+</td>
</tr>
<tr>
<td>8</td>
<td>Who do you think will oppose and support the idea of REDD+? Who will have the most influence?</td>
<td>To identify stakeholders involved in the implementation of REDD+</td>
</tr>
<tr>
<td>9</td>
<td>Who should receive the benefits of REDD+?</td>
<td>Indication of respondents’ perspective towards the distribution of REDD+ benefits</td>
</tr>
<tr>
<td>10</td>
<td>What are financial mechanisms that can be considered to distribute REDD+ benefits?</td>
<td>Indication of respondents’ perspective towards the mechanisms to distribute REDD+</td>
</tr>
<tr>
<td>Question</td>
<td>Response</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>11 What do you think of using fiscal instruments (such as conditional and unconditional grants as well as the revenue sharing mechanism) to distribute REDD+ benefits?</td>
<td>benefits</td>
<td></td>
</tr>
<tr>
<td>12 What do you think of the proposed transfer formula (and the indicators)? <em>(The proposed formula of transfer will be presented here)</em></td>
<td>Indication of respondents' perspective towards the distribution formula of intergovernmental fiscal transfers of REDD+.</td>
<td></td>
</tr>
<tr>
<td>13 Do you have any suggested alternative indicators that can be used in the formula? Please explain.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 If you receive the transfer, how would you spend the transfer to reduce deforestation and forest degradation in your locality?</td>
<td>Indication of respondents' perspective towards technical considerations of REDD+ payment design – <em>conditionality of the transfer</em>.</td>
<td></td>
</tr>
<tr>
<td>15 Do you think it is important to prescribe particular activities that can be financed by the transfer?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 How should the benefits of REDD+ be distributed to the local communities?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 What accountability mechanisms are required to avoid misuse of funds?</td>
<td>Indication of respondents' perspective towards technical considerations of REDD+ payment design – <em>accountability mechanism</em>.</td>
<td></td>
</tr>
</tbody>
</table>

**Responses of stakeholders to the existing fiscal transfers**

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 Do you think the implementation of fiscal transfers <em>(DAK environment, shared-revenues, and others)</em> is satisfactory in your locality?</td>
<td>Indication of respondents' perspective on the existing fiscal transfers in Indonesia - To understand the effectiveness of the transfers in achieving policy objectives. The responses will be used as a basis for projection on the effectiveness of REDD+ payment distribution using intergovernmental transfers.</td>
</tr>
<tr>
<td>19 Please provide your comment on the following elements of the transfer: 1) formula; 2) conditionality; 3) monitoring and accountability</td>
<td></td>
</tr>
<tr>
<td>20 What are the issues or challenges of the implementation of the transfers?</td>
<td></td>
</tr>
</tbody>
</table>

**Political and administrative feasibility of alternative fiscal transfer designs for REDD+ payment distribution**

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 Who are the relevant stakeholders involved in the decision-making process of selecting REDD+ benefit distribution and what do you think of their preferences?</td>
<td>To observe the preferences of stakeholders in the implementation of REDD+ payment distribution using an intergovernmental fiscal transfer.</td>
</tr>
<tr>
<td>22 What strategies and venues do stakeholders use to achieve their objectives (either oppose or support)?</td>
<td></td>
</tr>
<tr>
<td>23 What do you think of the resources and competency of your institution to manage REDD+ benefits?</td>
<td>To observe the capacity of agencies in the implementation of REDD+ payment distribution using an intergovernmental fiscal transfer in Indonesia.</td>
</tr>
<tr>
<td>24 What do you think of other stakeholders’ capacity to manage REDD+ benefits?</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix 2 Working Plan Documents of Timber Plantation Companies Used in the Opportunity Cost Analysis

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Total Concession Areas</th>
<th>Decree Legalising the Working Plan Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siak Raya Timber</td>
<td>23,030 hectares</td>
<td>Forestry Ministerial Decree SK.202/Menhut-II/2007</td>
</tr>
<tr>
<td>Mitra Kembang Selaras</td>
<td>14,800 hectares</td>
<td>Forestry Ministerial Decree SK.71/Menhut-II/2007</td>
</tr>
<tr>
<td>Riau Indo Agro Palma</td>
<td>19,870 hectares</td>
<td>Forestry Ministerial Decree SK.555/Menhut-II/2006</td>
</tr>
<tr>
<td>Lestari Unggul Makmur</td>
<td>10,390 hectares</td>
<td>Forestry Ministerial Decree SK.217/Menhut-II/2007</td>
</tr>
<tr>
<td>Bukit Betabuh Sei Indah</td>
<td>13,420 hectares</td>
<td>Forestry Ministerial Decree SK.67/Menhut-II/2007</td>
</tr>
</tbody>
</table>
## Appendix 3 Working Plan Documents of Commercial Logging Companies Used in the Opportunity Cost Analysis

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Total Concession Areas</th>
<th>Decree Legalising the Working Plan Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mamberamo Alas</td>
<td>677,310 hectares</td>
<td>Forestry Ministerial Decree SK</td>
</tr>
<tr>
<td>Mandiri</td>
<td></td>
<td>253/VI-BPHA/2009</td>
</tr>
<tr>
<td>Tunas Sawaerma</td>
<td>214,935 hectares</td>
<td>Forestry Ministerial Decree SK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>195/VI-BPHA/2010</td>
</tr>
<tr>
<td>Batasan</td>
<td>106,643 hectares</td>
<td>Forestry Ministerial Decree SK 33/VI-BPHA/2010</td>
</tr>
<tr>
<td>Hanurata Coy</td>
<td>169,500 hectares</td>
<td>Forestry Ministerial Decree 479/Menhut-VI/BRPHP/2004</td>
</tr>
<tr>
<td>Bade Makmur Orisa</td>
<td>462,600 hectares</td>
<td>Forestry Ministerial Decree 057/Kpts-II/1993</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Papua Provincial Decision KEP-522.1/3802/2010</td>
</tr>
<tr>
<td>Company Name</td>
<td>Department</td>
<td>Address</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td>XYZ Corporation</td>
<td>Sales</td>
<td>123 Main St, Anytown USA</td>
</tr>
<tr>
<td>ABC Inc.</td>
<td>HR</td>
<td>456 Business Ave, Nowhere</td>
</tr>
<tr>
<td>DEF Ltd.</td>
<td>Accounting</td>
<td>789 Industry Rd, Somewhere</td>
</tr>
<tr>
<td>GHI Corp.</td>
<td>Marketing</td>
<td>101 Tech Way, Everywhere</td>
</tr>
<tr>
<td>JKL Inc.</td>
<td>Operations</td>
<td>202 Innovation Blvd, Elsewhere</td>
</tr>
</tbody>
</table>
Appendix 4 The Financial Assumptions of Oil Palm Plantation Companies Used in the Opportunity Cost Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Butler et al (2009)</th>
<th>Oil Palm Plantation Company</th>
<th>Astra</th>
<th>Lonsum</th>
<th>Smart</th>
<th>PTPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFB yield for &quot;high yield&quot; scenario (tons/ha)</td>
<td>20.50</td>
<td></td>
<td>20.89</td>
<td>19</td>
<td>20.9</td>
<td>17.78</td>
</tr>
<tr>
<td>Oil extraction ratio (OER) for crude palm oil</td>
<td>20.65%</td>
<td></td>
<td>22.56%</td>
<td>23.60%</td>
<td>23.50%</td>
<td>24.12%</td>
</tr>
<tr>
<td>Palm kernel extraction ratio</td>
<td>5.10%</td>
<td></td>
<td>4.92%</td>
<td>5.90%</td>
<td>5.19%</td>
<td></td>
</tr>
<tr>
<td>Price CPO ($/Ton)</td>
<td>683</td>
<td></td>
<td>694</td>
<td>713</td>
<td>632</td>
<td></td>
</tr>
<tr>
<td>Profit (IDR/ha)</td>
<td>10,464,706</td>
<td></td>
<td>6,287,021</td>
<td></td>
<td>5,562,248</td>
<td></td>
</tr>
</tbody>
</table>
### Table 4.1: Summary of Opportunities for Complementary Care

<table>
<thead>
<tr>
<th>Service</th>
<th>Revenue</th>
<th>Cost</th>
<th>Profit Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service 1</td>
<td>$2,500</td>
<td>$1,200</td>
<td>52.0%</td>
</tr>
<tr>
<td>Service 2</td>
<td>$3,000</td>
<td>$1,800</td>
<td>40.0%</td>
</tr>
<tr>
<td>Service 3</td>
<td>$2,800</td>
<td>$1,400</td>
<td>50.0%</td>
</tr>
<tr>
<td>Service 4</td>
<td>$2,400</td>
<td>$1,100</td>
<td>54.2%</td>
</tr>
</tbody>
</table>

(Revenue figures are in thousands of dollars.)
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