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# Final report

*project* **Improving governance, policy and institutional arrangements to reduce emissions from deforestation and degradation (REDD)**

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# 1 Acknowledgments

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## 2 Executive summary

Climate change is an immediate and growing problem with significant potential impacts on all productive sectors. Deforestation contributes about 10% of all human induced global greenhouse gases emissions. With 90 million hectares of forests and annual deforestation of at least 1.5 million hectares, Indonesia can play a central role in reducing deforestation and forest degradation (REDD). This project addressed Indonesia's interest to capitalize on the potential benefits to be derived from REDD and to improve forest governance.

The project carried out economic and policy research at the national, provincial (Riau and Papua provinces), district and community levels. Two districts per province were selected. The economic and policy research was grounded on an assessment of the actual causes of deforestation in project districts. On that basis, an estimation of the benefits and costs of deforestation and REDD, and their policy implications, was undertaken. That assessment considered economic impacts at the national and district levels, as well as the impacts on business and smallholders. The project carried out further investigations of policy issues, with a focus on improving the governance of forests, by analysing the governance factors that cause the inefficient and inequitable use (including deforestation) of forest resources, and their allocation to timber and oil palm plantations. After having addressed the causes of deforestation and the economic aspects of deforestation and REDD, the project considered the national, district and local level aspects of the architecture of REDD. This analysis focused particularly on supporting the development of a decentralized governance system for REDD. That research focused on the links between decentralization, fiscal incentives and REDD, and the implications of land tenure issues in Indonesia and payments for environmental services schemes.

The research outputs produced by the project (the majority of which were published in international scientific journals, and a book) indicates that there are possible benefits to be gained by Indonesia from the implementation of REDD, as well as some potential costs. The Government of Indonesia, and the local governments, would need to carefully assess the options open to them once the framework for the implementation of REDD is agreed at the international level. The project has provided frameworks to assess those options. They include: i) how to approach the analysis of the macroeconomic impacts of REDD; ii) the assessment of the distribution of revenues from land use activities, and how that distribution should be taken into account in the allocation of revenues from REDD; iii) how to analyse both smallholders' opportunity costs and their willingness to accept compensation to avoid deforestation; and iv) how to analyse the views of the different stakeholders affected by REDD. The project has also provided a framework for the design of fiscal transfers to local governments, and it has clearly laid out the need for scaling up community based forest management, and how that can support the implementation of PES and REDD. All this information has been presented to the Indonesian Government through workshops, training courses, and publications.

The economic impacts from this type of policy research are difficult to quantify given that it is uncertain whether certain policies change or do not change as a result of the research carried out by the project. In qualitative terms, it can be stated however that the project has provided significant contribution to policy making through capacity building activities related to policy, presentations, and publications. These activities contribute to the formulation and change of policy, which in turn impact on the economy. The main social impacts from the project are expected to arise from the research on PES and land tenure in Indonesia. The research generated by the project highlights how communities that reside close to, or within, forests that are currently deemed to be state forests can also participate in PES schemes. Positive environmental impacts from the project would arise if the REDD mechanism is finally agreed at a global level, and it was implemented in Indonesia.

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## 3 Background

Climate change is an immediate and growing problem with significant potential impacts on all productive sectors. Deforestation contributes about 10% of all human induced global greenhouse gases emissions. Reducing deforestation and forest degradation (REDD) has therefore an important role in global responses to the threat of climate change. Deforestation also leads to large losses of biodiversity given that tropical forests constitute the most important reservoir of global biodiversity.

Indonesia is the 5th largest emitter of greenhouse gases with estimated greenhouse gas emissions of 2 Gigatonnes CO<sub>2</sub>e in 2005 accounting for 4.5% of global totals. Over 85% of Indonesia's current emissions come from deforestation or land-use change (Margono et al. 2014). Therefore, with 90 million hectares of forests and annual deforestation at about 2 million hectares (Margono et al 2014), Indonesia can play a central role in REDD. It also stands to gain significantly from carbon trade. If Indonesia could halve its deforestation rate, it could receive over USD 1 billion per year in carbon credits, assuming an average stocking rate of 250 t/CO<sub>2</sub>/ha and a price of \$4/t/CO<sub>2</sub>. Given the potential size of the financial benefits, it is imperative for the country to improve its capacity to benefit from carbon trade.

At the policy level, Australia had recognized the need to support REDD and It had launched the \$200 million Global Initiative on Forests and Climate (GIFC). The objective of the GIFC was to facilitate significant and cost effective reductions in greenhouse gas emissions in developing countries through reductions in deforestation, encouraging reforestation and the promotion of sustainable forest management. However, when this project was designed, there was rather limited support available to Indonesia to develop its policy research capacity in relation to REDD.

Therefore, Indonesia requested ACIAR to support forest management by developing a research project on the governance and economic aspects of REDD at the bilateral consultation held in Jakarta in February 2007. Through its partnership approach with national institutions, ACIAR was seen to be excellently placed to build Indonesia's capacity to develop and implement appropriate policies and institutional arrangements to deal with the emerging carbon market and to ensure that its benefits are equitably distributed, including to the rural poor who live in, or in proximity of, forests. Building this capacity as soon as possible was considered to be essential to Indonesia because during the project planned period it had to negotiate the framework for the inclusion of REDD in the post-Kyoto protocol, and it needed start to design the national policies and institutional arrangements to implement REDD activities.

This project addressed Indonesia's interest to capitalize on the benefits to be derived from REDD credits and to improve forest governance. Indonesia's interest on the climate change and deforestation link has been addressed above.

The project was designed to address the Ministry of Forestry's priorities 3 and 4 as listed below:

1. Combating timber theft from state forest and illegal timber trade;
2. Revitalizing the forestry sector especially wood industries;
3. Rehabilitating and conserving forest resources;
4. Empowering people living near or within forests to improve their livelihoods;
5. Reviewing and agreeing on extent and boundaries of state forest land by involving all relevant stakeholders, including provincial and district governments, and the private sector.

The project was within the Forestry Research and Development Agency's (FORDA) research priorities for socio-economic research 1 and 2 as listed below:

1. Mitigating climate change;
2. Improving forest governance;
3. Contributing to the development of community-based timber plantations;
4. Contributing to the conceptual and practical development of Forest Management Units, the forest management structure recently introduced in the legislation.

The following were FORDA's priorities for forest governance research:

1. Influence of Institutions on forest management:
  - 1.1 how policy-making processes are influenced by various stakeholders
  - 1.2 relationships between institutions regulating various sectors (eg mining, oil palm, forestry), central and local governments
  - 1.3 uncertainty generated by conflicting regulations and regulatory gaps
  - 1.4 implementation of Forest Management Units
  - 1.5 organizational structure of the Ministry of Forestry
2. Administration of the timber products supply chain and minimization of opportunities for corruption
3. Indicators and benchmarks for good forest governance
4. Human resource capacity building and restructuring of human resource management for improved governance.

The project was designed to support priorities 1.2, 2, 3 and 4.

The project operated in a policy environment supportive of work on REDD. This interest in REDD was demonstrated in 2009 when the former Indonesian President committed to reduce national greenhouse gas emissions by 26% against "business as usual" by 2020 through domestic efforts, and an additional 15% (to 41%) with international support. Indonesia has been introducing changes in national, provincial and district legislation and law enforcement in the forestry sector. It has also been actively considering the recognition of the rights of communities to land and forest resources. It has developed a national and sub-national emission reduction action plan through the budget to try to deliver the commitment to a 26% reduction on "business as usual" emissions (Gol 2011). Indonesia aims to achieve 87% of this goal by reducing emissions from deforestation and peat land conversion (DNPI 2012). President Joko Widodo, was elected in 2014 with a policy platform based on delivering improvements to livelihoods for poor people. The government is still in the midst of an important set of reforms to reshape the policies and institutions that are relevant for land-use, forestry and sustainable development. However, the ambitions for reductions in emissions appear to remain intact. In fact, following his election, the President made a public commitment to promoting a sustainable approach to development and its previous international commitments on emission reductions have been retained.

The capacity development activities and outputs generated by the project have contributed to policy development in Indonesia, and continue to be relevant to the new administration. They are also relevant to other countries because they have increased knowledge about the benefits and costs of REDD and deforestation, the possible obstacles faced by REDD, and the eventual policy options to support REDD.

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## 4 Objectives

The aim of the project was to support the development of policy and institutional arrangements at the provincial and district level to facilitate the implementation of REDD and the capture and equitable distribution of financial benefits from an international carbon market. The following were the underpinning objectives and activities.

**Objective 1:** To identify the causes of deforestation in project districts

To develop appropriate policies aimed at reducing deforestation, the problem itself needs to be understood. Therefore, the research question to be addressed by this component is:

*1.1) What are the direct causes of deforestation in project districts?*

The concept 'direct causes' refers to the land use activities that replace forest cover, such as oil palm plantations and smallholder crops. The first objective of the project was therefore to identify the causes of deforestation in the project districts in the provinces of Riau and Papua. The activities carried out to achieve the objective were as follows. Analysis of remote sensing images for the period 2000-2005 to identify deforested areas and the type of vegetation that has replaced forests. Interviews with local stakeholders who were involved in deforestation to ascertain the direct causes of deforestation.

**Objective 2:** To estimate the benefits and costs of deforestation and REDD

The benefits of deforestation are derived at several levels, including the national, provincial, district, community and individual levels. Understanding these benefits was needed to contribute to: i) a deeper understanding of the underlying causes of deforestation; and ii) the assessment of the REDD credits that need to be provided so that the relevant stakeholders have sufficient incentives to reduce or halt deforestation. The research questions to be answered by this project component were:

*2.1) What are the financial and economic benefits derived from deforestation by the relevant stakeholders?*

*2.2) What are the potential REDD credits they could receive if they reduced or avoided deforestation?*

To answer these questions, the project carried out stakeholder analyses to identify all relevant groups and interests and household and business surveys to assess the benefits and costs of the land uses that replace forests in project provinces. The potential benefits to be derived from REDD credits were estimated from carbon maps of the areas of interest. The opportunity costs of alternative land uses are only a partial, although important, measure of potential costs of reduced deforestation. In order to assess the potential macroeconomic costs of reduced deforestation, a general equilibrium analysis (with a Computable General Equilibrium model) of the broader impacts on the Indonesian economy was carried out.

**Objective 3:** To improve the governance of forests

This component assessed the existing governance arrangements in order to understand how they influence forest management. This knowledge was required to understand whether there are governance factors that lead to the inefficient and inequitable use of forests. A country can maximize the benefits derived from REDD if it improves the efficiency of use of the forest resources so that it can receive REDD credits without foregoing significant amounts of production related to deforestation activities. Understanding the governance factors that lead to inefficient and inequitable use of forests also contributes to understanding the most significant underlying causes of deforestation. The research questions to be answered by this component were:

*3.1) What are the governance factors causing the inefficient and inequitable use (including deforestation) of forest resources?*

### *3.2) What are the most appropriate policies to reduce the misuse of forest resources?*

To answer these questions the project assessed forest land allocation policies and practices in the project provinces, review the system of government incentives influencing land uses, and identified policy options to reduce the inefficient and inequitable use of forest resources.

**Objective 4:** To develop a decentralized governance system for REDD

This component contributed to the design of institutional and policy arrangements aimed at implementing REDD activities in the project provinces. Regardless of the form taken by a REDD mechanism at the international level, it can be expected that each country will be responsible for the implementation of REDD within its boundaries. This implies that Indonesia will have to devise a system that balances the interests of the various levels of government as well as other stakeholders, including the private sector and local communities. The research question addressed by this component was:

#### *4.1) What are the options for the design of a governance framework (appropriate to the specific conditions of Indonesia) for the distribution of REDD credits to the local level that ensures equity and successful reduction of deforestation?*

To answer this question, the project researched the design a fiscal transfer system from the national to the provincial and district levels coupled with an environmental performance monitoring mechanism, and assessed the implications of land tenure systems for the implementation of a mechanism for the payment of REDD credits to the community level.

**Objective 5:** To manage the project effectively and build capacity

This component was designed to support the effective management of the project and to maximise its likelihood of policy and capacity building impacts. The component included the operations of the advisory Steering Committee (which was design to advise the project on the key issues concerning REDD that were of interest to the relevant Indonesian policy-makers), a mid-term review, the training of staff to build capacity, and national workshops aimed at disseminating the research carried out by the project.

### **Extension of the project beyond the original timeline and scope**

The project was initially extended (without additional cost to ACIAR) in order to complete all the originally scheduled activities. As the project entered the last few months of its implementation, the last scheduled project coordination meeting was held in Canberra on 16-17 September 2013. It involved the Director General of FORDA, three of his staff working on the project, the Australian Team Leader, and a research fellow working on the project FST-2012-040. This meeting identified further activities/outputs that would have been very useful to the Government of Indonesia, and that could be delivered as an extension of this project and, importantly, that would support the implementation of the project FST-2012-040.

The activities and outputs arising from this extension are reported in the following sections.



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## 5 Methodology

At the provincial level, the project was carried out in the provinces of Riau and Papua. Two districts per province were selected to ensure that the relevant characteristics of forest management were covered. The factors that were considered in the selection of the districts were:

1. At least one district per province should have significant forest resources and forest concessions;
2. Districts in a 'normal' status province and districts in a more autonomous province (respectively Riau and Papua);
3. Forests located in areas close to and far from market (respectively Riau and Papua);
4. Forests with good and limited agricultural potential (respectively Riau and Papua);
5. Forests in high and low population density areas (respectively Riau and Papua);
6. Districts present a range of development activities representative of those commonly found in Sumatra and Papua, eg large and small scale plantations of oil palm, timber plantations, and other smallholder activities focused on annual and perennial crops.

The methods to select project districts are described in Objective 1 below.

**Objective 1:** To identify the causes of deforestation in project districts

The first step in the research process was to select districts in Riau and Papua provinces.

Medium resolution land cover data was used to identify the areas in project provinces that were deforested during the period 2000-2005. A GIS map of the provinces identifying deforested areas, land use allocation, agricultural potential (for which data was already available from previous mapping projects) and district boundaries were produced. The districts were selected on the basis of the criteria specified above. For the sample areas, higher resolution images were analysed to assess the vegetation types/crops that had replaced forest cover. Land use data was overlaid with vegetation data to assess the land use allocation of the area. Field surveys were carried out to ground-truth the interpretation of the remote sensing data. Field surveys of sampled deforested areas to verify land use replacing forests and interviews with local stakeholder took place to assess how the various stakeholders gained access to the areas they deforested.

**Objective 2:** To estimate the benefits and costs of deforestation and REDD

The stakeholder analysis was carried out by identifying the relevant stakeholder groups, how they benefit from deforestation, how they would benefit from REDD schemes, and the influence that they can have on policy-making. This analysis involved literature reviews, interviews with key informants and with selected members of stakeholder groups.

The financial and economic benefits received by the various stakeholders in the project provinces were assessed through the collection of primary and secondary data on the various economic activities that take place in the deforested areas identified in Objective 1 component. Data collection involved questionnaire surveys, key informant interviews, informal interviews, review of reports and government policies and documents, and review of other literature. Stakeholder analysis was used to identify relevant stakeholders and their role in deforestation, whilst cost benefit analysis was employed to assess the net present value of the relevant economic activities and the related value of avoided carbon emissions.

The national macro-economic impacts of reduced deforestation were simulated with a Computable General Equilibrium (CGE) model of the Indonesian economy. These

simulations were carried out using existing Social Accounting Matrices of the Indonesian economy and simulated the impacts of reducing the output of the forestry sector, which would represent a reduction in timber inputs derived from land clearing, as well as simulating the growth of the agricultural sector, which would result from avoided deforestation activities.

**Objective 3:** To improve the governance of forests

The first step was to review forest land allocation policies and practices in project provinces policy documents, involving interviews with district, provincial and national government officials, representatives of industries, and NGOs. The interviews were conducted through questionnaires. Identification of policy options to reduce the misuse of forest resources were carried out through a participatory approach involving workshops with relevant stakeholders, including all levels of government, the private sector and civil society.

**Objective 4:** To develop a decentralized governance system for REDD

The analysis involved the design of a system of fiscal transfers from the national to the provincial level coupled with a performance monitoring mechanism designed to link the financial transfers to the achievement of pre-specified deforestation targets. The intergovernmental arrangements for the management of land resources and for the distribution of benefits were reviewed, involving a review of the literature and experiences of decentralized fiscal management in Indonesia and other relevant countries. Consultation with relevant Ministries and workshops were aimed at devising an appropriate transfer system. The analysis of land tenure and resource security focused on the capacity of communities to monitor forests, the type of tenure agreements that could be put in place and the costs of implementing resource rights mapping and transfer. The analysis involved a review of the literature and interviews with relevant stakeholders. Workshops were held in Jakarta and project provinces to discuss with stakeholders policy options and constraints, and findings of the project.

**Objective 5:** To manage the project effectively and build capacity

At the beginning of the first year, a two-day project inception meeting was held in Canberra. The objectives of the meeting were: i) to ensure that project staff have a shared understanding of the issues to be addressed by the project; ii) to develop a detailed annual research plan for all project activities; and iii) to develop a team spirit.

An advisory Steering Committee (SC) was formed to support the effective management of the project and provide strategic directions and advice to the project. The SC met yearly to hear the progress of the project and provide advice about how to maximize the policy impact of the project. The SC included the following members: i) Director General of FORDA; ii) Director General of Forest Utilization; iii) Director General of Forest Protection and Conservation; v) Director of Local Government Affairs, Ministry of Home Affairs; vi) Secretary of FORDA; vii) a representative of the Ministry of Environment (to be nominated); viii) one representative for each of the two participating provinces; ix) the Indonesian Project Coordinator; and x) the Australian Project Leader.

***Extension Activities to support FST-2012-040***

During the development of project *FST-2012-040* (which builds on the project which is the focus of this Final Report), (the then) AusAID requested that it should be designed to work in collaboration with its REDD project in Central Kalimantan, as the ACIAR project had relevant research activities. However, AusAID decided to close down its project in June 2014 (and significantly scaling it down as of December 2013). This created a problem for the implementation of the ACIAR project.

FORDA was the executing agency of the AusAID project, and it intends to continue work on the Central Kalimantan project, and it was interested to receive support by the ACIAR

project. Therefore, this component of the extension of FST-2007-52 sought to support the implementation of FST-2012-040 in Central Kalimantan, and FORDA's interest in pursuing that work.

The Kapuas District Government in Central Kalimantan is seeking to develop a land use map allowing it to improve its planning activities to include the role of REDD projects. An activity carried out during the extension of this project (Extension Activity 1) involved a spatial analysis to identify suitable lands for cultivation and areas that should be protected (based on biophysical criteria), village surveys to verify the spatial data and to collect socio-economic data including on land claims, traditional practices, social condition and livelihoods as well as large-scale investments.

During the inception phase of FST-2012-040, it was noted that it could support the work of FORDA and Kapuas District Government in the area of the AusAID project which is still forested. This could involve surveying the smallholders in the villages along the river in the tract near the forested area to ascertain their interest in participating in a continuation of REDD activities, and the amount of financial and non-financial incentives that would be required. However, before that activity could take place, there was a need to understand the issues that affected the AusAID project, and how they might affect the implementation of FST-2012-040. Therefore, Extension Activity 2 involved an analysis of the reasons that led to the closure of the AusAID project, and the interest of different stakeholders in eventually continuing a REDD project in the same area of the AusAID project.

## 6 Achievements against activities and outputs/milestones

### Objective 1: To identify the causes of deforestation in project provinces

No.	Activity	Outputs/ Milestones	Completion date	Comments
1.1	Analysis of remote sensing images to assess deforested areas	GIS based land use change maps of Riau and Papua provinces (P)	July 2008	Existing data on deforestation and land uses was considered for the selection of four districts in the two provinces, carried out at a meeting in Canberra in June 2008
1.2	Selection of 4 districts for governance/ economic assessments	2 districts per province selected for further study (PC, A)	August 2008	Districts selected at a meeting in Canberra in June 2008, which involved all project partners. Districts are: i) Siak and Rohan Hilir in Riau; ii) Sami and Merauke in Papua
1.3	Field survey of sampled deforested areas to verify land use replacing forests in Papua	GIS maps updated, including crops replacing forests (PC,A)	August 2009	This activity was initially delayed as a result of problems in identifying an appropriate contractor to carry out the work. Tropenbos International Indonesia was contracted
1.4	Field survey of deforested areas to verify land use replacing forests in Riau	GIS maps updated, including crops replacing forests (PC, A)	December 2008	This activity was initially delayed as a result of problems in identifying an appropriate contractor to carry out the work. Tropenbos International Indonesia was contracted
1.5	Interviews with local stakeholders to ascertain the processes that led to land use change in Papua	Records of interviews summarised and entered in database	April 2009	This activity, together with Activity 1.3, resulted in the publication of a report, see Publication #1, Section 10.2
1.6	Interviews with local stakeholders to ascertain the processes that led to land use change in Riau	Report on the direct causes of deforestation in Riau and Papua (PC, A)	October 2009	This activity, together with Activity 1.4, resulted in the publication of a report, see Publication #2, Section 10.2

PC = partner country, A = Australia

### Objective 2: To estimate the benefits and costs of deforestation and REDD

No.	Activity	Outputs/ Milestones	Completion date	Comments
2.1	Review literature on benefits and costs of alternative land uses in Indonesia	Project report (A, PC)	March 2010	Report goes beyond a literature review to conduct benefit costs analysis in relation to several land use options/discount rates, see Comments on Activity 2.6. Output is Publication #3 Section 10.2
2.2	Gather secondary data on carbon stocks in district projects	Geo-referenced maps of carbon stocks in project districts created (A)	June 2008	Data gathering was carried out in July - August 2008. Due to problems in No 2.3, existing aggregate data was used in the CBA prepared by the project

2.3	Gather and process primary data on carbon stocks	Geo-referenced map of carbon stocks in one project district created and compared with secondary data (PC, A)	July 2009	Primary data was collected in July - October 2009, and was processed. However the methods tested by the PhD student from FORDA (supervised by Dr Chris Brack) and supported by the project did not result in usable data. Hence existing carbon stock data was used in CBA
2.4	Stakeholder workshops in Riau and Papua	Information on stakeholders' views entered in database (PC, A)	February 2010	The workshops were held in Riau in April 2010, in Papua in July 2010
2.5	Stakeholder analysis to identify all relevant groups and interests	Report on stakeholders' views (PC, A)	July 2010 and September 2014	A Policy Briefs (in English) of workshop outputs was published, Policy Brief #1, Section 8.4 A paper was submitted to a journal for publication during the extension phase of the project (2014), and is still under review, Publication #4 Section 10.2
2.5 A	Review of literature on motivations for corporate environmental responsibility and effectiveness: applicability to the forestry and plantation sector in Indonesia	Report (A)	August 2012	This was an additional activity developed during the project as it was recognised that a greater understanding of the corporate environmental responsibility literature was needed in order to understand options for improving business' behaviour in forest management. This activity produced an annotated bibliography rather than a review, because the research fellow working on this activity resigned from the project due to health reasons. The bibliography was used as an input to 2.5B, which includes a review
2.5 B	Motivations and effectiveness of CER in Indonesia's forestry and plantation sector: implications for REDD	Report (A)	January 2013	This was an additional activity developed during the project as it was recognised that a greater understanding of the corporate environmental responsibility literature was needed in order to understand options for improving business' behaviour in forest management. Collection of data on Corporate environmental activities was commenced in July 2011, however was interrupted due to health problems faced by the project research fellow, and her subsequent resignation from the project. Griffith University was contracted to bring this activity to a conclusion, and produced a report that supported the development of the follow up project on REDD+ in Indonesia. Publication #5 Section 10.2
2.6	Household and business surveys to gather data to estimate benefits of alternative land uses	Data collected and entered in database (PC, A)	Completed in part in March 2010	This activity was broken up in several components due to its complexity: i) the analysis of business activities was carried out jointly with Activity 2.1; ii) interviews with households in Riau were initiated in February 2011, completed in April 2011, then entered in database and analysed

2.7	Cost/benefit analysis of land use options and REDD financial transfers for relevant stakeholders	Report on the economic benefits and costs of deforestation and REDD in project districts (PC, A)	May 2014	This report on the smallholders part of this activity was delayed as a result of the delays faced in the implementation of Activity 2.6. Following the resignation from the project of a research fellow (Sarah Milne) a contractor was employed to support the production of this output, Publication #5 Section 10.2
2.7 A	Analysis of household characteristics influence on stated willingness to accept payment by farmers for avoided deforestation	Report (A)	December 2015	This report was part of the extension of the project, and built on Activity 2.7. It was due for completion on October 2014, but was finalised in December 2014. The report (Publication #7 Section 10.2) was presented at a conference in February 2015 (Presentation #17, Section 8.4) and is being prepared for submission to a journal.
2.8	General equilibrium analysis of impacts from REDD	Report on macroeconomic implications of REDD (PC, A)	June 2014	A paper on this topic was published by an ANU academic (outside the project) in collaboration with an Indonesian colleague after this project had started. The ATL reviewed the paper to decide whether this output had become redundant. It was decided to continue this activity as the above mentioned paper had gaps, and academics from the Bogor Agricultural University were contracted. The report ((Publication #8 Section 10.2) has been reviewed informally by academics at the ANU and needs to be revised before submission to a scientific journal.

PC = partner country, A = Australia

### Objective 3: To improve the governance of forests

No.	Activity	Outputs/ Milestones	Completion date	Comments
3.1 A	Review of REDD architecture proposals to inform national development	Published paper	January 2009	New output, to support Activities in Objectives 3-4. Publication #9, Section 10.2
3.1	Review of forest governance and administration literature	Project report (A, PC)	May 2009	Following initial research for this output, it was decided that it would be better to focus this review on perverse incentives for land use, to better inform outputs 3.2 and 3.4. A review of the literature on perverse incentives was carried out and included in the preparation of the outputs for Activities 3.2 and 3.4, as its descriptive nature did not make it suitable as a stand alone publication

3.2	Assess forest land allocation policies and governance structures (protected forests, oil palm and timber plantations)	Project report (PC)	December 2012	While carrying out this activity, it was realised that there was a significant degree of overlap with Activities 3.3, 3.4, and 4.5. Therefore, the output from this activity (Publication #10, Section 10.2) focused on allocation policies for oil palm plantations. Issues concerning protected forests were dealt with in Activity 4.4. Issues concerning forestry aspects were addressed in Activities 3.3, 3.4, and 4.5. The governance structures (formal and informal processes) were considered in Activity 3.3 and 4.5.
3.3	Analysis of problems and stakeholders influencing the timber supply chain (production forests and land clearing permits)	Project report (PC)	April 2011	This output was delayed due to changes in project staff within FORDA. It was contracted to the Bogor Agricultural University, see Publication #11, Section 10.2
3.4	Review the system of government incentives for plantation establishment (timber and oil palm)	Policy Brief & report on forest land allocation policies and governance practices in project districts (PC)	June 2013	The report was completed in February 2012 and published in 2013, Publication #12, Section 10.2. Given that Activities 2.1 and 3.3 had already noted that active government promotion of the expansion of plantation activities represented the main government's incentive, this activity focused on understanding potential incentives for sustainable plantation establishment and management.
3.5	VENSIM modelling to link results from activities 3.1-3.4	Project report on modelling	May 2011	After completing Activities 3.1-3.4 it became clear that it was not possible to link the various governance factors into a simple VENSIM model. This activity was not implemented.
3.6	National workshop on policy options to reduce the inefficient use of resources	Summary report on outcomes of workshop	June 2014	During the implementation of the project, the number of REDD related activities in Indonesia increased, including the number of workshops, thus increasing the risk of duplicating REDD related workshops. Due that factor, and also because of delays in the completion of some the activities of the project (which resulted in the timing of this workshop to be close to the end of the project), this workshop was merged with the national workshop (Output 5.8).

**Objective 4: To develop a decentralized governance system for REDD**

No.	Activity	Outputs/ Milestones	Completion date	Comments
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4.1	Review of literature on decentralization and fiscal incentives for conservation	Project report (A)	December 2009	A draft report was completed in August 2008, the report was revised and presented at the International Conference on Climate Change in Copenhagen in March 2009, and was published, Publication #13, Section 10.2
4.2	Review of existing fiscal transfer mechanisms in Indonesia and potential conflicts with conservation goals	Project report (A)	March 2010	Reported completed, presented at a workshop organized by the project in Jakarta in April 2011, published as working paper, and published, Publication #14, Section 10.2
4.3	Propose options for a fiscal transfer system for REDD credits from the national to the provincial and district levels	1. Policy and institutional options for the design of an intergovernmental transfer fiscal system with environmental performance-based monitoring system (A) 2. Policy brief for the Minister of Forestry and local level governments (A) 3. PhD Thesis on Decentralized Fiscal Mechanism for REDD (A)	April 2012	A Policy Brief (in Bahasa Indonesia) was prepared in July 2011, Policy Brief #2, Section 8.4  The PhD describing all policy options completed in April 2012 (Publication #15, Section 10.2). The policy options presented in the PhD essentially include those derived in Activity 4.2, and described in Policy Brief #2.  To be noted is the fact that the PhD thesis, and the papers that have been published from it, are currently being prepared for publication in a book format, Publication #16, Section 10.2
4.4	Review of stakeholders' views (economic, political, social) on land tenure	Project report (PC)	Due date August 2008	This output has been replaced by a report on the forestry legislation and land tenure, and implications for rural peoples' access through REDD. The report was included in the PhD Thesis (Activity 4.6) and a Policy Brief was produced, Policy Brief #3, Section 8.4
4.5	Assess implications of land tenure systems for forestry and plantation management in Riau and Papua	Project report (PC)	September 2012	Included in PhD thesis, Activity 4.6. The completion of the thesis was delayed compared to the original project plan. By the time that it was completed, there had been significant policy developments in Indonesia in relation to land tenure, particularly through findings by the Constitutional Court that the Ministry of Forestry needed to work on recognising customary land tenure. Therefore, the report (and that section of the thesis) are somewhat out of date. However, they will inform work in relation to land tenure that will be published by project FST2012/040
4.6 A	Review of Payments for Environmental Services	Project report	New Output to support preparation of Output 4.6 below	The literature on PES expanded considerably after project inception, and conflicting views on the role and design of PES had emerged. To facilitate project work in this area this new output was produced. Publication #18, Section 10.2



4.6	Design a mechanism for equitable distribution of REDD credits that addresses land tenure systems	1. Mechanism proposed (PC) 2. Policy brief for the Minister of Forestry and local level governments (PC) 3. PhD Thesis on REDD payments to communities (PC)	September 2012	A policy brief was prepared to disseminate the key findings, Policy Brief #3, Section 8.4.  The PhD thesis was completed, Publication #18, Section 10.2
4.7	Provincial workshops in Riau and Papua to discuss initial proposals for Activities 4.3 and 4.6	Provincial and district governments better informed	April 2011 and February 2012	These workshops were planned for the work on fiscal decentralization and PES to be presented at the same time. This was not possible due to the different rate of progress of the two PhD scholars. In order to still have two workshops (rather than four as they had to be presented at different times) and stay within budget, two national workshops (involving representatives from Riau and Papua) were held, one in Jakarta in April 2011 on fiscal decentralization, and one in Bogor in February 2012 on PES. See Workshops 1 and 2, Section 8.4
4.8	Workshop (Jakarta) on policy and institutional requirements for the implementation of REDD	National government and stakeholders better informed	June 2013	The workshop had a focus on jurisdictional approaches to REDD as a key institutional aspect of implementation of REDD. See Workshop 3, Section 8.4

PC = partner country, A = Australia

### Objective 5: To manage the project effectively and build capacity

No.	Activity	Outputs/ Milestones	Completion date	Comments
5.1	Project inception meeting	Annual project implementation plan (PC, A)	June 2008	Meeting held in June 2008 in Canberra, in conjunction with an open day-long seminar on REDD in Indonesia and PNG co-funded by the International Centre for Excellence in Asia Pacific Studies
5.2	Staff from FORDA (5) and Ministry of Environment (2) trained in cost-benefit analysis	Staff better prepared to assess economics of REDD (PC)	June 2009	Held in June 2009 in Bogor.
5.3	Steering committee meeting	Annual project implementation plan (PC, A)	August 2009	Held in Ministry of Forestry, Jakarta
5.4	Staff from FORDA (5) and Ministry of Environment (2) trained in policy analysis and development	Staff better prepared to assess REDD policy options	May 2010	This training was held in Bogor.
5.5	Mid-term review and Steering committee meeting	Annual project implementation plan (PC, A)	August 2010	Held in Ministry of Forestry in Jakarta

5.6	Steering committee meeting	Annual project implementation plan (PC, A)	September 2011	Held in Ministry of Forestry in Jakarta
5.7	Staff from FORDA (2), Ministry of Environment (2) and Ministry of Home Affairs (2) trained in performance-based monitoring system	Staff understand policy options and can implement as required/preferred by the Government	September 2011	It was held on December 2011. The focus was slightly changed to Payments for Environmental Services as this was deemed more relevant by FORDA
5.8	National workshop to disseminate research	Workshop held in Jakarta (PC, A)	June 2014	This activity was merged with Activity 4.8. The workshop had a focus on the economic aspects of REDD, given that other aspects of the research output from the project had been covered in other workshops. This made the presentations and policy debate more focused. See Workshop 4, Section 8.4

PC = partner country, A = Australia

### **Extension Activities to support FST2012/040**

Details of the results of the outputs arising from the extension, as well as their impacts, will be addressed in details in the reports for project FST2012/040.

No.	Activity	Outputs/ Milestones	Completion date	Comments
1	Analysis of land use allocation and livelihood activities in Kapuas District	Report (PC)	December 2014	A full draft was provided to the ATL by the contracted consultant in December 2015. Final editing is being carried out at the time of preparation of this report.
2	Analysis of stakeholders' perspectives on the AusAID project and their views on the continuation of REDD activities in the area	Report (A)	December 2015	Data collection was significantly delayed due to the very late issuance of a visa by the Indonesian government to allow field research. All data collection was completed by October 2014. Writing of the report was delayed due to fact that the research fellow writing the report had to be away for family reasons till the end of January 2015. It is being finalised at the time of writing this report.

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## 7 Key results and discussion

The project addressed national and local level institutional and economic aspects of current forest management activities in Indonesia, and the possible architecture of REDD+, again in relation to both institutional and economic aspects.

This analysis was underpinned by the activities that were carried out within the first objective of the project, which sought to understand the causes of deforestation in project districts.

To address this question, the project produced two reports (Publications 1 and 2), which came to the following conclusions.

The main contributory factors or dominant direct causes of deforestation and forest degradation in Papua are timber extraction, estate crop development and transmigration area development. From these dominant direct causes, the following underlying causes of deforestation and forest degradation were determined:

1. Economic motives, which involve efforts to raise the regional revenue through investments linked to natural resource extraction, estate crops, plantation forests, mining and forest management enterprises;
2. Forestry governance and government policy covering a lack of harmony in forestry policies, leading to business uncertainty and misalignment of central and regional government policies.

In Riau, the analysis focused on the two project districts of Rokan Hilir and Siak. It found that the drivers of deforestation and forest degradation in Siak were spatial planning policies regulating land use, community livelihoods such as oil palm plantations, road development, and agriculture sector development. The development of infrastructure other than roads in community activity centres and transmigration areas did not significantly influence deforestation and forest degradation in the two districts.

Following that analysis, the assessment of the benefits and costs of deforestation and of REDD+, and stakeholders' perspectives, were analysed in the outputs produced under project Objective 2.

With the paper ***Stakeholders' incentives for land-use change and REDD+: The case of Indonesia*** (Output 2.1), the project investigated the opportunity costs of alternative land uses accruing to different stakeholders, with a focus on companies and the national, provincial and district level governments, with particular emphasis on the influence of alternative discount rates. A cost–benefit analysis of the opportunity costs of avoided deforestation was conducted on the three major land-use activities considered: commercial logging, timber and oil palm plantation. The opportunity cost of oil palm plantations on mineral soil preceded by logging of degraded forest is prohibitively high, meaning that it would be very expensive to compensate companies for not carrying out this land use in order to avoid emissions (break even point around 24 US\$/tonCO<sub>2</sub>eq). However, avoiding deforestation on peat soils would have a lower break-even point, in the range of 2-3 US\$/tonCO<sub>2</sub>eq (due to the larger amounts of carbon per hectare found in peat). Therefore the government should focus on the implementation of REDD in peat areas; it could be expected that Indonesia would benefit financially from avoiding deforestation, given that international carbon prices can certainly be expected to be above the break even cost mentioned above. This publication also stresses that 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. The study also notes that land-use management in Indonesia is rather centralistic, where the national government retains most of the revenues from land-use alternatives to REDD+. However, district governments also have a significant influence on land use decisions. Therefore, to influence their behaviour, REDD+ schemes would need to create a direct link between the distribution of public revenues and district governments' decisions on

land-use activities in their localities.

The benefits and costs of deforestation accruing to smallholders were assessed in the publication ***Benefits and costs of deforestation by smallholders: Implications for forest conservation and climate policy*** (Output 2.7). The focus of this paper on smallholders is due to the fact that large areas of land at the forest frontier are managed informally by smallholders. Deforestation is often accompanied by fires that release large amounts of carbon dioxide, and these emissions are especially high in the case of peatlands which contain thick layers of carbon-rich matter. Therefore, this paper derives marginal abatement cost (MAC) curves using data from a farmer survey in Riau province (Sumatra island), where rates of peatland deforestation are high. The first finding of this analysis is that, like in the case of companies (noted above, Output 2.1), peat soils would provide a better return on investment of REDD+ funds than mineral soils. For example, at a price of \$3/tCO<sub>2</sub>e, a total of 8.8 Mt of CO<sub>2</sub>e could be obtained in peat soils over 25 years, compared to 3.1 Mt in mineral soils. However, and this is the key contribution of this publication to the literature, it is also shown that farmers' stated willingness to accept payment not to clear forest to establish oil palm is significantly higher than the opportunity costs estimated with a MAC as reported above. The amount requested by farmers per ha of land are higher for mineral soils than for peat soils. A payment of \$10/tCO<sub>2</sub>e would satisfy 50% or less of the farmers in the area. It is clear therefore that implementing REDD+ activities it is likely to be significantly more costly than foreshadowed by studies that have focused only on the assessment of opportunity costs, without considering the level of compensation sought by farmers.

Given the importance of the issue raised above, in the extension period the project explored the question of household characteristics influence stated willingness to accept payment by farmers for avoided deforestation with a report on ***Drivers of deforestation and smallholder willingness to accept payments for forest conservation: a quantitative analysis in Riau, Sumatra, Indonesia*** (Output 2.7A). The analysis of willingness to accept (WTA) data revealed that older farmers tend to be less willing to accept payment, especially when they have larger households per hectare of land operated. Farm area and years since the plot was planted with oil palm also were negatively related to the probability of accepting payment. The latter suggests attachment to land related to time of ownership. A variable that was found to have a strong negative influence on the likelihood that payment would be accepted is whether the parcel was originally obtained as forest. In terms of the amount of payment requested, higher payments were requested by farmers who obtained parcels as forests and those who had more income from agriculture. The analysis also found that the difference between the WTA and the opportunity cost for each household was greater for farmers who were older, better educated and with higher income from agriculture. The number of adults in the household and the fact that a parcel was obtained as forest also positively influenced the difference between WTA and the opportunity cost. The report also note, however, that we must consider that the true opportunity cost to the landholder may differ from that calculated from the data because of uncertainty, farmer's risk attitudes, transaction costs, loss aversion and other factors that will increase the total cost of the farmer participating in a REDD+ project. The implications of these findings for the design of REDD+ policies for smallholders will be addressed during the preparation of the paper to be submitted for publication to a scientific journal (which was taking place at the time this Final Report was being completed).

The above analysis implies that the implementation of REDD+ policy will inevitably be affected by local social and political dynamics, with the potential for success depending significantly upon cooperation from a range of stakeholders at the sub-national level. With the paper ***When global climate policy trickles down: Lessons from the analysis of local discourses about forest management and REDD+ in Indonesia*** (Output 2.5), the project looked at how global policy is interpreted on the ground, by local actors who are

likely to be involved in REDD+ implementation. We did this by examining local perceptions of REDD+ and forest management in the two provinces of Riau and Papua, where deforestation rates are high and low respectively. Using data collected from stakeholder workshops held in each province, we conducted a discourse analysis that reveals how different actors perceive and position themselves around REDD+ and forest governance. The results reveal six discourses used by local actors, which variously conflict and converge. These discourses reflect long-standing conflicts and alliances, as well as the infiltration of ideas from national and international levels. Seen together, they highlight how REDD+ is likely to take shape on-the-ground, becoming (re)constituted through interactions with underlying local dynamics and dialogues. A key finding is that local discourses can be grouped around two divergent positions on REDD+. One position supports forest exploitation, seeing limited prospects for financial gain in forest carbon; this is the position taken for instance by traditional forestry management companies. The other position embraces sustainable forest management, expressing conditional support for REDD+ subject to benefit-sharing and property arrangements, with some NGOs, for instance, taking this view. Therefore, a significant challenge in implementing REDD+ will be the reconciliation of these relatively different views. If reconciliation proves to be impossible, the relative political power of the different actors embracing those views will have a significant influence on whether REDD+ policies will be implemented.

Policy decisions on REDD+ should be informed by the potential national economic impacts of those decisions (which will also influence the political economy of those decisions). The potential national impacts of REDD+ were assessed with a report titled ***Assessing the Macro and Sectoral Economic Impacts of the Implementation of Reduced Deforestation Policies in Indonesia*** (Output 2.8). The report carries out an empirical general equilibrium assessment of deforestation and the policies to reduce deforestation in Indonesia. Two different policy measures are considered in the analysis: i) increasing productivity in the forestry sector; and ii) an increasing productivity of the oil palm sector. These two policy measures were considered because increased productivity per hectare could lead to reduced deforestation, assuming that total production was not increased. Another simulation measures the economic impact of land conversion from forest to oil palm plantations and is used as a baseline for the two of policies noted above. Deforestation as assessed using the baseline simulation is found to slightly increase Gross Domestic Product (GDP) and real household consumption. However, it is also found that improving the productivity of the forestry and oil palm sectors results in an increase in GDP. Therefore, if REDD policies focused on Improving productivity of the forestry and oil palm sectors, while restricting their expansion into forest areas, they could reduce deforestation and at the same time have a positive impact on GDP.

The policy implications for REDD activities highlighted above were particularly rooted in economic analysis. The project carried out further investigation of policy issues under project Objective 3, which focused on improving the governance of forests, by analysing the governance factors causing the inefficient and inequitable use (including deforestation) of forest resources.

A detailed description and analysis of the regulatory and governance framework concerning land use activities and forestry was the basis for the ***Analysis of the Problems and Stakeholders Influencing the Timber Supply Chain in Production Forests and Land Clearing Permits*** (Output 3.3). The report finds that the key incentive to the development of forestry and oil palm plantations is the active promotion of their development by the national and local governments; this finding is also corroborated by Outputs 2.1, 3.2, and 3.4. On the basis of a detailed review of existing studies, and interviews with stakeholders in Riau and Papua, the report argues that a REDD+ mechanism should be positioned as a supporting instrument of sustainable forest management (SFM). To make SFM work, three important elements of the regulatory and governance framework should be improved: i) the legal system, ii) institutional arrangements, and iii) fiscal policies. To improve the legal system, a comprehensive framework arrangement comprising a set of regulatory, administrative, and information

instruments is needed. A regulatory instrument on SFM should involve and synchronize the rules of local government, forest management, and spatial planning. Administrative reform should focus on the improvement of the bureaucracy, forest management, and forest services. To implement SFM and REDD+ effectively, a well planned forestry information system is needed: this would include reliable assessment of timber extraction (and input to production), the processes involved (to monitor the legality of timber extraction), and accurate recording of the output of timber products. In relation to institutional arrangements, one of the most important aspects is formation of Forest Management Units (FMUs). Due to different characteristic of each region, the institutional structure of FMUs should be developed to address the local causes of deforestation and forest degradation, in order to ensure that the forest is well managed. With regard to more appropriate fiscal policies, there are two aspects to be considered: natural resource accounting and green fiscal policy. Improvements in natural resource accounting could be done by applying green GDP measures as satellite accounts. The formulation of green fiscal policy could involve the formulation of regulations, and then implementation of, Payments for Environmental Services (PES), Liability Rules (LR), and Purchasing Development Right (PDR) as integral instruments to support national development goals. Whilst it is beyond the scope of the project to address the second and third points, PES and a system for fiscal transfers for REDD were addressed under project Objective 4, and will be discussed below.

Land allocation policies related to oil palm plantations, which impact on forests, were analysed through a case of the province of Papua. The case study focused on Papua because as a result of increasingly limited land in other parts of Indonesia – especially Sumatra and Kalimantan – Papua has emerged as the leading candidate to accommodate new oil palm expansion. The paper *Oil palm estates in Indonesia's forest frontiers: an option for sustainable development?* (Output 3.2) notes that government planners and private sector actors believe that oil palm investments will develop local economy, create jobs, and reduce poverty. Using an Input-Output approach, the paper examines the implications of the proposed investments. In aggregate terms, oil palm investments provide a powerful incentive for the national and local government to allocate more land to this activity, as they are shown to be able to generate significant tax revenues, as well as boosting the economic output in the province, generating jobs, and increasing worker salaries. However, the oil palm sector operates in isolation and has limited economic multipliers. The number of jobs is potentially large, but mostly of an unskilled kind. Those best positioned to benefit in terms of income gains are skilled workers. The paper finds that the government should reduce the size of plantations and develop them gradually to allow time for greater economic integration and for skill acquisition by local communities so they are better equipped to compete for jobs. The priority areas for plantation development should be degraded, non-forest land. These findings are particularly important for the implementation of REDD. First, they should be seen in the context of the macro-economic analysis discussed above (Output 2.8): i) whilst local level analysis such as that carried out by this paper shows that oil palm expansion can have positive local economic impacts, similar or greater economic impacts could be achieved by increasing the productivity of existing oil palm plantations; ii) the government should give appropriate consideration to facilitating expansion of oil palm plantations on degraded non-forested land to limit the emissions arising from forest clearing.

Another paper on Papua explores the potential incentives for sustainable plantation establishment and management arising from sustainability certification schemes. This analysis is carried out in the context of the large scale land acquisition for agro-development. The paper *Can large scale land acquisition for agro-development in Indonesia be managed sustainably?* - Output 3.4) analyzes the Merauke Integrated Food and Energy Estate (MIFEE), and the potential for MIFEE to meet sustainability requirements under the schemes of the Roundtable on Sustainable Palm Oil, the Indonesian Sustainable Palm Oil, and Forest Stewardship Council. The available information paints a skewed picture of expected outcomes, where short-term economic

benefits derived from forest clearing dominate, and environmental impacts and social implications appear to be underestimated. The analysis indicates that oil palm concessions under MIFEE could be compliant with the Roundtable on Sustainable Palm Oil if they resist the short-term perverse incentive of extracting profits from conversion timber. Certification under the Indonesian Sustainable Palm Oil scheme would be possible without any major overhaul. On the other hand, FSC certification for timber concessions is not possible. According to the Indonesian forestry regulations, such plantations must be established on parts of permanent forest estate deemed unproductive. Since the definitions and degree of unproductiveness differ, the establishment of these plantations almost invariably involves the clearing of natural forest, which directly contradicts FSC Principle 10.9. The other major obstacle is related to land tenure. In Indonesia all forest land belongs to the state. The indigenous or customary community land rights receive tacit approval but these rights are not formally recognized, which contradicts FSC Principle 2 and Principles 3.1–3.4. Considering these challenges, it is unlikely that MIFEE companies seeking to develop timber plantations could achieve FSC standard. Therefore, this case study shows that certification schemes for oil palm plantations are relevant to reducing the conflict of objectives between government-promoted agri-industrial developments and government REDD policy. But timber certification is unlikely to be as relevant in the context of timber plantation development. When considering these type of agro-industrial schemes, the Indonesian government should therefore push for the implementation of oil palm certification, timber legality verification systems, reduce the size of plantations, and target non-forestland for the development of timber plantations.

In relation to the architecture of REDD+, the project added an extra activity to consider proposals that had been made at the global / national level as they affect local implementation. The essence of those proposals is to provide financial benefits to developing countries proportionally to the amount of avoided emissions they achieve, i.e. output based. A paper published in *Ecological Economics* (Combes Motel et al 2008) aimed to provide an alternative to the output based approach, which the authors called *Compensated Successful Efforts (CSE)*. In the CSE approach, financial benefits should be provided on the basis of developing countries' successful 'efforts' to reduce emissions from deforestation, that is, it is input based. In the paper ***Compensated successful efforts for avoided deforestation vs compensated reductions*** (Output 3.1A), the project considered this proposal to assess whether it could be relevant to the issues addressed by this project. It found that using the actual rate of deforestation observed at the end of the commitment period, as proposed by Combes Motel et al. (2008), may seem to reduce the uncertainty related to the accuracy of a historical baseline (used in the output approach), and the associated risk of creating 'hot air', proper of the output based proposals. The CSE approach introduces, however, uncertainty about the accuracy of the estimates of avoided deforestation attributable to structural factors and to domestic policies and measures. This uncertainty is due to limited knowledge about the relevant structural factors affecting deforestation and to the econometric methods of estimation. Therefore, the project paper did not support the CSE, and it was not considered any further for application to Indonesia.

Work of the national level architecture of REDD was carried out through the activities of Objective 4, which focused on supporting the development of a decentralized governance system for REDD. To this effect, research addressed the links between decentralization and fiscal incentives, and land tenure and payments for environmental services.

The paper ***Reducing Emissions from Deforestation and Forest Degradation (REDD) and Decentralized Forest Management*** (Output 4.1) stressed that the top eight countries responsible for 70 percent of the world's total annual deforestation, had implemented certain forms of decentralization in public administration and forest management. Therefore, the paper analyzed key implications of decentralized forest management for the implementation of REDD+ by looking at the case of Indonesia. However, the findings are also relevant to other countries that have a degree of decentralized forest management administration. The implications noted in the paper are

that there are three possible options for the involvement of local governments in the implementation of REDD+: 1) the central government decides on a national reference level and devolves the implementation to local governments; 2) the central government decides on a national reference level and seeks expressions of interest from local governments to implement REDD in their administrative areas; and 3) the central and local governments decide on a national reference level jointly and local governments implement REDD activities locally. The paper then highlighted fiscal instruments that could be used for the distribution of REDD+ revenue. Those fiscal instruments were addressed in other research carried out by the project.

Following the above paper, the design of fiscal instrument for the decentralized implementation of REDD+ was considered in the paper ***Designing intergovernmental fiscal transfers for conservation: The case of REDD+ revenue distribution to local governments in Indonesia*** (Output 4.2). The paper notes that a global REDD+ scheme would involve the transfer of financial resources to forested developing countries taking part in it. Therefore, the paper simulates different approaches to the design of intergovernmental fiscal transfers (IFTs) as a means to channel REDD+ international payments to local governments. Two approaches are tested: the cost-reimbursement and the derivation approach.<sup>1</sup> It is demonstrated that both approaches could be used. Using the cost-reimbursement approach, localities with more degraded forests would receive a higher compensation per unit of carbon emission reduction than districts with primary forests. Avoiding further conversion of logged-over areas is associated with higher opportunity costs when compared with preventing the conversion of primary forests, because the alternative land-use activities in degraded areas are mainly timber plantations and oil palm plantations (which are not allowed in primary forest areas). In contrast, the derivation approach sets a fixed percentage and rate to distribute REDD+ revenues, and ignores the opportunity costs of REDD+ incurred by local governments. The key findings of the paper, relevant to Indonesia and more generically for other developing countries, are as follows. Using the cost-reimbursement approach, the IFTs distributed to local governments for pursuing REDD+ are determined entirely on the basis of the opportunity costs, which vary depending on land-use alternatives and the condition of the forests within a locality. There will therefore be an equity issue associated with this approach, as districts that have degraded their forest would receive higher revenues using this approach than those that have not pursued deforestation and forest degradation. Using the cost-reimbursement approach would also require an estimation of the costs of REDD+ for all localities, which may involve high transaction costs. In contrast, the distribution of REDD+ revenues amongst eligible district governments using the derivation approach ignores the opportunity costs of local governments from alternative land uses and focuses only on the market price of carbon credits and the share of revenues allocated to local levels. Localities with opportunity costs higher than the price of carbon credits should be allowed to refuse participation in REDD+, while localities with low opportunity costs would be allowed to keep the benefits from reducing deforestation and forest degradation that exceed their costs. Voluntary participation of local governments is therefore a prerequisite for this approach to succeed. Furthermore, using the derivation approach does not require an estimation of REDD+ costs for all districts, which will reduce the transaction costs of the implementation of REDD+.

The analysis of the issues related to Payments for Environmental Services (PES) schemes was tackled by first going to the core of the concept, given that there were still

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<sup>1</sup> 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. The derivation approach determines the size 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.



significantly different views in the academic literature and practice about what PES involves. The extra activity carried out by the project resulted in a paper (***Redefining payments for environmental services*** - Output 4.6A) that provides a significant contribution to the discussions about PES. Because the paper deals with the theory of PES it is relevant to the Indonesian as well as global REDD+ context. The definition of PES developed in the paper was the basis for further research on PES discussed below. The paper notes that the Environmental Economics and the Ecological Economics perspectives on PES propose rather different views on how to define PES, its key elements, and on the role of PES in ecosystem conservation and rural development. The paper compares these two perspectives and develops a revised definition: PES are schemes that are transparent, and provide additional services with conditional payments to voluntary providers. Key design elements of PES involve cost-effectiveness and best practice for positive livelihood impacts.

In relation to the analysis of the specific institutional issues that may affect the future implementation of PES in Indonesia, with the aim of supporting REDD+ activities, they were address by the PhD thesis ***Designing Payments for Environmental Services (PES) to Reduce Emissions from Deforestation and Forest Degradation (REDD+) in Indonesia***. The study shows that securing property rights over forest resources is the most influential factor determining the success of PES schemes, including significantly reducing emissions from deforestation and forest degradation. However, land and forest policies in Indonesia have not clarified customary rights over forest resources. This study shows that there is a conflict between national regulations and local realities that results in the Papuan customary rights not being properly recognised, although it is operating at the local level. Customary communities living within and surrounding state forests in Papua claim that they have full property rights over forest resources, but they still feel that they have limited access to the forest. Moreover, the policy that puts companies as preferred agents to manage forest resources, often triggers conflict between the companies and local communities. This situation can be found in Riau where local communities do not have access to state forests. Therefore, they demand proper access to forest resources. This has been a persistent problem in state forest management and it often leads to forest degradation, and even deforestation. To improve the control of local communities over forest resources, establishing community-based forest management, by improving and implementing current regulations, is essential. The regulatory analysis carried out in this study shows that there are already policies and regulations that could be used to the tenure arrangements clearer. Communities can be involved in forest management through customary forests, community forests, village forests and community plantation forests.

The main stage of the development of community-based forest management is delineating forest boundaries, since it would assure that the development of institutional arrangements takes place in the right order. The implementation of community-based forest management is the basis for designing PES at the local level. Such implementation would have a positive impact on tenure security and would reduce the technical constraints for implementing PES. However, it would increase the upfront investment costs of PES. On the other hand, the need for long-term support for capacity building in community based forest management could be supported by the long-term nature of carbon payments.

An assessment of the existing tenure arrangements and an examination of community perceptions and knowledge of PES, should be conducted as the initial stage of designing PES for REDD+. These activities are important in helping to assess the potential interest local communities to participate in PES. Then, the first step in designing community-based PES for REDD+ would be the recognition of forest tenure through the development of community-based forest management. The second step would be designing payment mechanisms that may require establishing new, or modifying existing, local institutions. Once their rights over forest resources are acknowledged, the communities can negotiate their involvement in REDD+ with the buyers. Despite some opportunities arising from the fact that the regulatory framework already allows the establishment of community based

forest management – which can be the basis for PES programs to support the implementation of REDD+ – the existing situation appeared challenging at the time the research was concluded. There appeared still to be limited bureaucratic resistance to the actual implementation of community based forest management. The understanding of the role of PES was also still limited despite the work carried out through this project.

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## 8 Impacts

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### 8.1 Scientific impacts – now and in 5 years

The project has already had significant scientific impacts, which are expected to grow over the next five years. The most significant impacts are those generated by the publications focused on payments for environmental services (PES) to communities (Publication #14, in section 10) and on fiscal mechanisms to distribute revenues to local level governments (Publications # 10, 11, 17).

The paper on PES has become a key reference in the field because it provides a new definition of PES actually is, together with a clearer understanding of what it involves to set up PES schemes. The scientific impact of this publication is demonstrated by the fact that it is the second most cited paper (in Google Scholar) among papers with the same or most recent date of publication. The broad scientific impact is also demonstrated by the fact that this paper is cited by other publications in a range of journals, from those more closely focused on forests to land use policy, coastal management, and geography. Given that the scientific literature on PES is becoming one of the largest areas of study in relation to the economics of natural resource management, the impacts of this publication stand to increase over the next five years as more and more studies will address the implementation of PES in different countries (including Indonesia) and in different sectors, and will need to consider the features of PES as proposed in this paper produced by the ACIAR project.

In relation to the publications focused on fiscal mechanisms to distribute revenues to local level governments, they deal with a rather new area of research which has seen very few scientific publications but which has significant growth prospects and, more importantly, can have very significantly practical implications for natural resource management and benefits to local communities. Decentralization of resource management has taken place in dozens of countries in all continents, and is more ubiquitous than payments for environmental services schemes. Therefore, improvements to the funding mechanisms that underpin those processes have the potential to affect resource management on a very large scale. The publications produced by the project are amongst the first ones to address this research area in a comprehensive way. The book that is currently being finalised will be the first book to address this topic and will provide important information for practitioners, government officials, as well as academics on how to analyse fiscal distribution issues related to natural resource management and design appropriate systems. We expect, therefore, significant scientific impacts over the next five years.

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### 8.2 Capacity impacts – now and in 5 years

The capacity impacts that are known to project staff are reported below. Given the policy nature of the project, and the ongoing development process of REDD+ in Indonesia and globally it is difficult at this point to state what the impacts will be in five years. Given the ongoing development of REDD+, ACIAR is funding a project on REDD+ which builds on the present project, and it should be easier at the end of that project to assess the potential longer terms impacts of these activities.

#### ***Capacity Impacts***

Capacity impacts of the project can be assessed, among others, from the involvement of project staffs in producing publications, the policy-making processes as well as awareness raising related to REDD+ at the national and sub-national levels.

In relation to publications, 15 out of 18 total publications involved, or were prepared by, Indonesian team members. The project produced nine journal articles (eight published,

one under review), of which six involved Indonesian team members. To be noted, only one paper with multiple authors did not involve Indonesian team members. Three of the published papers had an Indonesian team member as first author. The project also resulted in the publication of a book, and the first author was an Indonesian team member.

In relation to direct input into policy processes, Ms. Fitri Nurfatriani provided input to:

1. Climate Change Task Force of FORDA and the Ministry of Forestry
2. The formulation of Forestry Ministerial Decree No. 30/2009 on the Procedures of REDD+
3. The development of proposal to be submitted to Forest Carbon Partnership Facility (FCPF) – Readiness Fund

Mr. Subarudi was involved in:

1. FCPF Carbon Fund task force
2. The development of policy for carbon-based reduced impact logging
3. The team for developing low emission development for Bogor City
4. Several workshops awareness raising activities related to REDD+ and village forest, ecosystem restoration and forest governance
5. The preparation of:
  - a. Government Regulation (GR) No. 12/2014 on Non-Tax Revenue from Forestry Sector, especially in carbon trading issue
  - b. GR No. 71/2014 on the protection and management of peat
  - c. Law on Acknowledgement and Protection of Customary Communities
  - d. The revision for GR No. 44/2004 on Forest Planning
  - e. The revision for GR No. 150/2000 on the prevention of soil degradation
  - f. The revision of GR No, 4/2001 on environmental pollution
  - g. The revision of Law No. 5/1990 on Bio-Natural Resource Conservation

Dr Zahrul Muttaqin graduated from the ANU with a PhD and was supported by this project. He has been involved in the preparation of REDD+ in Indonesia. Some activities where Dr. Muttaqin has engaged include:

1. FCPF – Readiness Fund Program in Indonesia
2. FCPF- Carbon Fund program
3. Member of FORDA's Research Council
4. Supporting the implementation of research within Puspijak
5. Participating in some regulation preparations or revisions within ministry of forestry especially that are related to community-based forest management

Dr Silvia Irawan, who studied with an AusAID scholarship, also graduated from the ANU with a PhD through the support of this project, for which she authored several reports and papers. She has become a sought after consultant in the area of forest management policies and climate change, and is the national director of the Indonesian branch of the American think tank Earth Innovations Institute.

### ***Institutional impacts***

The project has significant impact on raising the awareness of provincial forestry services, involved in the project, to REDD+ issues. Several workshops conducted in Papua and Riau have supported the introduction of REDD+ to stakeholders in both provinces. The focal point of the project in Riau Province, Mr. Murod, had involved in the development of Reference Emission Level of Riau Province, and now promoted at the Head of Forestry Service in Kepulauan Meranti District

Mr. Frederik Sali and Mr. Silahuddin of Riau Forestry Service that had been involving in the project have also actively participated in the development of Strategic and Action Plan of REDD+ in Riau Province. Mr. Marthen Kayoi, former Head of Papua Forestry Service and the counterpart of the project, had promoted REDD+ issues and helped Papuan Government in preparing REDD+ implementation.

The findings of the project related to benefit distribution of REDD+ from national level to sub-national level until community level have been used as inputs for policy development in the Ministry of Forestry as well as for the development of FORDA's medium-term research planning. Other activities such as training on policy analysis have also been utilised to develop policy and activities within FORDA.

Finally, at the end of 2014, the Australian Team Leader was asked by a senior Indonesian government official to provide views on the restructuring of the REDD+ Agency and whether it should be merged with the new Ministry of Environment and Forestry.

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## **8.3 Community impacts – now and in 5 years**

### **8.3.1 Economic impacts**

The economic impacts from this type of policy research are difficult to quantify given that it is uncertain whether certain policies change or do not change as a result of the research carried out by the project. This is principally due to the fact that policies are influenced by a large number of factors and stakeholders. In the case of the present project, the uncertainty is compounded by the fact that REDD is still evolving as a mechanism at the international level and is not being fully implemented in individual countries, although in Indonesia there were (in the case of the former AusAID initiative) and still are several REDD+ activities, such as those supported by Norway and Germany.

In qualitative terms, it can be stated however that the project has provided significant contribution to policy making through capacity building activities related to policy, presentations, and publications. These activities contribute to the formulation / change of policy, which in turn impact on the economy. As noted in the Background section, the implementation (or otherwise) of REDD would have a significant impact on the Indonesian economy (as also exemplified in Publication # 3), and government's decisions about REDD that are better informed are bound to have positive impacts on the economy. Given that it is still being discussed at the international level how to implement REDD, the practical economic impacts of the policy research carried out by the project are more likely to become evident over the next five years.

### **8.3.2 Social impacts**

The main social impacts from the project are expected to arise from the research on PES and land tenure in Indonesia. The research generated by the project highlights how communities that reside close to, or within, forests that are currently deemed to be state forests can also participate in PES schemes, which thus far had mostly focused on involving land owners who had private rights to land. The project has clearly demonstrated how those communities could be involved in PES projects, which could be established following the formal recognition of rights within community based forest management mechanisms that exists in Indonesia. However, the project has also highlighted that there is still some resistance to the expansion of community based forest management, and that there is also an ongoing lack of understanding of PES and its potential role in Indonesia, including for the support of REDD activities. These issues will need further attention, both by researchers and especially by policy makers.

Indonesia has seen very limited activity related to PES, but a bill was prepared by the then Ministry of Environment to facilitate the implementation of PES schemes. Now the Ministry

of Environment has been merged with that of Forestry is more likely that the proposed bill will be considered by Parliament, paving the way for the implementation of PES. If that eventuates, then the research carried out by the project would be likely to have significant positive social impacts on the communities who live close to forests and that could be targeted by PES schemes aimed at improving resource management.

### 8.3.3 Environmental impacts

Positive environmental impacts from the project would arise if the REDD mechanism is finally agreed at a global level, and it was implemented in Indonesia, as it is expected.

These environmental impacts would involve increased sustainable management of forest resources, with beneficial impacts on biodiversity, the climate, and ultimately the productivity of agricultural, forestry and fisheries sectors.

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## 8.4 Communication and dissemination activities

### Policy Briefs

1. Activity 2.5 Milne, M., Milne, S., Nurfatriani, F., Dermawan, A., Tacconi, L. 2010. Local stakeholders perception of REDD+.
2. Activity 4.3 Transfer Fiskal antara Pemerintah Pusat Daerah untuk Mekanisme Distribusi Manfaat REDD+.
3. Activity 4.4 Muttaqin, Z. Restrukturasi Arsitektur Kelembagaan Kawasan Hutan di Indonesia.
4. Activity 4.6 Workshop Pendanaan Dan Mekanisme Distribusi Insentif REDD+.

### Workshops

1. Workshop on Financing and Incentive Distribution Mechanism for REDD. Held at the Ministry of Forestry, Jakarta, 28 April 2011. About 90 people from government, donor organizations, and NGOs. The workshop was opened by the Director General of FORDA.  
The workshop was organized by the Center for Climate Change and Forest Policy (FORDA), and involved presentations from Project Staff, and staff from the Ministry of Finance, and University of Indonesia. The objective of the workshop was to support the discussion among decision makers about the most appropriate mechanisms for the transfer of REDD+ revenues from the central government to provincial and district governments.
2. Workshop on Payment Mechanisms and Community Involvement. Held at the IPB Conference Centre, Bogor, 9 February 2012. About 60 people attended the workshop. The workshop was opened by the Director of FORDA.  
The theme of the workshop was involving local communities in payment schemes to Reduce Emissions from Deforestation and Forest Degradation (REDD+) in Indonesia. The objective of workshop was to share information on the design and implementation of PES for REDD+ mechanisms within state forests, including the implications of land tenure systems for the implementation of PES at the community level. The activities of the workshop comprised: (1) Presentations from Demonstration Activities in Berau and Musi Rawas to learn about the involvement of local communities in REDD+; and (2) Focus groups involving stakeholders from government agencies, NGOs, private sectors and researchers.
3. Workshop on Jurisdictional REDD+ in Indonesia. Held at the IPB Conference Centre, Bogor, 21 June 2013. About 40 people attended the workshop. The workshop was opened by the Director General of FORDA.

At the time there was lack of progress in the establishment of a national REDD+ agency, and the design of a national REDD+ financial mechanism, some parties thought that the implementation of REDD+ in Indonesia could be started at the district level. A district also has a certain administrative boundary, including forest boundary. A district also could better deal with local communities, since it could localise the problems related to community empowerment and therefore could reduce transaction cost of implementing a development program. Therefore, this workshop focused on options for the implementation of a jurisdictional approach to REDD+. The workshop was divided into two sessions: the morning saw a panel discussion with presentations, and the afternoon session involved group style discussions.

4. Final project workshop, Economic Aspect of REDD+ in Indonesia. Held at the IPB Conference Centre, Bogor, 25 June 2014. About 90 people attended the workshop. The workshop was opened by the Director General of FORDA.

The project had carried out a wide-ranging examination of the impacts of reducing deforestation and forest degradation on the national economy, the costs and benefits of reducing deforestation and forest degradation faced by forestry and plantation companies, and the costs and benefits of reduced deforestation and forest degradation faced by smallholders. Therefore, this workshop was aimed at presenting the results of these studies and discussing their implications for the formulation of policies related to the financial and economic aspect of REDD+ implementation.

## **Presentations**

1. Tacconi, L. (2009). REDD and Climate Change: current situation and challenges. Lecture presented at the Bogor Agricultural University, February 2009.
2. Nurfatriani, F. Public Consultation in Palembang, South Sumatra. Forest Service Office of South Sumatera Province, 16 April 2009. 29 participants from Provincial and District Government (Forest Service Office of South Sumatera Province, Provincial office of Environmental Ministry, Agriculture Service Office of South Sumatera Province, Provincial Research and Development Agency, Natural Resource and Conservation Office, Forest Service Office of Ogan Komering Ilir District), Private sector (PT. Musi Hutan Persada), NGO (Walhi, Wahana Bumi Hijau) and MRPP-GTZ.
3. Nurfatriani, F. Public Consultation in Riau, Forest Service Office of Riau Province, 19 November 2008. 30 participants from Provincial and District Government (Forest Service Office of Riau Province, Provincial office of Environmental Ministry, Forest Service Office of Siak District, Riau Province Office (Governor office)), NGO (Jikalahari), Private sector (PT. Riau Andalan Pulp and Paper, PT. Indah Kiat, and PT Arara Abadi).
4. Irawan, S., L. Tacconi (2009). Deforestation and ecological fiscal transfers in Indonesia. DIVERSITAS Open Science Conference 2. "Biodiversity and Society: Understanding connections, adapting to change". 13-16 October 2009, Cape Town, South Africa
5. Irawan, S., L. Tacconi (2009) Reducing Emissions from Deforestation and Forest Degradation (REDD) and Decentralized Forest Management. Paper presented at the 'Climate Change: Global Risks, Challenges & Decisions', University of Copenhagen, 1-12 March.
6. Irawan, S., L. Tacconi (2010). Fiscal incentives for conservation at the local level: the case of REDD implementation in Indonesia. Invited presentation at the Annual Meeting of the Association for Tropical Biology and Conservation "Evaluating Economic Incentives for Conservation: From Case-Studies to Process Understanding", 19-23 July 2010, Bali.

7. Tacconi, L. (2010). Forest biodiversity and governance issues. Invited presentation to the Crawford Fund 2010 Annual Development Conference themed 'Biodiversity and World Food Security: Nourishing the Planet and its People', Parliament House, Canberra, 1 September.
8. Tacconi, L. (2010). Linking policies to implement REDD+: decentralization, payments for environmental services and illegality. Presentation at the International Conference on "Emerging Economic Mechanisms: Implications for Forest-Related Policies and Sector Governance", FAO Headquarters (in the framework of COFO-World Forestry Week), Rome, 6-8 October 2010.
9. Tacconi, L. (2010). Forest biodiversity, Climate change and Governance. Invited presentation at the Sixteenth Crawford Fund Annual Development Conference, Parliament House, Canberra, 30 August – 1 September 2010.
10. Tacconi, L. (2010). Linking policies to implement REDD+: decentralization, payments for environmental services and illegality. Presentation at the International Conference on "Emerging Economic Mechanisms: Implications for Forest-Related Policies and Sector Governance", FAO Headquarters (in the framework of COFO-World Forestry Week), Rome, 6-8 October 2010.
11. Irawan, S., L. Tacconi (2010). Fiscal incentives for conservation at the local level: the case of REDD implementation in Indonesia. Invited presentation at the Annual Meeting of the Association for Tropical Biology and Conservation "Evaluating Economic Incentives for Conservation: From Case-Studies to Process Understanding", 19-23 July 2010, Bali.
12. Irawan, S. (2011). Fiscal transfer mechanism for REDD+. Presentation at the Workshop organized by the project in the Ministry of Forestry, April 2011.
13. Tacconi, L. (2011). Redefining payments for environmental services. Presentation at the International Symposium on Society and Natural Resources, Madison, Wisconsin, June 4-8.
14. Tacconi, L. (2011). Livelihoods is REDD+: Land tenure and Payments for environmental services. Invited seminar presentation at the Department of Urban and Rural Development, Swedish University of Agricultural Science, Uppsala, 9<sup>th</sup> November 2011.
15. Muttaqin, Z. (2012) PES and land tenure issues. Presentation at the Workshop organized by the project in Bogor, February 2012.
16. Irawan, S. (2012). Fiscal transfer mechanism for REDD+. Presentation at the Workshop organized by the project in Bogor, February 2012.
17. Moss, J., O. Cacho, L. Tacconi (2015). Drivers of tropical deforestation and implications for climate policy. Contributed Paper, Australian Agricultural and Resource Economics Society Conference 2015, Rotorua, New Zealand.



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## 9 Conclusions and recommendations

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### 9.1 Conclusions

The project delivered all the outputs that had been identified (except on Policy Brief in Output 3.4), and also other outputs (at no extra cost) that were identified during the implementation of the project. These supplementary outputs were identified as necessary for scientific reasons as well as needed by policy makers. This adaptive approach was deemed essential by the project team, and FORDA, in order to maximise the benefits to be generated by the project.

The research produced by the project indicates that there are possible benefits to be gained by Indonesia from the implementation of REDD, as well as some potential costs (see Results section, particularly Outputs 2.1, 2.7, 2.7A, 2.8). The Government of Indonesia, and the local governments, would need to carefully assess the options open to them once the framework for the implementation of REDD is agreed at the international level.

The project has provided frameworks to assess those options. They include: i) how to approach the analysis of the macroeconomic impacts of REDD (Output 2.8); ii) the assessment of the distribution of revenues from land use activities, and how that distribution should be taken into account in the allocation of revenues from REDD (Output 2.1); iii) how to analyse both smallholders' opportunity costs and their willingness to accept compensation to avoid deforestation (Output 2.7A); and iv) how to analyse the views of the different stakeholders affected by REDD (Outputs 2.5, 4.5). The project has also provided a framework for the design of fiscal transfers to local governments (Outputs 4.2, 4.3), and has clearly laid out the need for scaling up community based forest management, and how that can support the implementation of PES and REDD (Output 4.5). All this information has been presented to the Indonesian Government through workshops, training courses, and publications.

The research undertaken by the project identified the need to i) carry out an analysis of the potential for involvement of business in the implementation of REDD in partnerships with local communities, ii) the need to further research the implementation of PES with smallholders who live close to forests, and who often do not have secure property rights to the land, and iii) further research on how to integrate fiscal transfer mechanisms (to be used by the central government to transfer revenues to local governments) with PES systems that aim to transfer financial resources to smallholders. These issues will be addressed by the new project that ACIAR agreed to fund during the extension of this project, as noted earlier in the report. Therefore, the main recommendation to be highlighted (apart from those arising in the specific scientific outputs generated by the project) relates to the approach to be adopted in the implementation of policy focused research projects.

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### 9.2 Recommendations

The experience of this project indicates that it is advisable for policy oriented research projects to adopt an adaptive approach that allows significant flexibility in the implementation of research activities, including the identification of new activities and outputs as well as the removal of some planned ones if they are found to be no longer relevant during the implementation of the project.

This recommendation is based on the experience of this project, which dealt with a policy issue (REDD) and policy environments (national and international) that were evolving as the research was being carried out. As a result, it was uncertain whether some issues

needed to be addressed and to what extent, as well as whether all the stakeholders had been appropriately identified.

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## 10 References

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### 10.1 Cited in the report

- Combes Motel, P., et al. (2008) A methodology to estimate impacts of domestic policies on deforestation: Compensated Successful Efforts for “avoided deforestation” (REDD). *Ecological Economics*, 68, 680-691.
- DNPI (2010) Indonesia’s Greenhouse Gas Abatement Cost Curve. Indonesia National Climate Change Council.
- Gol (2011) Indonesia’s Guideline for Implementing Green House Gas Emission Reduction Action Plan (RANGRK).
- Margono, B.A, et al. (2014) Primary Forest Cover loss in Indonesia over 2000-2012. *Nature Climate Change*, 4, 730-735.

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### 10.2 List of publications produced by the project

1. Output 1.5 Santosa, K.D, E.G.M. Hartoyo, A. Dermawan, K. Obidzinski (2012). Analysis of Land Cover Change, Forest Degradation and Deforestation in Papua. Center for International Forestry Research, Bogor.
2. Output 1.6. Santosa, K.D, E.G.M. Hartoyo, P. Gunarso, A. Dermawan, K. Obidzinski (2012). Analysis of Land Cover Change, Forest Degradation and Deforestation in Siak and Rokan Hilir Districts, Riau. Center for International Forestry Research, and Tropenbos, Bogor.
3. Output 2.1. Irawan, S., L. Tacconi, I. Ring. (2013). Stakeholders’ incentives for land use change and REDD: the case of Indonesia. *Ecological Economics*, 87: 75-83.  
In order to facilitate the distribution of the information, this report has also been published as Asia Pacific Network for Environmental Governance Working Paper #2
4. Output 2.5. Milne, M., S. Milne, F. Nurfatriani, L. Tacconi. When global climate policy trickles down: Lessons from the analysis of local discourses about forest management and REDD+ in Indonesia. Paper submitted to *Ecology and Society*.
5. Output 2.5A. Sarker, T. (2013). Corporate Environmental Responsibility (CER) in the forestry and plantation sector in Indonesia. Working Paper #4, Asia Pacific Network for Environmental Governance, The Australian National University.
6. Output 2.6. Cacho, O., R. Gonzalez, S. Milne, L. Tacconi (2014). Benefits and costs of deforestation by smallholders: Implications for forest conservation and climate policy. *Ecological Economics*, 107: 321-332.
7. Output 2.7A. Moss, J., Cacho, O. (2015). Drivers of deforestation and smallholder willingness to accept payments for forest conservation: a quantitative analysis in Riau, Sumatra, Indonesia. Unpublished project report.
8. Output 2.8. Rina Oktaviani, Noer Azam Achsani, Sahara, Eka Puspitawati, Zahrul Mutaqin, Luca Tacconi. Assessing the Macro and Sectoral Economic Impacts of the Implementation of Reduced Deforestation Policies in Indonesia. Project Report.
9. Output 3.1A. Tacconi, L (2009). Compensated successful efforts for avoided deforestation vs compensated reductions. *Ecological Economics*, 68(8-9): 2469-2472.
10. Output 3.2 Obidzinski K, A. Dermawan, A. Hadiano 2014. Oil palm plantation

investments in Indonesia's forest frontiers: limited economic multipliers and uncertain. *Environment, Development and Sustainability*, 16: 1177-1196.

11. Output 3.3. Nurrochmat, D.R., N. Kosmaryadi, A. Hadianto (2011). Analysis of Problems, and Stakeholders Influencing the timber Supply Chain in Production Forests and Land Clearing Permits. ACIAR Project Report, Research Center for Forest Policy and Climate Change, Forestry Research and Development Agency, Bogor.
12. Output 3.4 Obidzinski, K., I Takahashi, A. Dermawan, H. Komarudin, A. Andrianto (2013). Can large scale land acquisition for agro-development in Indonesia be managed sustainably? *Land Use Policy*, 30: 952-965.
13. Output 4.1 Irawan, S., L. Tacconi (2009). Reducing emissions from deforestation and forest degradation (REDD) and decentralized forest management. *International Forestry Review*, 11(4): 87-98.
14. Output 4.2 Irawan, S., L. Tacconi, I. Ring. (2014). Designing intergovernmental fiscal transfers for conservation: The case of REDD+ revenue distribution to local governments in Indonesia. *Land Use Policy*, 36: 47-59. In order to facilitate the distribution of the information, this report has also been published as Asia Pacific Network for Environmental Governance Working Paper #3.
15. Output 4.3 Irawan, S.. Intergovernmental Fiscal Transfers for Conservation: The Case of Reducing Emissions from Deforestation and Forest Degradation (REDD+) in Indonesia. PhD Thesis, The Australian National University, Canberra.
16. Output 4.3 Irawan, S., L. Tacconi (Forthcoming). Intergovernmental Fiscal Transfers, Forest Conservation and Climate Change. Book to be published by Edward Elgar, England. This is a revised and edited version of Publication #15.
17. Output 4.5 Muttaqin, M.Z. (2012). Developing Payments for Environmental Services (PES) to Reduce Emissions from Deforestation and Forest Degradation (REDD+) in Indonesia. PhD Thesis, The Australian National University, Canberra.
18. Output 4.6A. Tacconi, L. (2012). Redefining payments for environmental services. *Ecological Economics*, 73(1): 29-36.

Other publications produced by project staff, drawing on project findings, but not linked to specific outputs

19. Ring, I., Drechsler, M., van Teeffelen, A, Irawan, S., Venter, O. (2010). Biodiversity conservation and climate mitigation: what role can economic instruments play? *Current Opinion in Environmental Sustainability*, 2(1-2): 53-58.
20. Tacconi, L. (2011). Forest biodiversity, climate change and governance. pp 52-59. In Brown, A.G. ed. *Biodiversity and World Food Security: Nourishing the Planet and Its People*. Sixteenth Crawford Fund Annual Development Conference, Parliament House, Canberra, 30 August – 1 September 2010.