CLIMATE
POLICY
INITIATIVE

Demonstrating Approaches to REDD+ Lessons from the Kalimantan Forests and Climate Partnership

Anja Rosenberg
Jane Wilkinson

November 2013

San Giorgio Group
Case Study

Descriptors

Sector	Land use, climate finance
Region	Indonesia
Keywords	Land use, peat forest, rehabilitation, ecosystem restoration, REDD+, climate finance
Related CPI Reports	San Giorgio Group Case Studies
Contact	Anja Rosenberg, Anja.Rosenberg@climatepolicyinitiative.org

San Giorgio Group Case Study Overview

This paper is one of a series prepared by Climate Policy Initiative for the San Giorgio Group examining the use of public money to catalyze and incentivize private investment into low-carbon technologies and drawing lessons for scaling up green, low-emissions funding. The San Giorgio Group case studies seek to provide real-world examples of what works and what does not in using public money to spur low-carbon growth. Through these case studies CPI describes and analyzes the types of mechanisms employed by the public sector to deal with the risks and barriers that impede investment, establish supporting policy and institutional development, and address capacity constraints.

About CPI

Climate Policy Initiative is a team of analysts and advisors that works to improve the most important energy and land use policies around the world, with a particular focus on finance. An independent organization supported in part by a grant from the Open Society Foundations, CPI works in places that provide the most potential for policy impact including Brazil, China, Europe, India, Indonesia, and the United States.

Acknowledgements

Our analysis benefited from close dialogue and interaction with a number of national and international organizations and government agencies ministries active in areas relevant for this study. We would like to thank (in alphabetical order) Grahame Applegate, Leanne Devereux, Rachael Diprose, Timothy Jessup, Erika Oord, Rachma Safitri Yogasari, and in particular, Skye Glenday.

The authors acknowledge the helpful comments during review from Gary Paoli, Neil Franklin, Rauf Prasodjo, Agus Sari, Matt Leggett, Daniela Göhler, Budi Kuncoro, Marcel J. Silvius, and Werner Kornexl.

Finally the authors gratefully acknowledge comments and internal review by CPI staff: Angela Falconer, Elinor Benami, Clarissa Costalonga e Gandour, Ruby Barcklay, Morgan Hervé-Mignucci, Elysha Rom-Povolo, Dan Storey, Barbara Buchner and Tim Varga. We would like to thank Tom Heller for his ongoing guidance.

Executive Summary

Emissions from deforestation and forest degradation make up nearly one fifth of global greenhouse gas emissions (IPCC 2007). Reducing Emissions from Deforestation and Forest Degradation (REDD+) is a high level framework that aims to assist developing countries to slow, halt, and reverse forest loss and associated emissions. It sets out three sequential elements: (a) the development of national strategies or action plans, policies and measures, and capacity-building; (b) the implementation of these strategies, plans, policies and measures in ways that could involve further capacity-building, technology development and transfer, and results-based demonstration activities; and (c) results-based actions that should be fully measured, reported, and verified.

With estimated costs of halving emissions from deforestation and forest degradation by 2030 ranging between USD 17 to USD 23 billion (UNEP FI 2011), the projected level of investment needed far exceeds available public resources, and significant private funding sources will undoubtedly be required. **However, until operational, transparent, and effective national REDD+ strategies and frameworks are implemented, private investors face significant policy risks and disincentives, and have few economic reasons to support REDD+ activities.**

For Indonesia, a major part of the REDD+ effort will need to focus on emissions from degraded tropical peatlands. Peatlands, and in particular tropical peat swamp forests, store more carbon than any other terrestrial ecosystem and are important reservoirs of biodiversity and ecosystem services such as water filtration. With around half of the global peatland area within developing countries located in Indonesia (BAPPENAS 2009), **finding ways to rehabilitate peat forests degraded due to deforestation and inefficient agricultural practices, and to mitigate future emissions, has potential global significance**. The race is on to understand whether degraded peatland can be rehabilitated effectively to avoid the emission of millions of tons of CO_2 and conserve other important ecosystem services, and what barriers need to be overcome to attract private investment at scale.

The Australian government-funded Kalimantan Forests and Climate Partnership (KFCP) is one of the earliest large-scale REDD+ demonstration activities in Indonesia. One of the four components of this project aimed to demonstrate effective approaches and techniques to rehabilitate peatland at scale and preserve threatened peat swamp areas. **In this case study, we analyze the KFCP peatland rehabilitation component to distill lessons that might inform the implementation of a national REDD+ framework and provide early insights to future REDD+ project developers.**

Some lessons learned

The KFCP peatland rehabilitation component began in 2009 and concluded in June 2013 before achieving its objectives in full. While the KFCP did not prove the feasibility of peatland rehabilitation, the project as a whole has generated key insights, improving the prospects of designing a defensible and robust technical approach in the future.

In particular, **the case highlights the role of international public finance in supporting the development and testing of approaches that have high potential to generate public goods that benefit all members of society but little or no associated profit.** Contributions made by the KFCP to technical knowledge of peatland rehabilitation are likely to reduce costs for future investors, and include:

- An innovative design for a system of peat rehabilitation. Although only components were implemented and tested, lessons about these as well as lessons about how much time is needed for preparation and approvals, are of high value and should be disseminated broadly, particularly given the partnership studied, monitored, and evaluated all interventions irrespective of outcomes.
- Continuous monitoring of peat, water table and vegetation. Recorded data is a crucial basis for peat science, emissions estimation, and peatland rehabilitation.
- Improved approaches to peat forest rehabilitation including small dam construction and determining which plant species and plantation development methods can be used for reforestation of degraded peatlands.

The KFCP also highlights the centrality of effective community engagement to the success of peatland rehabilitation activities. Future public and private project developers will be obliged to ensure the 'full and effective participation' of communities in REDD+ activities and will need to implement proven mechanisms to fulfill this obligation. The KFCP's 'Village Agreements' provide a potential model for engaging communities located on or near REDD+ sites, and achieving agreement to community-implemented activities that

support peat forest rehabilitation, develop additional income sources, and lay a foundation for permanent emissions reductions.

Some lessons pending - issues for future REDD+ investments in Indonesia

The business case for future commercially oriented investors in Indonesian peatland rehabilitation activities remains uncertain. As a public partnership, the KFCP did not set out to generate financial returns. Nevertheless, KFCP data does provide **preliminary estimated revenues that compare favorably with estimated costs for designing and implementing peatland rehabilitiation activites** of AUD 14.1 million. Our analysis shows that if the KFCP saved 26 million tons of verifiable carbon units over a 30-year period (as projected by experts advising the KFCP), with prevailing carbon market prices of between AUD 4 or and AUD 23 per ton, the project could generate average annual returns of between AUD 3.5 million and AUD 20 million. Calculations are based on simple assumptions and are highly uncertain. Still, they suggest the potential for achieving financial viability is good, assuming all other risks can be managed.

Work is needed to clarify tariff and revenue sharing arrangements, to enable investors to fully assess project profitability and reduce their exposure to risk in REDD+ projects. In the absence of an established benefit sharing system, there is little certainty about who stands to share in future revenue streams. The taxation of REDD+ activities is also still being defined by the Government of Indonesia, and income tax and VAT or other additional REDD+ specific tariffs, could significantly impact the balance sheets of REDD+ projects.

National policies and mechanisms to minimize transaction costs and underpin the robust measurement and verification of emission reduction units will be essential to attract commercially oriented investors. Future financial returns, whether these streams come from performance-based mechanisms or from carbon markets, are likely to rely on the generation of verifiable emission reductions. There will therefore be additional costs to investors for complying with related requirements (e.g. project level monitoring and reporting, and social and environmental safeguards). An effective, operational national framework for these requirements is under development, including through the recent establishment of the Indonesia REDD+ Agency in September 2013. Whether this framework tackles barriers across landscapes, or on a project-by-project basis, has important cost implications for investors.

Effective management and regulation of land and various classes of land rights will be essential to reconcile Indonesia's environmental and economic development goals. Continuing support for policy improvements to clarify land tenure is needed to encourage potential private backers of REDD+ activities in Indonesia. Without a national framework that sets out consistent requirements at the central, provincial and district level, private sector investors will not easily be able to navigate governance arrangements.

While the KFCP ultimately fell short of its objective to demonstrate effective approaches at scale to the rehabilitation of peatland, the case highlights the importance of clarifying project standards, social engagement, and future revenues. Public sector reforms to address these issues will be technically and politically challenging. However, it is such reforms that have the greatest potential to reconcile Indonesia's need to achieve sustained economic growth, particularly in the agricultural sector, while ensuring development is environmentally sustainable and protects high value ecosystems or 'natural capital'. Substantial, well-targeted public sector finance, from domestic or international actors, is likely to be required to support national policy makers to achieve these reforms in the short to medium term.

The following table summarizes how KFCP addressed barriers to successful peatland rehabilitation:

WHO	ISSUE	KFCP RESPONSES AND EFFECTS
INDONESIAN AUTHORITIES	REDD+ Framework, including financing and benefit sharing mechanisms, is in an early development phase	KFCP is fully funded by the Australian government. Unlike possible future privately funded activities, the investor is not seeking to benefit from future revenue flows. Under Village Agreements, local communities are encouraged to participate in implementation activities aimed at securing alternative livelihoods and income sources.
	Policy and legislative uncertainty around zoning, land tenure, and approvals processes	Under the KFCP partnership, which includes all levels of Indonesian government, access was granted to the state-owned land on which the project is located, avoiding lengthy delays, cost over-runs, and in a worst case scenario, the inability to establish the project.
INTERNATIONAL ACTORS	Uncertainty about viability of large scale peat forest rehabilitation	Research and design teams have identified and started to systematically address inadequacies identified in previous attempts to block canals and raise water tables and developed a new technical approach.
	Lack of understanding of peatland geography, ecology, hydrology, vegetation, etc.	Australian and Dutch aid provided funding to pay the costs of a digital elevation model of the peat surface and vegetation canopy of a larger area that included the KFCP site to build a better understanding of peat depth and guide the design and engineering of canal blocking systems across the whole Ex Mega Rice Project area. Data on peat, water tables and vegetation has been collected systematically while an expert peat panel was established to develop an emissions estimation methodology.
COMMUNITIES	Failure to engage communities could result in opposition, impermanence, and the continuation of unsustainable agricultural practices	Village Agreements encourage communities to support and participate in rehabilitation activities aimed at achieving permanence including reforestation and fire management by: Providing funding for community training programs to improve communities' technical capacities, environmental sensitivity, and management skills

Table of Contents

1. Introduction

In October 2011, Climate Policy Initiative and the World Bank Group, in collaboration with China Light & Power (CLP) and the Organization for Economic Co-operation and Development (OECD), established a working group of key financial intermediaries and institutions engaged in green, low-emissions finance: the San Giorgio Group.

The San Giorgio Group recognizes that a major barrier to scaling up climate investment flows is the limited availability of clear, 'on the ground' examples of financial practices, environmental policies, and political signals that make green investment effective. The goal of the San Giorgio Group is to fill this gap by drawing on the experience of its members to track and analyze the life cycle of existing projects, programs, and portfolios. In so doing we aim to distil lessons about evolving financing practice and provide insights on how to scale up climate finance and spend resources more wisely. Our enquiries are framed by four overarching questions:

- What is the role of public money?
- How can public money be best delivered (instruments and institutional channels)?
- How to ensure alignment of international and national public investment flows with each other and with private investment?
- How can continued learning be ensured?

San Giorgio Group case studies share a systematic analytical framework. They explore in depth the role of project stakeholders, the sources of return for the various stakeholders, the risks involved and arrangements to deal with them, and lessons on how to replicate and scale up best practice.

Emissions associated with deforestation currently account for nearly 20% of global emissions (IPCC 2007). The United Nations Environment Program estimates that halving these by 2030 will cost USD 17-33 billion (UNEP FI 2011). Public or philanthropic finance may provide a necessary bridge to achieve this, but new, commercially oriented funding sources will undoubtedly be required.

The Kalimantan Forests and Climate Partnership (KFCP) is a publically financed demonstration activity that aims to develop and test methods for reducing greenhouse gas emissions from deforestation and forest degradation (REDD+). Located in Central Kalimantan on the Island of Borneo, one component of the project set out to undertake the first large-scale peat forest rehabilitation in Indonesia, and to manage, monitor and evaluate the impacts.

The goals of KFCP are to:

- Rehabilitate peat swamp forest;
- Establish a greenhouse gas emissions estimation and monitoring program;
- Demonstrate practical and effective REDD+ greenhouse gas payment mechanisms;
- Develop REDD+ management and technical capacity and readiness at provincial, district, sub-district, and village levels.

This San Giorgio Group (SGG) Case Study focuses on the first component — to rehabilitate peat swamp forest. Peatlands, and in particular tropical peat swamp forests, store more carbon than any other terrestrial ecosystem, and as such contribute critically to REDD+ efforts. To date, there has been limited in-depth analysis of the costs of achieving technically and socially effective[1] solutions to peat forest rehabilitation. Other studies on the KFCP and its peat forest rehabilitation activities have generally focused on the projects' technical and social approaches. In this SGG case study, we focus on whether the public money used to develop and implement the peat forest rehabilitation component of the KFCP REDD+ demonstration activity has helped to unlock other efforts to rehabilitate peat forests, or to promote investment by other classes of investors.

By focusing our examination on the costs and effectiveness of KFCP peat forest rehabilitation activities, we aim to highlight lessons that can be learned and applied by investors and policy makers alike to promote rehabilitation of degraded tropical peatlands in Indonesia and beyond, and to identify any outstanding issues that need to be addressed.

Section 2 of the report provides an overview of the KFCP and its objectives, outlines the major steps it took to rehabilitate peat forest, describes the project timeline and identifies the key stakeholders. Section 3 explores costs incurred, projected costs for rehabilitating degraded peat forests on the KFCP site, as well as projected returns and project effectiveness in furthering understanding of methods to rehabilitate

1 In the case of the KFCP, we limit our analysis to the achievements of component one related to the peat forest rehabilitation within the KFCP project site, by applying metrics of effectiveness based on what has been learned and might be replicated elsewhere. Our evaluation of effectiveness is focused upon proof of concepts rather than achievement of technology cost reductions or deployment.

peat forests. Section 4 examines risks faced during the development and operation phase of activities. It discusses approaches to addressing these risks and considers which have been mitigated or reallocated, and the extent to which mechanisms and arrangements may or may not reduce risks for future projects. Section 5 analyzes the potential for KFCP lessons to be applied and scaled more generally. The section discusses the challenges and barriers still impeding the involvement of potential private investors in peat forest rehabilitation. Section 6 discusses an approach to REDD+ that refocuses policy reform efforts through a lens that prioritizes the need to achieve rural development while protecting high conservation value lands.

2. An Overview of the Kalimantan Forests and Climate Partnership

Demonstrating technical and social approaches to effective rehabilitation of peat forests, as well as determining their financial viability, is crucial to attract new, commercially oriented funding sources, including as part of a REDD+ mechanism. A key component of the Kalimantan Forests and Climate Partnership (KFCP) aimed to demonstrate the feasibility of rehabilitating peatland.

2.1 Project background

Finding ways to rehabilitate peat forests degraded due to deforestation and inefficient agricultural practices, and to mitigate future emissions, has potential global significance. In addition to storing carbon, peatlands are important reservoirs of biodiversity and ecosystem services such as water regulation. Tropical peat forests have been systematically logged and the peatlands underneath drained to make way for plantations, agriculture, commercial timber operations, housing and industry, and to mitigate flooding. When drained and exposed to oxygen and subsequent decomposition, the peat can release significant amounts of carbon dioxide, methane, and nitrous oxides (Parish et al. 2008). Dried peatlands are also highly susceptible to fires that produce large amounts of haze and noxious gases, are difficult to extinguish, cause serious threats to health and livelihoods, and release additional greenhouse gas emissions (Hooijer et al. 2006).

Half of the global peatland area within developing countries is located in Indonesia (BAPPENAS 2009). **Indonesia is already one of the world's largest contributors to global emission levels, around 60% of which originate from land use change and forestry, with a high proportion of these coming from degradation of peatlands and peat fires (SNC RI 2010).** Framed by its unilateral commitment to reduce greenhouse gas emissions by 26% against a business-as-usual trajectory in 2020,[2] Indonesia's high potential to reduce emissions from land use has focused international attention on the development and implementation of REDD+ activities and supporting mechanisms.[3] However, efforts to stop the loss of peat forests face challenges associated with governance and misaligned incentives. Designs for possible interventions must always consider complex social, political and economic dimensions. Economic growth goals at the national and regional levels include increased agricultural production. Without incentives to optimize land use according to the value of its natural capital, there is pressure to expand agriculture onto high conservation value lands including peat forests.[4] Substantial investments of political and financial capital are needed to reduce degradation of peatlands and peat swamp forests and begin their rehabilitation process.

2.2 Project Overview

The KFCP aims to develop and demonstrate a credible, equitable, and effective approach to reducing greenhouse gas emissions from peat forest degradation.[5] In total, the Australian Government committed AUD 47 million to the entire KFCP project to support four main components, as set out in the introduction, in the Province of Central Kalimantan. This SGG case study focuses on the analysis of peat forest rehabilitation activities (component one) under the KFCP.

The KFCP is based in an area of peat swamp forest and degraded peatland in the Ex-Mega Rice Project (EMRP) area in Kapuas District in Central Kalimantan, Indonesia. The Mega Rice Project began in 1996 with the aim of logging and draining 1.2 million hectares (ha) of "unproductive" and sparsely populated peat swamp forest in order to convert it into rice paddies. After the

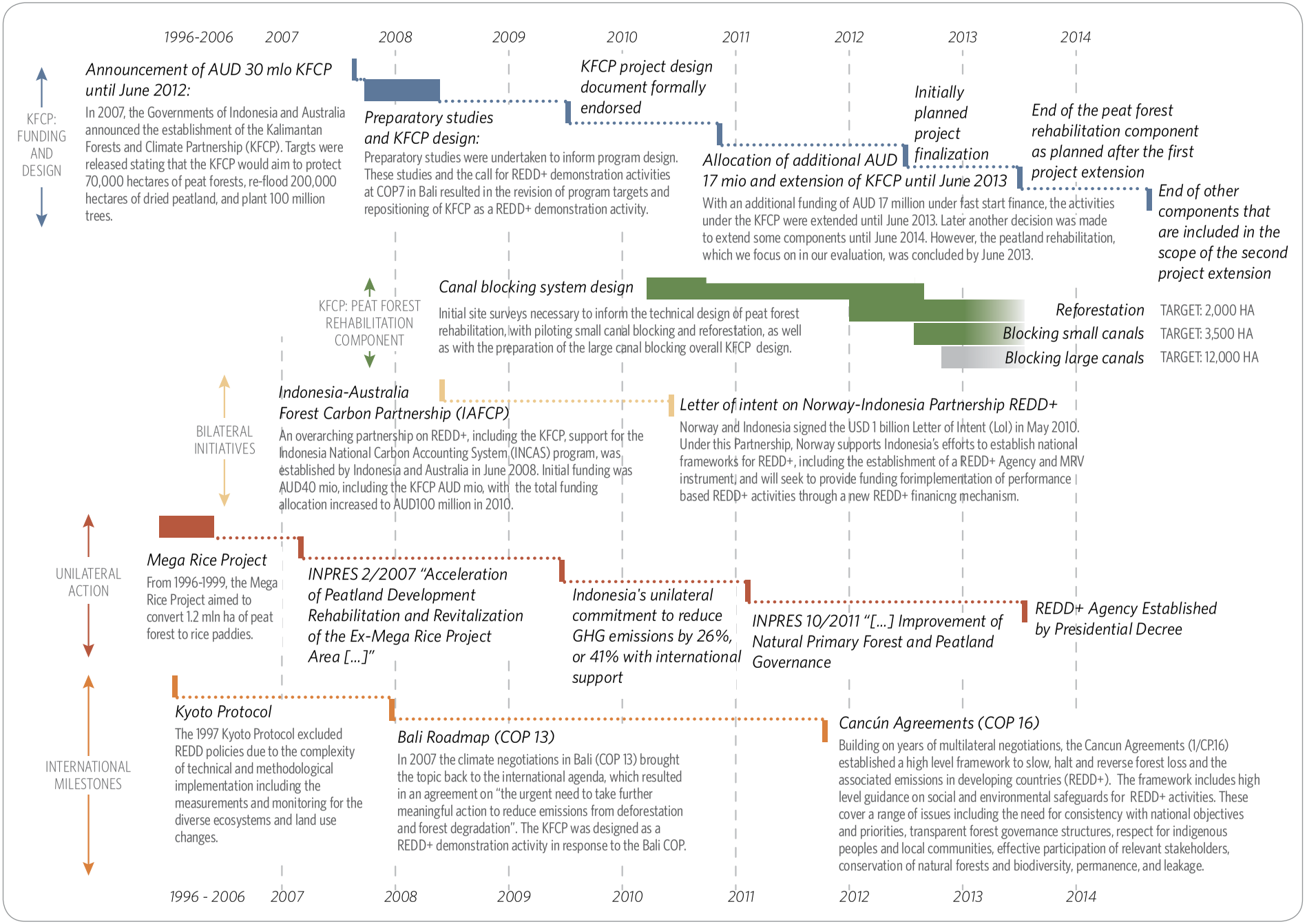
2 President Yudhoyono announced that Indonesia would reduce emissions by 26%, and up to 41% with international financial support, against BAU by 2020 at the 2009 G-20 Leaders' Summit at Pittsburgh (SNC RI 2010).

3 For example, the partnership between Norway and Indonesia has played an instrumental role in implementing a Moratorium on the Provision of New Permits and Improvement of Natural Primary Forest and Peatland Governance (INPRES 10/2011), which effectively imposes a 2-year moratorium on new forest concession licenses, and has motivated work to design and implement a nationally owned funding instrument to channel USD1 billion, based on payment for performance.

4 The Economic Masterplan for the Acceleration and Expansion of Economic Development (MP3EI 2011) articulates development plans which crisscross wide swathes of the landscape. The plan devotes an estimated USD 40 billion of investment over next 15 years towards competing land uses throughout the country.

5 The KFCP is the main initiative under Australia's AUD 273 million International Forest Carbon Initiative (IFCI), which aims to find practical ways to reduce forest emissions and was established in January 2008. Under IFCI, the Indonesia-Australia Forests and Carbon Partnership (IAFCP) builds the framework for the KFCP. With a total budget of AUD 100 million the IAFCP aims to support the Indonesian Government's efforts to tackle REDD+.

Project timeline



formal cessation of the project in 1999, the area was rendered vulnerable to fire and microbiological oxidation resulting in significant greenhouse gas emissions. **A key component of the KFCP project outputs was to test approaches to conserving remaining intact peat swamp forests within the project area, and rehabilitating degraded areas**.

Out of the 120,000 ha comprising the KFCP project site, 15,500 ha of peat forest located on two separate blocks (Block A and Block E – see Appendix A for a high resolution map) were targeted for rehabilitation and conservation interventions. Related interventions were planned to help to raise water levels across the peatland to near-natural levels (hydrological rehabilitation), supporting survival of reforested areas, minimizing the incidence of fire, and thus supporting avoidance and reduction of greenhouse gas emissions and promoting the sequestration of carbon. Planned rehabilitation objectives included:

- **To trial a new system for blocking large drainage canals** on 12,000 ha of highly degraded peat in Block A, and out of this area, to reforest 2,000 ha to **demonstrate and monitor the impacts of the hydrological rehabilitation on the vegetation**;[6] and
- **To block a selection of small canals on an area of 3,500 ha** in Block E, by building soft dams and filling them manually with mineral soil and dead vegetative material from surrounding areas, thereby testing their impact on peatland hydrology and preserving the remaining peat swamp forest.[7]

2.3 Project timeline

In 2007 the Governments of Indonesia and Australia announced the establishment of the Kalimantan Forests and Climate Partnership (KFCP). The KFCP peatland rehabilitation component, on which we focus in this study, commenced in 2009 and concluded in June 2013. Although the KFCP achieved many outputs and helped to address some of the development and demonstration barriers in peat forest rehabilitation, it did not deliver all envisaged objectives in the available timeframe.

Table 1 highlights and describes key milestones in the KFCP project against the background of international and national policies incentivizing REDD+ interventions, including peat forest rehabilitation.

2.4 Project Stakeholders

Four main groups of international, national, government and non-government stakeholders have been involved in the project: the Government of Indonesia and its governmental bodies; international donors (including the Australian and Dutch governments); local communities living in the affected area; and service providers. Aligning the interests of all stakeholders is a complex undertaking. Table 2 lists the stakeholders' contributions in detail, focusing on their role in the financing of the project.

Figure 1 illustrates the relationships and resource flows between stakeholders identified in Table 2. It categorizes and maps the financial links and the different agreements between the stakeholders that allowed them to manage resources and allocate different risks. It shows the flow of finance from the international donors (the Australian and Dutch governments) to international and national service providers, including the communities living on the site. Figure 1 also highlights the contribution of the Indonesian government which contributed to program governance, provided human resources, and approval to use land.

Because the partnership is not designed to generate financial returns, we grey out potential revenue sources and potential private investors. However, their inclusion reflects their likely role in any future replication or scale-up efforts. We discuss their potential contribution in section 5 of this report.

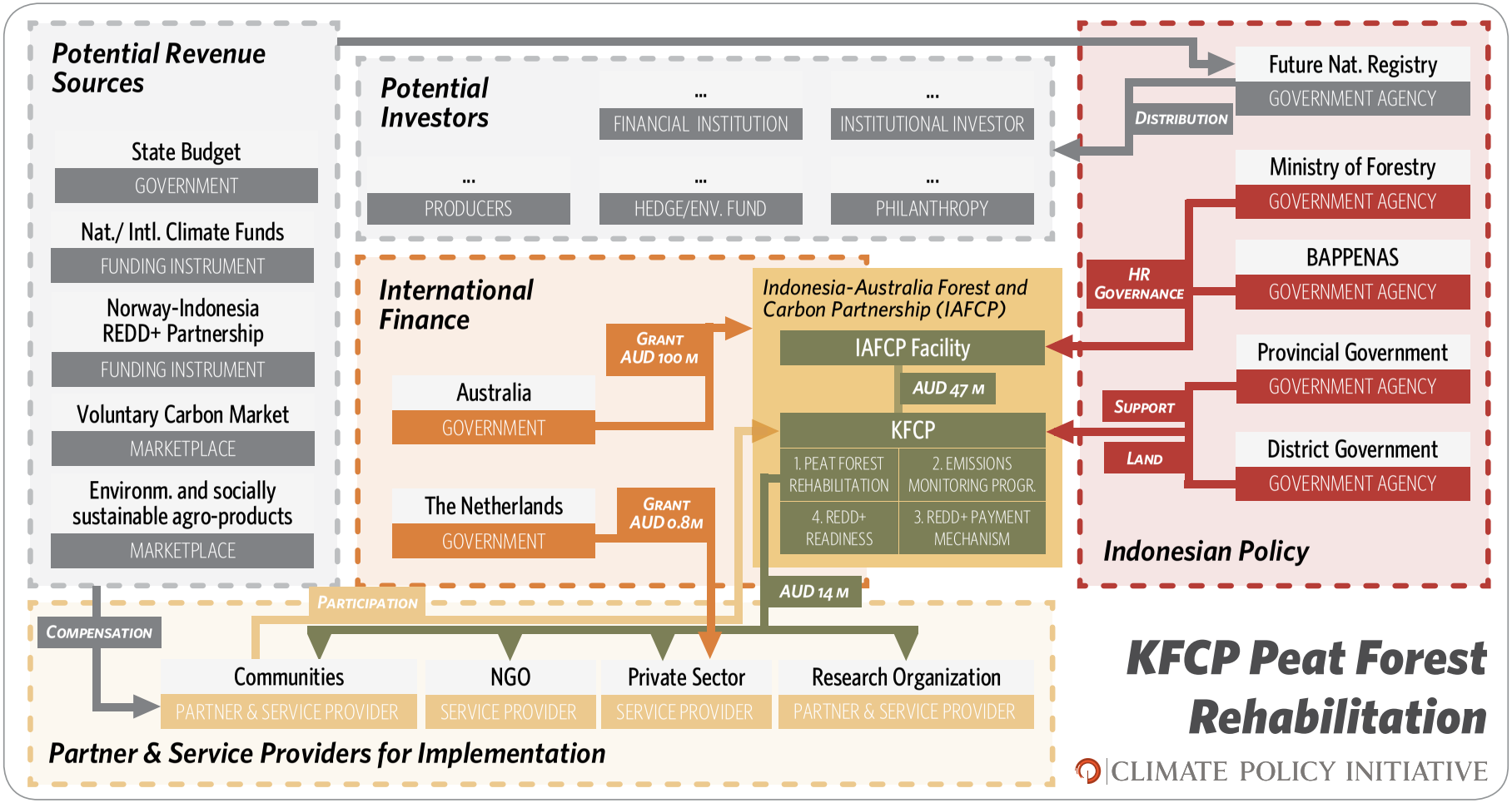
6 This activity was planned on Block A – an area of 50,000 ha located in the southern half of the KFCP project area (Block A), which was severely deforested and drained by large industrial canals constructed by heavy machinery, and subsequently burned numerous times since 1997/98.

7 This activity was planned for Block E, located in the northern section of the project area. Block E was covered by 60,000 ha of logged and unlogged peat swamp forest, and about 10,000 ha of rubber and degraded riverine forest and shrub-lands on shallow peat. This forest tract still provides important environmental services, including the maintenance and storage of carbon in the forest and in the underlying peat soil. Half of the forest was logged and drained by small hand-dug canals used to extract logs and other forest products for transport to markets located down the Kapuas River (see Appendix A for a high resolution map).

Table 2: Description of stakeholders and their roles

STAKEHOLDER		DESCRIPTION AND ROLE	FINANCING ROLE
INTERNATIONAL DOORS	Government of Australia	The Australian government manages the KFCP under the Indonesia-Australia Forest Carbon Partnership (IAFCP) in partnership with the Government of Indonesia. In total, the IAFCP Facility will receive AUD 98 million from Australia's overseas development aid (ODA) budget for all planned projects. AUD 47 million of this has been allocated to the KFCP, which planned a budget of approximately AUD 14.1 million for peat forest rehabilitation related activities (note it includes management of activities and related community engagement). The Government of Australia does not aim to generate financial returns from the project.	Finances the KFCP ongoing project activities via a grant from ODA budget
	Government of the Netherlands	The Dutch government contributed an additional AUD 0.8 million to pay the costs of a Light Detection and Ranging (LiDAR) survey of the EMRP area to ascertain peat topography across the site. This survey was crucial to the KFCP project design phase. The Government of the Netherlands does not aim to generate financial returns from the project.	Provided more than 50% of the finance for an EMRP area LiDAR survey
GOVERNMENT OF INDONESIA	Indonesian Ministry of Forestry	The Ministry of Forestry (MoFor) is the KFCP's national-level executing agency within the Government of Indonesia. Representatives of the MoFor participate in the KFCP Task Group that prepared terms of reference for and evaluated the results of work undertaken during the demonstration activity. Furthermore, the majority of the KFCP demonstration site is part of the National Forest Estate, which is under MoFor authority.	Authorizes access to land
	National Development Planning Agency (BAPPENAS)	National Development Planning Agency (BAPPENAS) along with MoFor are members of the IAFCP Steering Committee whose responsibilities included management oversight of the KFCP. BAPPENAS and MoFor provided technical input and human resources.	Oversees development partner activities and ODA in Indonesia.
	Provincial government	The governments of Central Kalimantan and Kapuas District (Implementing Agency) each participate in the partnership. Besides collaborating closely with communities, it was these levels of government that also granted permission to access the whole area of land on which the KFCP peatland rehabilitation activities were based. The implementing agencies are also represented on the IAFCP Steering Committee.	Authorizes access to land
	Kapuas district government		
COMMUNITIES	Local communities	Local communities possess the right to agree or disagree to activities that take place in or impact their land and resources. Hence partnerships with local communities are integral to securing support for planning and implementing rehabilitation activities and to underpinning the permanence of KFCP interventions.	Authorizes access to land
PARTNERS/SERVICE PROVIDERS	NGO partners Research organizations Private sector	Partners and technology and service providers have carried out much of the technical project design, implementation, and monitoring work associated with canal blocking, reforestation, community engagement, and initial baseline studies.	

Figure 1: KFCP Stakeholder Mapping



Source: CPI compiled this information based on various sources. Potential revenue sources and potential investors are blocked out, since they are not available at present.

3. Costs, returns, and the potential profitability of peatland rehabilitation

In the case of KFCP, public money built a necessary bridge to future replication of interventions. It paid for the development and implementation of a model for full and effective community participation and an innovative design for a system to rehabilitate degraded peatland.

Assuming measurable, verifiable, and permanent emission reductions are achieved, investments to rehabilitate degraded peat forest or keep peat swamp forests intact could generate significant revenue streams, even with low-carbon prices.

This section addresses one of the San Giorgio Group's main questions: What are the public financial inputs and what are the main outcomes of the KFCP peat forest rehabilitation activities? When assessing the financial profile of peat forest rehabilitation, we first consider the projected costs of activities associated with different interventions across the project phases. We consider capital costs accrued during project planning and implementation, expenditures during operation, and estimate possible returns and profitability at the project level based on two proxy carbon prices (assuming that verifiable emissions reductions can in fact be achieved). We analyze the business case from a future project developer's perspective and at the same time accommodate questions that are key to communities and public actors.

3.1 Capital costs associated with the KFCP

Peat forest rehabilitation has both technical and social components that imply significant capital costs. Interventions must be designed to suit site conditions, including hydrology, topography of the peat, geography, weather, labor supply and local regulations, the location of and potential impacts upon local communities. We summarize KFCP-specific capital expenditure (CAPEX)

Table 1: KFCP-specific capital expenditure for peat forest rehabilitation

PROJECT PHASE	CAPEX (AUD MILLIONS)[1]	CAPEX UNCERTAINTY
PROJECT DESIGN	1.2	
Planning and technical design[2]	0.8	Low
Feasibility studies[3]	0.4	Low
DEVELOPMENT AND CONSTRUCTION OF CANAL BLOCKING SYSTEM[4]	11.3	
Blocking large canals	6.5	High
Reforestation	1.9	Medium
Blocking small canals	1.0	Low
Testing and monitoring	0.9	Medium
Management and technical supervision	1.0	Low
TOTAL	12.5	
Community engagement[5]	1.6	Low
Government authorization of land use	0	Not applicable

Notes: (1) Disbursements were mostly paid in Indonesian Rupiah (IDR). See Appendix C for exchange rate assumptions. (2) Described costs covered surveys initiated for the whole project area (120,000ha): ground surveys, LiDAR survey (initially undertaken for 1,200,000 ha and scaled down to 120,000 ha), and an evaluation of established canal blocking designs. See Appendix B for further details. (3) Feasibility studies included Environmental Impact Analysis (AMDAL), and Regional Environmental and Social Assessment (RESA). In our analysis of capital cost of peat forest rehabilitation, we account for 40% of the total cost for AMDAL and RESA to reflect the share attributable to the KFCP peat forest rehabilitation component only. (4) Development and construction costs are based on the KFCP technical team's projection for the development and construction activities that were necessary to demonstrate the KFCP approach to peat forest rehabilitation and monitor their impact. They relate to the total area currently estimated for the selected activities under the KFCP: the 12,000 ha of highly degraded peatland in Block A to be used to demonstrate the large canal blocking, out of which 2,000 ha were also planned to be reforested (50% accomplished); and the 3,500 ha of mostly intact peatland in Block E where small canals were planned to be blocked (15% accomplished). See Appendix B for further details. (5) Costs cover community engagement related activities, which were directly related to peat forest rehabilitation.

Box 2: Difficulties of estimating costs related to the use of land in Indonesia

In theory, an ERC in Central Kalimantan costs IDR 50,000/ ha (or ca. AUD 5/ ha) for up to the first 100,000 hectares, with a progressive fee thereafter (Mazar Starling 2012). **This would imply an ERC to use 100,000 ha would cost AUD 500,000.** However, anecdotal evidence suggests this rarely constitutes the actual cost paid for by investors and that **acquiring an ERC concession to use 100,000 ha might cost closer to AUD 5-7 million.** If, on the other hand, we consider market prices for purchasing land in Central Kalimantan that is clear of any title or zoning restrictions as another indicator of what it cost to use land, these range between IDR 2.5-4.0 million/ ha1 (Boer et al. 2012; Table 2.3) (or ca. AUD 260 – 415/ ha). **This would imply 100,000 ha would cost AUD 26 – 42 million.**

1 "In Central Kalimantan, normally cost of land acquisition is about IDR 2.5 million/ha, included payment for land and letter of notification for land ownership released by the village head so called SKPT (Surat Keterangan Pemilikan Tanah)." (Boer et al. 2012)

for peat forest rehabilitation activities related to land use, project design, development (that is, construction), and community participation in Table 1.

As an early demonstration activity, the KFCP's design incorporated principles such as learning by doing, building community participation and capacity, and ensuring knowledge generation. Modifications, changing timelines, and new or unforeseen expenditure during the implementation phase, including incorporating lessons learned, were therefore to be expected. Given that CAPEX depends on the different potential risks that may or may not have to be mitigated in this and/or future peat forest rehabilitation projects, we try to indicate the degree of cost uncertainty in the table. Where the implementation of individual elements remains incomplete, uncertainty around CAPEX is necessarily higher.

In total, the KFCP planned to spend AUD 12.5 million to develop and implement the technical interventions of peat forest rehabilitation activities on 15,500 ha located in Block A and E. A further AUD 1.6 million went to the process of ensuring full and effective stakeholder participation, which is intertwined with, but not restricted to, the use of land.[8]

3.2 Possible capital costs mitigated by the KFCP partnership structure

The public partnership between the Indonesian and Australian governments meant regular concession, licensing, or approval procedures did not apply. In other circumstances, project developers would have needed to secure concessions and approvals to use land for 'ecosystem restoration' before initiating a project on state-controlled land within the national forest estate. The following discussion considers some of the most important of these.

Authorization to use of land

KFCP peatland rehabilitation activities took place within the national forest estate. To accommodate all the rights and legal provisions related to the project site, KFCP partnered with both the Government of Indonesia and local communities for the whole project life-cycle. In other circumstances, entities wishing to rehabilitate a piece of degraded land in Indonesia would first need to obtain a concession to use state-owned forest land. For REDD+ projects, an Ecosystem Restoration Concession (ERC) would be the most favorable option (Mazar Starling 2012).[9] To obtain an ERC, entities would have to undertake an unpredictable and nontransparent permitting process, requiring liaison and negotiation with different levels of government and ministries. Challenges and delays are compounded by the lack of government capacity to support processing ERC applications (Mazar Starling 2012). This implies significant risk that would need to be mitigated by future investors in similar projects.

Box 2 illustrates the high level of uncertainty around how much a company might need to pay to gain clear access to land within a reasonable time frame. In any case the overall investment cost of obtaining authority

8 Both figures are based on known and estimated costs provided by the KFCP team at the time of drafting this report

9 Besides Ecosystem Restoration Concessions (ERCs) there are also other legal structures supporting sustainable management such as Hutan Desa (English: Village Forest). The KFCP is supporting communities to set up the structures necessary to manage 'village forests'. A Forest Management Unit (KPH) - like the one being established in Kapuas district, which incorporates parts of the KFCP site – could license a Hutan Desa through which villagers manage the forest within the forest estate. Private sector investors could choose this way of community licensing as part of their project design instead of using an ERC.

Box 3: A new model for community participation: Village Agreements

In the case of KFCP, the intended outcome of effective community engagement is fair and binding Village Agreements (VA's). **KFCP VA's aim to achieve three objectives: i) ensure full and effective participation of communities, ii) provide compensation for potential loss of income, and iii) generate co-benefits by enhancing livelihoods and promoting sustainable land-use practices.** VA's regulate the principles for cooperation, the kinds of activities to be implemented and financed, terms and conditions for management and finance, standards, safeguards, work schedules, budgets for activities, etc. (IAFCP)

Examples of activities under the KFCP VA are:

- Implementation of community based interventions such as rehabilitation of degraded peat forests, including reforestation activities;
- Support to develop alternative livelihoods where peat forest rehabilitation activities lead to potential loss of income (e.g. from canal blocking). In general, small canals will only be blocked with approval of the 'owners', the communities on whose land the small canals are located. In instances where communities or individuals agree to restrict their access or use of areas, or their interests may otherwise be adversely affected, the VA allows for compensation. As part of the VA, the project provides access to an alternative livelihood for small canal owners and the wider community, such as resources and know-how to plant rubber, farm fish, and undertake agroforestry enterprises; and
- Promotion of sustainability and permanence. Since current farming methods and the use of fire to clear land threaten current assets, the KFCP aims to minimize these threats by establishing incentives to adopt sustainable land-use practices in the community areas and to encourage the diffusion of improved agricultural practices.
- In 2011, the KFCP team consulted with communities through about 100 formal village meetings, more than 100 focus group discussions, and other means in connection with establishing Village Agreements. Between 2011 and 2012, seven VA were negotiated and signed.

to use land can far exceed the cost of official fees for concessions and acreage. The gap is a proxy for the value of the informal rents that are redistributed among various stakeholders and probably need to be matched in any future plans to redistribute revenues associated with carbon markets.

Community engagement

Traditional community laws (adat) mean that surrounding communities exert a form of customary title over some of the land on the KFCP site. Central Kalimantan's provincial regulations, in combination with relevant national law, recognize adat land rights and require that they be mapped and registered by 2015.[10] The international framework also accommodates community rights and requires "taking into account the need for sustainable livelihoods of indigenous peoples and local communities and their interdependence on forests" (1/CP.16). Countries also agreed that when undertaking REDD+ activities, "safeguards" should be promoted and supported. Social safeguards in this context can be summarized as respect for the knowledge and rights of indigenous people and members of local communities and their **full and effective participation** in REDD+ activities (1/CP.16; Appendix 1). To comply with these social safeguards, among other things, REDD+ project designs must guarantee that indigenous people have the right to approve or prohibit activities that take place in or otherwise impact their lands, territories and resources.

The KFCP has demonstrated a model for full and effective community participation by establishing agreements with all villages in and adjacent to the project site (see Box 3). **Between 2011 and 2013, the KFCP planned to spend AUD 1.6 million on establishing and managing Village Agreements.[11] Without them, the project would**

10 In addition, the May 2013 Constitutional Court ruling on the 1999 Forestry Law recognizing customary forests as separate from state forests will need to be implemented. The way forward is uncertain but the ruling implies that customary forests will be excluded from the gazettal of Kawasan Hutan.

11 This cost includes core management staff and field facilitators, travel cost disbursed to establish and manage VAs, and the costs of holding consul-

not have been viable. Subsequent project developers will need to deploy similarly proactive strategies to engage communities effectively, using skilled negotiators, inclusive decision making processes, and possibly capacity building. For example, the KFCP has worked with local adat leaders and the provincial Dayak adat council (DAD) to give legal training, combined with an understanding of REDD+, to local leaders to support the process of identifying adat land rights and use in the KFCP area. KFCP has also assisted in the demarcation of village boundaries (a prerequisite for recognizing use rights) and facilitated village development plans.

3.3 Operational costs

According to senior project advisors, had the technical designs for KFCP been built and had they functioned as envisaged (that is, raising water levels by enabling the siltation process to effectively block canals), maintenance would not have been needed.

However, **some performance incentives will be necessary to ensure the "permanence" of the peat forest rehabilitation activities**. These include activities to protect forest from encroachment (reduced forest degradation), reduce the incidence and extent of fire (reduced greenhouse gas emissions), and assist with monitoring. In addition, the KFCP supports alternative livelihoods such as rubber, agroforestry and fish ponds (Box 4). **In the future, direct payment, or revenue redistribution mechanisms (such as through taxes, or payment for performance) will be needed to ensure communities also benefit** from revenues derived from the permanent results of peat forest rehabilitation activities, and adopt new behaviors that ensure interventions maximize their full emission reduction potential.

In the case of KFCP, it is too early to estimate the value of returns to communities that alternative livelihoods will deliver if successfully implemented, and the demonstration of VA's as an approach for ensuring full and effective community participation is ongoing. The final impact of a VA and alternative livelihoods can only be evaluated in a comprehensive social assessment after this component of the KFCP is finalized in 2014.

tation meetings in villages undertaking peatland rehabilitation activities. It excludes disbursements for activities that are implemented under VA such as community based interventions, development of alternative livelihoods, promotion of sustainability and permanence, or training and education workshops with villagers. Disbursements for these activities are partly accounted for as development and construction cost. See Appendix B for details.

3.4 Project Returns

Early lessons from San Giorgio Group case studies highlight that in general, public investments should only pay for goods and services in which the private sector will not invest. These include public goods that have high social returns but limited associated profit and; capital investments that carry risks or costs private actors deem unacceptable (Buchner et al, 2012).

In this case, public support for early demonstration and development efforts generated multiple benefits with high social returns and improved prospects for implementing more effective approaches and activities. Different aspects of the project, including the identification of specific technical, financial and social barriers to REDD+, may inform Indonesia's national REDD+ strategy and facilitate Indonesia's participation in future carbon markets, as well as future regional or international climate change frameworks.

Through all phases of its development, the KFCP tested and demonstrated REDD+ methodologies. Its successes and failures created knowledge which will help to reduce uncertainties, and thus help to lower risks, associated with future REDD+ projects. This may in turn attract subsequent private investors, to fund projects geared toward generating verified carbon units that can be traded on global carbon markets. identifies the major project stakeholders, including hypothetical future project developers, and highlights which of the returns to the KFCP would stand to benefit them. The subsequent subsections describe these returns in detail.

Payment for public goods and vintage costs

- The KFCP generated some returns that have no associated revenue streams, but which are public goods. Key among these is the **contribution to global knowledge about peat science, including**:
- Development of monitoring methodologies to underpin robust peat science, emissions' estimation, and peatland rehabilitation;
- Data collection during project activities, including assessments of the recorded impacts of different interventions including blocking of small canals and reforestation on peat hydrology, vegetation, oxidation and emissions;
- Improved approaches to peat forest rehabilitation including the development of a technical design for an innovative canal blocking system; and

Box 4: Costing incentive payments to encourage sustainable practices

Suyanto et al. 2009 suggest that prior to the commencement of peat forest rehabilitation activities on the EMRP, forest extraction activities made up a high share of communities' annual income in the project area, at least until 2008. According to Suyanto et.al 2009, between IDR 0.3-2.1 million/ capita or 8-44% of the average annual income per capita in the immediate KFCP project area came from legal forest extraction activities (other important income sources include agriculture, fishing, entrepreneurial activities, and professional work). Approximately 8,400 people lived in the area and amassed a total income of approximately IDR 8.7 billion (or ca. AUD 0.9 million) per year from forest extraction. As the completion of canal blocking would restrict access to parts of the forest areas where extraction took place (12,000 ha), this could theoretically lead to a loss of income.

In addition, blocking small canals may deprive owners of small canals of the ability to charge tolls for their use to transport goods such as forest logs out of the area (see 'Box 3: A new model for community participation: Village Agreements' for more on the agreement process and compensation). On average, tolls equal 10% of the transported goods' market value. This implies that owners of small canals in the immediate KFCP project area earned around IDR 0.9 billion (or ca. AUD 0.1 million) per year from tolls for the transport of extracted forest products – income that if lost, would need to be compensated in one way or another.

We note that, according to the KFCP, most small canals in the project area had already been abandoned due to the exhaustion of resources. In this case, the provision of alternative livelihoods probably represents an additional development benefit to communities, rather than compensation for lost opportunity. This may not be so for interventions where some resources remain intact and vulnerable. The table below therefore provides an approximation of what might be expected of subsequent investors should they be required to compensate lost opportunities and create incentives for more sustainable practices, including by providing access to alternative livelihoods.

EXAMPLE FOR INCOME SOURCE	AUD MILLIONS
Income from forest extraction	0.9/ year
10% toll for transport of logs	0.1/ year
Total income related to forest extraction in project area	**1.0/ year**

Due to unforeseeable natural, economic and political fluctuations, it is difficult to project with any certainty, future income related to forest extraction. However, if one simply extrapolated the number mentioned in this box over the 30 year accounting period of a REDD+ project, income from forest extraction in the project area would add up to AUD 30 million.

- Determination of suitable plant species and plantation development methods for reforestation in degraded peatlands.

The KFCP also provided valuable insights about expected project costs, risks, and benefits. **As a demonstration project, some of the costs of the KFCP intervention are best described as vintage costs, that is, development or demonstration costs that would not be borne by subsequent investors who have the benefit of KFCP lessons.** We calculate that approximately 11%, or AUD 1.6 million of the KFCP full projected costs, are vintage costs associated with early stage development and demonstration. These include costs for the initial designs of canal blocking and peat monitoring methods, work to monitor peat (e.g. monitoring hydrology and reforestation approaches which could be adapted in future projects - see Appendix B on Technical Implementation and Cost Details). Even though some of this work is incomplete, progress toward testing and

proving some key design principles will inform future public and private project developers about the most robust approaches to canal blocking and reforestation, and serve to reduce research and development costs.

Socio-economic benefits

Beyond the technical component of peat forest rehabilitation, **the KFCP arrangements to ensure community participation also delivered significant community benefits.** As described in more detail in section 3.2 and box 3, VA have encouraged broad community involvement in decision making processes and improved the prospects for transparent and inclusive systems of governance. As such, they have also increased the "REDD+ readiness" of communities. Through learning-by-doing, communities have already enhanced their capability to negotiate with potential project developers about the scope of projects, the extent of community participation, and access to alternative livelihoods or other project development benefits.

Future public and private project developers will also benefit from lessons learned through the VA process, as they will be obliged to ensure full and effective participation of communities and will need to implement a proven mechanism to fulfill this obligation. Broad participation also enhances the perception of ownership of results among communities, and improves the prospects of achieving peatland rehabilitation and conservation in the long-term.

Ecosystem rehabilitation and emissions savings

Peat forest rehabilitation activities are expected to revitalize natural ecological processes, including by rewetting the peat, raising water levels, and reforestation. As a result, the area will be less vulnerable to fire and more conducive to the natural regeneration of peat swamp forest species. This would **strengthen ecosystem services such as carbon storage, sequestration, as well as provision of cleaner air and more reliable water services**. At the time of writing this report, the KFCP has not yet demonstrated ecosystems could be effectively rehabilitated, or greenhouse gas emissions saved. However, KFCP estimates for greenhouse gas emissions savings from peatland rehabilitation on a location like the KFCP indicate the scale of potential impact.

Revenues from carbon savings

We can only estimate future revenue streams, but understanding their possible range helps to determine whether they are likely to be sufficient to attract future profit-driven project developers. Our calculations

Table 2: Sources of return for the major project stakeholders and future project developers

		GOVERNMENT OF AUSTRALIA	GOVERNMENT OF INDONESIA	LOCAL COMMUNITIES	FUTURE PROJECT DEVELOPERS
NON-FINANCIAL RETURN/ BENEFITS	Fund early vintage cost				
	Proof of technical design; methods ready for replication and scale up in other locations and geographies; improved viability of large-scale peat forest rehabilitation				
	• Ecosystem rehabilitation • Return of parts of the project area to almost natural condition maintenance of ecosystem services • Avoided greenhouse gas emissions				
	Socio-economic benefits (improved technical capacity, environmental sensitivity and management skills of communities in project area)				
FINANCIAL RETURN	Revenues from carbon stocks		Mechanisms for sharing financial returns still need to be developed under the national REDD+ framework and strategy		

Box 5: Potential greenhouse gas emissions savings from KFCP interventions

To date, there is no agreed robust and cost-effective methodology to estimate greenhouse gas emissions associated with different levels of peatland degradation. Current emissions reduction estimates for the KFCP are based on an initial methodology and are highly uncertain as a result.

Based on the initial methodology, CO_2 emissions from Blocks A and E, together, are projected to reach 57 million tonnes over 30 years in a no-interventions scenario (excluding any sequestration (e.g. from forest growing). If the large drainage canals in Block A and the small canals in Block E are successfully blocked within the next few years, and no more logging or peat fires occur, CO_2 emissions are projected to fall to 31 million tonnes over 30 years (by 15.4 million tonnes CO_2 in Block A, and 15.5 million tonnes CO_2 in Block E) excluding sequestration. Based on these estimates, successful rehabilitation of Blocks A and E could save at least 26 million tonnes CO_2, or just under half of current projected levels – provided that interventions are effective and permanent.

assume the potential to sell carbon units on regional or international carbon markets will continue to represent a prospective stream of revenues from peat forest rehabilitation.[12]

The future value of potential carbon market revenues is subject to uncertainty around political decisions about carbon markets, long-term demand for units, and weak carbon price signals. Even so, should the project conserve 26 million tonnes of saleable carbon units over a 30 year period, at prevailing prices of AUD 4[13] or AUD 23,[14] the KFCP has potential to generate returns of up to AUD 3.3 million and AUD 10.8 million respectively.

As the Australian government never aimed to generate financial returns from the KFCP project, the question of how potential revenues from saleable emissions reductions would be redistributed among different stakeholders was never addressed. A mechanism for redistributing rents and/or sharing benefits generated by REDD+ activities still needs to be developed under the national REDD+ framework and strategy.[15] This will provide potential investors with more clarity on potential net revenues.

12 One could consider multiple funding streams here such as national-scale financing mechanisms, systems for paying ecosystem services, or carbon market options (Lee et al. 2011).

13 In 2011, the voluntary carbon market (VCM) over-the-counter (OTC) average price for the Verified Carbon Standard (VCS) was USD 4.4/ t CO2 (World Bank 2012; Annex 3). Please see Appendix C for exchange rate assumptions.

14 At the time of writing this report this price was intended to be fixed for the first three years under the then planned Australian Carbon Price Mechanism (CPM), which would have required participants to acquire and surrender permits, tradable as personal property and regulated as financial products. (World Bank 2012).

15 We note ongoing debate about which emission units would count toward Indonesia's unilateral 26% reduction target; which would be counted toward the 41% target, or how such accounting methods might impact the distribution of revenues associated with the generation, or transfer, of such units. A similar debate is ongoing at the international level, and is closely linked to methods of accounting for emissions reductions and avoiding double counting.

3.5 An investment profile for future investments in peat forest rehabilitation

Based on experiences from the KFCP site, we consider a simplified investment profile for future investments in peat forest rehabilitation. Underlying uncertainties are high and we therefore limit our estimates to cost inputs and overall profitability. calculates the net present values (NPV) of the costs and revenues of direct peat forest rehabilitation activities over a 30-year period using KFCP projections and data.

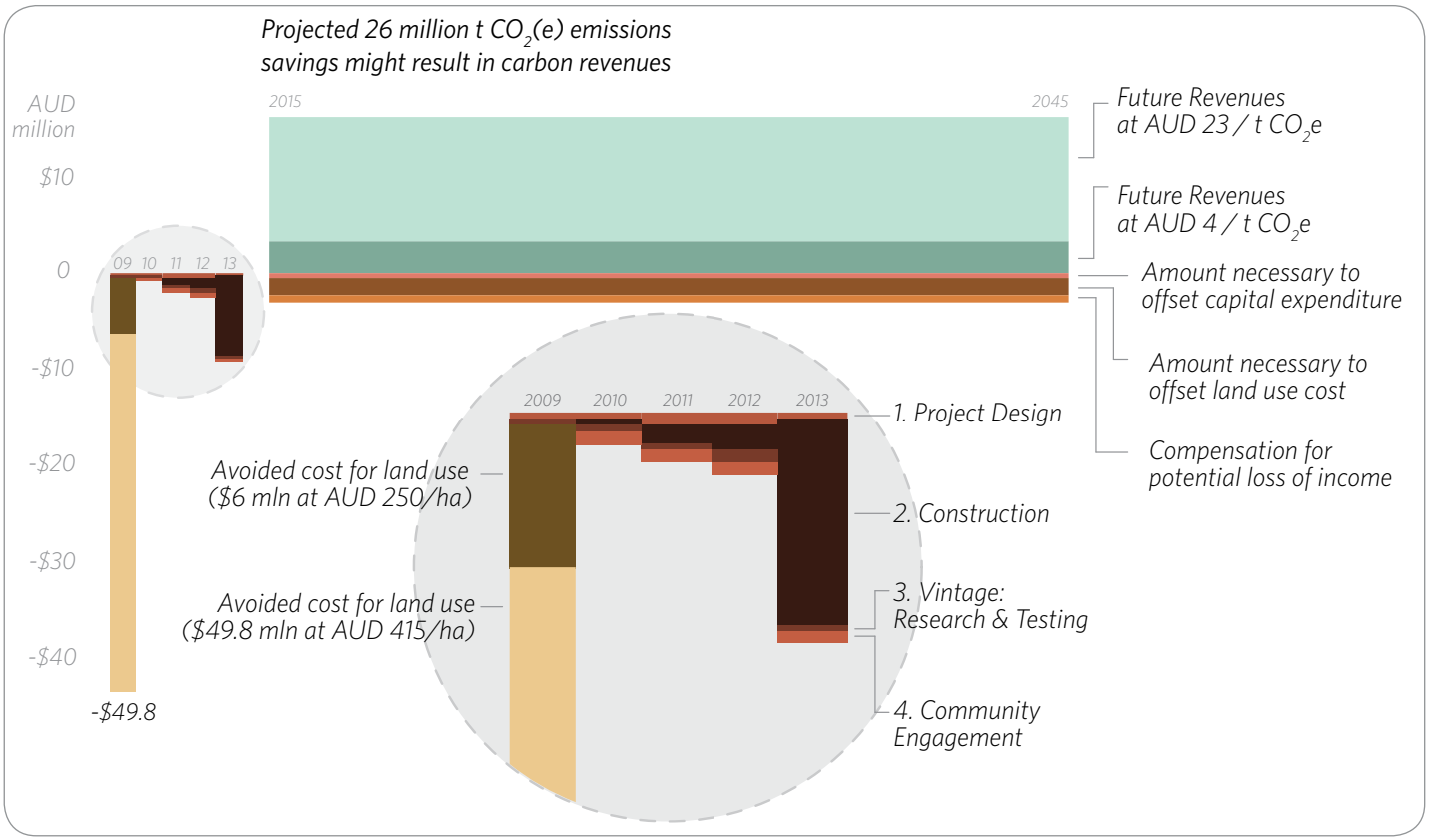
- cost of a concession/ market value of land to an area of 120,000 ha (see Box 2);
- capital expenditures to establishment of Village Agreements, project design, development and monitoring as projected for rehabilitating of the full KFCP pilot area;
- full compensation of the potential loss of income of communities on the project site over a period of 30 years, noting the potential loss of income refers to forest extraction only (see Box 4).

Based on the assumptions described below Table 3, the capital cost of technical interventions which accrued to the KFCP, are the smallest cost item, while the **potential cost for land use or operations-related expenditures represent the largest outlays.**

Figure 2 depicts a 30-year time frame of a project with investment flows similar to the KFCP. The left part of the graph depicts costs associated with concessions to use the land (which did not accrue to the KFCP). In addition, this part of the figure reflects KFCP costs associated with project design, development, and construction. We note these include the 11% we attribute as vintage costs. The right part of the graph shows the an annual average for total potential future revenues over the same 30 year period assuming carbon prices from AUD 4/t CO2 to AUD 23/t CO2. It also reflects the average annual value of lost income that communities might experience over 30 years (see Box 4). It does not make any assumptions about the form or expense of developing an appropriate compensation mechanism.

The volume of **achieved carbon savings and prevailing carbon prices will determine the value of actual carbon revenues earned.** We find that provided the full 26 million tonnes of CO_2 are saved, carbon revenues are highly likely to offset total estimated investment costs, even if carbon prices remain at their current very low levels. Even if only half of the estimated emission savings are achieved and carbon prices are at the lower

Figure 2: KFCP capital expenditures and potential future revenues



end of the scale, future revenues are highly likely to outweigh estimated project costs by a substantial amount, with potential average revenues ranging between AUD3.5-20 million per annum.

3.6 Have KFCP expenditures been effective in furthering understanding of methods to rehabilitate peat forests?

The San Giorgio Group aims to facilitate an overall understanding of whether public money is being spent effectively. To do this we track progress from initial financial **inputs** (international and domestic public resources and private investment) and consider the **outputs** they enable. We also consider the **interim benefits from these interventions and the final outcomes** that support the program's overarching environmental and economic objectives.

Table 3: Potential investment profile of peat forest rehabilitation over 30 years taking

NET PRESENT VALUE (NPV)[1]	AUD MILLIONS
Potential cost for land use[2]	5-50
Capital cost[3]	14
Compensation for potential loss of community income[4]	30
Total cost[5]	**49-94**
Potential revenues from carbon savings[6] (13 million CO_2)	**52 - 247**
Potential revenues from carbon savings[6] (26 million CO_2)	**104 - 494**

Assumptions: (1) highly hypothetical comparison, assuming zero cost of capital to simplify matters; (2) applying cost of a concession/ market value of land (see Box 2) to an area of 120,000 ha; (3) capital expenditure for establishment of Village Agreements, project design, development and monitoring as projected for rehabilitation of the full KFCP pilot area; (4) full compensation for the potential loss of income of communities on the project site over a period of 30 years, when the potential loss of income refers to income from forest extraction only (see Box 4); compensation could be provided through support for developing alternative livelihoods, sharing future revenues, or direct payments; (5) total cost do not include transaction costs for claiming carbon revenues, including compliance with associated requirements, constant MRV or potential taxation, since none of these can be estimated to date. (6) potential revenues from emissions saved over a period of 30 years and sold under fixed carbon prices between AUD 4 - 23/ t CO_2; no limitations apply to the long-term demand for carbon units.

In the case of the KFCP, the objective of the public money spent was not to generate profits, but rather to demonstrate the technological and scientific feasibility of both monitoring and reducing emissions from degraded peat forests while upholding underlying principles of community engagement. **In the case of KFCP, public money built a necessary bridge to future replication of interventions** by (1) delivering public goods that currently have high social returns but limited associated profit and; (2) carrying risks or costs private actors deem unacceptable to date.

According to the scope of our inquiry, we limit our assessment of effectiveness to the component related to the peat forest rehabilitation activities in Blocks A and E. Lessons generated (successful and otherwise) do stand to improve the prospects of effective peat forest rehabilitation for subsequent project developers including other non-commercially oriented funding sources. Table 5 illustrates that although the KFCP achieved many outputs and interim benefits, and helped to address some of the early vintage barriers in peat forest rehabilitation, the partnership did not deliver all envisaged objectives and outcomes in the available timeframe. However, there is potential to build on the knowledge generated by the KFCP, and to advance work to demonstrate successful technical and social methodologies for rehabilitating peat forests. This would help to clarify the financial viability of these activities thereby making further progress toward attracting commercially oriented investment.

Table 4: Summary of KFCP effectiveness in furthering understanding of methods to rehabilitate peat forests

INPUT	OUTPUT	INTERIM BENEFITS	FINAL OUTCOME
Grant-based funding by Government of Australia	Innovative designs and methods for peat forest rehabilitation including effective canal blocking		✓ Fund early vintage cost that would not be borne by subsequent investors
Peat forest rehabilitation AUD 14.1 million[1]	✓ Develop designs/ methods	✓ Improved understanding of project costs, risks and benefits	x Proof of technical design and methods ready for replication and scale up to other locations and geographies x Improve viability of large scale peat forest rehabilitation x Return of parts of the project area to almost natural condition so that they provide ecosystem services such as carbon sequestration x 26 million tonnes of avoided CO_2 emissions over 30 years
	x Demonstrate effectiveness of designs/ methods	x Increased water levels on KFCP site (hydrological rehabilitation) x Incidence of fire minimized x Elimination of ineffective approaches to peat forest rehabilitation	
	✓ Reforestation of 2,000 ha; testing viability of different plant species and planting methods	✓ Improved understanding of different plant species, planting methods and their suitability for peat forest rehabilitation	
	✓ Develop methods to monitor the impact of small canal blocking and reforestation on peatland hydrology incorporating international standards	✓ Increased understanding about peat science	
	✓ Establish and run Village Agreements	✓ Full and effective participation of communities in all project phases	✓ Improved technical capacity, environmental sensitivity, and management skills of communities in project area

Notes: (1) Technical team's projection for rehabilitating full KFCP pilot area. (2) In total the Australian government has committed AUD 47 million to the KFCP, out of which AUD 14.1 million (projection) was planned to be allocated to support peat forest rehabilitation activities. Furthermore, the government grant covers (i) work with local communities to find ways to sustainably manage peat swamp forests and enhancing local livelihoods; (ii) capacity building to integrate REDD+ into planning and governance at the province, district and community levels; and (iii) provision of technical support to monitor and measure forest carbon.

4. Risk allocation in the KFCP peat forest rehabilitation activities

Unlike possible future privately funded activities, the KFCP is not designed to benefit from future revenue. Because it is funded by a public financial grant, the project does not bear financing risks that result from, for example, interest rate fluctuations associated with loan repayments, or refinancing costs.

The public partnership has to a great degree allowed the KFCP to sidestep governance and institutional challenges, and unclear legal and policy settings that might add risks and costs to other similar projects.

To evaluate the risk profile of the KFCP peat forest rehabilitation activities, we apply a risk management framework. We (1) identify and assess individual risks; (2) analyze the impacts of critical risks and the mitigation instruments adopted to address them; and (3) outline the risk allocation implications for the project's stakeholders. We also consider the extent to which these mechanisms and arrangements may reduce risks for future projects. Where KFCP risk allocation frameworks are not applicable to future project developers, we indicate how private sector actors in particular might mitigate the related risks.

4.1 Risk identification and assessment[16]

We first identified three major risk categories in the KFCP peat forest rehabilitation component:[17]

- **Development risks** cover all the risks incurred before the project begins to operate. They include policy uncertainty about land concession permitting, construction risks (e.g. extreme weather events, capability of completing construction to standard), financing, and community engagement risks.
- **Operations risks** cover all the risks related to project output, operating costs, and revenues, including community engagement, early monitoring activities, and all regulatory and price risks relative to the associated benefits.
- **Outcome risks** refer to risks more specific to the delivery of overarching high-level project objectives, including inability to develop and test a viable approach for peat forest rehabilitation, or to implement systems to underpin permanence.

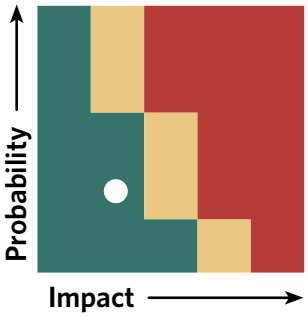
Next, we systematically classify the identified risks according to two criteria: their probability or frequency of occurrence (from very low to very high) and their level of impact on the project's financial and non-financial objectives (from very low to very high).

16 This risk identification and assessment is wholly the authors' opinion and does not reflect AusAid's assessment.

17 This approach builds upon the typical project risk breakdown along development stages by adding the 'outcome' dimension, which is dedicated to the overarching results of the program. Acknowledging the degree of subjectivity embedded in this approach, and that some risks are interrelated and may involve more than one dimension, the San Giorgio Group strives to systematically capture these three dimensions across case studies.

LOW-RISK EVENTS

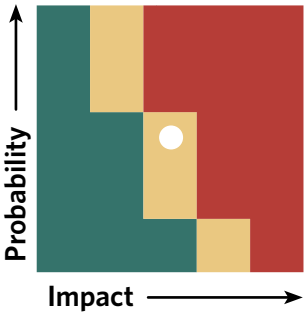
Risk events with low impact whatever their probability of occurrence, or medium impact risks with a very low probability of occurrence. There are no low risk events associated with work to demonstrate peat forest rehabilitation.



MODERATE-RISK EVENTS

Risk events between low-risk and high-risk events:

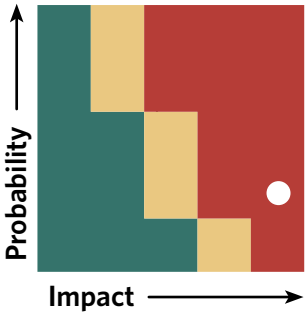
Insufficient capacity to undertake rehabilitation interventions at the required scale to international standards. This risk was borne by KFCP. It was addressed through specific tendering process for contractors and training programmes for communities.



HIGH-RISK EVENTS

Risk events with a very high impact whatever their probability of occurrence or medium-impact events with a high probability of occurrence. These were all borne by the KFCP and included:

- Failure or inability to develop and test a viable approach for achieving measurable peat forest rehabilitation,
- Failure to secure and maintain community engagement,
- Policy and regulatory uncertainty around land zoning and use.



The KFCP found various ways to deal with high-risk events including through:

- Partnership with different levels of government,
- Partnership with communities, and
- Grant finance.

4.2 Risk analysis and mitigation instruments/strategies

Failure or inability to develop and test a viable approach for achieving measurable peat forest rehabilitation

The KFCP peat forest rehabilitation component bore a high risk that it would be unable to develop and test a viable technique that resulted in a measurable decrease in emissions. This would represent unrecoverable costs to KFCP and threaten the project's credibility and long term objectives. We stress that as a demonstration project, some design failure is to be expected and modifications during early research and development are budgeted for.

Although the Australian government extended the funding period for the partnership by one year, delays and unforeseen barriers prevented commencement of construction of large canal blocking systems even within the extended timeframe. Nonetheless, important elements were tested and valuable lessons learned (see section 3.4 Project Returns for more details).

Barriers included:

- Extreme flooding delayed KFCP site surveys (see Appendix B for details) by almost 2 years. Neither development and construction, nor detailed plans commenced until much later;
- Delayed approvals from all levels of Indonesian government caused delays to the implementation of canal blocking; and
- The tendering process to find a service provider with sufficient capability for constructing the compacted peat dams took longer than expected.

The Australian government fully covered the risk of monetary loss related to inability to fully test the designed peat rehabilitation approach. While failure to meet all objectives may not have immediate financial implications for the project itself, all governments are under pressure to demonstrate public expenditures are delivering results.

Failure to maintain community engagement

Failure to address community concerns, such as loss of income sources or proprietary claims to the land or canals located on the land, could delay successful activities and increase costs. This risk applies to all project stages (development and construction, operations) and impacts permanent outcomes. Facilitating full and effective community participation is an obligation for proponents of REDD+ projects and failing to do so may even risk a project's entitlement to generate revenues now and under future national frameworks. In a worst case scenario, failure to engage communities effectively may foster continuation of common practices or commencement of new activities to clear, drain, or burn the land, resulting in further environmental damage. To reduce this risk, Village Agreements (VA – see Box 3) encouraged communities to engage with peat forest rehabilitation activities such as reforestation and canal blocking under the KFCP. Managing this risk is time consuming – and needs to be undertaken before rehabilitation activities begin.

Policy and regulatory uncertainty around land zoning and use

Some of the most serious risks investors – and particularly commercial private investors - in developing peat forest rehabilitation projects face, come from significant uncertainties around land zoning, tenure, and approvals.

From a project developer's point of view, poor zoning could lead to lengthy legal contests, delays, cost over-runs, and in a worst case scenario, the inability to establish the project. Activities carried out in poorly zoned areas are very vulnerable to political and economic changes in Indonesia, including those stemming from electoral cycles, Constitutional Court rulings, and land grabs by big business acting to securitize future business plans.

The organization of the KFCP as a public partnership mitigates risks flowing from these uncertainties, by giving all levels of government opportunities to steer the project. For example, the Ministry of Forestry acts as the executing agency responsible for co-ordination of the project while the Kapuas District acts as the implementing agency carrying out the project activities. The Governor of Central Kalimantan also supported the establishment of a KFCP Working Group at the provincial and district levels. The partnership is also supported by a Steering Committee chaired by the Government of Indonesia.

The uniqueness of the KFCP's risk allocation framework also means the KFCP project did not systemically tackle the risks related to inconsistent policies and practices around land use in a way that can be replicated by private investors. Nor was it designed to. However, the fact remains that policy risks associated with the regulation and use of land present among the most significant

Box 6: Land zoning legislation in Indonesia

One of the major impediments to investment in REDD+ activities in Indonesia is the lack of clarity that arises from inadequate and contradictory spatial planning provisions, and overlapping administration of the Indonesia's land and forest resources.

The Forest Law (UU No. 41/1999) is a national legal instrument that assigns the Ministry of Forestry (MoFor) authority to classify Indonesia's land mass into forest zones and non-forest zones (ICCSR 2009). **Forest zones** are divided into production, protection and conservation forest, all of which are managed by MoFor.

Spatial Planning Law (UU No. 26/2007) classifies land as for production or for protection and mandates regional authorities to manage such land to support economic development, accommodating population growth and the expansion of agriculture and rural development. Implementing regulations require agreement to be reached between regional government and the Ministry of Forestry on the areas of production, protection, and conservation under the Ministry of Forestry's authority. For those provinces that have not yet agreed on their revised spatial plan with the Ministry of Forestry the different interpretation of boundaries between forest and non-forest zones result in divergent land classification, overlapping claims of administrative authority, and significant legal and policy uncertainty.

In practice, MoFor has designated land irrespective of contrary local spatial planning measures – often resulting in further duplication and lack of clarity. In 2011, local authorities from Central Kalimantan sought to increase their ability to determine land use within the province, and brought a legal challenge questioning the MoFor's authority to designate land. To this point, Forest Zones had been defined as "a particular area **designated and/or gazetted** by the Government (MoFor) to be maintained as permanent forest" (UU No. 41/1999 §1(3)). The case went to the Constitutional Court, which found for the province (Decision No. 45/PUU IX/2011). The court said that only the formal gazettement process can be used to designate the forest zones, the decision however is not retrospective. To date only approximately 10% of the area previously considered designated 'forest zones' has been gazetted by the MoFor. The MoFor recently announced it would complete all outstanding gazettals of forest zones by the end of 2014.

Positive and negative impacts could flow from the Constitutional Court's decision (Wells et al. 2012). On one hand, if tensions between local authorities and MoFor cannot be resolved, a protracted disagreement over land allocation could delay resolution of provincial spatial plans, as well as efforts to gazette the forest zone – both of which require collaboration between the two government bodies. If local

authorities issued local licenses in non-gazetted forest zones, the MoFor could face difficulties issuing new, or modifying existing licenses. If, alternatively, the MoFor is unable to allocate sufficient time and resources to complete gazettal, including mapping and enclaving pre-existing community rights, tension and conflicts will be ongoing. All this would heighten financial risks, weaken investment conditions, and constrain the development of REDD+ projects.

On the other hand the Constitutional Court decision offers a significant opportunity to resolve and rationalize zoning and spatial planning conflicts. A potential outcome might be the adaption of existing boundaries to reflect actual forest cover, while allowing the expansion of agriculture and economic development in non-forest zones currently designated as protected or for conservation. Furthermore, if community rights are fully accommodated and formally recognized during gazettal of the outstanding zones, both the private sector and communities would gain legal certainty about land tenure.1

1 "Consensus delineation of revised forest zone boundaries, enhanced local community support, and the ability to focus resources on targeted areas of

Following a Presidential Instruction in September 2013, a compromise solution is emerging that will enable the regional governments to continue their spatial planning process, with the areas of disagreement between them and the Ministry of Forestry to be marked as a 'Holding Zone'. This in effect limits legal uncertainty to the areas of disagreement, but offers no concrete solution to resolving it.

The EMRP area where the KFCP project site is located has a special status with regards to land zoning and land use planning. The Presidential Instruction on Acceleration of Peatland Development Rehabilitation and Revitalization of the EMRP Area in Central Kalimantan (INPRES 2/2007) effectively eliminated the occurrence risks stemming from contradictory land use plans for the EMRP area. Issued in 2007, it classifies the EMRP area into: land for conservation, rehabilitation and reforestation (~63%); land for forestry cultivation (~11%); and land for non-forestry cultivation such as rice fields (~26%). In addition, it supports land use by local communities and others for the purpose of developing basic infrastructure, transportation, housing, and human resource development (BAPPENAS 2009). For the EMRP area INPRES 2/2007 played a role in overcoming any uncertainty regarding land zoning and tenure mitigating some of the most significant risks to investment in peat forest rehabilitation.

According to the INPRES 2/2007 and the subsequent **Master Plan for the Rehabilitation and Revitalization of the EMRP Area** (EMRP Masterplan 2009) the site where the KFCP peat forest rehabilitation activities take place is classified as land for conservation, rehabilitation and reforestation.

forest zone, can together provide a starting point for a new phase of effective law enforcement and management of Indonesia's forests." (Wells et al. 2012)

barriers to attracting private backers of REDD+ activities in Indonesia.

Uncertain ownership of future REDD+ revenues

When making decisions about whether to invest in REDD+ activities or not, future investors will weigh up costs, and whether these are sufficiently offset by potential revenues. Discussions around future revenues must necessarily consider the whole value chain of a REDD+ activity,[18] much of which remains uncertain. The lessons learned from the KFCP on costs contribute to understanding whether financial viability can be achieved. However, **the production of verifiable emission savings will be a necessary component of generating future income streams, be that payment for performance or through trading revenues. Until a national REDD+ strategy provides clarity about how these are managed and distributed, it will be difficult for investors to measure, or balance, the cost-return equation**. This may limit badly-needed investment in commercial-scale REDD+ activities and diminish the potential for wide-scale replication of peat forest rehabilitation efforts.

For projects that follow the KFCP, investors will be required to make additional up-front expenditures and pay for transaction costs throughout the life of the project. Uncertainty around these stem from the **absence of an agreed national or sub-national methodology or working policy framework for**:

- **Systematic monitoring and measurement of emissions reduction;** A transparent, internationally-accepted measuring, reporting and verification (MRV) system will be necessary, and while the Indonesian government is developing such a system, its implementation is still some

18 For a full discussion see Box 2 of this report. It is important to recognize that results-based actions that are fully measured, reported and verified, and that might therefore be fungible, are only envisaged to happen in phase 3 of the phased approach established during COP 16 in Cancun. The KFCP is a phase 2 demonstration activity that aims to support the development of the national REDD+ strategy. It was not designed to demonstrate the cost-effectiveness of peat forest rehabilitation in general and therefore did not set out to address uncertainties related to revenues from REDD+.

way off and associated registration costs are undefined.

- **Issuance or trade in carbon units generated by REDD+ activities**; Additional transaction costs may arise as stakeholders negotiate with different levels of government to claim revenues and rights associated with carbon assets, and these costs might be very significant.
- **Additional requirements for REDD+ projects** i.e., compliance with additional requirements beyond the current regulatory framework to use land; As long as there is no such information, companies face difficulties to price cost of compliance and verification in project budgets.
- **Tariffs on revenues;** The potential to tax REDD+ activities is also still being debated by the Government of Indonesia and income tax and VAT (at the current level of 10%) could significantly impact the balance sheets of REDD+ projects (Mazar Starling 2012).

The absence of a centralized mechanism or system of incentives that ensures all project stakeholders stand to benefit in some way from rehabilitation activities, mean that different stakeholders are currently either likely to under, or overestimate the rents that can be claimed. Either scenario will drive up short term costs and may act as a disincentive for investors. **Work to clarify how potential future revenues will be treated and what costs are likely to accrue along the way, is needed urgently,** and will be essential to adjust profitability estimates and attract subsequent private investors to peat forest rehabilitation projects. Some overseas investors may be able to address some or all of these uncertainties with the help of guarantees (political risk insurance) provided by institutions such as Overseas Private Investment Corporation (OPIC).[19]

19 OPIC is the U.S. Government's development finance institution, which provides financing, guarantees, and political risk insurance to U.S. based companies with the aim to support them in gaining footholds in emerging markets. Other guarantee providers such as the World Bank's Multilateral Investment Guarantee Agency (MIGA) or private suppliers also aim to protect foreign direct investment in developing countries against-political risks. To date they mainly address investors and projects in infrastructure i.e., power, telecommunications, mining, oil and gas. OPIC is currently developing regulatory risk products that cover REDD+ projects and in particular, investments that are going forward now in developing countries which are still building capacity to implement national systems and clarifying how to credit carbon savings from REDD+ projects. The OPIC Regulatory Risk Products are meant to protect private actors against "jurisdictional regulations" that interfere with a project's ability to earn carbon credits (Nicastri 2012).

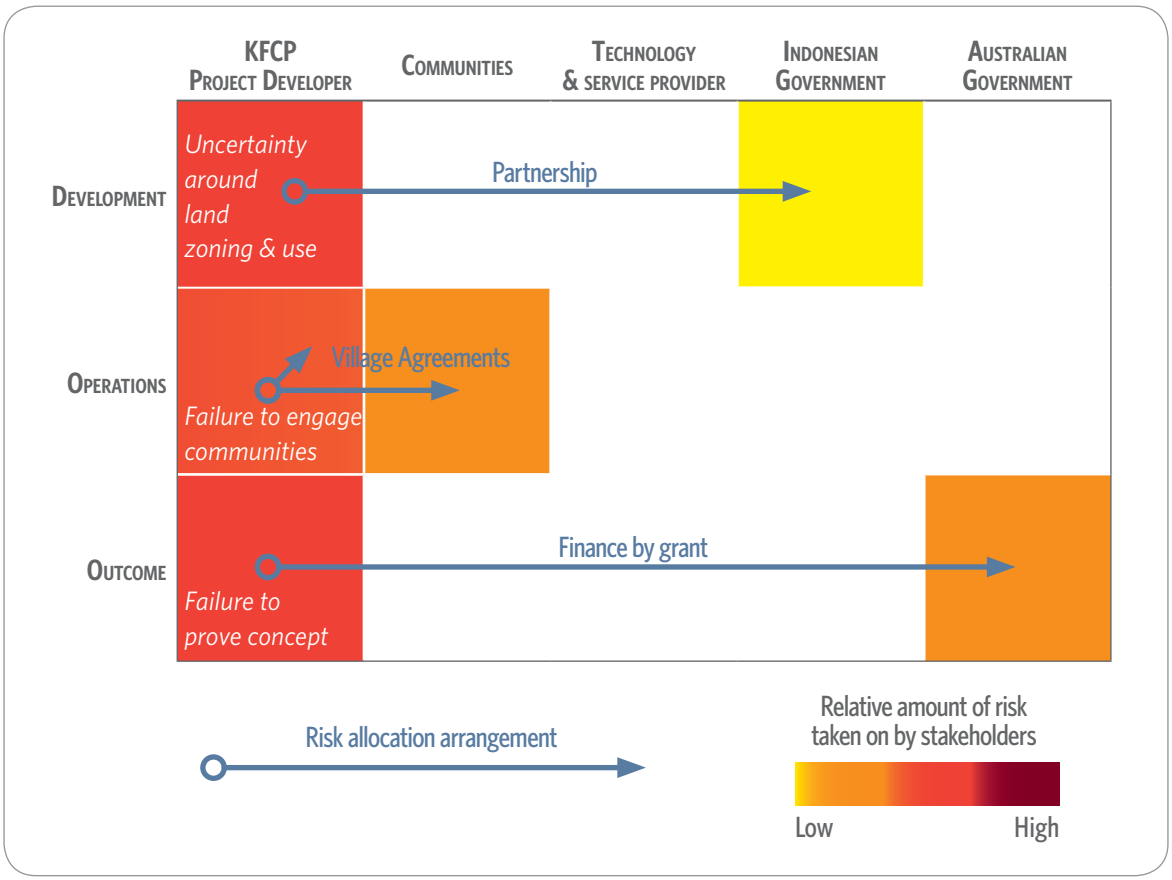
4.3 Risk allocation framework for peatland rehabilitation activities

The dynamic risk allocation matrix[20] in Figure 4 provides an illustration of the risks of peatland rehabilitation activities under the KFCP, where they originate, which stakeholder faces them and at what stage(s) of the project, and how the strategies and operations implemented under the partnership have altered the project's overall risk profile. To categorize risk we multiply the estimated 'magnitude of risk' by the 'likelihood of risk'. 'Very high' risks are displayed in dark red, 'moderate' risks in orange and 'low' risks in yellow. The matrix does not attempt to represent risk allocation for subsequent projects, which as previous discussions in this case study (see particularly the preceding section 4.2) make clear, are likely to bear significant risks in relation to land use with significant attendant costs.

Mechanisms that helped to mitigate development and operations risks, for example around land zoning, by partnering with numerous levels of government impacted other elements and increased risks associated with, for example, delays in approvals from all levels of Indonesian government to commence canal blocking. As a result, while the design of technical approaches for peatland rehabilitation developed exponentially under the KFCP, construction was unable to commence before social and political risks were addressed. The time budgeted to develop related frameworks and reach agreement among partners where needed ultimately proved too short resulting in the materialization of outcome risks.

20 Given the lack of detailed information about contracts, and the demonstration character of this project, we acknowledge this weighting system is subjective.

Figure 3: KFCP dynamic risk map



5. Is the KFCP approach to peat forest rehabilitation replicable and scalable?

While KFCP lessons and learning could be replicated across the immediate project area and in surrounding districts, more favorable governance, incentive, institutional, legal and policy settings, such as those envisaged in the national REDD+ strategy, are needed to unlock new sources of investment, including at scale.

A pipeline of viable peat forest rehabilitation projects that replicate, build upon and scale up peat forest rehabilitation activities can only be developed when the underpinning concepts, designs and methodologies prove effective. In this section, we explore the elements of KFCP that worked well and continue to work well, and weigh the prospects for scaling up or replicating approaches trialed and demonstrated by KFCP to other projects and geographies.

It is too early to assess whether KFCP designs for blocking canals will work in raising the water table and avoiding greenhouse gas emissions because they still need to be fully tested. It also remains to be seen if resulting emission reductions can be robustly measured and verified. Nevertheless, some of the KFCP's approaches made clear progress in addressing barriers currently impeding investment in REDD+. Two KFCP activities in particular will support initial design and operations of future projects in the area:

- The completion of a Light Detection and Ranging (LiDAR) survey (see Appendix B for Technical Implementation Details) has provided an exact evaluation of the peat topography, hydrology, and vegetation for the entire EMRP area. Subsequent project developers may use the information to inform and expedite canal blocking and reforestation activities across the whole EMRP area.
- Lessons have been learned that will help to reduce project cost and technology risks in future. These include improved approaches to peat forest rehabilitation such as the technical design of an effective canal blocking system, and the determination of suitable plant species and planting methods for reforestation.

Potential business models to replicate activities either in the EMRP area and beyond could be supported by other donors and private sector funded projects,[21] based on a range of incentives to obtain a range of possible benefits for developers (Webb 2010), including:

- **Compliance with carbon caps** will force companies to generate or acquire REDD+ credits to meet their compliance obligations, or those that they anticipate for the future.
- **Profit.** REDD+ could provide profit to financial institutions through emissions trading mechanisms. Already, investment funds such as BioCarbon, Althelia or Terra Bella seek to generate financial return from sustainable land use and sustainable forestry pilot/ demonstration activities in the form of payment for ecosystem services (PES),[22] including the sale of verified emission reduction units in compliance and voluntary carbon markets. With conducive policy settings, additional revenues could also be achieved through production of environmentally and socially sustainable agro-products.
- **Corporate Social Responsibility (CSR)**; some companies are interested in investing in activities for an environmental, social or charitable purpose to improve or maintain their environmental and/ social credentials and address reputational risk. CSR investments are not equivalent to PES, since there is no conditionality of payments involved such as agreed

21 See Figure 2 for how potential revenue sources such as profits from REDD+ or environmentally and socially sustainable agro-products relate to the setup of a peat forest rehabilitation project.

22 Payment for ecosystem services (PES) is a voluntary transaction for a well-defined environmental service (or land use likely to secure that service), purchased by at least one environmental service buyer from at least one environmental service provider, if and only if, the environmental service provider meets the conditions of the contract and secures the environmental service provision (Wunder 2005). PES is one of a category of policy instruments that can secure sustainable financing for protected areas, and is best deployed to provide incentives for sustainable land use management outside protected areas. Countries can start with locally-generated investments in ecosystem services that are important to local buyers. This approach reduces uncertainty and risk related to internationally regulated markets and prices (ESCAP 2009) such as REDD+.

compliance with land management practices (ESCAP 2009). The Indonesian government[23] already obliges companies to spend a certain percentage of their profits to show environmental responsibility and assist natural conservation. REDD+ and in particular peat forest rehabilitation could become part of these efforts.

- **Risk management ;** Investors such as hedge funds look to diversify their investment portfolio to mitigate risk.

The public sector might continue to provide financial support to peat forest rehabilitation projects from:

- **Overseas development aid (ODA);** ODA is a prospective funding source that could help to advance approaches to peat forest rehabilitation and bear early stage risks. However, ODA needs to ensure development outcomes are achieved and will only be spent when reversing the loss of **environmental** resources helps reduce poverty. There is substantial political debate around how ODA budgets are directed, which increases pressure on delivering obvious value for money quickly.
- **National/ International funds;** and
- **State budgets.**

Despite lessons learned from KFCP peat forest rehabilitation activities and prospective benefits to private investors, there remain very significant barriers to the effective implementation of REDD+ activities.

- The **policy and regulatory environment governing the use of land** in Indonesia is inefficient, contradictory, and highly politicized. Significant social challenges remain. To date, access to land, the issuance of concessions, and approvals, are dealt with on a case by case basis, reducing the likelihood of breakthroughs from one project translating to successes in another (see Box 2).
- **KFCP-scale community engagement activities impose another major challenge for the private sector**. Without them unsustainable land use practices (i.e., unsustainable farming methods and the poor use of fire for land management, forest extraction, and the construction of canals to improve access to and from trade destinations) are likely to persist.
- **At present, REDD+ interventions rarely constitute competitive investment opportunities** due to difficulties in generating saleable credits from emission reductions, in particular related to the ownership of related revenues and the sustainability of emission reductions, and a lack of demand for credits on carbon markets (Mazar Starling 2012).

In the absence of an implemented national REDD+ strategy with a predictable regulatory framework, the need of individual investors to de-risk investments on a case by case basis will almost certainly limit the scale of private investment in ecosystem restoration or conservation. The KFCP lessons can inform the development of policies designed to support the implementation of Indonesia's REDD+ strategy, particularly those associated with peat forest rehabilitation activities, and promoting community participation. The following section suggests how such a framework could balance different economic drivers to promote low-carbon growth and protect ecosystem services.

23 Law No. 40/ 2007 on Limited Liability Companies, Law on State-owned Enterprises No. 19/2003 and the Ministry of State-owned Enterprises Decree No. Per-05/MBU/2007

6. A new framework for growing the economy and protecting the environment

Work to implement Indonesia's REDD+ strategy is underway and this is a major step toward addressing deforestation impacts and their drivers at the landscape level. However until the strategy is implemented in full, current policies continue to favor low resource productivity and do little to alleviate pressure to convert high value ecosystems for the production of profitable cash crops.

In order to move away from business-as-usual practices, work is needed to develop policies that:

- Grow the rural economy in Indonesia in a way that reduces costs and impacts (economic, social and environmental);
- Shift environmentally suitable, low productivity land into higher productivity uses;
- Increase productivity at the same time as conserving scarce resources and environmental services, including through appropriate land zoning and better protection policies for high value ecosystems; and
- Strengthen financial incentives to support behavioral change, and shares benefits equitably among community, business and government stakeholders.

Experiences from other countries such as Brazil (see Box 7 on the next page) provide evidence that economic incentives combined with implemented conservation policies can be effective in curbing deforestation without jeopardizing economic growth.

Box 7: Comprehensive policy reform in Brazil

In 2004, Brazil launched the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm), which introduced a new form of dealing with deforestation in the Legal Amazon and represented the first step in a comprehensive environmental policy reform process. From that moment on, conservation efforts were based on a large set of strategic measures that were to be implemented and executed as part of a collaborative effort between federal, state and municipal governments, alongside specialized organizations and civil society. The PPCDAm introduced new procedures for monitoring, environmental control, and territorial management. Highlights include:

- Coordinated activities among government agencies;
- Strengthening of command and control efforts and introduction of real-time remote-sensing forest monitoring technology; and
- Extensive expansion of protected territories.

Another important policy landmark occurred in 2008. First, efforts to monitor land use and enforce environmental legislation were further strengthened through:

- The creation of priority municipalities – and a "black list" of top deforesters who were henceforth subject to stricter command and control measures (monitoring, enforcement of environmental legislation, credit restrictions); and
- The passing of legislation that provided stronger legal support for the investigation of environmental infractions and application of sanctions (i.e., fines, embargos, seizure of illegal production material).

Second, a novel credit policy was implemented that conditioned rural credit concession upon proof of compliance with environmental regulation. The resolution-induced reduction in rural credit led to a decrease in deforestation in the Amazon Biome (Assunção et al. 2012). Assunção et al. 2011 also found policies introduced in the second half of the 2000s made a substantial contribution to conservation efforts in the Amazon, especially during periods of rising agricultural prices. They found that the observed decline in deforestation levels has not been solely a response to market conditions and economic dynamics, but rather that the set of implemented policies described above was effective in curbing deforestation. They interpret their results as an indication that stringent policy increases the cost of forest clearance to producers, serving as a deterrent to private incentives to convert forest areas into agricultural land.

Opportunities to implement this 'production and protection' approach to land-use currently exist in Indonesia, including in Central Kalimantan where the KFCP is located. For example, the Government of Central Kalimantan aims to triple the area of planted oil palm by 2020 to 3.5 million hectares (Daemeter Consulting, 2012). While expanded oil palm could support economic development ambitions, increasing production through adding more acreage would continue to drive ecosystem degradation. A production and protection approach that zoned land according to its most appropriate uses, and established incentives for high productivity rather than expansionist agriculture, could encourage the development of new plantations on identified low-carbon lands, improve the productivity of existing plantations, and enhance protection of remaining high-value and carbon-rich ecosystems such as peat forests.

7. Conclusion

The KFCP project took place in a fluid institutional and policy environment—both nationally, and internationally— and delays have occurred throughout the project for a variety of reasons. Lessons from the KFCP highlight that REDD+ and its framework are still new concepts with complex linkages to development and conservation outcomes. Indeed, the project was conceived before many of the guiding principles and mechanisms for managing REDD+ (internationally and in Indonesia) were in place.

KFCP peat rehabilitation activities built important understanding about what it takes to rehabilitate degraded peatlands and help to preserve intact peat swamp forests. Among their most important lessons are on how public partnerships wholly funded by international public money can support early research and development activities in developing countries with high potential social returns but no immediate profit.

While demonstration of peat rehabilitation approaches remains at an early stage, it enabled important advances and contributed to a clearer understanding of what kinds of associated activities are needed to support successful REDD+ interventions. There is potential some of the scientific and technical knowledge gained from the KFCP experience to other projects, to help lower project costs and improve the chances of success. These lessons include learning about:

- Improved approaches to peat forest rehabilitation including the development of a technical design for an innovative canal blocking system and determination of suitable plant species and plantation development methods for reforestation in degraded peatlands.
- Village Agreements as a potential approach to ensure the full and effective participation of local communities.

The KFCP's demonstration activities have also started to clarify at what cost peat forests might be rehabilitated, and what the potential returns for profit-driven investors might be. However, as a public partnership, the KFCP did not test alternative approaches to managing significant costs and risks associated with land tenure that will be faced by other investors. Further, because the project was not commercially-oriented, significant questions remain around what additional transaction costs future projects might face, whether revenues will be taxed and how, and who stands to benefit.

International policy incentives that were expected to drive REDD+ actions, such as carbon markets and payment for performance mechanisms, have been slow to emerge. Given this, and the need to tap new sources of investment, lessons from the KFCP highlight the importance of a stable and well-designed policy environment to support effective long-term REDD+ investments

Immediate and sustained reforms such as those envisaged by the national REDD+ strategy, backed by international technical and financial assistance where appropriate, offer the best potential to open the doors for private investments in REDD+ in Indonesia at levels that are commensurate with the scale of the financing challenge. Until then public sources of finance - international and domestic - will remain essential to support the development and implementation of effective peat forest rehabilitation efforts.

8. References

Assunção, J, e Gandour, C, and Rocha Ro. 2012. Does credit affect deforestation? Evidence from a rural credit policy in the Brazilian Amazon. Rio de Janeiro: Climate Policy Initiative.

Assunção J, e Gandour C, and Rocha Ru. 2011. Deforestation slowdown in the Brazilian Amazon: Prices or policies? Rio de Janeiro: Climate Policy Initiative.

BAPPENAS 2009. Reducing carbon emissions from Indonesia's peat lands: Interim report of a multidisciplinary Study. Indonesia: National Development Planning Agency.

Boer R, Ridho D, Nurrochmat, Ardiansyah M, Hariyadi, Purwawangsa H, and Ginting G. 2012. Reducing agricultural expansion into forests in Central Kalimantan-Indonesia: Analysis of implementation and financing gaps. Bogor: Center for Climate Risk & Opportunity Management at Bogor Agricultural University.

1/CP.16. Decision 1/CP.16 - The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention. Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010. FCCC/CP/2010/7/Add.1.

12/CP.17. Decision 12/CP.17 - Guidance on systems for providing information on how safeguards are addressed and respected and modalities relating to forest reference emission levels and forest reference levels as referred to in decision 1/CP.16. From Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to11 December 2011. FCCC/CP/2011/9/Add.2.

Daemeter Consulting 2012. Challenges and opportunities for promoting high-yield/low impact palm oil in Central Kalimantan. Main Briefs. Mimeo, Climate Policy Initiative (CPI).

EMRP Masterplan. 2009. Master plan for the conservation and development of the Ex-Mega Rice Project Area in Central Kalimantan. Final draft. Jakarta: Government of Indonesia/ Royal Netherlands Embassy.

ESCAP 2009. Innovative socio-economic policy for improving environmental performance: Payments for ecosystem services. Greening of Economic Growth Series. ST/ESCAP/2560. Bangkok: United Nations Economic and Social Commission for Asia and the Pacific (ESCAP).

Indonesia Australia Forest Carbon Partnership (IAFCP). KFCP Village Agreement fact sheet. [Internet]; [cited 2013 February 6]. Available from: http://www.ausaid.gov.au/countries/eastasia/indonesia/Documents/kfcp-village-agreements-fact-sheet-ipm.pdf

ICCSR 2009: Indonesia Climate Change Sectoral Roadmap. Jakarta: Government of Indonesia. Available from: http://siteresources.worldbank.org/INTINDONESIA/Resources/Environment/ClimateChange_Full_EN.pdf

IPCC 2007: Fourth Assessment Report - Climate Change 2007. Geneva: Intergovernmental Panel on Climate Change (IPCC). Available from: http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm

Hooijer A, Silvius M, Wösten H. and Page S. 2006. PEAT-CO2, Assessment of CO2 emissions from drained peatlands in SE Asia. Delft Hydraulics report Q3943 (2006).

KFCP 2009. Kalimantan Forests and Climate Partnership: Design Document. Jakarta.

Lee D, Seifert-Granzin J, Neeff T, Göhler D, Liss BM, and Busch A. 2011. Discussion paper for a regional expert workshop supported by the German International Climate Initiative. Subic/ Philippines: German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)/ German International Cooperation Agency (GIZ)

Mazar Starling. 2012: Opportunities and barriers for private sector investment in REDD+ in Indonesia. Mimeo: Indonesia-Australia Forest Carbon Partnership (IAFCP).

MP3EI 2011. Masterplan for acceleration and expansion of Indonesia economic development. ISBN 978-979-3754-14-7. Jakarta: Coordinating Ministry for Economic Affairs.

Nicastri RA. 2012. OPIC product development for renewable resources: Expropriation coverage for REDD & feed-in tariff projects. Internal presentation. Washington DC: Overseas Private Investment Corporation (OPIC).

Parish F, Sirin A, Charman D, Joosten H, Minayeva T, Silvius M, and Stringer L (Eds.). 2008. Assessment on peatlands, biodiversity and climate change. Kuala Lumpur: Global Environment Centre/

Wageningen: Wetlands International.

SNC RI 2010. Indonesia second national communication under the United Nations Framework Convention On Climate Change (UNFCCC).Jakarta: Indonesian Ministry of Environment.

Suyanto, Khususiyah N, Sardi I, Buana Y, van Noordwijk M. 2009. Analysis of local livelihoods from past to present in the Central Kalimantan ex-mega rice project area. Working Paper Nr. 94, World Agro-forestry Center.

UNEP FI 2011: REDDy SET GROW - Part 1. A briefing for financial institutions. Opportunities and roles for financial institutions in forest carbon markets. UNEP Finance Initiative's Biodiversity and Ecosystems Workstream (BEWS) and Climate Change Working Group (CCWG).

Webb C. 2010. The role of private sector finance in REDD+. Carbon Markets & Investors Association.

Wells P, Franklin N, Gunarso P, Paoli G, Mafira T, Kusumo DR, and Clanchy B. 2012. Indonesian Constitutional Court Ruling Number 45/PUU-IX/2011 in relation to forest lands – Implications for forests, development and REDD+. Jakarta: Daemeter Consulting/ Tropenbos International/ Makarim Taira S.

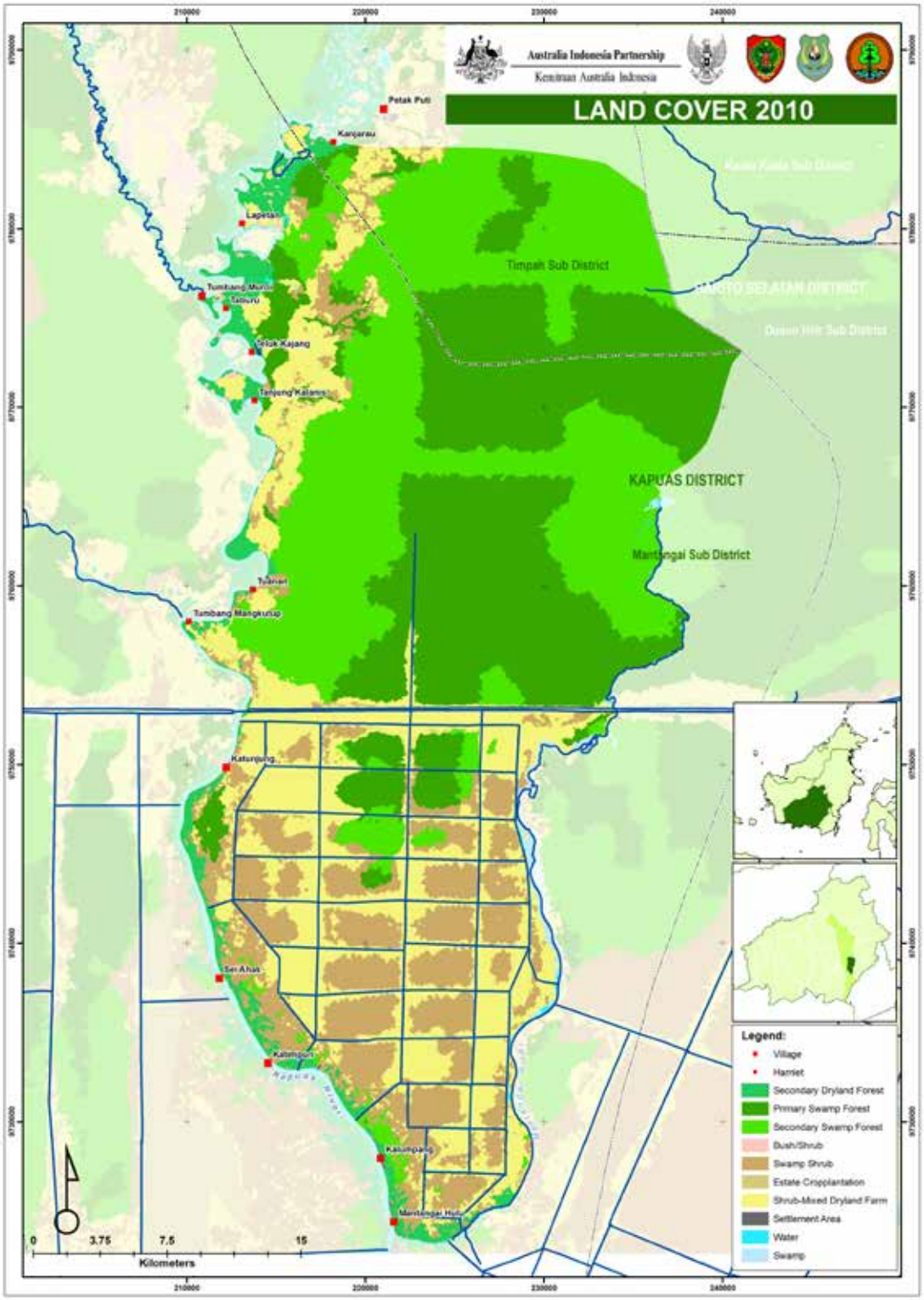
World Bank 2012. State and trends of the carbon market 2012. Washington DC: World Bank.

Wunder S. 2005. Payments for environmental services: Some nuts and bolts. CIFOR Occasional Paper No. 42. Bogor: Center for International Forestry Research (CIFOR).

Appendix A. Maps of KFCP site

The KFCP site lies completely within Kapuas District in the province of Central Kalimantan on the island of Borneo. It is bordered by the Kapuas River to the west and south-west, and the Mantangai River to the east and south east.

Figure 4: Map of KFCP Site



Appendix B. Technical Implementation and Cost Details

Project design

Design technical solution. KFCP disbursed AUD 0.8 million in total to pay for work to assess the KFCP site's profile and develop the initial design for technical interventions. To inform the detailed construction plan for the canal blocking system, contractors conducted:

- A Light Detection and Ranging (LiDAR)[24] survey provided an exact evaluation of the size and topography of the whole Ex-Mega Rice Project (EMRP) area of 1.2 million ha. In our analysis of capital cost we account for 10% of total cost of the LiDAR survey, to scale down expenses to the KFCP area of 120,000 ha;
- Ground surveys provided information about biological, hydrological, and chemical conditions as well as a detailed assessment of the individual canal blocks and blocking systems that already existed;
- Social surveys helped to clarify location and ownership of the small canals to be blocked; and
- An evaluation of established canal blocking designs implemented to date helped to assess their effectiveness and/or appropriateness for the KFCP location. It showed that efforts to date have mainly relied on the implementation of dams; and in particular box dams. They are constructed from either sawn boards, or wooden logs with inserts filled with bags of mineral soil, sand or peat and often placed with little regard to the peatland topography. Box dams are often poorly constructed and designed and located at intervals with head heights that were too large. These dams were damaged by floods or boat traffic within one or two years, to a degree where the structure had little impact on water levels (Euroconsult Mott MacDonald/ Deltares 2009).

24 Light Detection and Ranging (LiDAR) is an Optical Remote Sensing technology that helps to build an accurate, high resolution model of the ground. In 2011, the Government of Australia and the Government of the Netherlands initiated a LiDAR survey for the EMRP area. The survey generated a digital elevation model of the peat surface and vegetation canopy to guide the design and engineering e.g. of canal blocking systems. The Government of the Netherlands contributed the major part of the cost (AUD 800.000), as they wanted the EMRP area surveyed as part of the proposed Lowland Development Strategy and to support the implementation of the INPRES 2/2007 under which the EMRP Master Plan (EMRP Masterplan 2009) was prepared (see Box 5 for details).

The contractors completed this work by the end of 2012 with the development of a new design for canal blocking (see details below).

Feasibility studies. Contractors finalized feasibility studies at a cost of AUD 0.4 million. They conducted an Environmental Impact Analysis (AMDAL) and a Regional Environmental and Social Assessment (RESA) for the KFCP. In our analysis of capital cost we account for 40% of total cost of AMDAL and RESA to reflect the share attributable to the KFCP peat forest rehabilitation component only.

- In Indonesia, all businesses require either an Environmental Management and Monitoring Plan (UKL/ UPL) or an Environmental Impact Analysis (AMDAL) to demonstrate they are behaving in an environmentally responsible manner.
- In addition, KFCP undertook a full Regional Environmental and Social Assessment (RESA). RESA also helped to clarify rights and needs of communities living in the immediate project area. To address these rights and needs the KFCP developed a strong framework to engage communities via Village Agreements (VA; see Box 3).

Construction and development

The KFCP planned to spend AUD 9.4 million[25] to implement three technical peat forest rehabilitation activities as part of a canal blocking system:

- **Blocking large canals with dams** help to raise the water table and re-wet the peat in the degraded areas, reduce rate of subsidence, inhibit microbial oxidation and the spread of peat fires.
- **Blocking small canals** prevent the access and further degradation of the remaining peat swamp forest and help to raise the water table and re-wet the peat.
- **Reforestation** in highly degraded areas helps to raise soil moisture levels and humidity, lower

25 These expenses cover machinery rental, fuel, cost of (de)mobilization, trained operators, construction supervisors, local workers, their insurance, transport, equipment, material, expenses for training and verification, and a reserve for unexpected costs. In addition, expenses for management and technical supervision as well as testing and monitoring are included in this budget.

temperature of the peat, thus further reducing fire risk and peat greenhouse gas emissions.

Block large industrial canals

Up to AUD 6.5 million was allocated to block large canals by constructing dams.[26] Work was planned to be undertaken by surrounding communities based on arrangements negotiated under VA. Where heavy machinery was required, small contracts covering discrete components were planned. Construction work did not commence and the viability of the system remains untested as this component of the KFCP ended as planned in June 2013. Depending on the success of future demonstration work (or need to modify system designs), costs may need to be revised. As such, these cost projections are best estimates.

The KFCP approach to blocking large canals comprises four elements.

- **Machine-built dams with water redirected around into canal spillways**. Compacted peat dams are a part of the design for blocking large canals, consisting of peat soil excavated from the surrounding area and deposited into the canal. Compacting the peat after depositing is essential to reduce its permeability. Compacted peat dams alone are more durable and less expensive than box dams (Euroconsult Mott MacDonald/ Deltares 2009).
- Instability of peat soil and poor site access for heavy machinery can affect the timing and conduct work and additional cost during construction. Experienced construction supervisors and properly trained workers with the skill to operate equipment under difficult conditions reduce this likelihood. Delays (including due to weather)[27] and additional work to correct unsatisfactory results are possible and might increase total costs.
- **Palisades.** The canal blocking design involves the construction of palisades using gelam wood (Melaleuca sp.). Palisades support the compacted peat dams by blocking debris that if allowed to pass, could weaken or destroy the dams. According to project designers, vegetation needs to overgrow these 'soft dams' quickly to add strength. VA regulate communities' construction of palisades.
- **Partial infilling of canals.** Compacted peat dams and palisades should be erected and combined with partial infilling of the canals, to bring water levels up even further. This helps to ensure that peak water flows are largely over land and not through the canal. Contractors and communities undertake this work.
- **Planting of natural flood tolerant species along edges of canal.** Planting Pandanus sp. cuttings (Rasau) vegetation in or on the edge of the canal reduce the risk of the water carrying away the loose infill material and cutting a new channel through. The plantings will also greatly increase canal roughness and reduce flow velocity. Cutting about 40 cm in length are collected from mature plants in close proximity by communities involved in the canal blocking and planted at between 5 and 10 m apart. Communities plant natural flood tolerant species along edges of canals.

The design of the large canal blocking approach stipulates that the canals are to be filled in with peat sediment after construction. Therefore the structure does not include options for boat passages or similar.

Blocking small canals

Under VA, KFCP paid local communities AUD 1.0 million to block a selection of small canals in a number of villages.[28] Since small canals vary in width and length, different levels of effort were needed to block them by building palisades and filling them manually with mineral soil from the surrounding areas. This was one of the earliest attempts to test the impact of blocking small canals in intact forest as part of a large scale project to rehabilitate peatland hydrology and maintain the health of the natural forests. At the end of 2012, 15% of the planned work[29] had been completed.

Nursery production and reforestation

KFCP planned to allocate up to AUD 1.9 million to reforest 2,000 ha of partially forested land in Block A.[30] As KFCP's peatland rehabilitation component was a demonstration activity, the aim was not to re-veg-

26 This amount equals IDR 65.7 billion. Unit costs are IDR 0.1 – 0.6 billion/ dam (dams range in diameter between 15 – 25 meters) and IDR 0.1 billion/ palisade (see Appendix B for technical details).

27 KFCP committed to pay contractors for days, where no work can be conducted due to rain, flooding, etc.

28 This amount equals IDR 9.9 billion or IDR 0.1 billion/ unit. In addition to "wages" of villagers, it also covers disbursements for equipment, material, management, and miscellaneous.

29 To date villagers have blocked 15 small pilot canals out of 101 planned.

30 This amount equals IDR 18.9 billion or IDR 9.4 million/ ha.

etate the entire project site, but to reforest an area at a scale sufficient to demonstrate and monitor the impacts of the hydrology rehabilitation on the vegetation. Reforestation activities also tested whether different species were more or less suitable for this area. Regulating this activity under the VA aims to strengthen communities' engagement and laid a foundation for permanence. Local workers received income from undertaking three activities:

- The need to source appropriate vegetation generated an opportunity to establish two **community nurseries**, where local workers raised seedlings until they were robust enough to be planted in highly degraded areas.
- **Planting.** Local workers reforested highly degraded areas using purchased seeds and those grown in community nurseries.
- **Natural regeneration.** If vegetation was too dense naturally grown seedlings were at risk. Local workers thinned vegetation to help these seedlings to survive.

At the end of 2012, KFCP had planted about 1,050 ha of degraded areas using purchased seeds and those grown in community nurseries.

Testing and monitoring

KFCP estimated AUD 0.9 million to **test and monitor the impact of the new canal blocking design** on the peat hydrology and the peat swamp forest[31]; work was conducted by a contractor.

- A **geotechnical evaluation of peat** was undertaken to inform on the impact the KFCP activities have. The selection of the small canals to be blocked coincided with the ability to monitor the impacts of the activities on the peat hydrology and peat swamp forest.
- **Documentation and knowledge sharing costs** describe the time it takes to record information and provide products on the KFCP activities as knowledge sharing under its obligations as a REDD+ demonstration initiative.
- **Testing the durability of the canal blocking system** would have been necessary after the construction phase if construction had commenced. It might have entailed a modification of the canal blocking design.

31 This covers the cost the contractor bears namely fixed income of staff and the test stations on-site.

Management and technical supervision

The Partnership needed AUD 1.0 million to pay for **management and technical supervision** services.[32]

Additional allocations

Additional allocations during the development phase and beyond are anticipated.

- Because the Government of Australia financed the KFCP 100% from its budget, there were no insurances, taxes, levies, or financing costs that might normally be associated with land rents, loan repayments, or currency risks. Insurance for machinery and taxes related to labor during construction were included in the expenditure for the contractors and communities.
- We could not estimate the share of expenditures for the local KFCP office (staff, occupancy, travel) dedicated to the technical elements of peat forest rehabilitation only nor any equipment or furnishing beyond the ones included in development. Therefore, we exclude this budget line from our analysis.

Decommissioning

A key design feature of the canal blocking system is the use of organic materials for all constructions. The use of organic matter encourages sediment to silt up the canals, which will eventually block them completely. There will be no decommissioning costs.

Community engagement

Between 2011 – 2013 KFCP disbursed approximately AUD 1.6 million to pay for activities related to the establishment and management of Village Agreements (VA). These cost calculations limit to those four villages which are directly engaged in peat forest rehabilitation work costed in this paper. The costs include:

- Team managers, field activity facilitation staff, and travel associated with community engagement over a three year period;
- The VA contract manager, who administers the payments made to the villages under the VA as a part of the VA;
- Village meetings associated with (i) negotiating VA prior to signing, (ii) negotiating each work package (activity) implemented under the VA which regulate the technical work that

32 This covers the fixed income of staff 10/2010 – 06/2013.

villagers contribute to peat forest rehabilitation i.e. palisade construction; iii) verification of the process of implementation prior to making VA payments to villages;

- Payments to the small teams of villagers, who run the work package implementation on behalf of the village (Village Activity Implementation Team) and monitor its progress (Village Monitoring Team) on behalf of their villages.
- Hosting the traditional community custom (adat) ceremony to bless canal blocking and other ceremonies.

When estimating the cost of community engagement we did not account for activities that relate to (i) demonstration, learning and furthering science, (ii) larger social development aspects of the program, or (iii) any compensation mechanism for lost opportunity. Hence, we explicitly excluded:

- Education workshops and capacity building activities that go beyond what a private sector initiative might look for when training and supporting villages but which are nonetheless an important component of the development program aspects of KFCP;
- International short term technical assistance;
- Training on mapping of adat land rights;
- Other expenses beyond core staff and travel cost of activities that are implemented under VA such as (i) community based interventions, which are accounted for as development and construction cost, (ii) alternative livelihood program costs, (iii) farmer field schools, and (iv) data collection for demonstration purposes. Expenses for such activities include hosting meetings, survey implementation costs, or mapping exercises.

Appendix C. Exchange Rate Assumptions

Table 5: Historical exchange rates Australian Dollars (AUD), Indonesian Rupiah (IDR), Euro (EUR) and US Dollars (USD)

Currencies	2009	2010	2011	2012	2013
AUD – IDR	8,288.00 [1]	8,321.87 [2]	9,006.14 [2]	9,640.59 [2]	10,146.00 [3]
AUD – EUR [4]	0.56	0.69	0.74	0.81	
EUR – IDR [5]	14,443.74	12,041.70	12,206.51	12,017.56	
AUD – USD	0,80 [1]	0.92 [5]	1.03 [5]		

Notes: (1) KFCP 2009 (2) Historical average exchange rates http://www.oanda.com/lang/de/currency/average (3) Foreign exchange AUDIDR forward curve; retrieved from Bloomberg database http://libguides.lib.msu.edu/citingbusdatabases (4) European Central Bank - Historical average exchange rates http://www.ecb.int/stats/exchange/eurofxref/html/eurofxref-graph-aud.en.html (5) Historical average exchange rates http://aud.fx-exchange.com/usd/exchange-rates-history.html