Best Management Practices in the Indonesian Palm Oil Industry

Case Studies
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### ABBREVIATIONS

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<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>AD/ART</td>
<td>Anggaran Dasar dan Anggaran Rumah Tangga</td>
</tr>
<tr>
<td>B2B</td>
<td>Business to Business</td>
</tr>
<tr>
<td>BMP</td>
<td>Best Management Practice</td>
</tr>
<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
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<tr>
<td>CER</td>
<td>Certified Emissions Reduction</td>
</tr>
<tr>
<td>CH₄</td>
<td>Methane</td>
</tr>
<tr>
<td>CIGAR</td>
<td>Covered In-ground Anaerobic Reactor</td>
</tr>
<tr>
<td>CO₂</td>
<td>Carbon Dioxide</td>
</tr>
<tr>
<td>CPO</td>
<td>Crude Palm Oil</td>
</tr>
<tr>
<td>CSO</td>
<td>Civil Society Organization</td>
</tr>
<tr>
<td>CSR</td>
<td>Corporate Social Responsibility</td>
</tr>
<tr>
<td>EFB</td>
<td>Empty Fruit Bunches</td>
</tr>
<tr>
<td>FFB</td>
<td>Fresh Fruit Bunches</td>
</tr>
<tr>
<td>FKPPKS</td>
<td>Forum Komunikasi Petani PIR Kelapa Sawit</td>
</tr>
<tr>
<td>FPIC</td>
<td>Free, Prior, and Informed Consent</td>
</tr>
<tr>
<td>GAP</td>
<td>General Agricultural Practices</td>
</tr>
<tr>
<td>GAPKI</td>
<td>Indonesian Palm Oil Producers Association</td>
</tr>
<tr>
<td>GAR</td>
<td>Golden Agri-Resources, Ltd</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GHG</td>
<td>Greenhouse Gas</td>
</tr>
<tr>
<td>GOI</td>
<td>Government of Indonesia</td>
</tr>
<tr>
<td>GtC</td>
<td>Gigatons Carbon</td>
</tr>
<tr>
<td>GWP</td>
<td>Global Warming Potential</td>
</tr>
<tr>
<td>ha</td>
<td>hectares</td>
</tr>
<tr>
<td>HCV</td>
<td>High Conservation Value</td>
</tr>
<tr>
<td>HCVF</td>
<td>High Conservation Value Forest</td>
</tr>
<tr>
<td>HSL</td>
<td>PT Harapan Sawit Lestari</td>
</tr>
<tr>
<td>IDR</td>
<td>Indonesia Rupiah</td>
</tr>
<tr>
<td>IGA</td>
<td>Income-Generating Activity</td>
</tr>
<tr>
<td>IPB</td>
<td>Bogor Agricultural Institute</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>IPM</td>
<td>Integrated Pest Management</td>
</tr>
<tr>
<td>IPNI</td>
<td>International Plant Nutrition Institute</td>
</tr>
<tr>
<td>ISCC</td>
<td>International Sustainability and Carbon Certification</td>
</tr>
<tr>
<td>ISPO</td>
<td>Indonesian Sustainable Palm Oil</td>
</tr>
<tr>
<td>KUD</td>
<td>Koperasi Unit Desa</td>
</tr>
<tr>
<td>LUC</td>
<td>Land Use Change</td>
</tr>
<tr>
<td>m</td>
<td>meters</td>
</tr>
<tr>
<td>mt</td>
<td>metric ton</td>
</tr>
<tr>
<td>MFI</td>
<td>Micro Finance Institution/Initiative</td>
</tr>
<tr>
<td>MOU</td>
<td>Memorandum of Understanding</td>
</tr>
<tr>
<td>N₂O</td>
<td>Nitrous Oxide</td>
</tr>
<tr>
<td>NGO</td>
<td>Nongovernmental Organization</td>
</tr>
<tr>
<td>OPF</td>
<td>Oil Palm Fronds</td>
</tr>
<tr>
<td>PK</td>
<td>Palm Kernel</td>
</tr>
<tr>
<td>PKC</td>
<td>Palm Kernel Cake</td>
</tr>
<tr>
<td>PKS</td>
<td>Palm Kernel</td>
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<tr>
<td>POM</td>
<td>Palm Oil Mill</td>
</tr>
<tr>
<td>POME</td>
<td>Palm Oil Mill Effluent</td>
</tr>
<tr>
<td>POMS</td>
<td>Palm Oil Mill Sludge</td>
</tr>
<tr>
<td>RAD-GRK</td>
<td>GHG emissions reduction plans</td>
</tr>
<tr>
<td>RAT</td>
<td>Rapat Anggota Tahunan</td>
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<tr>
<td>RSPO</td>
<td>Roundtable On Sustainable Palm Oil</td>
</tr>
<tr>
<td>SD</td>
<td>Sekolah Dasar</td>
</tr>
<tr>
<td>SLTP</td>
<td>Sekolah Menengah Tingkat Pertama</td>
</tr>
<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
</tr>
<tr>
<td>TBS</td>
<td>Tandan Buah Segar</td>
</tr>
<tr>
<td>TPH</td>
<td>Tempat Pengumpulan Hasil</td>
</tr>
</tbody>
</table>
ACKNOWLEDGEMENTS AND DISCLAIMER

The authors acknowledge the innovation, foresight and leadership of companies profiled in the Case Studies in the areas of plantation and mill management for which they are featured. In no case, however, did the authors fully assess other aspects of each company’s operations. The Case Studies are not, therefore, to be seen as a comprehensive, operations-wide endorsement of featured companies, even though some of them are at the forefront of multiple areas of innovation to manage impacts. For all of the Case Study topics, companies beyond those featured here are also working to improve practices and merit recognition for their efforts. Featured firms were chosen because they are recognized to be at the forefront of innovation, and have made significant investments in time, personnel and other resources to trial and refine the programs described.

Daemeter gratefully acknowledges financial support from the Climate and Land Use Alliance (CLUA) for this project. The views expressed herein are those of the authors and do not necessarily reflect the policy view of CLUA or its affiliates.

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ABOUT DAEMETER

Daemeter is a leading independent company based in Indonesia and the US, providing research, advisory and practical on-the-ground support to many leading palm oil, forestry, energy and mining companies, as well as government and civil society, with a shared interest in responsible management of Indonesia’s natural resources. Daemeter has expertise in social, ecological and legal aspects of sustainability in Indonesia, with expertise in Policy research and analysis; High Conservation Value (HCV) Assessment; Social and cultural research; Smallholder farmer activities; Corporate Sustainability advisory; Investment risk management; Biodiversity surveys, management and monitoring; Third party certification; and Training. Since 2008, Daemeter has worked with leading companies, foundations, NGOs, researchers and donor groups on a wide range of strategy development, stakeholder engagement, and sustainability projects. See www.daemeter.org.
INTRODUCTION

Background

This document presents six Case Studies on palm oil sustainability in Indonesia. Each study highlights an area where progress is being made by leading members of industry to improve the social and environmental performance of plantations and mills. Progress is evident in the actions taken by companies profiled, their achievements to date, and commitment to continuous improvement in one or more aspects of their operations. The Case Studies demonstrate that progress to mitigate social, biodiversity, and greenhouse gas (GHG) emissions-related impacts of oil palm is possible and underway. Much of the information provided in the Case Studies is not widely known outside industry, and in some cases, outside the firms themselves that are profiled. The aim of this report is to make these success stories and related technical information more widely known within industry and among actors in government, civil society, and the donor community engaged in monitoring and/or supporting industry to achieve Indonesia’s vision for oil palm as a driver of sustainable economic growth. The authors hope the Case Studies will encourage industry associations and individual companies to adopt a proactive approach in experimenting with new practices and to share lessons learned with colleagues. It is further hoped the study will encourage government, consumers, and downstream supply chain actors to provide incentives for wider adoption of best management practices (BMPs) by industry as a whole.

Oil Palm in Indonesia

Oil palm is the most profitable agricultural crop in much of Indonesia, with demonstrated potential to accelerate economic growth and alleviate poverty in rural areas through creation of jobs and market linkages for farmers to develop plantations. Indonesia is the largest palm oil producer in the world, with export revenues of more than $15 billion annually (3% of GDP) in recent years and total area under cultivation more than doubling since 2000. Palm oil, processed as refined oil for food and a wide variety of other products, forms an important component of food security for Indonesia and consuming countries. Global demand for palm oil is very strong and projected to grow in the future, creating a powerful incentive for industry to expand production, an aim strongly supported by government policy. Indonesia’s oil palm industry is dominated by several large domestic and multi-national agribusiness firms, but with numerous smaller firms and myriad smallholder farmers accounting for approximately 40% of planted area. Many of the largest plantation firms are vertically integrated, handling value-added processing, shipping, and manufacture and marketing of consumer products. The bulk of mature plantations are located on the islands of Sumatra and Borneo (Kalimantan), with expansion into frontier areas on the islands of Sulawesi and Papua underway.
Despite significant economic benefits, rapid expansion of oil palm plantations since 2000 has become a focus of significant national and international criticism for growing social and environmental impacts. Environmentally sensitive areas such as peat swamps have been converted to plantations, ecosystem services such as water supply and carbon sequestration have been adversely affected, and in some cases, communities have suffered severe livelihood and welfare losses with few offsetting benefits. Continued rapid expansion carries the risk of greater environmental degradation and social disruption that could potentially undermine development benefits from oil palm, leading to calls for government to pursue a more sustainable development path that expands palm oil production while protecting the welfare of affected communities and critical environmental values. Some companies have made significant progress in addressing serious environmental and social issues, and in the process set new standards for industry best practice. Much work remains to be done, however, to encourage broader adoption of these practices industry-wide.¹

### Case Study Overview

The Case Studies presented here profile upstream segments of the palm oil supply chain—the plantations and mills that grow and process fresh fruit bunches (FFB) into crude palm oil (CPO). Topics were chosen for investigation because (1) they offer examples of commercially viable solutions to important social and environmental issues related to palm oil production; (2) sufficient information was available to develop the Case Study theme; and (3) at least one company working on the issues highlighted was willing to support development of the study. Case study topics, and the rationale for their selection, are as follows:

- **Case Study 1—Company-supported Smallholder Cooperatives.** Award-winning company-sponsored support to the formation, capacity building, institutional development, financial management and long-term profitability of smallholder (plasma) farmer cooperatives in Riau and Jambi strengthens rural livelihoods and builds shared value in company-community partnerships.

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• **Case Study 2—Company-supported Farmer Income Generation Activities.** Innovative and effective mechanisms for companies to spread the benefits of plantations more broadly and evenly within nearby communities by providing farmers with comprehensive assistance to grow oil palm (or other commodities) on their own land, thereby enhancing livelihoods, increasing production and improving community-company relations.

• **Case Study 3—Zero Waste Practices.** A suite of technologies and waste processing practices that allows plantations and mills to operate essentially waste-free, thereby greatly reducing environmental impacts while generating useful and in some cases marketable by-products.

• **Case Study 4—Yield Improvement.** Companies significantly increasing CPO yields from their plantations by implementing low-cost BMPs that allow more palm oil to be produced from the same land area, thereby increasing profitability, reducing costs, optimizing land use, and potentially reducing pressure to convert forests or other high-value sites to meet rising future demand for CPO.

• **Case Study 5—Greenhouse Gas (GHG) Footprint.** Policies, technologies, and practices for measuring, tracking, reporting, and reducing GHG emissions from plantation and mill operations.

• **Case Study 6—Biodiversity Conservation.** Policies, procedures, strategies, and collaborations for identifying, managing, monitoring, and reporting on priority biodiversity conservation areas within oil palm plantations.

**Inter-relationships Among Topics**

Oil palm plantations and mills are large, complex, integrated agro-industrial operations connected with the surrounding society, economy, and natural landscape. The Case Study topics should be viewed from this broad perspective to understand fully how topics are connected. Implementing good practice in one area can bring positive benefits in other areas, just as poor practices can have adverse consequences in other areas of operation. In recognition of this fact, many companies are beginning to adopt a holistic management approach to capture multiple benefits and cost savings from mutually reinforcing improvements in social, environmental, productivity, and emissions mitigation areas.

**Possible Future Topics**

Many other topics are worthy of further study and could be included in future Case Study reports. A partial list includes the following:

• **Free, Prior, and Informed Consent (FPIC).** Companies are improving their approach to community engagement, disclosure, and negotiation practices to gain informed consent from local communities affected by planned operations prior to licensing and/or development.
• **Dispute Resolution Procedures.** In recognition of the long-term importance of resolving disputes with local communities, companies are beginning to involve multiple parties in processes to resolve company-community disputes fairly, transparently, and effectively.

• **Due Diligence to Avoid Investments in Environmentally or Socially Sensitive Areas.** Many companies have adopted corporate policies to avoid new plantations on peat land, high conservation value areas, or socially/culturally sensitive areas. To implement this policy, they conduct systematic due diligence to assess risk and inform investment decisions before new licenses are purchased.

• **Water Footprint Management.** As water availability and use rights become a matter of growing concern, companies are experimenting with ways to reduce their impact on local water supplies for milling FFB through process optimization, conservation measures, and recycling.

• **Integrated Pest Management (IPM).** To maintain tree health and thus yield while reducing use of chemical pesticides, sophisticated use of established and emerging IPM techniques to monitor, detect, research and control pests are becoming widespread practice in the industry.

• **Supply Chain Management.** Increasing numbers of downstream supply chain actors, foreign and domestic, are making commitments to source CPO responsibly and trialing proactive, business-to-business measures to encourage producers to implement best practice and manage the social and environmental footprint of production, especially deforestation.

• **Responsible Investment by Financial Institutions.** In recognition of the role finance can play to leverage broad-based efforts to promote good practice, increasing numbers of multi-national and commercial lending institutions are using due diligence, incentive, and compliance-based approaches to encourage more responsible production.

• **Improved Oil Palm Governance by Local Administrations.** Though not widely discussed, efforts are being made by local governments in palm oil producer regions of Indonesia to improve development outcomes from oil palm through better spatial and economic planning; enacting regulations to address local social or environmental concerns; moratoria on plantation licensing; supporting investments in technical capacity; promoting multi-stakeholder participation in various processes; and improving transparency in regulation.

**Overarching Conclusions**

Several common themes emerged from the Case Studies that point to areas where action is needed to reward current efforts and accelerate broader adoption of the good practices featured. These are highlighted below to reinforce their importance and to inform future dialogue on how to build consensus across stakeholder groups to take coordinated action.
Industry Leadership. The industry itself is in the best position to bring about change through industry-wide initiatives and leadership of progressive firms. Senior managers of plantation companies are often the key supporters of performance improvement, sometimes initially motivated by outside pressure or corporate image concerns and later by sound business logic. Larger firms have more incentive and resources to explore and adopt new technologies and practices. These firms are more certain of reward through market access and increased profits. Sustainability is increasingly seen by industry as a source of innovation and growth rather than simply risk management. These trends should be rewarded and strengthened.

Information Sharing. Information related to the innovations in management practice described in the Case Studies are largely spread informally through personal relationships, when employees leave one company for another, or by consultants who work for multiple firms on the same issue not subject to confidentiality. More formal mechanisms for information sharing, such as sustainability forums, business networks, training courses or handbooks, are needed to accelerate uptake of innovative practice. In the case of small firms and smallholders, free technical support may be required.

Changing Market-based Incentives. Due to (a) low barriers to entry and (b) favorable market conditions in recent years, oil palm companies have been rewarded handsomely for establishing plantations whether or not they are well managed. As land availability becomes more restricted, and if palm oil prices weaken, well-managed firms can earn significantly more profit and marginal firms will struggle to compete and/or become targets for acquisition. Such market consolidation could bring larger segments of industry under improved management by larger companies, which in turn could reduce impacts.

Governance Gap. Local government enforcement capacity is often severely limited by knowledge and resource constraints, a situation worsened by self-imposed budgetary limits and pressures to support expansion. Where this holds, industry can be, in effect, largely self-regulating and takes on direct responsibility for positive and negative development outcomes. Under these conditions, the major role of government in guiding oil palm development is through spatial planning, taxation and economic development policy, whereas that of companies is in determining how the regulatory framework is implemented on the ground. Corporate values and governance are critically important in this context.

Capacity Improvement. Improved capacity of local government, private sector, local community, and civil society actors is needed to implement innovative social and environmental practices fully.
CASE STUDY 1

EMPOWERMENT OF SMALLHOLDER OIL PALM FARMERS THROUGH PLANTATION COMPANY SPONSORSHIP AND SUPPORT

PT INTI INOSAWIT SUBUR

By Yulianto Kurniawan

Summary

Oil palm companies contribute to rural development through many pathways. Beyond enhancements to infrastructure, provision of social services and philanthropic contributions, growing numbers of companies also directly support smallholder oil palm farming enterprises. Such partnership farmer schemes come in many forms, but all entail company-provided operational, technical, and financial support of farmers to produce oil palm fresh fruit bunches (FFB) sold to the sponsoring mill. When plasma schemes are successful, the positive impact on rural economies can be transformational. When they fail, the social and environmental impacts are negative and long lasting. In some settings, the development benefits of plasma programs are largely determined by the performance of farmer cooperatives designed to support them.

Under most plasma arrangements, cooperative institutions provide critical farmer services, including (i) ensuring access to training for continuous learning of good farming practices; (ii) ensuring fair prices are obtained for smallholder FFB sold at mills; (iii) ensuring access to fertilizers and other inputs (e.g., quality seedlings) at a fair price at a fair price; (iv) supporting transport of FFB to mills in a timely and safe manner to maintain quality; (v) providing coherent bargaining with companies (e.g., over terms and conditions of business transactions); and (vi) facilitating business diversification through training, access to credit, and related business support services. Cooperatives often fall short in one or more of these functions due to failed leadership, poor managerial systems, non-transparency, capture by elite interests, and collusion between cooperative leaders and company counterparts.

Noting the strain on company-community relations caused when cooperatives fail, growing numbers of companies are investing significant resources in building successful smallholder partnerships as a core strategy for creating shared value with local stakeholders. This case study describes an award-winning smallholder support program led by PT Inti Indosawit...
Subur (IIS), a subsidiary of Asian Agri Group. The PT IIS project aims to support capacity building, institutional development, financial management, and long-term profitability of smallholder farmer cooperatives in Riau and Jambi province. PT IIS treats provision of technical, institutional, and financial support to smallholders as an integral part of its production model, supporting more than 29,000 smallholder farmers with total planted area of 60,200 ha organized in over 80 village business cooperatives.

Through provision of certified high-yield planting material; technical assistance on planting, tree maintenance, and yield management practices; training on pest management including chemical-free methods; road maintenance; access to credit; and structured, ongoing training to build institutional and management capacity of the cooperatives—the program has been acknowledged for its commercial success to farmers, sustainability milestones under both RSPO and ISCC standards, and has achieved national recognition as a model of successful agricultural cooperatives. This Case Study offers key lessons to improve smallholder outcomes under cooperative arrangements and serves as a model for adaptation and adoption by other members of industry.

1.1 Background

1.1.1 Company-Community Smallholder Partnerships—The PIR Trans Model

In 1986, the Indonesian government launched the “PIR Trans” smallholder oil palm farming program via Presidential Decree No.1/1986. The program paired rural farmers (usually transmigrants from Java or Sumatra) with plantation companies to supply fresh fruit bunches (FFB) to mills from farmer-owned 2-ha plots linked with company-owned ‘inti’ plantations. Many smallholder oil palm farmers benefitted handsomely from the program, especially in Sumatra, enjoying marked improvements in their standard of living and welfare. Farmers who previously worked as laborers in low paying, unskilled jobs became landowners and invested proceeds from oil palm into small businesses such as groceries, restaurants, transportation services and more. Yet, not all PIR Trans farmers enjoyed such success. For example, some participants opted instead to sell their 2-ha plots after only one to two years and return home. Nevertheless, overall the PIR Trans program succeeded at laying the groundwork for integrating small farmers into oil palm production and stimulated job creation in areas where alternative opportunities were lacking. Where companies provided mentoring and farmers worked hard to learn, PIR Trans smallholders became skilled producers of a new and valuable crop.

Under most plasma arrangements, including the PIR Trans model, cooperative institutions provide critical farmer services that can directly influence the outcome of smallholder schemes. These include (i) facilitating access to training for continuous learning of improved farming practices; (ii) ensuring access to fertilizers and other inputs (e.g., quality seedlings) at a fair price; (iii) supporting the transport of FFB to mills in a timely and safe manner to maintain quality; (iv) providing coherent bargaining with companies over terms and condi-
tions of business transactions, including fair prices paid for FFB; and (v) facilitating business diversification through training, access to credit, and related business support services. Cooperatives often fall short in one or more of these functions due to failed leadership, poor managerial systems, non-transparency, capture by elite interests, and collusion between cooperative leaders and company counterparts.

In this Case Study, we profile a very successful model for company-supported, smallholder oil palm farming in which the company played an extremely important, proactive role in establishing and nurturing cooperative institutions. The company involved is PT Inti Indosawit Subur, and its cooperative arrangements, which offer a proven model for adaptation by other members of industry in other geographies.

1.1.2 PT Inti Indosawit Subur—At a Glance

PT Inti Indosawit Subur (IIS) is an operating holding company of Asian Agri, one of the largest oil palm companies in Indonesia. In total, IIS partners with nearly 29,000 smallholder farmers, managing more than 60,200 ha of planted oil palm in Jambi and Riau. All these farmers are organized under and supported by 80 different company-facilitated cooperatives (KUD).

PT IIS treats provision of technical, institutional, and financial support to smallholders as an integral part of its production model. Accordingly, the company invests significant resources in building successful smallholder partnerships as a core strategy for creating shared value with local communities and advancing its Corporate Social Responsibility (CSR) mission.

Through provision of certified high-yield planting material; technical assistance on planting, tree maintenance, and yield management practices; training on pest management including chemical-free methods; road maintenance; access to credit; and structured, ongoing training to build institutional and management capacity of the cooperatives—the program has been acknowledged for its commercial success to farmers, sustainability milestones for certification under both Roundtable on Sustainable Palm Oil (RSPO) and International Sustainability and Carbon Certification (ISCC) standards, and proven models for building successful company-mentored cooperatives.

1.2 Plasma Buatan: A model cooperative

1.2.1 Introduction to Plasma Buatan

One of the most successful cooperative associations under IIS is the company’s plasma program in Buatan. The farmers organized under Buatan cooperatives cover 10,934 ha of productive oil palm divided into 12 housing units (Satuan Pemukiman [SP]), each with its own cooperative (Table 1.1). The Buatan smallholder program began in the late 1980s with planting of 590 ha for 295 members under co-management arrangements with the company (Table 1.2). Buatan grew steadily each year until 1993, when it reached 5,467 members and 10,934 ha of planted oil palm. Under Buatan, the 2-ha plantings for each household were co-managed by IIS and farmers for the first four years of growth then handed over to farmers for direct management responsibility. This process (Konversi in Bahasa Indonesia) began in
1992 and continued annually until 1997, when all farms in Buatan came under full management responsibility of farmer members, supported by cooperatives and the company.

Table 1.1. Housing Units and cooperatives in Plasma Buatan

<table>
<thead>
<tr>
<th>No.</th>
<th>Housing Unit</th>
<th>Name of Cooperatives</th>
<th>Village</th>
<th>Area (Ha)</th>
<th>#of households</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SP I</td>
<td>KUD Mulus Rahayu</td>
<td>Delima Jaya</td>
<td>704</td>
<td>352</td>
</tr>
<tr>
<td>2</td>
<td>SP II</td>
<td>KUD Bhirawa Bakti</td>
<td>Buana Bhakti</td>
<td>984</td>
<td>492</td>
</tr>
<tr>
<td>3</td>
<td>SP III</td>
<td>KUD Bhakti Mandiri</td>
<td>Bukit Harapan</td>
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<td>490</td>
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<td>SP IV</td>
<td>KUD Jaya Makmur</td>
<td>Kumbera Utama</td>
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<td>SP V</td>
<td>KUD Sumber Rejeki</td>
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<td>6</td>
<td>SP VI</td>
<td>KUD Sejahtera</td>
<td>Makmur</td>
<td>970</td>
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<tr>
<td>7</td>
<td>SP VII</td>
<td>KUD Tani Rukun</td>
<td>Simpang Perak Jaya</td>
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<td>512</td>
</tr>
<tr>
<td>8</td>
<td>SP VIII</td>
<td>KUD Kebun Sawit Harapan</td>
<td>Gabung Makmur</td>
<td>800</td>
<td>400</td>
</tr>
<tr>
<td>9</td>
<td>SP IX</td>
<td>KUD Buatan Jaya</td>
<td>Jati Mulya</td>
<td>860</td>
<td>430</td>
</tr>
<tr>
<td>10</td>
<td>SP X</td>
<td>KUD Mitra Usaha</td>
<td>Buatan Baru</td>
<td>1,200</td>
<td>600</td>
</tr>
<tr>
<td>11</td>
<td>SP XI</td>
<td>KUD Makarti Sawit</td>
<td>Buana Makmur</td>
<td>800</td>
<td>400</td>
</tr>
<tr>
<td>12</td>
<td>SP XII</td>
<td>KUD Bina Mulya</td>
<td>Suka Mulya</td>
<td>872</td>
<td>436</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td>10,934</td>
<td>5,467</td>
</tr>
</tbody>
</table>

Table 1.2. Stages of Plantation hand over for PLASMA BUatan

<table>
<thead>
<tr>
<th>Stages</th>
<th>Area (Ha)</th>
<th>#of households</th>
<th>Planting year</th>
<th>Date of Plantation Hand Over</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>590</td>
<td>295</td>
<td>1988</td>
<td>September 1992</td>
</tr>
<tr>
<td>II</td>
<td>1,484</td>
<td>742</td>
<td>1989</td>
<td>July 1993</td>
</tr>
<tr>
<td>III</td>
<td>2.312</td>
<td>1,156</td>
<td>1990</td>
<td>September 1994</td>
</tr>
<tr>
<td>IV</td>
<td>3.300</td>
<td>1,650</td>
<td>1991</td>
<td>September 1995</td>
</tr>
<tr>
<td>V</td>
<td>2.052</td>
<td>1.026</td>
<td>1992</td>
<td>August 1996</td>
</tr>
<tr>
<td>VI</td>
<td>1.196</td>
<td>598</td>
<td>1993</td>
<td>October 1997</td>
</tr>
<tr>
<td>Total</td>
<td>10,934</td>
<td>5,467</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.2.2 Leading Cooperatives in Plasma Buatan

Of 12 KUDs in Plasma Buatan, two have enjoyed recognition as especially well-managed, effective institutions: KUD Bhirawa Bakti (SP II) in Desa Buana Bhakti and KUD Jaya Makmur (SP IV) in Desa Kumbera Utama (Table 1.3, Figure 1.1). Skills and professionalism of the executive management are key to success of the cooperatives, but likewise high levels of member participation in KUD activities, reporting and decision making are also critical to the cooperatives long term stability and achievements. Members are especially active in training programs for farming and business management, and contribute resources to the development of business units owned by the cooperative itself, including savings and lending units, production facilities and groceries store (mini market).

Table 1.3. Profile of KUD Bhirawa Bakti AND KUD jaya Makmur, two cooperatives in Plasma Buatan recognized for their achievements
<table>
<thead>
<tr>
<th>Aspect</th>
<th>KUD Bhirawa Bakti</th>
<th>KUD Jaya Makmur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of establishment</td>
<td>1991</td>
<td>1992</td>
</tr>
<tr>
<td>Executives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chairman</td>
<td>Sunarto</td>
<td>Rustamari</td>
</tr>
<tr>
<td>Secretary</td>
<td>Siswandi</td>
<td>Kusman</td>
</tr>
<tr>
<td>Treasurer</td>
<td>Fajar</td>
<td>Suryana</td>
</tr>
<tr>
<td>Area of plantation</td>
<td>984 Ha</td>
<td>920 Ha</td>
</tr>
<tr>
<td>Number of members</td>
<td>492 households</td>
<td>460 households</td>
</tr>
<tr>
<td>Number of farmer groups</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Business Units</td>
<td>FFB of Plasma and homeyard, Saving and Lending, Groceries and production facilities</td>
<td>FFB of Plasma and homeyard, Saving and Lending, Groceries and production facilities</td>
</tr>
<tr>
<td>Gross Assets in 2012</td>
<td>Rp 10,627,256,591 ($US 1,062,000)</td>
<td>Rp 4,829,690,230 ($US 483,000)</td>
</tr>
<tr>
<td>Net Assets in 2012</td>
<td>Rp 1,823,335,591 ($US 1,062,000)</td>
<td>Rp 1,664,564,548 ($US 166,500)</td>
</tr>
<tr>
<td>Third party certification</td>
<td>RSPO and ISCC</td>
<td>RSPO and ISCC</td>
</tr>
</tbody>
</table>
Figure 1.1. Time line of (a) Accumulated Net Wealth and (b) Annual net profit for KUD Jaya Makmur over the Period 2006-2012.

Financial success of the cooperatives is evident in their total assets, reaching more than $1 million for KUD Bhirawa Bakti and nearly $500,000 for KUD Jaya Makmur, and net profits of more than $50,000 for both in 2012. To date, these two KUD have received a variety of awards from district, provincial and national levels of government. For example, in commemorating National Cooperative Day, the KUD Jaya Makmur received one of twelve national awards as one of the nation’s best performing stallholder cooperatives.

1.3 Key ingredients for a Successful Cooperative: Farmers’ Perspectives

Smallholder agricultural cooperatives in Indonesia have a mixed history, with an equal or greater number of failures than successes. Pitfalls are many, well known and readily overcome if the right support and mentoring can be provided. In this context, the nature and continuity of company support can be a strong determinant of whether cooperatives succeed. Here, we highlight views from cooperative farmers in Plasma Buatan concerning what they view as key ingredients of their success and the role played by PT IIS in helping them achieve this.

1.3.1 The Cooperative Executives: unity, competency and support base

Cooperative executives—the Chairman, Secretary and Treasurer—are the main actors that determine the cooperative’s success. Four factors in particular are crucial: (a) how they were
elected, (b) their unity in serving members, (c) competency in the role, and (d) perceived integrity to serve the group’s interest as a whole, not special interest sub-groups within it.

According to members of Buatan, higher education is not always necessary to become a KUD executive, but rather candidates must be perceived to have skills as individuals that are complementary within the group, enabling the executive as a whole to meet the varied demands placed upon them. Executives appointed because of support among vocal members, as opposed to broad based recognition of their talents, rarely last long, because they are quickly viewed to support a narrow interest group rather than membership as a whole and are voted out.

Good executives are honest, creative and innovative in pursuit of the cooperative’s mission and vision. For example, the current chairman of KUD Bhirawa Bakti, Sunarto, had only a primary school educational background, but since he is a competent farmer, creative and always working to improve himself in his capacity to manage the cooperative, he’s attracted widespread support among members and leads his cooperative to become one of the best in Plasma Buatan. Sunarto joins motivation courses to enhance his leadership skills and basic training on accounting. He is now widely known for his ability to review and understand financial reports well, despite his limited formal education. He serves as a role model for hard work, service to the membership and shared success in pursuing a common goal.

The role of PT IIS in the cooperative executive has been limited in the past many years, a fact that is widely praised. Perceived credibility of the Executive among members depends in part on their ability to strike the right balance between partnership and independence with companies on which the cooperative depends. If PT IIS played an active role influencing the Executive, this would create a crisis of trust and make it hard for them to lead effectively.

1.3.2 Service to the Membership

Another key determinant of cooperative success is how it builds programs around meeting the needs of its members rather than just the bottom line of the cooperative as a business. Generating profit is a goal, but a well-run cooperative must also serve the needs of its membership in order to obtain long term buy in, sacrifice and support. A cooperative must be responsive, creative, and proactive in understanding needs of its membership, and designing programs to meet these needs fairly, effectively, and without bias.

Cooperatives are founded based on the shared, common objectives of its members, and success is therefore judged not only by profits earned for the cooperative, but also the level of member satisfaction, not by the amount of profits. The role of executives becomes extremely important in this regard, because they have to serve the diverse needs of numerous members, in a way that is responsive and without perceived bias.

For example, at both cooperatives in Buatan, the cooperatives operate a savings and loan business unit, offering members low interest rates and no-cost administration to support small business development, or other farm credit needs. The cooperatives also have programs to meet member emergency needs for medication or other treatment. For active members in the cooperative, KUD Jaya Makmur also offers a benefit to cover costs of a wedding party.
As further examples, both KUD also used a portion of profits to build a permanent office building used by the cooperative for daily activities, to host the annual meeting of members and also for use to host other meetings. Some cooperatives have also established mini-marts that offer groceries to members on credit if they need it (Figure 1.3), with costs deducted from FFB sales in the future.

In this area, PT IIS has played an important role supporting cooperatives in developing business models are cooperative services for meeting membership needs. Such programs must be financially sustainable to deliver in the long run, and training to build capacity for business management has therefore been another key area of support from PT IIS.

Figure 1.2. Mini Markets in KUD Bhirawa Bakti (left) and that in KUD Jaya Makmur (right)

1.3.3 Continuous Training and Capacity Building

Capacity building through continuous training is a keystone of cooperative success. It is necessary to provide skills and understanding about new and improved farming techniques, especially in the case of cooperative farmers who are new to oil palm and must be taught the full range of skills required from planting and tending to pest management and harvesting. It is also necessary to help farmers develop a better understanding of business logic and investment decisions, especially in rural areas where formal education levels tend to be lower and literacy or numeracy levels present challenges. Training is also important for intangible reasons, however, by creating enthusiasm about personal development, commitment to learning and shared growth as part of the cooperative. This helps to create unity and commitment to a shared goal of success for the cooperative, and thus better cohesion in decision-making and action. Many trainings were provided by the cooperative itself to its membership, e.g., trainings related to basic business management and improved farming techniques. But PT IIS has played an especially important role in this area, in identifying needs, designing programs, delivering trainings and ensuring their follow up on a continuous basis.

Example trainings provided to cooperative members in Plasma Buatan include the following subjects, among others:

- Principles and Criteria of RSPO
- Occupational health and safety and first aid
- Cooperative management and basic economics
• Good Agriculture Practices (GAP), such as IPM, soil and water conservation, harvesting techniques and zero burning practices
• HCV assessment techniques, including identification, management and monitoring

1.3.4 Transparent robust accounting and success of the annual meeting of the membership

One of the most common causes of failure in farmer cooperatives is linked to poor accounting practices by the Executive to record costs, revenues and assets of the cooperative. Poor practices are not only bad for business—they breed suspicion that Executives are enriching themselves at the expense of the membership. Sometimes bad accounting practices are a reflection of human resource limitations, where executives simply lack basic understanding of accounting principles, or even ability to read a financial report. In other cases, they arise from a lack of internal control systems and procedures. When no system is in place, the risk of fraud can be very high, and this creates distrust. Even with a system in place, some cooperatives still prefer to hire independent audits to ensure there is no cheating among Executives, which can be fatal to a cooperative for not only financial reasons but also psychological ones (Figure 1.3).

Farmers reported that, at a minimum, well-managed cooperatives must have internal control systems with at least the following elements:

• Clear separation in functional responsibilities among the Executives
• System of authority and bookkeeping procedures which protect security of the property, income and costs of the KUD, and ensure transparency in accounting procedures
• Internal audits to ensure good practices in implementing duties and functions of each organizational unit in the cooperative
• Providing cooperative staff members with required skills to execute their responsibilities to a high level of quality

Figure 1.3. Financial Report of KUD Jaya Makmur, for fiscal year of 31 December 2006 and 2012, which has been audited by the Public Accountant Office
Poor accounting and control systems also prevent one of the most important accountability instruments in a well-managed cooperative, the so-called Annual Meeting of Members (Rapat Anggota Tahunan, RAT, in Bahasa Indonesia). This is the event at which the Chairman submits his/her annual report to the membership on activities and finances of the past year, planned activities and projected budgets for the coming year, and performance of the Executive itself. Hosting of the annual meeting promptly and professionally each year (typically on 31 March) is a good indicator of management quality for a cooperative. It therefore weighs heavily in district, provincial and national evaluation procedures to rank performance of cooperatives. It is not uncommon for cooperatives across Indonesia to fail to hold an RAT, even lapses of two to three years can occur. This usually reflects a breakdown in management linked to poor accounting systems, which makes it difficult for executives to prepare financial reports for its members. When this occurs, it may lead to dissatisfaction among members, engendering calls for resignation of the Executives or instead gradual withdrawal of members themselves from the cooperative as feelings of apathy settle in.

In this context, support from PT IIS also played an important role in strengthening cooperative institutions in Buatan by helping to make sure proper systems were put in place, and then executed in accordance with procedures. Where problems arose, IIS assisted in diagnosing underlying causes and provided solutions via training and other capacity building measures.

1.3.5 Independence in the partnership with the company

A fourth important factor promoting stability in the cooperative functions is success of the Executive in maintaining its independence from the company. This is not an easy task for a cooperative of plasma palm oil farmers, considering that the cooperative itself relies on the company for help in training and institutional strengthening, as well as plantation infrastructure and other production facilities. In most cases, especially successful cooperatives, company assistance of some form is always provided, so true independence is not possible. At the same time, cooperative leadership must think carefully about how interactions with the company are structured, to avoid real or perceived linkages that place Executives at risk of losing their independence.

A loss of independence for leadership in the cooperative can create material problems for members, especially in relation to the cooperative’s important function to negotiate FFB prices on behalf of the membership. Where farmers are unhappy with prices, the cooperative institution gives them collective power to assert their rights more effectively and negotiate higher prices. But to do this effectively in a manner trusted by the membership, its leadership must maintain its independence.

1.3.6 Forum to register and reconcile grievances

Representing the interests of a large group of people is not an easy task. Cooperatives at Buatan typically have 300-500 members, each with their own expectations for benefit from the cooperative and standards of satisfaction. In this context, it is inevitable that some members will develop dissatisfaction and seek ways to redress this. That complaints arise is
not a big problem in itself. Where it can become fatal, however, is when members have no idea where and how to seek recourse. Many cooperatives have failed because of a lack of procedures for resolving complaints. A successful cooperative must, therefore, have an established system to resolve problems when they arise, and competent executives to implement the system.

To address this problem effectively, the Jaya Makmur cooperative at Buatan has developed systems and procedures for handling grievances embodied in a system referred to as “Mechanism of Farmer Communication, Consultation and Grievance Submission.” The cooperative uses this system not only to solve problems as they arise, but also to document what occurred, how it was resolved and what can be learned to take steps for avoiding the same problem in the future.

In addition to this internal mechanism for Jaya Makmur cooperative itself, Plasma Buatan also developed a forum for addressing problems that affect more than one KUD today or in the future (Figure 1.5). This cross-cooperative forum is called the “Communication Forum of PIR Oil Palm Farmers” (abbreviated FKPPKS in Bahasa Indonesia). Where problems arise that affect more than one KUD, this forum will be used to address it. An examples issues taken up in this forum is, How to improve roads and supporting transport so that harvested FFB can be transported to the mill faster and more safely to protect quality and prices thus paid?

Figure 1.4. Mekanisme Komunikasi, Konsultasi dan Keluhan Petani

In addition to this internal mechanism for Jaya Makmur cooperative itself, Plasma Buatan also developed a forum for addressing problems that affect more than one KUD today or in the future (Figure 1.5). This cross-cooperative forum is called the “Communication Forum of PIR Oil Palm Farmers” (abbreviated FKPPKS in Bahasa Indonesia). Where problems arise that affect more than one KUD, this forum will be used to address it. An examples issues taken up in this forum is, How to improve roads and supporting transport so that harvested FFB can be transported to the mill faster and more safely to protect quality and prices thus paid?
Another issue dealt with very well by the forum concerned fruit sorting and grading. Grading FFB quality used to be done in the company mill (loading ramp), which created uncertainty among farmers about how and why fruits were graded in certain ways. Through the forum, discussions were held with the company and now grading is done at each farmer’s garden with three parties present: (1) the garden owner, (2) the garden worker (if one is hired) who makes decisions about which fruits to harvest when, and (3) a buyer from the company. The system creates transparency in the grading process, and allows for continuous learning about oil palm fruit quality and harvesting techniques to produce FFB of a ripeness and quality rewarded by the company.

1.4 Conclusion

Establishing a harmonious partnership between companies and plasma farmers is not easy. Media discourse on the subject paints a bleak picture, suggesting success stories are few and far between. In reality, successful company-community partnerships are more common than first impressions would suggest, especially in Sumatra. One key requirement for successful partnerships to be sustained is that they must bring mutual benefit to both parties. For smallholders, companies provide credit assurances,
technical assistance, mentoring, institution building and production facilities necessary for new plasma farmers to succeed and cooperative structures to mature. In exchange, companies can benefit handsomely from significant increases in plantation base and thus supply to their mills. Both of these facets are illustrated by the case studies of Asian Agri Group’s PT IIS and its cooperative farmers at Buatan.

From a mentoring and performance point of view, efforts by PT IIS to support smallholder cooperatives have been extremely successful. This is evident in the above average level of welfare of the plasma farmers, accumulating wealth of the cooperative, certification under multiple standards, and frequent awards for quality cooperative performance. Such success is tied directly to continuous mentoring and support to farmers provided by the company and the cooperative itself. Further proof of partnership success is the high level of drive among cooperative members to continue developing and improving their skills to achieve individual targets as well as shared goals of the cooperative. Key to the success of Buatan is the strong institutional (cooperative), whose establishment was facilitated by PT IIS but populated and managed successfully by farmers themselves.

The Buatan cooperative serves as an example of successful company-community partnerships, with important lessons learned that should be modelled, adapted to local circumstances and trialled throughout Indonesia where smallholder schemes are in planning or under development.

Acknowledgements

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The contributions of all the respondents in this study are especially appreciated. Many thanks to Rustamari, Kusman and Suryana (KUD Jaya Makmur, Desa Kumbara); Sunarto and Zainal Arifin (KUD Bhirawa Bhakti, Desa Buana Bhakti); and Tarmin, Nario, Suratijo, and Riswoyo (Asian Agri Plasma farmers)—for allowing themselves to be interviewed and their kind support during the research.
CASE STUDY 2

A STRATEGIC APPROACH TO CORPORATE SOCIAL RESPONSIBILITY PROGRAMS FOR COMMUNITY DEVELOPMENT IN OIL PALM

ASTRA AGRO LESTARI GROUP

By Gary Paoli, Leony Aurora and Rahayu Harjanthi

Summary

Oil palm companies are required by Indonesian law to make a portion of land within their plantations available to local smallholder farmers to grow their own oil palm trees on small plots (often referred to as plasma). Typically, the company provides technical and financial support to farmers and purchases fresh fruit bunches they produce. The area managed by smallholders has grown to 40% of Indonesia’s total planted area over the past three decades, involving more than two million farmers. Companies are also required under Indonesia’s Corporate Social Responsibility (CSR) law to provide additional development assistance to communities near their plantations, typically in the form of health and education services, roads, and livelihood improvement or diversification support. Where successful, smallholder plantations and CSR programs have made significant progress in spreading the development benefits of oil palm. Yet, concerns remain over benefit sharing within and among affected communities, including disputes over land rights, problems that are exacerbated by inadequate company-community communication and trust. PT Astra Agro Lestari, one of Indonesia’s largest palm oil producers, has worked diligently for more than a decade to refine community development programs that both improve local livelihoods and company-community relations. After years of experimentation, Astra developed a model Income Generating Activity (IGA) program that supports farmers to grow oil palm (or other commercial crops) on land they own, with a larger degree of management discretion retained by farmers than is typical under conventional plasma schemes. Astra provides financing, technical assistance, and reliable access to markets at a fair price for these farmers. The IGA program has proven to be extremely financially rewarding for participating farmers and increased land values, creating a foundation for shared benefit, open communication and improved relations between the company and local communities.
2.1 Background

Indonesia is the world’s largest producer of palm oil, and has seen tremendous growth of the industry in the past three decades. During this period, oil palm has been promoted by the Indonesian government and development banks as a vehicle for agriculture-based rural economic development, with plantations established on all the main islands of western Indonesia outside densely-populated Java. In addition to livelihood benefits derived from better infrastructure to access plantations and processing facilities, revenues from selling oil palm fresh fruit bunches (FFB) are a critical source of income for smallholder farmers and their families where the industry has become firmly established and oil palm has become a popular farmer crop. In addition, local communities near plantations typically enjoy different forms of company-provided direct support for a wide variety of social services as part of Corporate Social Responsibility (CSR) programs in their areas. Such programs have grown in scope and become increasingly sophisticated over the years as companies seek to deliver meaningful long-term livelihood improvements from their CSR investments.

Despite contributions of oil palm to local economies and rural communities near plantations, much attention focused on social impacts of oil palm is not positive. Critics have singled out recent expansion as one of the main causes of land-based conflict between companies and local communities in Indonesia, as well as within communities themselves. Economic benefits to communities from oil palm are said to vary tremendously from one plantation to the next, even among communities in the same plantation, raising the questions:

- What explains why some communities benefit handsomely from oil palm while others do not?
- How can community development programs in oil palm be designed to ensure plantations make lasting positive contributions to local economies and communities?

This Case Study explores a strategic approach taken by PT Astra Agro Lestari, one of Indonesia’s largest palm oil companies, to engage proactively with local communities to develop effective channels of communication, meet their expectations for better livelihoods and create a conducive, mutually respectful environment that promotes shared, long-term value for communities and the company. Through refinement of its Income Generating Activity (IGA) program trialled over the past ten years, Astra made a conscious effort to maximize the value of CSR programs and lay a foundation for lasting development impacts across its area of operation. In doing so, the company employed an adaptive and “continuous improvement” oriented approach to developing IGA, providing a real-world example of a community development program that works.

2.2 Oil Palm and Local Communities

2.2.1 Oil Palm as a Vehicle for Rural Development

With support from the Indonesian government, oil palm has become a major vehicle of development in frontier rural areas. Plantations and mills provide large numbers of moderate to low skilled jobs in districts and communities that often urgently need cash income, and stimulate broader economic activity by fuelling demand for a wide range of supporting ser-
vices, materials and industries. With the aim of increasing and diversifying benefits to com-
munities beyond direct employment by companies, in the late 1970s and 1980s the Indone-
sian government began promoting smallholder oil palm through introduction of a new de-
velopment model comprising nucleus (inti) company estates and linked smallholder (plasma)
plantations. Judged by the number of smallholder oil palm farmers this created, the program
has been a resounding success. In 1979, only 1% of oil palm plantations were owned by
smallholders. Today, smallholders now control about 40% of the total 8.5 million hectares of
planted oil palm across the country. At least three million people (more than 1% of the In-
donesian population) are directly employed by the sector, and double that number benefit
from economic activities linked to it, according to industry estimates.

These figures are expected to grow as Indonesia continues promoting oil palm as part of lo-
cal and national economic growth strategies. Investment in the sector is growing rapidly and
the development of new plantations is continuing in Sumatra and Kalimantan at a rapid
pace. With smaller areas available for expansion in Sumatra and Kalimantan, major oil palm
companies are looking at eastern Indonesia, particularly Papua, as the next frontier for fu-
ture plantation development.

2.2.2 Local Community Expectations and Company Response

The development of oil palm plantations in a rural context marks the onset of a long period
of frequent and intensive interactions between companies and local communities in and
around plantations. Such communities typically include a mix of indigenous peoples, mi-
grants with a long history in the region, and more recent arrivals including government-
sponsored transmigrants. The expectations from such a diverse group for benefits arising
from oil palm are extremely varied, reflecting differences in their familiarity with the sector,
social and cultural norms of interaction with companies, and positions of stature within their
community, among other factors. Likewise, companies vary tremendously in their approach,
skills and experience to navigate such community diversity, a fact that further complicates
the challenging problem of how to ensure constructive interactions between parties with
unequal knowledge and resources.

Two major focal points of interaction between companies and communities that determine
the net impact of plantations on local livelihoods center on the design and implementation
of (a) plantation schemes for company-supported smallholder oil palm farming, and (b) local
community development programs, often implemented as part of Corporate Social Respon-
sibility (CSR).

The nature of arrangements for smallholder oil palm is extremely variable, and so too are
their net livelihood impacts across Indonesia. Arrangements vary from conventional nucleus
(inti) and plasma smallholder schemes mentioned above (where companies establish oil
palm gardens for villagers who farm them independently and then repay loans to the com-
pany from future revenues) to joint ventures or partnerships with varying degrees of gov-
ernment involvement, management roles and contractual relationships between companies
and participating smallholders. Research has shown that maintaining constructive intera-
cctions between government, smallholder cooperatives, farmers and the company is a critical
determinant of success for smallholder arrangements, but managing these interactions is
not easy. Smallholder projects can fail for many reasons, and when they do, company-community relationships become strained and conflicts related to land use frequently arise. Failures of smallholder programs can arise for diverse reasons, including incomplete transparency during negotiation of land sharing agreements between companies and communities, dysfunctional cooperatives that fail to represent smallholder interests effectively, unrealistic expectations by communities about the size and timing of financial benefits from oil palm, and differences between plantations in the terms of smallholder arrangements that can lead to distrust. Companies therefore increasingly approach the design of smallholder programs carefully, both to promote local development and to avoid disruptions to business, insecurity of investment and risk to corporate image.

Even when smallholder programs succeed, however, this does not ensure widespread livelihood benefits to all or even most parties affected by plantation operations. This is because not all community members participate in smallholder arrangements and even for those who do, benefits may not meet their expectations. It is therefore in a company’s interest to nurture good relationships with communities more broadly, and an important mechanism for doing this is through effective CSR programs. The importance of CSR programs to company-community relations has grown in recent years, as expectations for local benefit have increased and recent policy changes have given companies wider discretion to design and implement community development programs independent of government involvement and oversight. In this way, the net impacts of oil palm on community development are increasingly dependent on a company’s own policies, a trend that creates both opportunity for individual companies with progressive ideas, but also reputational risk for the sector as a whole.

### 2.2.3 Pressure for Companies to Improve Practices

The past ten years has seen a marked increase in pressure on oil palm companies to implement best practices in their operations. A turning occurred in 2007 when world attention began to focus on the role of forests in climate change and livelihoods for rural communities. Indigenous peoples’ rights and FPIC requirements are now firmly included as part of sustainability performance standards from multinational institutions, as well as voluntary programs such as the Indonesian Sustainable Palm Oil (ISPO) and Roundtable on Sustainable Palm Oil (RSPO) standards for oil palm. Commitments by leading producers in Indonesia to meet new plantation performance standards have inspired a small but growing number of international palm oil buyers to commit financial and technical assistance to support production of sustainably produced palm oil. Further, leading Indonesian and global banks, such as Bank Negara Indonesia, HSBC and Citi Bank are also beginning to develop their own guidelines to support and reward good practice.

Pressure to improve social practices are felt most strongly by larger companies, particularly those that are publicly listed and/or selling to western markets, because public image can

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2 The implementation of regional autonomy laws combined with the landmark Law No. 18/2004 on plantations together created a highly decentralized system of governance and oversight that gave wide discretionary authority—and responsibility—to companies to manage relationships with communities.
directly influence share prices and sales volume. Local and international NGOs, as well as business associations, are increasing efforts to encourage and reward such firms to approach community development in a proactive and inclusive manner. At the same time, business networks of progressive companies are forming to facilitate shared learning and business-to-business exchanges on best practice.

All of these developments are a positive sign of genuine improvements. Continued pressure, encouragement and financial support will reinforce emerging good practice, but ultimately successful community development outcomes are determined by effective communication, and this depends on corporate policies and commitments to promoting long-term shared value. This, in turn, requires companies to develop skills to manage complex relationships between company and community actors with very different cultures, norms of interaction and levels of knowledge, influence and authority. Growing these resources will take time, and the aim of this Case Study is to support that process.

2.3 Case study: Strategic Approach to Community Development in CSR

2.3.1 PT Astra Agro Lestari

The plantation company featured in this Case Study is PT Astra Agro Lestari (hereafter Astra), the oil palm unit of PT Astra International, one of Indonesia’s largest companies. Astra entered the palm oil sector in 1984 when it purchased 15,000 hectares of plantations in Riau. Since then, its plantation areas have expanded many-fold, with Astra currently managing 272,994 hectares of plantations in Sumatra, Kalimantan and Sulawesi (Figure 2.1), of which approximately 22% are associated smallholders. Astra employs directly more than 60,000 people under more than 40 subsidiaries, including a rubber company and an agricultural manufacturing and services company. Astra sold about 20% of its shares to the public in 1997 at IDR1,550 per share. Since then, share prices have strengthened markedly to IDR19,700 at the end of 2012, outperforming the benchmark Jakarta Composite Index. Astra’s revenues have been steadily climbing, supported by increased oil palm prices in the past decade and rapid expansion of the company’s plantation and milling base. Astra sells more than 97% of its palm oil products to domestic markets.
In annual reports, Astra states aspirations “to be the most productive and innovative agri-based company in the world”, with a mission “to be a role model and contribute to the nation’s development and prosperity”. The company is an active member of the Indonesian Palm Oil Producers Association (GAPKI). Astra is not a member of the Roundtable on Sustainable Palm Oil (RSPO) but supports the Indonesian government’s certification initiative Indonesian Sustainable Palm Oil (ISPO). Three units have been awarded ISPO certificates: PT Sari Aditya Loka (Jambi), PT Gunung Sejahtera Dua Indah and PT Gunung Sejahtera Ibu Pertiwi (both in Central Kalimantan). The company has produced annual sustainability reports available to the public on its website since 2009 (http://www.astra-agro.co.id/). Astra is also a frequent recipient of awards for its achievements in CSR, including the 2012 prizes for “Indonesia Green Award”, “Social Business Innovation Award” and “20 Green CEO.”

2.3.2 Astra Agro Lestari and Community Development

With vast oil palm plantations in numerous sites in Sumatra, Kalimantan, and Sulawesi, Astra’s operations have impacts on local communities across Indonesia, including both indigenous peoples and transmigrants (mostly from Java). The company has built and improved community development programs and communication channels in response to past issues with communities, particularly relating to overlapping land-rights claims in the license areas awarded by government.

To meet local expectations for improved livelihoods, Astra has made the design of effective community development initiatives a core part of its CSR program. These programs are in addition to significant investments in plasma and associated smallholder schemes, collectively accounting for more than 22% of the companies managed supply base. In 2012, such plasma smallholders together with other independent third parties supplied nearly 40% of
the 6.6 million tons of FFB processed by Astra that year, illustrating their importance to company operations.

For implementation of CSR programs, Astra prioritizes villages within its plantation license as Program Targets, since they are considered to experience the most direct impacts from operations and are potentially vulnerable to competition for local resources (especially land) and other effects. In total, 255 townships (desa) occur within these target areas, representing approximately a thousand villages (dusun) and several thousands of families.

Astra follows four key principles in formulating community development initiatives within their CSR programs. All programs must be:

- Based on what communities need (responsive).
- Carried out with attention to specific problems, aspirations, and local potentials of each community (targeted and appropriate to each community).
- Oriented toward strengthening self-reliance (long-term and facilitory).
- Designed so that communities participate actively in the implementation of the initiative (collaborative based on shared ownership).

Astra’s sustainability reports highlight three main thematic areas emphasized in its CSR programs: Economy, Education and Health. Programs under this umbrella are extremely diverse, and include support to small-scale farmers of different agricultural commodities, oil palm farming (plasma), Income Generating Activity (IGA; described below), micro-finance initiatives, development of schools and scholarships, and revitalization of child health care facilities, among others. The total amount of funding spent on CSR initiatives is not disclosed in annual reports.

To promote effective design of CSR programs in line with the principles outlined above, Astra assigns personnel as dedicated Community Development Officers, with the task of building communication channels, establishing ties and maintaining constructive relationships with communities around the plantation. A key part of their job is to develop a clear understanding of community needs, problems, aspirations and local potential to develop ideas for suitable development projects. Program concepts are then refined and improved through active dialogue with community members to establish mutually agreed activities and goals.

For this Case Study, Astra’s Income Generative Activity (IGA) program is profiled. Astra’s approach to and experience with IGA are a leading example of how companies that take a strategic view to community development, and who combine a “learning by doing” approach with a commitment to revise, refine and reshape programs, can achieve more optimal, enduring and sustainable community development outcomes from their CSR investments.
2.3.3 Income-Generating Activity

Origins

The IGA program was launched by Astra in 2002 to support economic empowerment of local communities around their plantations. At first, the company experimented with a range of programs tailored to meet specific desires and enterprise ideas of each community. Different villages requested and were provided a range of support programs, including rice, horticulture, chicken and bee farming, freshwater fisheries, metal working (blacksmith), cacao and rubber plantations, brick production, and non-timber forest products like rattan and gaharu. Under the IGA program, Astra provided loans to communities for investment capital, arranged trainings, and, where possible, bought the products produced by local enterprise that they supported.

While some of these diverse local industries were successful, it became clear over time to Astra that it had limited capacity to absorb most (or even much) of the marketable products from these community-based industries. For example, the company was able to buy wet latex from rubber production in one of their IGA projects in Tabalong District in South Kalimantan, and iron tools produced by metal workers in two IGA projects in districts in Central Kalimantan and West Sulawesi. The remainder of products created under IGA programs had to be sold in local or regional markets already controlled by existing traders and where barriers to entry were significant for villagers inexperienced in business. Some IGA participants were able to compete successfully in the open marketplace, but in general retail products and other outputs from most IGA projects could not compete with better or cheaper products produced elsewhere and sold locally. As a result, numerous IGA supported businesses became financially unviable and eventually failed.

Retooling the IGA program

CSR planners in Astra learned a very important lesson from these experiences. That is, the success of an income generation program depends heavily on the amount of control the company can exert over key local factors determining success, in particular supply chains and markets. Factors such as knowledge and expertise were also important (resolved through training), but these appeared to be relatively insignificant compared to the importance of markets. In reshaping the IGA program, Astra therefore decided to create and experiment with an oil palm-based IGA program, which enabled Astra to ensure they would have capacity to absorb local outputs and offer fair prices for products produced by IGA participants wherever Astra operated a mill.

The oil palm IGA program trialled by Astra was also designed to complement the traditional plasma oil palm smallholder program mandated by government regulations. Under IGA supported community palm oil, however, there were key differences compared to the standard inti-plasma arrangements practiced by the majority of peer companies. These differences are summarized in Table 2.1.
Astra began to pilot the IGA oil palm program in late 2003 with 30 households in Runtu village, West Kotawaringin District in Central Kalimantan, and another 30 households in Tikke village, Mamuju District in South Sulawesi. For many of these families, oil palm was a new crop that they had never grown, and convincing them to participate was not easy. To facilitate the process, Astra provided low interest loans for participants to buy seedlings and fertilizer, which would be repaid by farmers beginning in the fourth year using 30% of revenues generated by selling their fresh fruit bunch (FFB) to the company. Astra also provided training and direct on-site mentoring throughout the establishment phase – from land clearing to crop maintenance through to harvesting – using the opportunity to promote use of best practices from an early stage and further improve chances for success.

The IGA oil palm program showed early signs of success during this initial pilot phase, and Astra decided to expand the program into West Sulawesi and Central Kalimantan beginning in 2005. Within one year, more than 2,000 families voluntarily joined the IGA oil palm program, and the number of participants has consistently increased since then. As of late 2012, a total of 8,138 households with 15,988 hectares of plantations across Sumatra, Kalimantan and Sulawesi participate in and benefit from IGA (Figure 2.2). By 2012, the value of direct loans and fertilizer supplied to IGA farmers under the program reached IDR45.7 billion (US $4.5 million).

In 2012, Astra Agro paid IDR 1.6 trillion (c $180 million) for purchases of FFB from independent oil palm farmers, including those participating in the IGA program. Household incomes of IGA farmers are significant, ranging from net IDR 1.5 -2.5 million per month depending on management practices and the age of palms. Incomes will continue to increase over time as palms mature and fruiting and FFB productivity improves. Farmers are successfully paying back their loans as well, with most participants on track for repayment within 2-4 years, much faster than smallholder farmers under conventional plasma-inti smallholder arrangements. Another major benefit enjoyed by IGA participants is significant increases in wealth tied to the much higher value of their own cultivated land. This can serve as a livelihood safety net for households, fostering greater sense of security, and as a potential source of collateral for obtaining loans in the future.

**Successes and Challenges of the IGA Program**

Astra’s IGA oil palm program, as a voluntary initiative, provides an alternative to the government mandated inti-plasma scheme. Membership in the latter program is usually influenced heavily by local government, spatial plan issues and prevailing regulations, and for
structural reasons often leads to jealousy within and among villagers—exacerbating risk of conflict rather than reducing it. One major success of the IGA program, according to Astra, is that it helps to create a more mutually respectful and peaceful situation within the community and plantation. “This (IGA) program that was initially designed as a solution for settlement of conflict with residents, has proved to offer a real answer to improvement of people’s welfare,” said the head of Runtu village in Central Kalimantan, as quoted in Astra’s Sustainability Report for 2011.

Astra later introduced a partner initiative to the IGA program by establishing Micro Finance Institutions (MFI) to promote more disciplined “saving” behavior among farmers, and to promote the accumulation of farmer-generated capital reserves within the community. Both plasma farmers and IGA participants are encouraged to deposit savings in the MFI, which can then be channelled as loans. For IGA, the MFI funds are used by incoming IGA farmers to establish new oil palm plantations. Plasma farmers will also be able to access MFI funds when their crops become over-mature and reach an age where replanting is required.

Under the MFI program, communities are encouraged to save, be more productive, and to depend upon and help each other as opposed to depending entirely on Astra for capital assistance. The MFI provides a critical deposit and financing service in areas otherwise underserved by the traditional banking system. Establishment of a successful MFI in each community provides a solid foundation to help ensure the sustainability of both IGA and plasma-inti community development programs.

Astra notes that, while the IGA program has been a success, the company has faced challenges during implementation. For example, farmer incomes can be highly weather dependent, especially critical for households that specialize in oil palm farming as their primary crop. High intensity of rainfall can affect the volume and quality of FFB production, with an impact on prices paid for FFB produced. Astra addresses this by providing farmers with mentoring on how to mitigate negative impacts of high rainfall and, where successful, this has helped. A related challenge concerns how farmers with limited land resources can generate income from land that is newly planted to oil palm and not yet producing FFB. Astra has tackled both these issues by encouraging and supporting farmers to diversify their income sources, by encouraging inter-cropping of young oil palm plants with marketable horticultural crops such as peanuts and corn. The company also offers employment on the plantation. A final challenge noted by Astra Agro relates to challenges in working with local government to support farmers in obtaining formal certificates of land ownership for IGA participants. Such certificates would further increase the value of land planted to oil palm by IGA participants and thus household net worth of participating IGA farmers.

2.4 Conclusions

Astra has successfully designed a community development program that bridges the interests of both company and surrounding communities. On the one hand, it fulfils the company’s aim to build and maintain open, respectful lines of communication, to avoid conflicts and maintain operational stability, and on the other hand fosters and fulfils expectations from local communities for improved livelihoods on their own land. The program also serves to empower local communities economically, encouraging them to become independent
and enterprising farmers, and fosters mutual support and cooperation among community members via IGA’s partner Micro Finance Initiative (MFI). Development of the program has taken time, commitment to “learning by doing” and a willingness to adapt and refine the approach based on continual monitoring and evaluation of the program’s impacts.

There are several important lessons to be taken from the success of Astra’s IGA initiative. These can serve to inform community development programs implemented by other companies in other places, or even in other sectors:

- The program has a clear participant target group - the communities that experience direct impacts and have direct contact with Astra’s operations.
- The details of program implementation are tailored to each setting to address specific local challenges.
- The program is built on participative approaches, to enhance a sense of local ownership, and to ensure shared common goals and targets during project implementation.
- Astra continuously monitors, evaluates and adapts the program to optimize in accordance with evolving circumstances and changing community expectations.
- Astra realigned the original program to minimize the impact of external factors beyond their or the communities’ control. For example, early IGA projects faced weak local markets for their products and proved financially unviable. By focusing on an oil palm-based IGA model, Astra can provide appropriate expertise and training, and can buy all output from participants at fair prices.
- The IGA program promotes communities to utilize their own land effectively, adopting agricultural best practices for efficient, intensive production.
- The IGA program is supported by an innovative, locally appropriate financing mechanism in a region where traditional banking system coverage remains weak.
- By designing the initiative to be voluntary, farmers display much higher loyalty and sense of ownership toward the program. The program’s success is their success.

Acknowledgements

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CASE STUDY 2: A STRATEGIC APPROACH TO CORPORATE SOCIAL RESPONSIBILITY PROGRAMS FOR COMMUNITY DEVELOPMENT IN OIL PALM

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3 It should be noted that where appropriate, other farming commodities are supported by the IGA program, but oil palm is by area and value the largest commodity. Examples of other IGA products include horticulture of decorative plants in Penajam Paser Utara Regency (East Kalimantan), and freshwater fisheries in Tabalong and Hulu Sungai Selatan Regencies (South Kalimantan).
Summary

Crude palm oil (CPO) is produced in mills located on or near large plantations. Processed oil palm fresh fruit bunches (FFB) yield CPO as well as liquid and solid by-products that can pollute water, land, and air if not disposed of properly or transformed into useful products. In the past, many companies “externalized” the environmental costs of waste streams by disposing of them in landfills or rivers. Regulations aimed at reducing pollution have been effective but enforcement challenges remain in some areas. Progressive palm oil companies, aided by technology firms, researchers and donors, have developed methods for transforming mill and plantation wastes into useful products, dramatically reducing pollution and greenhouse gas (GHG) emissions while lowering production costs and creating valuable by-products beneficial to the environment. Widespread adoption of proven waste treatment technologies could move Indonesia’s palm oil industry toward a Zero Waste future. One such technology that has been widely adopted is composting solid mill by-products, often together with liquid palm oil mill effluent (POME), to produce organic fertilizers that offset chemical fertilizer usage, improve soils, increase yields, save money and reduce water pollution risk. POME is typically treated in large, open-air settling ponds (lagoons) before release into waterways, producing large quantities of methane and other harmful GHGs. Technologies designed to capture gases from POME are proven, with more than 30 of the 600 mills in Indonesia adopting methane capture technology, but they can be costly to implement. Musim Mas Group, one of Indonesia’s largest integrated palm oil producers and the focus of this case study, is currently installing such technology in all of its mills. Many other companies are considering similar investments, not only because it vastly reduces GHG emissions but also because when coupled with biogas generators it provides clean, reliable, low-cost electricity to power facilities,
share with communities, or even sell into the national grid. Coordinated effort among stakeholder groups could accelerate wider adoption of methane capture and related Zero Waste practices. Recommendations include: (a) Government should provide fiscal incentives for adoption of Zero Waste practices by providing tax breaks for investment, and facilitating mills to sell excess electricity into the national grid at guaranteed prices; (b) Supply chain actors should send signals to palm oil producers through preferential business agreements, price premia or other benefits linked to verified use of Zero Waste practices; and (c) Industry members should use peer support, learning networks and pressure groups to facilitate industry-wide adoption.

3.1 Background

Crude palm oil (CPO), the feedstock for edible palm oil and a vast array of other products, is produced in mills located on or near large plantations. Oil palm fresh fruit bunches (FFB) are processed in a multi-step process yielding CPO as well as liquid and solid by-products that can pollute water, land, and air if not disposed of properly or transformed into useful products. In the past, many companies “externalized” the environmental costs of waste streams by disposing of them in landfills or rivers, despite waste treatment and disposal standards defined in regulations promulgated under Indonesia’s Environment Law and Plantations Law. In recent years, progressive oil palm companies, aided by collaborations among technology firms, researchers and donors have developed cost effective methods for transforming mill and plantation waste into useful products. The practice dramatically reduces pollution and greenhouse gas (GHG) emissions while also lowering production costs, improving yields and creating valuable by-products. Ongoing technical advances along with broader adoption of proven technology has the potential to move Indonesia’s oil palm industry toward a Zero Waste future, addressing many environmental concerns that plagued industry in the past.

3.2 Waste Types, Pollution Hazards, and Potential Uses

Oil palm mills and plantations produce a large volume of waste in solid and liquid form, challenging managers to dispose of it in environmentally responsible and cost-effective ways. In addition to reducing chemical and biological pollutants, progressive companies also strive to reduce their carbon footprint by lowering GHG emissions throughout the planting, growing, processing, and waste treatment cycle. A large part of the total emissions footprint of a plantation established in a forested area results from the initial conversion of forest to plantation, and loss of carbon in aboveground biomass. These emissions can be partially addressed through conservation measures within a plantation (see Case Studies 5 and 6), but in general firms have much greater capacity to reduce emissions generated by plantation and mill operations. This is achieved by adopting proven and emerging technologies described in the following sections.

The types of solid and liquid wastes produced during the initial processing of oil palm FFB are described in Section 2.1 below, and the proportions of each waste type are shown in Table 3.1. The third column of Table 3.1 indicates the volume of by-products (in mass terms)
generated by a typical mid-sized palm oil mill (POM) processing approximately 900 tons of
FFB per day, which requires approximately 12,000 ha of mature plantations to run at full
capacity.

Table 3.1. Oil Palm Processing by-products from a typical mid-sized palm oil mill

<table>
<thead>
<tr>
<th>Waste Product</th>
<th>Percentage of FFB Wet Weight</th>
<th>Waste Produced by mid-sized mill (tons/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty Fruit Bunches</td>
<td>20-22%</td>
<td>180</td>
</tr>
<tr>
<td>Palm Oil Mill Effluent (including sludge)</td>
<td>60-65%</td>
<td>540</td>
</tr>
<tr>
<td>Palm Kernel Shells</td>
<td>5-7%</td>
<td>45</td>
</tr>
<tr>
<td>Fibre</td>
<td>12-14%</td>
<td>100</td>
</tr>
<tr>
<td>Palm Kernel Cake</td>
<td>3-4%</td>
<td>36</td>
</tr>
</tbody>
</table>


3.2.1 Solid Wastes

**Empty Fruit Bunches (EFB)** are the fibrous remains of FFB once the fruits have been re-
moved for processing. Conventional disposal techniques include (a) burning to power boil-
ers, which generates near carbon neutral electricity, (b) simply burning in open pits, which
causes air pollution, and GHG emissions; and (c) dumping in landfills, which can pollute
ground water, produce an unpleasant odour, and emit GHGs. A low-cost, environmentally
positive, and widely used disposal technique is to spread EFB as mulch around the oil palm
trees, thereby reducing soil erosion and moisture loss, and enriching soil organic matter.
Researchers have demonstrated that compost made from shredded EFB is a very good
source of plant nutrients and can partially replace chemical fertilizers normally applied to
trees. Some firms have successfully adopted this technology at the plantation scale. EFB
compost is rich in macro and micronutrients and conditions soil, producing higher yields, as
confirmed by research results. The composting process takes 45 to 70 days, depending on
the composting method used (see Box 1) and biological agent used to accelerate decomposi-
tion.

**Palm Kernel Shells (PKS)** are hard and dense, resembling miniature coconut shells. Making
up 5-7% of the waste stream, they are often burned in boilers to produce electricity and can
be used as mulch or processed to make activated charcoal used in treating other mill efflu-
ents. A project in Lombok, Indonesia is testing PKS as a possible replacement for kerosene in
drying kilns for agricultural products.5

**Palm Kernel Cake (PKC)** is the nutritious remains of the kernel oil extraction process. It is
sold unprocessed from the mill for animal feed or can be fermented with enzymes to yield a
high-quality fish food, giving plantations the option of producing their own food through
aquaculture, or selling the fish food for supplementary revenues.

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4 Mill capacity 900 tons of FFB per day.
Palm Oil Mill Sludge (POMS) is a semi-solid that settles out during POME treatment (see section 2.2). POMS can be composted by traditional methods or digested by introduced earthworms, creating high quality vermi-compost and earthworm biomass, which can be processed into animal feed.6

Oil Palm Fronds (OPF) are periodically trimmed from the trees and are either left in plantations as mulch, burned or landfilled. OPF and EFB fibres can be sold to make composite materials for the furniture and construction industries 7 or can be burned in boilers to produce electricity.

3.2.2 Palm Oil Mill Effluent

Palm mill effluent (POME), the liquid portion of the mill waste stream, has captured the greatest share of public attention and government scrutiny with respect to waste disposal in the industry. Ever larger quantities of POME are being produced as plantation area expands in Indonesia and trees reach peak production. Indonesia’s approximately 600 palm oil mills produce about 3 tons of POME for every ton of CPO, with a mid-size mill producing approximately 200,000 tons of POME per year. POME is a thick, brownish, and slightly acidic liquid that contains high levels of organic solids and oils, as well as dissolved proteins, carbohydrates, nitrogenous compounds, lipids and minerals. It is nontoxic but can be a major source of water pollution if discharged untreated into rivers because it depletes the dissolved oxygen needed by aquatic organisms, and in high concentrations can pose risk to humans. POME was discharged directly into rivers in the past, making the water unfit for human consumption or industrial/agricultural use in some well-publicized cases, but this practice is much less common today. Untreated POME was also discharged in large volumes on land, causing waterlogging of soils, killing vegetation and contaminating groundwater over time.

The conventional legally acceptable method of POME treatment is to discharge and contain it in vast open-air lagoons dug near the mill, where POME is held for 45-60 days to achieve anaerobic digestion. Some plantations use a two-part lagoon system, with anaerobic digestion in the first lagoon and final treatment under aerobic conditions in the second. Fully treated POME using the lagoon system can be safely released into water bodies or used for

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6  http://www.idosi.org/wasj/wasj11(1)10/12.pdf
7  http://cdn.intechopen.com/pdfs/38389/InTech-Oil_pal Oil_pal_Biomass_Fibres_and_Recent_Advancement_in_Oil_Palm_Biomass_Fibres_Based_Hybrid_Biocomposites.pdf

BOX 1. EFB AND POME CO-COMPOSTING

Empty Fruit Bunches can be composted in open-air piles or in enclosed areas with controlled aeration. In both cases, the EFB is typically chopped or shredded, combined with other organic material such as manure, and often mixed with a biological accelerant such as an enzyme or microbes. POME is typically sprayed on the compost periodically to maintain moisture content with the added benefits of nutrients contained in solid material within the POME. Co-composting is becoming a common practice, and also qualifies for emission reduction credits under the Clean Development Mechanism.
irrigation, but treatment lagoons have practical and environmental drawbacks. If the lagoons are not lined with an impervious material, chemicals from the POME leach into the soil and may contaminate groundwater. Lagoons require very large areas of land, are costly to dig and maintain, produce an unpleasant odour, and release methane, ammonia, and hydrogen sulphide into the atmosphere.

POME treatment in open lagoons produces an estimated 12.5 million tons of CO₂ equivalent each year in Indonesia (Franco, 2013). In aggregate, mills are estimated to contribute approximately 52% of the GHG emissions to the CPO supply chain (not including emissions from forest clearance), mostly through generation of methane from uncovered treatment lagoons (Winrock International, n.d.). In this regard, conventional lagoon treatment of POME is an environmental and financial liability. As noted above, one alternative POME treatment is co-composting with EFB or other solid wastes to accelerate the composting process and simultaneously convert two forms of waste into a useful product (see Box 1). Another option for converting POME waste into a financial asset is through investment in biogas capture equipment, either membrane-covered anaerobic lagoons or closed-tank anaerobic digester systems. Tank digestion systems are more energy-intensive and expensive to build than lagoons, but they are also faster, require much less space, and produce potentially valuable solid by-products. Additional biogas may also be extracted from solid mill waste using a solid anaerobic digester.

Captured biogas is 50-60% methane and after treatment to remove hydrogen sulphide and other harmful chemicals, can be burned in a turbine to generate electricity to power the mill and other plantation infrastructure. The volume of biogas is often enough to meet all the electricity needs for the plantation and in many cases excess power is available for sale to the national grid or provision to local communities as part of community development programs.

### 3.3 Business Considerations for Adoption of Zero Waste Practices

#### 3.3.1 Biogas Capture

Biogas capture has attracted the most public attention and business investment among the low waste practices described in Section 2. There are approximately 30 operational POME biogas capture projects in Indonesia, with many more in the pipeline. A selection is shown in Table 3.2. Many biogas projects are halted at the conceptual stage by lack of funds to do feasibility studies and inability to obtain financing. From the viewpoint of oil palm firms, biogas capture has the following benefits:

- Large reduction in GHG emissions, which facilitates certification under voluntary schemes and creates potential to sell carbon credits (Certified Emissions Reductions [CER]) on global carbon markets, after approval under the Clean Development Mechanism (CDM);
Fossil fuels for electricity generation on the plantation are replaced by a renewable energy source, which can be significant in remote areas where fossil fuel shipping costs are high;

- Potential to sell excess electricity to the national grid, which, when combined with savings on fossil fuels, can produce net revenues of as much as US $1 million per year in a typical mill (Franco, 2012);

- Waste water quality improved to the point of being usable for irrigation;

- POME digestion odours reduced;

- Creation of skilled and other jobs in biogas extraction, processing, and use; and

- Risk of methane-ignited fires in the vicinity of lagoons is reduced.

Biogas capture has the following costs and risks for firms:

- Initial investment is high, costing US$ 2.5-3 million to purchase and install lagoon covers, gas processing, and electrical generation equipment, equivalent to approximately 30% of the total cost of building a mid-sized mill;

- The potential financial return on investment is specific to the mill and equipment used. Financial returns may not be attractive without sale of electricity to the grid or CER credits, the value of which has fallen dramatically within the European Union Emissions Trading Scheme, making CDM registration less attractive. The loss of CER value could make some existing or planned investments uneconomical.

- Skilled operators are needed to run the equipment efficiently and some plantations report difficulty maintaining their systems in top working order. Operations and maintenance costs are approximately US $450,000 per year for a typical plant.

**Table 3.2. Selection of pome methane capture projects in Indonesia**

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Further information</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT ANJ Agri</td>
<td>Belitung</td>
<td><a href="http://anj-group.com/?page_id=47">http://anj-group.com/?page_id=47</a></td>
</tr>
<tr>
<td>PT Kresna Duta Agroindo</td>
<td>Jambi</td>
<td><a href="http://cdm.unfccc.int/Projects/DB/RWTUV1345190658.78/view">http://cdm.unfccc.int/Projects/DB/RWTUV1345190658.78/view</a></td>
</tr>
<tr>
<td>PT Perkebunan Nusantara V</td>
<td>Riau</td>
<td><a href="http://cdm.unfccc.int/Projects/DB/DNV-CUK1356547805.92/view">http://cdm.unfccc.int/Projects/DB/DNV-CUK1356547805.92/view</a></td>
</tr>
<tr>
<td>PT Perkebunan Nusantara VI</td>
<td>Jambi</td>
<td><a href="http://cdm.unfccc.int/Projects/DB/JQA1349834830.03/view">http://cdm.unfccc.int/Projects/DB/JQA1349834830.03/view</a></td>
</tr>
</tbody>
</table>

### 3.3.2 Composting

The cost of adopting solid waste composting technologies is financially and technically within reach of most firms and represents a win for the environment and a win for the bottom line in that low-cost, nutrient-rich compost is produced. The rate of adoption of these technologies is expected to accelerate over coming years, once its intrinsic value becomes more
widely known, and especially if new incentives are applied, as described in Section 4. Larger, more progressive firms will continue to lead in testing and adopting new technologies to be environmentally responsible, improve their public image, and achieve RSPO as well as ISPO certification as a means of ensuring access to sensitive markets. Yet, increasing numbers of smaller and medium size companies are also trailing Zero Waste practices.

3.4 Firms Taking a Proactive Approach

Many oil palm firms operating in Indonesia have taken concrete steps to transform waste disposal liabilities into a productive asset with environmental and social benefits. Several companies deserve mention as leaders in different aspects of Zero Waste practices, including London Sumatra Indonesia Tbk (for its leadership in EFB/POME co-composting), and Austindo Nusantara Jaya Agri, REA Holdings (see Box 2), Wilmar International, and Tolan Tiga (SIPEF) groups for leadership in experimentation with methane capture technologies for production of biogas from methane, among others.

Here, we highlight the efforts of Musim Mas Group, one of the world’s largest integrated palm oil producers, and an active participant in diverse efforts to promote Zero Waste practices and related BMPs throughout the industry.

3.4.1 PT Musim Mas Group and methane capture

Musim Mas Group is a fully integrated palm oil corporation and one of the world’s largest producers of palm oil derivative products such as cooking oil, soap, and and cocoa butter alternatives, among others. The corporation manages nearly 120,000 ha of established plantations, employs 28,500 staff and owns one of the largest palm oil refineries in the world. Musim Mas is also one of Indonesia’s largest exporters of CPO, reflecting its integrated business model, with 12 offices across Asia Pacific, Europe and the US.

Musim Mas is a founding member of the Roundtable on Sustainable Palm Oil (RSPO) and adopts a holistic, integrated approach to sustainability. In February 2007, the company’s President Director (Bachtiar Karim) launched the Musim Mas Initiative for Sustainability to

8 Preparation of this case study was informed largely by information drawn from, and analyzed in the following reference material: Gan (2012a,b), ZSL (2012) and the Musim Mas website (www.musimmasgroup.com)
establish and implement Group wide sustainability commitments modelled on the RSPO P&C. The approach includes deployment of a management system designed to ensure RSPO compliance, a dedicated management structure to implement the system and phased, time-bound planning for sustainability certification across the company’s operations. To date, all of the company’s fully established plantations are RSPO and ISCC certified, and two became certified under ISPO earlier this year. In 2011, Musim Mas acquired five new greenfield sites in West Kalimantan, all of which currently under development in accordance with RSPO and ISPO requirements for new plantings.

Musim Mas success in achieving certification has been made possible through implementation of a carefully designed management system. The system is implemented with support and oversight by a Steering Committee on Sustainability, which includes representation from top management in all business divisions. The planning and decision making-functions of the Committee are fully integrated with company operations, with a remit encompassing (a) establishing policies, implementing procedures and systems; (b) providing support and resources; (c) incentivizing and rewarding achievement; (d) engaging effectively with stakeholders; and (e) monitoring developments to report on progress.

3.4.2 Musim Mas Methane Capture Facilities at Pangkalan Lesung, Riau

The motivation for Musim Mas to commission a methane capture facility at Pangkalan Lesung (Figure 3.1) was born during internal company workshops in 2007 to design programs for mitigating environmental impacts, especially GHG emissions and fossil fuel consumption, and to provide cheaper, cleaner, more reliable supplies of electricity for mills, worker facilities and on-site amenities. To support preparation and due diligence phases for the project, a special purpose Committee was formed with representatives from all departments involved to create a working paper outlining technological options for methane capture. Experts were consulted and research was conducted, including study tours of existing facilities at other palm oil plantations, to survey existing technologies and subject them to technical and economic feasibility analysis. Through this process, a preferred system was identified, requiring installation of (a) in-ground anaerobic methane digestor equipment, (b) High Density Polyethylene (HDPE) material to seal in the digestion pond and collect methane gas, and (c) a biogas combustion generator converting methane gas to electricity (Figure 3.1).

The company’s systematic approach to planning and due diligence strengthened commitment from top management for the project, and created necessary drive to ensure staff and financial resources were mobilized to complete the project. Development and construction costs were largely self-funded by Musim Mas, as part of its commitment to reduce emissions and internalize sustainable business practices. In addition, the Danish Government funded efforts for the project to obtain CDM approval and initial registration of certified emission reduction (CER) credits. The facility was constructed and fully commissioned in 12 months, start to finish, a reflection of top management’s commitment, thoroughness of planning and the proven nature of technologies chosen.

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9 In 2009 PT Musim Mas plantation in Riau became the first Indonesian plantation to be RSPO certified
The biogas capture system at Pangkalan Lesung generates 1.5 MW of electricity from POME waste generated by processing 270,000 tons of FFB each year. Fixed costs for the biogas capture and power generation facility reached an estimated $US3.5-4 million, with operational costs of approximately $US350,000 annually, or 3-4 cents per KWh of electricity produced. Based on internal cost savings, the project will repay investment in roughly 10 years, assuming no CER sales are made or excess electricity is sold into the grid. Payback will be faster if/when these revenue streams come on line, especially sale of the up to 56,000 CER credits generated annually and registered with CDM. Musim Mas calculates that the biogas capture/electricity generation system is not economical at current CER prices but plans to continue operating the technology as part of broad-based efforts to manage the company’s emissions footprint. Results of the company’s ongoing monitoring of emissions reduction from the project can be viewed at http://cdm.unfccc.int/Projects/DB/DNV-CUK1297330109.8/view.

Figure 3.1. Musim Mas methane capture (left) and biogas power generation facility (right) at Pangkalan Lesung palm oil plantation and mill in Riau (Source: ZSL 2012)

3.4.3 Future Plans and Lessons Learned

Musim Mas has installed similar methane powered biogas facilities at all of its existing mills, with the last one completed in late 2013. Methane capture is one part of Musim Mas’ multi-faceted approach to mitigate GHG emissions from upstream operations, supported by other Zero Waste practices described above.

The Musim Mas decision to trial methane capture technology at Pangkalan Lesung and then roll out similar projects across the Group’s holdings reflects the company’s general approach to implementing Group wide change by first experimenting with pilot projects to develop successful models that are later taken to scale. This enables testing of alternative solutions to a problem, building internal capacity, and comparing cost-benefit scenarios to optimize processes and take full advantage of economies of scale. Key lessons learned by Musim Mas from experiences at Pangkalan Lesung include:

- The multi-faceted nature of the project required involvement of numerous staff in executive and operational roles from different departments. Coordinating such a large number of busy people was a challenge and would have been nearly impossible without firm, well communicated support from top management.
Setting explicit targets that are incentivized and rewarded was key to ensuring project implementation was seen as a priority and key personnel were actively involved.

Keeping large engineering projects on track requires flexible design and responsive problem solving, itself requiring (a) well-defined communication systems to make problems known, (b) knowledge sharing systems so that decision makers have access to required information and (c) clear lines of authority defining who has power to decide what.

3.5 Creating Incentives for Adoption of Zero Waste Technology

Zero waste oil palm practices and technology have been proven to be effective through research and use in plantations, yet the rate of adoption across the industry is still low in Indonesia compared with Malaysia, for instance. Some of the gap between demonstration of the technologies and their broad adoption can be explained by failure to effectively communicate within the industry and simply the tendency of firms to continue current practices rather than invest financial and management resources to try something new. Broader adoption could be encouraged through the following types of incentives:

- **Governance.** Oil palm pollution-control regulations are weakly enforced in most parts of Indonesia, providing little incentive for firms to improve their practices to avoid fines or other penalties. Simply enforcing existing regulations could go a long way to making low waste practices more attractive. The recently introduced, mandatory Indonesia Sustainable Palm Oil (ISPO) certification system requires oil palm firms to monitor, report, and make efforts to reduce their GHG emissions, including taking steps toward installing biogas capture systems or risk low scores and potentially revocation of plantation licenses. The PROPER environmental audit scheme also provides an opportunity to identify ways to improve oil palm waste treatment practices. GHG emissions reduction plans (RAD-GRK) now being prepared at the province and district levels could also be used as a tool to encourage plantations to reduce their emissions where reductions from palm oil mills are identified as a priority.

- **Financial.** Biogas capture systems are marginally financially attractive to firms unless they have the ability to sell electricity to the national grid or sell carbon credits on international markets. Selling renewable electricity to the grid is encouraged by the national electric company through feed-in tariffs and standard power purchase agreements but administrative obstacles can make the process of finalizing such agreements challenging for the seller. CERs have decreased dramatically in value and may have to be augmented by other incentives such as low-cost loans or tax write-offs for installing the equipment. Some firms are exploring opportunities to seek a business partner to invest in building/operating the biogas capture/electricity generation equipment on a profit sharing basis. Market competition should ultimately force all firms to adopt cost-saving waste technologies, but given rapid ex-
pansion of the industry and strong CPO price outlook, this could take a long time to take effect without additional financial incentives or regulatory measures.

- **Market.** Adoption of zero waste practices should have greater emphasis in both voluntary certification schemes and ISPO, especially with respect to reducing GHG emissions. Firms need stronger market signals that adoption will be rewarded through market access or price differentials. International NGOs could facilitate the process of educating consumers about the value of low waste practices in the context of oil palm sustainability.

- **Peer Support.** Palm oil industry associations could provide members with education and training regarding the low waste technologies and perhaps establish a mentoring system in which larger firms provide technical assistance to smaller firms. Adopting firms could be accorded more recognition within the industry as a subtle form of peer pressure.

### 3.6 Conclusions

Reaching a zero waste future in Indonesia’s oil palm industry is rapidly becoming an achievable goal both technically and financially. Financial and market incentives for firms to adopt zero waste technologies are coming into alignment as progressive firms test and adopt the technologies. Perhaps what is most needed to accelerate adoption of zero waste technologies is action by all levels of Indonesian government to facilitate financial incentives, such as electricity sales to the grid, while more firmly enforcing regulatory measures that would make it uneconomical to continue outdated waste disposal practices.

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CASE STUDY 4

BEST MANAGEMENT PRACTICES TO IMPROVE PALM OIL YIELDS AND REDUCE BIODIVERSITY, ENVIRONMENTAL AND CLIMATE IMPACTS

CARGILL CORPORATION

By Jim Schweithelm and Gary Paoli

Summary

Indonesia’s average palm oil yield per hectare has increased only modestly since the 1970s. Realized yields remain far below maximum potential yield, and average approximately half those achieved by some of Indonesia’s most progressive companies applying low-cost, yield improvement Best Management Practices (BMPs). If adopted industry-wide, yield BMPs could potentially reduce pressure to convert up to 1.6 million hectares of land to new plantations up to 2050, while still meeting projected increases in demand. BMPs are designed to: (a) reduce fruit loss during harvesting; (b) maintain tree health; and (c) control fertilizer application and soil moisture. Cargill, a large US-based food corporation, has been a leader in testing, improving and promoting BMPs through field trials at their plantations in Indonesia over the past decade. These trials showed that yields could be almost doubled from baseline conditions, and that high yields were possible even on marginal soils, demonstrating that degraded areas could be brought under cultivation, and potentially reduce pressure on carbon-dense, biodiversity-rich forest land. Experience implementing BMPs indicates that the amount of fertilizer needed to produce a kilogram of crude palm oil (CPO) can be markedly reduced from business-as-usual levels, reducing the GHG footprint of production. Companies implementing BMPs, such as Cargill, Golden Agri-Resources and PT Astra Agro Lestari among others, are continuously monitoring and analysing yield performance and finding ways to increase yields further, enjoying high returns on investment by increasing yields at the margin. Yet, despite the benefits of BMPs, most palm oil companies and smallholders have yet to adopt them, because past high prices and land availability created limited pressure to make investments in infrastructure, staff training and management capacity. Incentives for adopting BMPs are increasing, however, as land availability declines and costs of developing new plantations rise. Industry associations and progressive firms can speed adoption through technical assistance,
shared learning networks, and performance-based rewards. Government can encourage broader adoption by setting yield standards, e.g., through enforcement of BMP provisions in ISPO, but implementation ultimately depends on operations wide decision making by companies themselves.

4.1 Background

Indonesia’s national average palm oil yield has stagnated since the 1970s at c 3.8 metric tons (mt) of crude palm oil (CPO) per hectare despite widespread planting of high yield potential seeds and seedlings (GAR & SMART, 2010). Leading plantation groups in Indonesia and Malaysia have achieved CPO yields of 6 tons per ha or more at the plantation scale (Donough et al., 2006) and CPO yields of approximately 5 tons per ha have been demonstrated in commercial plantations in Indonesia using low-cost best management practices (BMPs; Fairhurst and McLaughlin, 2011). It is estimated that if all existing Indonesian oil palm plantations were to increase CPO yields to 5 mt per ha, 1.6 M ha of new plantings could be avoided by 2050 while still meeting projected global demand. This large area of avoided forest clearance would greatly reduce future GHG emissions and biodiversity impacts from the sector.

Implementing yield intensification BMPs has been shown to be a low cost means to increase financial returns while reducing negative biodiversity and climate impacts of plantations. BMPs also reduce soil erosion and water pollution from run-off of sediment and fertilizer, and using mill by-products as mulch and organic fertilizer creates other benefits by disposing of waste in an environmentally friendly manner while also increasing yields (see Case Study 3 for details). Yield improvements have also been shown to reduce the amount of fertilizer and pesticides required to produce one ton of CPO.

Yet, despite clear financial and environmental benefits, BMPs have not yet been widely adopted by commercial plantations or smallholders in Indonesia due to several factors that reduce incentives for adoption. First, government has not mandated minimum yield standards, so there is no regulatory pressure to improve. Second, current market demand and pricing have been until recently so favourable that even below average yields generated significant profits. CPO prices held steady for many months at twice production costs but are now 1.5 or less for average yield plantations, creating new financial incentives for firms to invest time and money to implement BMPs rigorously. Third, plantation managers sometimes purposely underestimate potential yields to lower the bar for expected performance, thereby also lowering senior management expectations regarding the scope for yield improvement. Fourth, despite more than two-fold expansion of planted area since 2000, effective land costs remain low in many parts of Indonesia, encouraging companies to acquire land now while it’s available rather than intensifying production on land already in production. This is beginning to change in Sumatra and parts of Kalimantan where the most favourable land is already planted or licensed. The cost of developing new plantations is also rising, making investments in yield improvement in existing plantations more attractive.
4.2 BMP Approach to Yield Intensification

The key to improved yields is better agronomic management through improved plantation organization, planning, and infrastructure development (Donough et al., 2009). Industry knowledge of BMPs for mature plantations is extensive, and has been described in a series of handbooks and pocket guides published by International Plant Nutrition Institute (IPNI) for use by plantation managers and staff (www.ipni.net/seasia). The IPNI BMP approach is a management tool designed to help managers identify poor plantation management practices that contribute to low yields and determine how they can be changed to improve yields.

BMPs are agronomic methods and techniques found to be the most cost-effective and practical means to reduce the gap between actual and site yield potential and minimize environmental impacts of the production system through efficient use of external inputs and production resources (Donough et al., 2009).

BMPs fall into three categories, shown in order of their ability to increase yields quickly:

1. **Crop recovery** - Reducing fruit loss by decreasing the harvest interval per tree from 12 days to 7 and collecting fallen fruit from the ground.
2. **Canopy management** - Pruning fronds regularly and replacing poorly performing or diseased trees.
3. **Soil, moisture, and nutrient management** - Maintaining mulch cover, optimizing fertilizer application, and constructing drainage systems. As noted above, mulch and some fertilizer needs can be met using wastes from oil palm processing mills.

Yields in existing plantations begin to improve as soon as BMPs are applied and agronomic constraints are removed. Yield improvement in the first year of BMP implementation is largely attributed to improved fruit recovery. Full impacts on yield begin to be realized during years 3 or 4, the period between flowering and ripening of fruit. Roads, mills, housing and other infrastructure for new plantations can be designed to facilitate yield maximization by making BMPs easier to implement logistically. BMP effectiveness ultimately depends on the commitment of senior company management to provide direction and allocate necessary resources, and to the diligence of plantation managers and field staff in applying practices in the field. Regularly tracking yield data gives managers a common basis for measuring trends in yield performance, which can be tied to compensation of plantation managers and staff through alignment with Key Performance Indicators and bonuses. Providing harvesters and other field workers with additional supervision and financial incentives is often required to achieve the best results. Field trials designed to test BMP cost and performance indicate that the cost of implementing BMPs is a small fraction of the value of typical yield increases.\(^\text{11}\)

\(^{11}\) At the time of writing, CPO is priced at approximately US $ 700 per mt. Estimated cost per ton of increasing yields through established BMPs is in the range of US $ 60 to 100 per mt, providing a significant financial incentive to producers.
4.3 Firms taking a Proactive Approach

Well managed oil palm firms in Indonesia and Malaysia have been working for years to develop management practices for improving yields on their plantations. Several companies deserve mention with regard to their vision and commitments to improving yield. In Indonesia, this includes large conglomerates such as Golden Agri-Resources, Ltd and Astra Agro Lestari Tbk, medium size firms such as First Resources Limited, and smaller emerging companies such as PT Austindo Nuasantara Jaya Agri, among others. Here, we profile the work of Cargill, and draw attention to other companies where their practices illustrate particular facets of how BMP are implemented in practice.

Cargill

Cargill is a large, privately owned, US-based food and agricultural corporation with 42,000 ha of oil palm plantations in South Sumatra and West Kalimantan, in addition to 28,000 ha of associated smallholder farmers.\(^{12}\) Cargill was one of the first companies in Indonesia to begin conducting systematic trials of yield enhancement BMPs under plantation conditions, and is widely acknowledged today as a leader in the field following more than ten years of research, experience and ongoing training.

Cargill began large-scale field trials in 2002 at their PT Harapan Sawit Lestari (HSL) plantation in West Kalimantan, building on previous work at PT Asiatic plantation in Sumatra. The trials, conducted over five years from 2002 to 2007, tracked yields from blocks where BMPs were implemented and in control blocks where existing management practices were continued. By 2007 yields in BMP plots increased more than 60% to 8 mt per ha of CPO, or 3.2 mt per ha above baseline conditions. Remarkably, this yield increase is itself nearly equivalent to the national average yield today of 3.8 mt per ha. The trials demonstrated two very significant points for Indonesia’s palm oil industry:

- Very high yields can be achieved on existing plantations even if initial standards of plantation establishment are poor and existing management is weak.
- Very high yields can be obtained even on marginal soils if adequate fertilizer is applied and phosphorous deficiencies are eliminated (Fairhurst and McLaughlin, 2009).

At the beginning of BMP trials, Cargill management was not necessarily convinced of the extent of potential benefits in relation to effort required, a reasonable mindset given the experimental nature of yield intensification at that time. When trial results began to show the magnitude and immediacy of yield increase, however, management came to support the effort fully and began making investments to implement BMPs across Cargill holdings, especially staff training on BMP Standard Operating Procedure\(^{13}\) and necessary improvements to building and road infrastructure. The company continues improving BMP practices today to achieve even higher yields by tracking yields in 25 ha blocks, determining the potential yield in each block and working to close the gap between actual and potential yields by improving

\(^{12}\) http://www.cargill.com

\(^{13}\) Cargill uses the IPNI handbooks as a basis for SOPs.
execution of BMPs\textsuperscript{14} (see Text Box 1 for another example). Performance evaluations of plantation managers are tied to plantation level results at closing the yield gap. This approach is in line with Cargill Process Optimizers, a corporation-wide approach aimed at reducing cost and improving yield in food manufacturing operations.

Cargill is now fully committed not only to applying BMPs on its palm oil plantations in Indonesia and other countries, but also to building capacity throughout Indonesia to support industry wide adoption of established BMPs. To this end, Cargill established in partnership with Bogor Agricultural Institute (IPB) Indonesia’s first public oil palm teaching farm to provide quality, industry-leading training to students and Cargill employees, as well as to conduct research and serve as a reference centre for RSPO and ISPO certification. Cargill has also been advocating yield intensification for some time as a core facet of oil palm sustainability in domestic and international sustainability venues.

Positive benefits of the Cargill experiments in 2002 extended beyond just the company’s own holdings. For example, the International Plant Nutrition Institute (IPNI) has subsequently implemented BMP projects in collaboration with five companies operating plantations in Sumatra and Kalimantan with very good results, and BMP developer Thomas Fairhurst (involved in Cargill’s groundbreaking work) also promotes the approach on plantations in Latin America and Africa. Community development benefits have also been substantial. For example, PT Hindoli plantation in South Sumatra has 10,000 ha of commercial and 17,600 ha of smallholder plantations operated by 8,800 farmer families, whose aggregate holdings were the first to be certified under RSPOs Smallholder Standard. Cargill provides training and technical support to associated smallholder farmers, which has allowed them to increase their yields substantially while also reducing environmental impacts. Additional income generated by yield increases has allowed farmers to repay their farm development loans more quickly than is typically the case.

\textsuperscript{14} Cargill uses Agrisoft System software (www.agrisoft-systems.de) to analyze plantation performance, allowing plantation and senior managers to monitor and evaluate yields and other production parameters on a continuous basis.

**BOX 1. GAR AND YIELD MONITORING**

Golden Agri-Resources, Ltd (GAR) is Indonesia’s largest oil palm plantation group with 464,000 ha planted (including approximately 100,000 ha of smallholder plantations), 40 palm oil mills, and extensive downstream production of consumer products. Through development and implementation of BMPs, the firm has achieved an average yield across its plantations of 5.3 mt per hectare, 1.5 mt above the national average. GAR is committed to continuous yield improvement in nucleus and plasma plantations, with the company reported to provide active support to associated smallholder farmers for increasing yields. The firm has a computerized system to track yields in 30 ha blocks within all plantations, allowing them to detect declining production and adjust agronomic practices quickly to maintain yields.
4.4 Creating Incentives to Promote Adoption of Yield Improvement BMPs

There is growing interest among public, private sector and civil society actors to improve palm oil yields in Indonesia. The Ministry of Agriculture’s ISPO standard requires companies to begin implementing yield improvement BMPs and tracking productivity response as a requirement for certification. The Indonesian palm oil producer association (GAPKI) has launched a program designed to support yield improvement among its members, and growing numbers of plantation firms have initiated programs to meet these voluntary commitments (see Text Box 2). NGOs, in collaboration with academia, have also established jurisdictional (province-wide) programs to promote and support yield improvement, such as the recently launched joint program between Palangkaraya University in Central Kalimantan and the Climate Policy Initiative.

At present, oil palm companies decide individually whether and at what pace to adopt yield improvement practices based on business considerations, market positioning and brand management. Facilitating widespread adoption of these practices to increase yields industry-wide would require the following actors to take some or all of the actions described below. Actions taken voluntarily by firms in their own economic self-interest are the most sustainable as they do not depend on consistent enforcement of regulatory measures by government or fiscal incentives with uncertain longevity.

- **Oil palm industry associations.** Aggressively promote industry-wide BMPs and targets for yields. Provide guidance, support and recognition for members to meet these standards, increase awareness of the financial benefits for adopting BMPs, and facilitate “B to B learning” regarding how to track yields and make interventions. Such support would especially help smaller producers who do not have the operational scale to conduct trials on their own.

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**BOX 2. YIELD INTENSIFICATION BY ASTRA AGRO LESTARI**

Astra Agro Lestari Tbk. is one of Indonesia’s largest palm oil firms, with planted area totalling nearly 273,000 ha, including 60,000 ha of associated smallholders. In line with the company’s mission to be one of Indonesia’s most productive and innovative agri-business firms, intensification programs have been a focus of corporate strategy since 2009. Through implementation of a Plantation Maintenance Management system designed to increase yields, in 2012 Astra achieved CPO productivity of 5.2 mt per ha, a 16% increase over 2011. Yield increases are achieved through a combination of better water and soil management, targeted fertilizer applications, enhanced detection and control of pest and disease, and application of liquid and solid organic fertilizers. Astra expects to continue productivity gains over time as young palms move into more productive stages and R&D programs to breed and produce its own high-quality planting material come on line.

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15 http://swaraprananta.com/konferensi-%E2%80%9C-semarak-100-tahun-industri-kelapa-sawit-komersial-di-indonesia%E2%80%9D

- **Oil palm firms and associated smallholders.** Commit to yield improvement and mainstream adoption of BMPs in company SOPs, management systems, and compensation agreements, as well as in smallholder support programs. This requires a high level of senior management commitment to tracking yields, providing necessary infrastructure and other resources, and supervising/rewarding improved performance.

- **Central government.** Mandate that plantations meet specified yield levels and/or document use of yield enhancing BMPs. These standards could be enforced within the ISPO certification system, which already requires BMP adoption and yield monitoring as noted above. Regulatory approaches are useful in bringing attention to yield improvement but are relatively weak tools for changing company behavior compared with economic self-interest, as noted above. Yield improvement depends on diligence at implementing BMPs, which would be difficult for a regulator to assess and even the accuracy of yield data might be difficult to confirm. Perhaps the most effective government policy response would be to reinforce the financial benefits to firms of achieving yield improvements by giving top performing firms tax breaks, reducing reporting requirements, or extending them priority for licensing new plantations.

- **Local governments.** District leaders and plantations agencies (Disbun) could support efforts to monitor compliance with central government requirements to implement yield enhancement BMP under ISPO, and provide training and extension services to reinforce company efforts. Achieving this would require central government support and investment in regional agencies, however, since in frontier areas regional officials often have inadequate technical capacity and resources to provide quality training and extension services to companies and smallholders.

- **NGOs.** Draw attention to the economic and environmental logic of improved yields and where possible provide technical support to smallholders and especially smaller firms to adopt BMPs. Ensure that information provided to the public regarding the relationship between yield improvement and environmental impacts is factually correct. Misinformation can impede adoption of yield improvement practices by creating uncertainty and mistrust among key actors.

- **Universities.** Conduct research and train agricultural scientists to support yield improvement innovations into the future.

### 4.5 Conclusions

Improving yields from mature and new plantations by adopting BMPs provides an important opportunity to achieve win-win outcomes in oil palm, wherein companies earn more profit while at the same time reduce their impacts on biodiversity, GHG emissions, and non-point pollution of water sources. If intensification programs were linked to forest protection in areas zoned for agriculture, it’s estimated that industry-wide adoption of BMPs could result in up to 1.6 million ha of avoided deforestation by 2050. Smallholder farmers also profit from improved yields, increasing income and well-being of their families. Financial incentives for adoption of BMPs increasingly outweigh the cost, as land availability tightens and cost of new expansion increases. The industry itself, through proactive measures by industry associ-
ations and leadership of progressive firms, is in the best position to encourage broad adoption of BMPs. These efforts could be supported and promoted by other private sector actors, however, especially downstream supply chain actors, through business-to-business agreements that reward high yield, low impact production models. Government regulatory action can provide an important policy signal to the industry but rigorous enforcement may be difficult. Government could potentially be more effective at encouraging BMP adoption by offering fiscal, financial, or administrative incentives to firms achieving specific yield benchmarks.

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Summary

Palm oil companies have come under increasing pressure to reduce the greenhouse gas (GHG) footprint of crude palm oil (CPO) production. The Indonesian Sustainable Palm Oil (ISPO) certification scheme has responded by requiring producers to track, report and mitigate emissions, and encouraging use of methane capture technology in treatment of palm oil mill effluent (POME). The revised Roundtable on Sustainable Palm Oil (RSPO) standard has similar requirements. In recent years, a number of progressive palm oil companies have made GHG emission reduction a core environmental goal of operations-wide management. PT REA Holdings plc, featured in this Case Study, provides a highly instructive example of company efforts to monitor, report and reduce GHGs. Leading sources of GHG emissions from CPO production include: (a) clearance of vegetation when oil palm is planted; (b) oxidation if peatland is drained for cultivation; (c) treatment of liquid mill wastes; (d) fertilizer use; and (e) fossil fuels burned for transport and generation of electricity. Land clearance for plantation establishment is typically the largest source of GHG emissions in CPO production, offset to an extent by carbon absorbed when oil palm trees grow and in situ forest conservation where applicable. Emissions from peatlands can be reduced by not planting on deep peat and managing water levels to reduce oxidation, but even so emissions from plantations on peat are much higher than those on mineral soils. Emissions from palm oil mills are the second most significant source, especially treatment of POME in open air settling ponds that produce large volumes of methane. Fertiliser use also produces GHG emissions, especially release of nitrous oxide (N₂O) when ammonium fertilizers are applied. Burning diesel and petrol for transportation and electricity typically contributes <5% to total emissions from
CPO. To track and reduce its operations-wide GHG footprint, REA uses the “Palm GHG Tool” to (a) quantify and aggregate emissions from cultivation, processing and transportation, and (b) adjust gross emissions for carbon sequestered in palms and emissions avoided through voluntary actions. Results of the calculation, which require accurate data compilation over a period of years, are expressed as net GHG emissions per tonne of CPO produced, and allow for setting numerical targets to track and report emissions over time, and to prioritize specific actions to meet reduction targets.

5.1 Background

A wide variety of stakeholders are placing increasing demand on plantation companies to take action to mitigate greenhouse gas (GHG) emissions. For companies who are members of the Roundtable on Sustainable Palm Oil (RSPO), the newly revised principles and criteria of RSPO have reinforced that monitoring operations-wide GHG emissions is steadily becoming a norm for responsible companies. The new text referencing GHG requires that “new plantation developments are designed to minimise net greenhouse gas emissions”. The indicators require that: (a) carbon stock of the proposed development area and major potential sources of emissions arising from the development shall be identified and estimated; and (b) there shall be a plan to minimize net GHG emissions which takes into account avoidance of land areas with high carbon stocks and/or sequestration options.

In Indonesia, the Indonesian Sustainable Palm Oil (ISPO) regulation enacted in 2011 also introduced requirements for producers to mitigate emissions. Criterion 3.6 of ISPO requires plantation companies to identify GHG sources and also:

- Prepare a Technical Standard Operating Procedure on mitigating GHG emissions;
- Prepare an inventory of GHG emissions;
- Prepare a record of land use trajectory/change;
- Prepare a record of efforts to reduce GHG emissions;
- Prepare a record of mitigation activity.17

Under guidance for achieving this, companies need to have completed an inventory of the sources of GHG emissions on site; explained and communicated efforts to reduce GHG emissions (methane capture, water table management in wetlands, best practice for fertilizer use among others) and the method of accounting; taken steps to recycle solid waste (fibre, shell, others) for boiler fuel; and measured the efficiency of fossil fuel use. Leading sources of GHG emissions typically include:

- Clearance of vegetation for establishing plantations (direct land use change (LUC)
- Oxidation of peat soil, where peatland is drained for oil palm cultivation
- The digestion of palm oil mill effluent (POME), which releases methane under conventional treatment
- The manufacture, transport and application of fertilizers

The use of fossil fuels for transport and for generating electricity

To meet ISPO and RSPO requirements, companies must undertake systematic evaluation of the sources and magnitude of emissions from throughout their operations, including plantation development, plantation and mill management, and CPO transport. The following graphic illustrates potential GHG emission sinks and sources at a typical plantation and mill (REA, 2013b).

Figure 5.1. Sources and sinks of GHG emissions at an oil palm plantation (Palm GHG Tool) 18

The company profiled in this Case study, REA Holdings plc, provides an instructive example of company efforts to understand sources of GHG throughout their palm oil supply chain and take action to reduce them by (a) quantifying the magnitude of these emissions, (b) setting targets to reduce emissions and (c) designing emission reduction plans to meet these targets.

5.2 REA Holdings plc

At a glance:

- A leader in sustainable palm oil production
- Applies modern methane capture and biogas conversion technologies
- Mitigates climate change related emissions and reduces local air pollution
- Increases local technical know how
- Currently reduces GHG emissions as part of its business practices

The province of East Kalimantan has experienced marked economic development in the last forty years due to an abundance of natural resources attracting significant foreign and do-
mestic investment. In the forestry sector, over 8.1 million hectares of forest have been licensed for utilization by timber companies in the past decade alone, and in the mining sector, just under 500 mining licenses have been issued across the province to various companies covering a total area of over 3.08 million hectares for exploration (Badan Penanaman Modal dan Promosi Daerah Kapubaten Kutai Kartanegara, n.d.).

REA Holdings plc, a British company listed on the London Stock Exchange, is one of the leading plantation groups operating in the province. In 1989, the REA Holdings entered East Kalimantan and commenced negotiations with government and communities to obtain land for plantation development. In 1991, the provisional allocation of land considered suitable for planting was obtained for land that was formerly part of a logging concession operated by a timber company (Chao et al., 2012). In 1992, oil palm seedling nurseries were established, and planting began in 1994. REA Holdings now has a land bank of approximately 100,000 hectares in East Kalimantan, roughly 40% of which has been or is being planted with oil palm. As of 31 December 2012, the area planted with oil palm or under active development by REA was 36,794 hectares, with the remainder planned for a combination of conservation, roads, infrastructure and future planting pending outcome of ongoing negotiation with communities (REA, 2013a).

5.3 REA’s Approach to GHG Footprint Calculation

In 2010, REA began the process of quantifying and measuring on-site and company-wide emissions. Beyond just responding to growing concern from external stakeholders over plantation emissions, REA believes that results of their carbon footprint calculation will assist the company to:

understand better and quantify the key sources of GHG emissions and sequestration associated with its oil palm operations and, therefore, to identify opportunities for reducing the group’s carbon footprint more effectively. Repeating the carbon footprint calculation on an annual basis will enable both the company’s management and external stakeholders to monitor the impact of actions taken by the group in an effort to reduce its GHG emissions in a quantitative manner (REA, 2013b).

REA’s carbon footprint calculation uses the RSPO Palm GHG tool. This tool estimates net GHG emissions associated with palm oil production at a particular mill by aggregating sources of emissions from the cultivation, processing and transport processes, and offsetting these against any carbon sequestered or GHG emissions avoided through related offset activities. The results of the calculation are expressed as the net GHG emissions per tonne of product sold. Net GHG emissions are also expressed per hectare of oil palm for the group’s plantings that are included within the scope of the carbon footprint calculation.

For REA, a proportion of their plantings are yet to produce optimal yields. Including such plantings in the carbon footprint means that the current carbon emissions per tonne of CPO and CPKO are higher than would be the case if all planted areas within the scope of the carbon footprint were fully mature (and thus producing higher yields per hectare). Under these conditions, net GHG emissions per hectare, rather than per tonne of oil palm product, are
considered to provide a stronger basis for assessing changes in GHG emissions intensity. This is because using GHG emissions per tonne of product would show declines in emissions intensity over time that reflect not only changes in management practices but also changes in the maturity profile of the plantation supply base (REA. 2013b).

Figure 5.2. Boundary for GHG emissions calculation in the Palm GHG Tool (Source: http://www.rspo.org/en/rspo_palmghg_calculator).

The estimation of REA’s GHG emissions for 2011 provides a baseline against which future reductions can be monitored, for example with the two methane recovery plants in operation. POMs process fresh fruit bunches (FFB) into crude palm oil (CPO) and palm kernel (PK) and create large quantities of solid and liquid waste. Methane emissions generated during treatment of palm oil mill effluent (POME) can be very high, with one account suggesting such emissions contribute on average 89% of total lifecycle emissions across plantations (Goon, 2010). Methane recovery is a process by which methane by-product from the anaerobic digestion of organic matter in POME is captured either directly in closed tank anaerobic digestion systems or in covered lagoon systems. Captured methane can be utilised either in a boiler for steam generation or to fuel biogas generators for power. For REA, investment in such a system will make a material contribution to reducing GHG emissions, due both to direct capture of methane and its conversion to electricity as a means of reducing fossil fuel use. To date, electricity produced has largely replaced use of diesel-powered generators for both operational and domestic purposes, reducing diesel fuel consumption and the associated emissions significantly. However, REA has identified that there is the potential to expand the existing capacity of methane capture facilities and generate excess electricity, which could be supplied to surrounding communities. At present, these communities are not connected to the national electricity grid due to their remote location and as a result are reliant on diesel powered electricity generators.
The estimated total GHG emissions profile for palm oil produced by REA’s two longest established palm oil mills, including carbon sequestration and avoided emissions via production of bio-energy production, is summarised below. The following sub-sections of this case study provide more information on major emission sources at the plantation.

5.3.1 Land Use Change

The biggest component of REA’s carbon footprint is GHG emissions arising from land clearing required to establish the oil palm plantation. These emissions are linked to the assumed immediate release of carbon stored in the biomass removed from above ground (trees, climbers, shrubs) and below ground (roots, detritus) when the land is cleared and prepared for planting. Such GHG emissions are offset to an extent by the carbon absorbed (fixed) from the atmosphere by oil palm seedlings that are planted. However, in many cases the carbon contained in the biomass removed when land is developed far exceeds the amount that can be sequestered over a single life cycle of the oil palms that replace it. The result is a net emission of CO₂ arising from direct conversion of complex, taller stature vegetation to a monoculture of palm (Kanasah et al., 2012).

There are a variety of ways to determine methods for determining above ground biomass when evaluating land use change. Generally, the amount of above ground biomass is determined by the type, quality and extent of vegetation that is removed when an area is converted to oil palm. To carry out this task, REA’s initial challenge was that high quality satellite imagery was not available prior to when land clearing began in the early 1990s. To address this, REA combined a series of composite images to provide a baseline for estimating areas of different cover types that were present prior to land clearing. This could then be combined with a biomass estimate for each land cover type to estimate biomass removed within each estate during the period 1990–1999, then annually from 2000 onwards. This was done by counting the cumulative number of pixels cleared over time and summing corresponding biomass values (tonnes biomass/ha) assigned to each pixel on the map (REA, 2013b). Using the generally accepted conversion rate of 50% for estimating carbon stock in the biomass of
standing vegetation, GHG emissions derived from above ground biomass removal could thus be estimated.

This left the challenge of how to estimate carbon emissions arising from loss of below ground biomass resulting from conversion. For this, a published default value was used from Mokany et al. for converting above ground to below ground biomass (Mokany et al., 2006). This is also the same default value identified by the RSPO GHG Working Group in a survey of published scientific literature. Estimated total GHG emissions from above and below ground land use change are then amortised over the lifecycle of an oil palm plantation, tabulated at 25 years. Accordingly, the group’s carbon footprint for 2011 includes one twenty-fifth of the estimated total GHG emissions from land use change applicable to the assessed operating units. When the group’s estates enter their second planting cycle, the GHG emissions caused by clearing the first crop of oil palm should be equal to the carbon that will be sequestered over the lifecycle of the second crop of oil palm, resulting in zero net GHG emissions from land use change in the future (REA, 2013b).

5.3.2 POME

As introduced above, when POM process FFB and produce CPO and PK, large quantities of solid and liquid waste are produced. Conventionally, processing of such POME generates significant GHG emissions, especially methane, one of the most significant greenhouse gases. This makes POME-derived methane one of the leading sources of GHG emissions for many established oil palm plantations. The conventional method for treating POME is to discharge the POME into open ponds which allows organic matter to settle downward in the water column and water-borne microorganisms to digest a large proportion of this suspended organic matter. Although this method is simple, well established, and carries benefits of reducing pollution impacts of POME were it to be discharged directly into rivers, the anaerobic digestion performed by these micro-organisms produces large volumes of methane, which carries 22.25 times higher global warming potential than that of carbon dioxide (REA, 2013b). For REA’s footprint calculation, the volume of methane potentially produced by its operations during POME processing was estimated based on the volume of POME produced by the mill and the chemical oxygen demand (COD) of this liquid (which carries a quantifiable methane production potential). Installing flow meters to measure the amount of POME produced by each mill would further improve the accuracy of ongoing monitoring efforts to track POME produced per tonne of FFB, which the company aims to reduce over time through gains in processing efficiency.

5.3.3 Planting on Peat

Peat soil is defined as soil with a surface horizon of >50cm of predominantly organic materials. When peat soil areas are drained to plant oil palm, the remaining organic matter becomes exposed to air and begins to oxidize (decompose) releasing large amounts of CO$_2$. The annual emissions of CO$_2$ per hectare derived from oil palm on peat soil are affected by the depth of water drainage, and must therefore be determined first by estimating depth of the water table in drained areas, and then multiplying this by a default value of 0.91 tCO$_2$/cm/year, a factor identified from the scientific literature by the RSPO GHG Working
Group (Hooijer et al., 2010). Water table management is therefore an important factor in minimising peatland decomposition in oil palm plantations.

In order to manage and reduce emissions on planting in peat soils, REA have worked with an independent peatland expert to produce plantation peat soil maps. REA’s carbon footprint analysis for 2011 derived an estimate of the level of the water table below the surface of the soil in the peat areas that was then used to closely estimate the GHG emissions derived from peat. From the beginning of 2013 REA introduced monthly monitoring of the water table in 10 blocks which are considered to be representative of the peat areas that have been planted with oil palm. Such analysis and research provides the company with accurate information concerning how to manage their planted peatland area, and enables the company to closely monitor and if required, respond to any significant in-plantation water table fluctuations.

5.3.4 Fertilizers

GHG emissions linked to fertiliser use include emissions associated with the manufacture of inorganic fertilisers, their transport to and within the plantation, and the release of nitrous oxide (N₂O) when inorganic and organic fertilisers containing nitrogen are applied.¹⁹ GHG emissions associated with the manufacture of inorganic fertilisers are calculated by determining the amount of each active ingredient (nitrogen, potassium, phosphate and magnesium oxide, among others) applied each year and then multiplying these by ‘emission factors’ identified by the RSPO GHG Working Group from the scientific literature (Jenisson and Kongshaug, 2003). The GHG emissions associated with transport of these fertilisers from the manufacturer to the plantation were calculated by estimating the fuel required for the journey based on (a) estimated distance the materials were transported, (b) fuel consumption per km of each mode of transport used, and then (c) applying a standard GHG emission factor for diesel (3.12kg CO₂eq/litre). The direct and indirect emissions of nitrous oxide, which has a GHG warming potential 298 times greater than CO₂, was calculated based on volumes of nitrogen fertilizers applied multiplied by IPCC default values (REA, 2013a, b). For REA, the emissions derived from organic and inorganic fertilisers amounted to 6% of total overall emissions (REA, 2013b).

5.3.5 Fuel on Site

With fuel, GHG emissions arise from the direct consumption of diesel and petrol for transport and electricity generation. The majority of the consumption of fuel comes from transportation costs both to and within the plantation. Given REA’s remoteness, the plantations are not able to receive electricity from the national grid and so, until the methane capture and conversion facilities were commissioned in 2012, generating sets (Gensets) were used to power the start-up of mills and provide power to estate buildings and employee housing and facilities. Overall, fuel consumption represents a 3% contribution to total GHG emissions arising from palm oil production. Plantations may include a credit for renewable

¹⁹ Arising from direct reactions with the soil, as well as leaching, run-off and volatilisation.
energy that is generated as a result of their operations and exported to domestic housing, for example electricity generated by a mill’s steam turbines. Composting from the EFB (empty fruit bunches) and POME from the plantation activities can further reduce the use of inorganic fertilizer and its associated transportation to a plantation.

5.3.6 The impact of smallholder agriculture on GHG footprint of a plantation

One challenge faced by plantation companies in measuring GHG emissions from their operations is how to measure and include the GHG impact of nearby scheme and independent smallholders who form part of the upstream mill supply chain. Plantations vary widely across Indonesia in their level of dependence on smallholder FFB for supplying the mill. In REAs case, for the 2011 calculation, the supply base for the two REA mills included in the footprint calculation source FFB from their own plantation as well as FFB cultivated by semi-independent smallholders (via the company’s PPMD scheme), independent smallholders, and local companies without their own processing facilities. Between 2009 and 2011, these sources accounted for 3-5% of the FFB processed by REA’s two mills. Due to incomplete data regarding the amount of fertiliser and diesel used by these outgrowers, it was necessary to estimate GHG emissions assigned to these FFB sources based on the average value obtained for the FFB cultivated by REA. This will be a challenge for other plantations seeking to evaluate GHG emissions and particularly for those with significant supplies of FFB from independent smallholders and other yet to be traced sources.

5.3.7 Major sources of carbon sequestration

Oil palm trees have the ability to absorb (fix) carbon dioxide from the atmosphere as it grows, through the process of photosynthesis. For REA, the amount of carbon that the oil palm crop sequesters in this manner was estimated using a published growth model (Henson, 2005). However, the total amount of carbon sequestered each year will vary depending on the age profile and the standards of cultivation at a plantation. With the REA example, this is equivalent to approximately 78% of the emissions from land clearing that have been allocated to 2011.

Because both the oil palm trees and natural vegetation fix CO2 through photosynthesis, the RSPO GHG Working Group allows growers to take into account carbon sequestered by areas of natural vegetation they conserve, beyond those required for protection by law (e.g., riparian buffers). Currently, Indonesian regulations oblige plantations to set-aside 50m–100m wide buffer zones along rivers, the margin of peat areas deeper than 3m and land with a gradient greater than 40%; so sequestration in such areas should not be included in the estimation of sequestration credits. Areas outside and additional to this, however, and that are actively managed and maintained by the company (e.g., High Conservation Value area set-asides) can be included as a distinct line item in net emission calculations. It can be very dif-

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20 It should be noted there is not yet complete consensus about the extent to which palm oil growers can include sequestration by conservation areas in their PalmGHG calculation. A uniformly accepted default value for estimating carbon sequestration by natural vegetation has not yet been accepted.
difficult, however, to estimate amounts of sequestered carbon in such areas, as site variation linked to habitat, soil, and vegetation can be very high.

### 5.4 Recommendations and conclusions for achieving emissions reduction

The field of reducing GHG emissions from palm is a relatively new one, and exciting opportunities exist for those willing to take the lead. One of the most critical factors and potential bottlenecks to this is the lack of documentation and material on the sources of GHG emissions at a given plantation, and the lack of understanding for how plantations take the first steps in measuring GHG emissions. The Palm GHG Tool developed by RSPO assists in addressing this challenge, but translation into the Indonesian language would further support its wider use. As REA explains, if companies anticipate beginning to monitor GHG emissions (noting this is a requirement under ISPO), they must begin first by ensuring they keep accurate records of the parameters required to perform calculations. Key among these are: obtaining satellite imagery, and if possible conducting carbon stock assessments of the vegetation present prior to land clearing; inputs used by smallholders; fossil fuel consumption by the company and external contractors; electricity consumption; fertilizer consumption; and the volume of POME produced (REA, 2011).

In the case of REA, land use change was a significant source of GHG emissions, a finding that will apply to all plantations established in areas that require conversion of natural forest, even forest that was logged in the recent past. Efforts to avoid such emissions are one key area on which stakeholders should focus together, noting this is one of the single most challenging policy issues facing sustainable palm oil today in Indonesia. Stringent land development requirements within plantations are also required to support efforts for maintaining resident biodiversity and ecosystem functions once plantation set asides are established. This requires both GIS-based geospatial analysis and on the ground research, but perhaps more importantly, it requires a greater form of partnership and collaboration than has been seen in the past among stakeholder groups with interest in the sector (Paoli et al, 2013).

As noted above, in addition to emissions from land use change, GHG emissions arising from POME are significant and merit special attention in developing plans to reduce emissions over time. Technologies exist and are being improved for enclosed co-processing of both EFB and POME to generate nutrient-rich organic fertilizers that condition soils, capture biogas by-products, and eliminate GHG emissions arising from conventional waste treatment.21 Such technologies require significant up-front capital investment, but Schuchardt and Stichnothe report that such costs can be fully recovered within two to three years through (a) direct savings on electricity consumption (through bio-gas offsets), chemical fertilizer use and effluent pond maintenance, and (b) indirect benefits of improved yields, expansion in plantable land otherwise required for waste treatment ponds, and reduced pollution risk

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(Stichnothe and Schuchardt, 2010). Indeed, a number of plantations have developed alternative business services via the sale of biogas generated electricity and organic fertilizer by-products (PPKS, 2010). Today, at least 40 such EFB and POME co-composting facilities are in use or under construction in Malaysia and Indonesia (Stichnothe and Schuchardt, 2010).

Methane capture technology is currently not widely used in Indonesia but is on the rise, with firms seeing GHG reduction as both a challenge and opportunity to reduce negative impacts, create jobs, and generate positive financial returns. The Indonesian government does not currently regulate GHG emissions from POME although use of methane capture technology is now required under Criterion 2.2.4 of the ISPO standard, which will encourage greater use in coming years. Where there is no immediate use for the methane or electricity, other more ambitious plans could include the use of compressed methane to run plantation vehicles or the extension of the national electricity grid to permit REA and other companies to feed-in methane generated electricity to the grid and thus provide nearby users electricity, e.g., villages bordering the group’s estates.

REAs leadership is also commended as one of the first palm oil plantation companies in Southeast Asia to have prepared a carbon footprint report made available to the public. The report quantifies current GHG emissions and will facilitate the design and implementation of effective strategies for reducing group-wide GHG emissions and provide a baseline against which future reductions can be measured (REA, 2013b).

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References


Summary

Over the past twenty years, large areas of Indonesia’s forests have been converted to agriculture, including oil palm plantations. This trend is likely to continue over the next decade to meet Indonesia’s targets for palm oil production growth. The biodiversity impacts of past expansion have drawn significant national and international attention, creating pressure for companies to consider biodiversity in the siting, design and management of their plantations and mills. The impact of plantation development on biodiversity varies greatly depending on where the plantation is sited, as this determines: (1) whether natural ecosystems will be affected; (2) the condition and rarity of habitats affected; and (3) broader ecological importance of the area at a landscape scale, e.g., in maintaining connectivity between protected areas or providing downstream hydrological services. A plantation company can mitigate impacts on-site by identifying and managing areas that provide important habitat or function as dispersal routes for animals through the plantation. Where companies make such commitments, they must invest significant human and financial resources to plan, manage, and monitor conservation set-asides and establish mechanisms to coordinate this work with other operations. Biodiversity conservation efforts can be supported by multi-stakeholder partnerships with local communities, government, civil society groups, and adjacent land users. But even then, companies face significant challenges, as standard approaches and guidelines for managing biodiversity in plantations are still being developed, and facets of Indonesian government policy make it difficult for growers to implement effective measures. Large plantation companies tend to be more willing than smaller ones to experiment with biodiversity conservation in developing new industry standards. One such company is Wilmar International Ltd. Wilmar exemplifies efforts being made by palm oil producers to conserve biodiversity within plantations, and through collaboration with the conservation community develop tools, guidelines and standards of good practice for industry. Wilmar’s experiences provide valuable lessons for industry and for other actors working to mitigate biodiversity impacts of oil
palm. As mandatory certification requirements under the Indonesian Sustainable Palm Oil (ISPO) standard are applied in coming years, all companies will be required to make efforts to mitigate biodiversity impacts. Important elements of an action agenda to capture recent momentum and improve future outcomes are: (a) aligning legal requirements and incentives to support conservation; (b) revising spatial plans to avoid licensing in forested areas and focus future development on deforested, low-carbon, low biodiversity areas; (c) create and promote use of biodiversity management tools and standards to reduce costs and increase effectiveness; (d) increase the pool of Indonesian biodiversity management experts; and (e) improve the capacity of stakeholders, especially local government and communities, to play an active role in biodiversity conservation.

6.1 Background

The diversity of plant and animal species in rain forests of Indonesia are higher than any other country in Asia, and among the richest in the world. Since 1999, more than 8% of such forests have been zoned for conversion to agriculture. Of this, an estimated 12-15 million ha are currently under license for oil palm development, of which c 9 million ha have already been planted (including industrial plantations and smallholders combined). Plantation expansion across Indonesia will continue in coming decades as demand for Crude Palm Oil (CPO) continues to rise, and government seeks to capitalize on Indonesia’s position as the leading global producer of CPO. Oil palm is not the only threat to forest in Indonesia, however, with significant areas also being converted to other uses such as mining, fibre plantations, small-scale agriculture, infrastructure developments and human settlements. The resulting trajectory of forest loss has raised serious concerns about the future of Indonesia’s rich biological heritage.

Oil palm expansion is widely viewed as one of the leading drivers of forest conversion in Indonesia. Not surprisingly, concerns over biodiversity have therefore drawn attention to this sector, and created pressure on leading companies to mitigate biodiversity impacts of their operations. This Case Study describes steps being taken by leading members of Indonesia’s palm oil industry to mitigate biodiversity impacts of oil palm development, drawing attention to efforts of Wilmar International Ltd. to manage, monitor and report on biodiversity impacts of its plantations. The purpose of this case study is to raise awareness of efforts being made to mitigate biodiversity impacts of oil palm, challenges encountered in the process, and new support tools, guidelines and approaches being developed to overcome these problems. It is hoped the case study will (a) promote deeper recognition of the efforts being made and outcomes achieved, (b) provide a catalyst for stakeholder discussion, and (c) highlight areas where future work is needed to form consensus around the desirable balance of production and protection goals within palm oil landscapes.
6.2 Potential and Perceived Impacts of Oil Palm Development on Biodiversity

6.2.1 Biodiversity: A Brief Introduction

Oil palm plantations are sometimes established on land that requires clearing lowland tropical rain forest, among the richest ecosystems in Indonesia. The biological value of a given forest can be measured in terms of the number of plant and animal species it supports as well as the ecological services it provides, such as carbon storage, provision of water and protection of soil, habitat for native animals, and connectivity between large blocks of forest habitat. Rare and endangered species are sometimes adapted to site-specific ecological conditions limited to small areas, giving rise to striking patterns of local endemism and compositional differences across landscapes. Understanding and conserving these patterns are a major concern among conservationists and an active area of research in Indonesia. Forests also support important aquatic ecosystems, such as rivers, swamps, and lakes, each with distinct species assemblages and ecological processes linked to surrounding forests through flows of water, nutrients, energy and animals. The impacts of plantation agriculture on aquatic biodiversity have received less attention than terrestrial ecosystems, but are a growing area of concern to stakeholders, especially where plantations are becoming the dominant land use.

6.2.2 Oil Palm-related Biodiversity Impacts

The conversion of forest into other land uses is the leading cause of biodiversity loss in Indonesia, and oil palm has been a leading driver of this change in the past decade. The impact of a given plantation on biodiversity varies greatly depending on where the plantation is sited, because location determines: (1) whether forest or other natural ecosystems will be converted; (2) the condition of habitats affected; (3) the rarity of habitats at risk; and (4) ecological importance of the area within the broader landscape for maintaining animal migration corridors, seed sources, or hydrological services. Converting grassland or badly degraded forest to a plantation has far less biodiversity impact than converting intact forest. Peat swamp forest represents a special case because in addition to vegetation being cleared for plantations, the peatland itself must be partially drained, fundamentally altering the underlying substrate for native plant growth, formed over thousands of years.

Biodiversity impacts can also vary greatly based on how the plantation is planned, developed, and managed (Yaap et al., 2010). A plantation firm can mitigate impacts of where the plantation is sited by identifying and managing areas that (a) provide important habitat to species of concern, (b) are critical for maintaining ecosystem services, or (c) provide routes for animal movement through the plantation. Identifying and protecting these areas requires employing qualified field teams to survey the license area early in plantation development and to develop management plans for maintaining these values. To be successful, plantation companies must commit significant human and financial resources to manage and monitor conservation set-asides and to establish mechanisms to coordinate this work with other aspects of plantation operations. Biodiversity conservation performance in plantations can be improved significantly by forming multi-stakeholder partnerships with local...
communities, local government, civil society groups, and adjacent land users, including other companies. Technical assistance from conservation NGOs and researchers, often supported by donors, is extremely valuable, especially when a firm is developing its conservation procedures and building expertise.

In addition to direct impacts on forest biodiversity, oil palm operations can adversely affect aquatic biodiversity by polluting water bodies through improper application of agricultural chemicals, disposal of waste products, and failure to prevent run-off of sediment from road construction or field clearance operations. Chemical and biological pollutants can directly kill aquatic organisms, lower oxygen levels below the tolerance of some species, and introduce toxic chemicals into food webs, affecting the health of animals, including humans. Companies can largely avoid water-related impacts, however, through proper mill and road design, improved disposal of waste products (see Case Study 3), and maintenance of vegetation buffer strips along water bodies.

Oil palm development can indirectly impact biodiversity in areas surrounding plantations by: (a) building roads that allow settlers, illegal loggers, and hunters to access remote forest areas; (b) attracting workers and their families who sometimes clear forested land to grow crops and place increased demands on wildlife, fish, and forest products; and (c) attracting other industries that require land and other natural resources. Managing such indirect impacts of oil palm development is primarily a planning and regulatory responsibility of local governments, but companies can help address indirect impacts through thoughtful road system design, controls on road use, and encouraging workers to use natural resources efficiently including restrictions on hunting.

6.2.3 Perceptions of Biodiversity Impacts of Oil Palm

Impacts of oil palm development on biodiversity are often described to be high and uniformly negative. This is because:

- Observers assume that primary forest is almost always being converted
- Public perceptions were formed at a time when the industry made little effort to avoid or mitigate biodiversity impacts. Massive wildfires started by contractors clearing land for oil palm, especially during the 1997/98 El Nino event, left an enduring public perception of industry indifference to environmental impacts. Such perceptions were reinforced by the occurrence of planation-linked fires in eastern Sumatra this past year.
- The industry is judged based on the practices of its weakest performers, not taking into account the effort being made by growing numbers of more responsible plantation companies that increasingly dominate the industry.

Critics also often assume that companies have substantial discretion to choose development sites and avoid areas with high biodiversity values. It is true that palm oil companies bear full
responsibility for their investment decisions, but in Indonesia they must choose from a diminishing subset of areas that are (a) not already licensed; (b) outside the government-designated Forest Zone where agriculture is prohibited; (c) zoned for agricultural development in current spatial plans; (d) offered by local government for oil palm; and (e) allowed by affected communities. Low biodiversity land meeting these five criteria is increasingly scarce in Indonesia. In the past, industry has also been charged with purposely selecting heavily-forested land to enjoy windfall profits for clearing and selling timber, behavior encouraged early in the post-Soeharto era by perverse regulatory incentives that waived payment of royalties on timber produced by clearing land for agricultural development. The regulation was revoked and the behavior largely ended years ago, but the negative impression it created has persisted.

6.3 Stakeholder Expectations for Biodiversity Conservation in Plantations: Industry Responses and Challenges

6.3.1 Stakeholder Expectations

Stakeholder expectations vary widely regarding industry responsibility to mitigate the impact of their operations on biodiversity. The most demanding stakeholders are members of the domestic and international conservation community, who expect that plantation companies will take active and often costly measures to avoid, protect and manage areas with high conservation value within their plantations. This includes scientifically credible methods to identify biodiversity values and develop a management approach, including tracking outcomes through long term monitoring of key species and ecological processes. For example, the orangutan (Pongo spp.), a highly symbolic and charismatic species under great threat from habitat loss, has been singled out for special attention in Kalimantan and Sumatra, where the species are often used as an umbrella species for setting management requirements and as a general indicator of ecosystem health. European groups largely support expectations of the conservation community, reflected in activist campaigns, government statements and required provisions of both voluntary and mandatory commodity certification schemes.

Expectations for impact mitigation of the Government of Indonesia (GOI), another key stakeholder, are ambivalent in that parts of the legal framework mandate plantation conservation efforts while other provisions make it difficult for growers to implement effective measures (see discussion in section 2.2, as well as Paoli et al. 2013). Local governments tend to be primarily focused on meeting plantation expansion targets and often see biodiversity conservation within plantations as an unaffordable luxury. Rural agricultural communities with claims over forest areas zoned for oil palm sometimes oppose development on environmental grounds, but sometimes also support development regardless of such impacts if they are rewarded financially or provided with improved infrastructure, services and economic opportunities. Likewise, forest-dependent people in remote areas may value conservation as a practical means to ensure access to forests for hunting and gathering of useful products, but they too can be willing to accept forest conversion and loss of biodiversity provided net benefits are perceived to outweigh the costs involved.

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6.3.2 Industry Responses

Oil palm companies vary greatly in terms of their response to these expectations and thus commitment to biodiversity conservation. Large plantation firms, such as those highlighted below in this Case Study, tend to be most willing to work toward meeting or surpassing stakeholder expectations as a means to maintain access to sensitive markets that require certified responsible practices, strengthen their corporate image and put corporate values to action on the ground. These companies are generally large enough to spread biodiversity management costs and expertise over larger operations, lowering per hectare costs at a programmatic level. Smaller firms tend to be less willing to expend resources on biodiversity-related efforts, because they have more limited resources, do not share these values, and typically sell their products through market chains that are not sensitive to these issues. Some companies deeply object to conservation as an objective in plantations, seeing biodiversity requirements as an attempt to impose foreign values on Indonesian companies. Yet, as the mandatory ISPO certification system is applied over the next few years, all firms will be required to make at least some effort to conserve biodiversity on their plantations or risk losing their licenses to operate. This will effectively raise the bar for all plantations.

6.3.3 Industry Challenges

Oil palm companies committed to work toward meeting some or all of the expectations of the conservation community face the following challenges:

- **Operational requirements.** Developing an oil palm plantation necessarily requires planting thousands of hectares of land to achieve established economies of scale. Oil palm trees cannot be inter-planted with forest trees as is possible with rubber or coffee, without significant impacts on yield, so total land clearance is required prior to planting. Plantations also require an extensive road network for planting, harvesting, and maintenance. Larger plantations typically build a mill to process fruit into Crude Palm Oil (CPO). A large number of workers are required to establish and run the plantation and an even larger number of smallholder farmers are typically affiliated with each plantation. These factors place practical limits on the amount of land that can be allocated for conservation purposes, and a theoretical “minimum impact” that even the best designed and managed plantation will impose.

- **Legal requirements.** During the Environmental Impact Assessment process, project proponents are required to identify areas with important biodiversity or ecosystem services values and propose how they will mitigate impacts upon these values. The recent Indonesian Sustainable Palm Oil (ISPO) regulation mandating industry-wide compliance with a government-established certification system also requires biodiversity conservation efforts among many other provisions. However, the Plantations Law of 2004 and other recent government regulations give local government authority to withdraw undeveloped land from a plantation (Paoli et al. 2013). In some well-known cases, these provisions have been invoked to excise conservation set-asides intended for biodiversity management. Responsible growers face risk that the integrity of their plantation could be compromised by removal of areas they’re working to conserve, and then having these relicensed to a separate party.
Management requirements. Effectively managing biodiversity in a plantation requires that senior and middle management support this effort and be willing to devote significant financial and human resources to it, and to integrating conservation into all aspects of plantation and mill operations.

Technical expertise. Indonesia’s forests are ecologically complex, containing an enormous number of plant and animal species. The pool of people with time and expertise to assess biodiversity values and devise plans for managing and monitoring them is small. These experts typically specialize in a specific set of species or habitat types. Most are affiliated with universities, the government, or conservation NGOs, leaving few people available to work for plantations on a long-term basis. Even more rare are scientific experts who have the management skills to lead a team of people and work effectively within a commercial setting.

Technical resources. Managing biodiversity in relatively small blocks of forest within an active plantation presents unique conservation biology challenges. Standard approaches and guidelines have not yet been developed, meaning that plantation conservation staff must work on their own, or with outside consultants, to develop approaches, thereby slowing the work and making it more difficult to measure and compare results.

Stakeholder support. The task of conserving biodiversity in and around an oil palm plantation is less costly for the company and more successful in the long run if local stakeholders, particularly nearby communities, local government, and local CSOs, support these efforts. Communities can play a major role by collaborating with the firm to protect the area, using traditional institutions to support management efforts. Local CSOs can facilitate this collaboration and local government can support the effort through their oil palm licensing and oversight procedures.

6.4 Companies Adopting A Proactive Approach to Mitigate Biodiversity Impacts

Compared to other aspects of plantation sustainability, such as waste management (Case Study 3) and yield enhancement (Case Study 4), systematic efforts by companies to conserve biodiversity within plantations are a more recent development. This means Best Management Practices (BMPs) for plantation companies are not yet well established. Nevertheless, the last five years has seen remarkable growth in private sector commitment to conserve biodiversity and genuine efforts to trial new approaches, form innovative partnerships, identify policy barriers and share lessons learned through a variety of multi-stakeholder forums. The progress made during this period is impressive, and several companies deserve mention for their efforts to mitigate impacts not only within their own plantations but also in the broader landscapes where they operate. In Indonesia, leading companies include large well-known conglomerates such as Wilmar International Ltd., PT Astra Agro Lestari, and Golden Agri-Resources Ltd, as well as growing numbers of medium size firms (see Box 1 for an example). Here, we profile the work of Wilmar International, a company whose public commitments to biodiversity conservation and actions to date illustrate the extent of operational changes, resource allocation and innovative partnerships required to make progress. Wil-
Mar’s experience also highlights challenges that lie ahead in promoting broader adoption of conservation measures throughout industry.

6.4.1 Wilmar International Ltd.

Wilmar International Ltd. is one of the largest palm oil plantation companies in the world, operating more than 240,000ha of plantations globally, including Indonesia and Malaysia (Figure 6.1, Box 2). Wilmar is a leading member of the RSPO, serving on its Executive Board until 2012 and providing leadership to many of its Working Groups and committees. All seven of the company’s plantations and mills in Malaysia, and five in Indonesia, are RSPO certified, with remaining plantations in Indonesia on track to be 100% certified by 2015. In 2011, Wilmar produced 520,000 tons of certified sustainable palm oil (CSPO), 9% of global production, making it the second largest producer of CSPO on the market.

BOX 1. ANJ AGRI AND PEATLAND BIODIVERSITY CONSERVATION

Aust-Indonesia Jaya Agri (ANJ Agri) is a growing agribusiness firm with interests in palm oil, sago and renewable energies. The company is a member of the RSPO committed to delivering positive community development benefits and lasting biodiversity conservation outcomes where it operates. ANJ Agri operates a 14,000 ha palm oil plantation in Ketapang, West Kalimantan, where studies on biodiversity, community use and soil hydrological mapping identified important areas for biodiversity conservation (including wild orangutan populations) and local livelihoods. The company set aside 3,400 ha of forested peat land within its plantation and works with local communities, NGOs, scientists and consultants to manage and monitor the area. Bauxite mining near the set aside is a long-term threat to the site but ANJ Agri is hopeful consensus solutions will be found.

BOX 2. WILMAR: AT A GLANCE

Wilmar International Limited is Asia’s leading agribusiness group. Founded in 1991 with headquarters in Singapore, Wilmar has grown to become the largest processor and merchandiser of palm and lauric oils globally, a major oil palm plantation owner (Indonesia’s fourth largest), and the leading palm biodiesel manufacturer in the world. Wilmar operates over 450 manufacturing plants across a wide range of agri commodities, and employs 93,000 people globally, with a primary focus in Indonesia, Malaysia, China, India and Europe. Wilmar’s integrated business model, from commodity origination and processing to merchandising and distribution, creates significant operational and cost efficiencies. In 2011 the company posted revenues of more than $45 billion and net profits of $1.25 billion. It is among the largest companies by market capitalization listed on the Singapore Stock Exchange.

Wilmar owns majority interest in nearly 170,000ha of developed plantations in Indonesia, divided between Sumatra and Kalimantan. The biodiversity impact of Wilmar’s plantation footprint has been a focus of criticism in the past, leading the company in 2008 to suspend development of new plantations while it formalized policies and procedures to implement a newly enacted Group-wide commitment to minimize biodiversity and environmental impacts. RSPO requirements served as the

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22 More than 74% Wilmar’s plantations are in Indonesia, 24% in Malaysia, and 2% in Africa.
starting point for developing programs aligned with this commitment – especially the need for High Conservation Value (HCV) assessment prior to developing new plantations – and several facets of Wilmar’s current programs go well beyond RSPO requirements, reflecting needs and opportunities that arose in their plantations. A major geographic focus of Wilmar’s investments in conservation is Central Kalimantan province, where the company operates 84,000 ha under the coordinated management of Wilmar’s Central Kalimantan Project (CKP). Many of the efforts undertaken, programs trialled, tools developed and lessons learned in managing the 13,000 ha of conservation areas at CKP are featured in this case study.

Figure 6.1. The distribution of Wilmar plantations across Indonesia and Malaysia.

6.4.2 Wilmar’s Biodiversity Conservation Programs: An Overview

A centerpiece of Wilmar’s approach to conserving biodiversity is conducting HCV assessments prior to commencing development for all its plantations. Results are used to inform plantation development and set in motion research, management and monitoring activities to maintain conservation values from earliest possible stages of plantation development. HCV commitments are complemented by (a) Group wide ban on development of peat lands of any depth (enacted in 2011) and (b) formulation of flagship species conservation programs in different areas, such as orangutan conservation in Central Kalimantan and tiger initiatives in Sumatra. Wilmar’s commitment to maintain HCVs, avoid peat and conserve target species are formalized in a Group wide policy signed by Wilmar’s Chairman, applicable to all its plantations and with implementation overseen by the Corporate Social Responsibility (CSR) Council, which includes senior managers, Directors and the Chairman himself. Top-level support and oversight ensures necessary investments are made in staffing, training, and equipment, and that an effective organizational structure, SOPs, and internal audits are in place to translate policy into practice (Figure 6.2).
Wilmar’s biodiversity conservation efforts center on three priority areas:

1. Biodiversity management, monitoring & reporting within Wilmar plantations
2. Establishment of partnerships for multi-party collaboration and capacity building
3. Development and promotion of biodiversity management and monitoring tools for use by Wilmar and the industry as whole

**Figure 6.2.** The Organizational Structure of Wilmar’s HCV management and biodiversity conservation program teams.

CASE STUDY 6: MITIGATING BIODIVERSITY IMPACTS OF OIL PALM THROUGH A COMPREHENSIVE APPROACH TO CONSERVATION 68
6.4.3 Wilmar’s Biodiversity Management, Monitoring and Reporting within Plantations

Alongside efforts to promote good practice within industry and supportive for conservation within government, biodiversity conservation within Wilmar’s own plantations is, naturally, a core focus of its efforts. Five facets are emphasized in the development of programs to achieve this:

- Systematic surveys and planning prior to plantation development
- Controlled development in line with approved plans
- Tailored conservation management and monitoring plans
- Staffing, equipment and capacity building to implement plans
- Collaborations with outside parties

HCV and Social Impact assessments by independent parties form the basis for Wilmar’s plantation development planning to identify sensitive areas and priority species to mitigate on-site impacts. Areas to be set aside for conservation are highlighted during assessments, and then discussed with local stakeholders, including communities, during public consultations to obtain feedback and inputs for finalizing development plans. Plantation development is then controlled through a series of SOPs and structured agreements with contractors to develop only in areas permitted by law (e.g., outside riparian zones and steep slopes) and in accordance with Wilmar’s approved development plans.

Wilmar sees human resource capacity on the ground as vital to success of conservation, and for this reason invests heavily in continuous training and upgrading of equipment to improve on-site capacity. For example, Wilmar conducts mandatory, annual 3-day trainings on HCV management and monitoring for all conservation staff, GIS staff and supporting departments including Community Development and Plasma Smallholder teams. Further training of conservation staff is carried out on a continuous basis in response to needs, and complemented by equipment upgrades such as camera traps, GPS units and monitoring/mapping software and supporting technologies. Wilmar staff are also encouraged and supported to participate actively in national and international seminars and conferences, both to build capacity and share lessons learned through practice on the ground.

Where there is potential to improve upon conservation benefits of maintaining specified HCV areas, Wilmar develops flagship species conservation programs tailored to local conditions. An example is the company’s effort to maintain orangutan populations in Central Kalimantan, which are present in large parts of the 13,000ha conservation area it maintains. In designing this program, Wilmar lead collaborative surveys with academic, NGO and government partners to assess orangutan population numbers and locate priority areas for conservation. The program grew overtime to include enrichment planting for habitat improvement, recruitment of full time staff assigned to conduct regular orangutan surveys and implement related conservation activities, and development of a comprehensive SOP for orangutan conservation. Social surveys and awareness raising campaigns by outside experts have also been commissioned to better understand social aspects of orangutan conservation where local community attitudes or traditions present a threat to orangutans or their habitat. A key output of the program for Wilmar is systematic orangutan conservation management and monitoring plans tailored to address threats and opportunities at each of the four
plantations in Central Kalimantan where orangutans are present in Wilmar’s conservation areas. These plans, in turn, are reviewed by independent orangutan experts for inputs to long-term training programs for ensuring conservation teams have required skills to implement the plan.

Where deemed necessary to achieve conservation goals within a plantation, Wilmar also seeks collaborations with outside experts or institutions to conduct training or to provide technical services directly. Other facets of Wilmar’s collaborations designed to support biodiversity conservation efforts in the broader landscape are discussed in the following two sections.

### 6.4.4 Establishment of Partnerships

Wilmar sees partnerships for training, technical survey needs, conservation planning, policy analysis and program development as critical to achieve its biodiversity conservation goals, and draws heavily upon this model. As examples, Wilmar has partnered with Wildlife Conservation Society (WCS), Worldwide Fund for Nature (WWF) and the Indonesian Institute of Sciences (LIPI) for technical field research and training support. WCS also produced an analysis of legal impediments to biodiversity conservation within plantations, which has served to inform policy dialogue with government and other stakeholders. Zoological Society of London (ZSL) provides Wilmar with ongoing in-depth support to train conservation staff in the design and execution of biodiversity monitoring programs, as well as robust reporting, both in Kalimantan and Sumatra plantations. As part of Wilmar’s overall goal to support orangutan conservation in the broader landscape, Wilmar also supports activities of the Borneo Orangutan Survival (BOS) Foundation (discussed further below) and the Orangutan Land Trust (OLT), a not-for-profit organisation promoting restoration and protection of areas where orangutans occur or potentially suitable for reintroduction programs. Wilmar also partners with local NGOs and government agencies active in biodiversity conservation to augment staff skills and to promote local participation and long-term support for its programs.

### 6.4.5 Development of Tools and Guidelines to Support Best Management Practice in Biodiversity Conservation

A third pillar of Wilmar’s biodiversity conservation programs is the development and promotion of tools, guidance and industry BMPs for mitigating biodiversity impacts. Wilmar pursues this through collaborations with NGOs, researchers and government envisaged to cover the full scope of biological, technical, social and policy challenges to effective conservation. Two leading examples include work with BOS Foundation on the development of orangutan conservation BMPs and ZSL on formation of biodiversity management, monitoring and reporting tools.

In May 2011, Wilmar signed an MOU with BOS Foundation and the provincial government of Central Kalimantan to develop and trial run BMPs for orangutan conservation in oil palm plantations. The scope of BMPs includes species protection; habitat establishment and enrichment; translocation of isolated orangutans; buffer zone management; research, training and education; human-orangutan conflict mitigation; and involvement of local communities.
in orangutan conservation and management. The long-term aim is the adoption of orangutan BMP as a formal policy throughout Central Kalimantan, thus helping to reduce threats and enhance protection of orangutan habitat across the province. Phase 1 of the MOU expired in late 2012 and was renewed in early 2013 to extend the collaboration for another three years.

Wilmar is also working with ZSL under auspices of the International Finance Corporation’s (IFC) Biodiversity and Agricultural Commodities Programme (BACP) to develop public domain tools for biodiversity management in oil palm plantations including: (a) Practical Handbook for Conserving High Conservation Value Species and Habitats Within Oil Palm Landscapes, (b) Reports on Management Options for Reducing Impacts of Oil Palm on Biodiversity, (c) a web-based biodiversity and palm oil information website (www.oilpalm-biodiversity.info/), and (d) scholarship programs to support Ms degree student research on priority areas of biodiversity conservation in oil palm. One major focus of ongoing collaboration between ZSL and Wilmar is the development of standard protocols for monitoring biodiversity in conservation set asides within plantations and a software platform to input, analyze and report results. The tool will be made available to industry and enable plantation companies to analyze, monitor and adapt their biodiversity management systems.

6.4.6 Successes and Challenges to Date

Notable progress has been made by Wilmar to mitigate direct impacts on biodiversity in its plantations, but significant challenges remain. Two leading challenges are: (a) unsupportive local government policy; and (b) threats to conservation areas from local and outside actors tied to hunting and illegal logging.

Current Indonesian law does not formally accommodate the maintenance of HCV or other voluntary conservation set-asides within palm oil plantations (Paoli et al. 2013). Consequently, large areas of land allocated for conservation can, in theory, be taken back by government on the grounds it’s “idle and unproductive” because it is not being converted. Due to this fact, in some Wilmar plantations significant areas of set asides allocated for protection have been reclaimed by government and relicensed to non-RSPO companies for development, especially in West Kalimantan. To date, Wilmar has worked effectively with government in Central Kalimantan to see conservation areas not simply as “idle and unproductive”, but rather as actively managed set asides to conserve biodiversity and environmental services. Wilmar continually provides government with evidence of active management on the ground as proof that conservation areas are vital elements of sustainably managed plantation landscapes.

Local threats to conservation set asides, as well as to required riparian buffers, are also a constant challenge for maintaining HCVs and other biodiversity values in plantations. To reduce these threats, Wilmar has adopted two measures. The first focuses on education and outreach to publicize the importance and value of biodiversity within plantations, and to seek consensus on the need to retain natural areas. The second is a pilot Ranger Program, where Rangers are empowered with full police authority to undertake daily patrols targeting illegal logging and hunting activities where hotspots are being detected. This latter program is being trialled in two plantations and if successful will be expanded to others. Wilmar
works with a range of local and outside stakeholders to manage local threats, and remains hopeful that with growing local support these threats can be managed.

6.5 An Action Agenda for Improving Biodiversity Conservation Efforts in Oil Palm Plantations

The background of this report described how biodiversity impacts of oil palm are perceived and stakeholders’ growing expectations for companies to reduce their biodiversity footprint. In response, growing segments of industry are taking action, and the case study of Wilmar illustrates both progress being made and challenges encountered to reduce impacts of the sector as a whole. To conclude we highlight a number of mutually reinforcing steps that could be taken by the Indonesian government, business, and interested stakeholders to improve biodiversity performance of the industry. Key elements of an action agenda include: aligning legal requirements and incentives to support conservation; revising spatial plans; creating tools, guidelines and standards; growing available expertise; and improving the capacity of local stakeholders.

- **Align legal provisions for conservation.** The legal framework could be reviewed and amended as needed to provide unambiguous support for voluntary conservation measures and require that defined conservation actions (such as maintaining habitat for protected or threatened species) be integrated into every plantation.

- **Steer future development toward low biodiversity land.** This will require adjustments to the boundaries of the Forest Zone (Kawasan Hutan) to make available deforested land currently prohibited for agricultural development and possibly revision of spatial plans at the district and provincial levels to remove biodiverse, high quality forest from the pool of land currently available for conversion to oil palm. So-called “land swaps” where deforested grass-lands in the Forest Zone are traded for densely forested land outside currently zoned for agriculture could form part of the solution, but efforts to date have been unsuccessful due to procedural complexity of the process and delays in finalizing spatial plans.

- **Create standards.** Individual companies and industry associations should work with government, conservation experts and conservation organizations to establish standards for conservation targets within oil palm plantations, as well as management procedures, and monitoring methods that can be applied throughout the industry.

- **Develop tools and expertise.** Continue to develop practical management tools such as those under development by ZSL in collaboration with Wilmar, and associated support tools for biodiversity monitoring and reporting. Industry groups could collaborate with international conservation organizations to develop and implement training courses for plantation managers and workers to build biodiversity monitoring and management skills and expand the pool of people with required skills, expertise and experience. Indonesian universities could be encouraged to develop

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courses specifically aimed at giving conservation professionals the knowledge to work in a plantation environment.

- **Support Trials on Collaborative Approaches to Biodiversity Conservation.** There is increasing recognition by diverse stakeholder groups in Indonesia, including government, of the significant potential to align biodiversity conservation, rural development and land tenure reform objectives through community based forest conservation efforts. Effort should be made to trial community based conservation programs, both with (i.e., joint management) and without direct company support, to evaluate potential scope for strengthening of local forest management institutions to enhance biodiversity conservation within plantations.

- **Improve local government and community capacity.** Local government and communities are critical actors in determining oil palm biodiversity outcomes. A needs assessment should be conducted to determine what actions could be taken by GOI, the industry (including downstream members of the supply chain), conservation NGOs, and especially donors to improve the capacity and decisions of these actors with respect to biodiversity conservation.

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References

