Forestry Research Collaboration Between FORDA and Partners

Improving sustainable research and development

Celebrating 100 years of forestry research in Indonesia

CIFOR

World Agroforestry Centre

TROPENBOS INTERNATIONAL Indonesia

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Foreword (Prakata)

Dr. Ir. Iman Santoso, MSc*

This year marks the 100th anniversary of forestry research in Indonesia, which records show officially began on 16 May 1913. In commemorating this centennial event, we had initially intended to document only the main achievements in forestry research, to reflect on all that had been done in this time, as the information, stories and descriptions gathered offered a wealth of insight into the state of forestry and research needs during that period. For that purpose, the Forestry Research and Development Agency compiled the book *Satu Abad Penelitian Kehutanan di Indonesia 1913–2013* (One Century of Forestry Research in Indonesia 1913–2013). But from there arose the idea of documenting the results of research collaboration with foreign research and development institutions working in Indonesia. This idea met with an enthusiastic response from CIFOR. CIFOR then applied considerable energy to helping compile this book, which has become an integral part of *Satu Abad Penelitian Kehutanan di Indonesia*.

This book includes 19 articles contributed by CIFOR, the World Agroforestry Centre and Tropenbos. Given the short timeframes available, reports by some institutes that had intended to write on their research collaborations with the Forestry Research and Development Agency have not yet been included.

Penelitian Kehutanan pada tahun ini memasuki usia 100 tahun. Berdasarkan dokumen yang ada, penelitian kehutanan dimulai 16 Mei 1913. Dalam rangka peringatan satu abad tersebut, pada awalnya kami hanya ingin mendokumentasikan capaian hasil penelitian kehutanan yang telah dilakukan, sebagai bahan kontemplasi tentang apa yang telah dikerjakan selama ini. Rangkaian fakta yang terkumpul akan memberikan banyak cerita dan gambaran tentang situasi, kondisi dan kebutuhan riset saat itu. Oleh karena itu Badan Litbang Kehutanan kemudian menyusun buku *Satu Abad Penelitian Kehutanan di Indonesia 1913-2013*. Pada saat itu kemudian terpikir untuk mendokumentasikan secara khusus hasil-hasil penelitian kolaborasi dengan institusi kelitbangan asing yang bekerja di Indonesia. Ide ini kemudian mendapat tanggapan yang sangat antusias dari CIFOR, sehingga CIFOR berperan aktif dalam proses penyusunan buku ini. Dengan demikian buku ini merupakan bagian yang tidak terpisahkan dari buku *Satu Abad Penelitian Kehutanan di Indonesia.*

Buku ini mencakup 19 tulisan yang dikontribusikan oleh CIFOR, ICRAF dan Tropenbos. Karena mendesaknya waktu, maka masih ada beberapa institusi asing yang ingin menuliskan hasil dan pengalaman penelitian kolaborasi dengan FORDA belum bisa ditampung dalam buku ini.

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A wide variety of topics are presented, with articles covering not only research but also capacity building, as our collaborations were essentially about increasing mutual understanding and information exchange in science and technology, and about obtaining benefits to be savored together. To reflect the main themes, we have grouped the articles into three sections: Collaborative Research, Forests and People, and Capacity Building.

The description of the dynamics drawn from our research and development will not only provide information about developing the substance of research topics, but can also be used as a basis for finding new ways to work together. Given the global nature of forest management and its problems, research collaboration is a valuable strategy for solving those problems. It is hoped that this small contribution, in the form of a collection of collaborative experiences, will be able to provide support for all parties to continuously improve bilateral or multilateral relationships so that we may continue to carry out research together in a collaborative manner.

We would like to express our great appreciation to CIFOR for so actively participating in preparing this book, and to those at the World Agroforestry Centre and Tropenbos who contributed articles on achievements resulting from collaboration with the Forestry Research and Development Agency.

We hope that this book will serve as a concrete contribution to even greater collaboration in forestry research in the future, to the benefit of all parties.

Topik penelitian yang disajikan sangat bervariasi. Selain kegiatan penelitian yang dituliskan pada buku ini, juga kegiatan *capacity building*, karena kegiatan kerjasama yang dilakukan pada dasarnya selain untuk meningkatkan saling pengertian dan pertukaran informasi IPTEK, juga untuk mendapatkan benefit yang dapat dinikmati bersama. Berdasarkan materi yang terkumpul, kami mengelompokkan dalam tiga bagian: yaitu *Collaborative Research*, *Forests and People* dan *Capacity Building*.

Gambaran dinamika situasi yang diperoleh dari informasi hasil litbang tersebut tidak hanya akan memberikan pembelajaran tentang pengembangan substansi topik penelitian bagi semua pihak, tetapi juga bisa digunakan sebagai dasar menentukan format-format baru dalam berkolaborasi. Mengingat bahwa persoalan pengelolaan hutan yang dihadapi semakin bersifat global, maka kolaborasi penelitian menjadi sangat strategis untuk menyelesaikan masalah secara bersama. Sumbangan kecil yang merupakan kumpulan pengalaman berkolaborasi yang ditulis di buku ini diharapkan dapat membekali semua pihak untuk terus meningkatkan hubungan bilateral atau multilateral untuk melaksanakan kegiatan penelitian secara berkolaborasi.

Disampaikan penghargaan yang tinggi dan terima kasih kepada CIFOR yang telah berperan aktif dalam penulisan buku ini, serta ICRAF dan Tropenbos yang telah berkontribusi tulisan untuk memberikan gambaran capaian dari kolaborasi yang pernah dilakukan dengan FORDA.

Pada akhirnya semoga penyusunan buku ini dapat memberikan sumbangan yang konkrit untuk peningkatan kerjasama penelitian kehutanan di masa mendatang dan memberikan benefit bagi semua pihak.

Introduction (Kata Pengantar)

Indonesia is one of the most richly forested countries in the world. Its forests are of major national and international significance, both biologically and economically, and central to the livelihoods of tens of millions of Indonesians. Like forests elsewhere, Indonesia's forests have been transformed by economic development and social change, at an accelerating rate over the past 50 years.

Scientific research on Indonesia's forests began some two centuries ago. Early stages of research focused on topics such as understanding the complex ecology of Indonesia's natural forests, and capitalizing on a long history of growing teak to develop planted forests. More recent research has grappled with informing the transformation of Indonesia's forested landscapes and the rehabilitation of degraded lands, with understanding the implications for forests and people of the post-reformasi transformations in Indonesia's governance, of better understanding the wetland forests that characterize much of Indonesia's lowlands and coasts, of how to work most effectively with farmers and communities to both enhance their livelihoods and sustain forests and trees, and how to strengthen the contribution of forests to climate change mitigation and adaptation. But research is only the start of the story. Managing Indonesia's forests wisely, for their diversity of values, requires knowledge and understanding from both the natural and social sciences.

Indonesia adalah salah satu dari negara-negara dunia yang kaya akan hutan. Hutan-hutannya memiliki signifikansi besar secara nasional maupun internasional, baik secara biologi maupun ekonomi, dan menjadi pusat bagi penghidupan puluhan juta orang Indonesia. Seperti halnya hutan dimanapun, hutan-hutan Indonesia telah berubah karena perkembangan ekonomi dan perubahan sosial, dalam laju yang dipercepat selama 50 tahun silam.

Penelitian ilmiah terhadap hutan-hutan di Indonesia dimulai kira-kira dua abad yang lalu. Tahap-tahap dini penelitian yang berfokus pada topik-topik seperti pemahaman ekologi kompleks dari hutan-hutan alam Indonesia, dan memanfaatkan sejarah panjang penanaman jati untuk mengembangkan hutan tanaman. Penelitian yang lebih baru bergulat untuk memberikan informasi mengenai transformasi lanskap berhutan Indonesia dan rehabilitasi lahan terdegradasi, dengan pemahaman mengenai implikasinya untuk hutan dan penduduk pada perubahan pasca-reformasi dalam tata kelola Indonesia, mengenai pemahaman yang lebih baik dari hutan-hutan rawa yang merupakan ciri sebagian dataran rendah dan pantai Indonesia, mengenai bagaimana cara bekerja paling efektif dengan para petani dan masyarakat untuk meningkatkan penghidupan mereka dan melestarikan hutan dan pohon, dan bagaimana memperkuat kontribusi hutan terhadap mitigasi perubahan iklim dan adaptasi. Tetapi penelitian hanyalah awal dari kisahnya. Mengelola hutan Indonesia dengan bijak, untuk keanekaragaman nilainya, memerlukan pengetahuan dan pemahaman dari bidang ilmu alami dan sosial.

This volume records these perspectives from some of the international institutions that have partnered with Indonesia over the past century of forest research. The three organizations featured in this compendium — CIFOR, Tropenbos and the World Agroforesty Centre — each have at least 20 years of presence in Indonesia, and are committed to collaborative research with Indonesian partner organizations. In Indonesia, FORDA is pre-eminent among those.

Some of the forest research needs and challenges in the next stages of Indonesia's development will be similar to those that have characterized the past 100 years; many others will be different. Regardless, the research overviewed in this compendium is part of the foundation from which research to address the knowledge and information needs of the next 100 years will be based. Those needs are likely to become more pressing as the pressures on Indonesia's forested landscapes intensify.

This compendium celebrates past achievements as we look to the future of Indonesian forests and forestry, in all its forms, and continue to explore how these partnerships can help sustain Indonesia's forests and its people.

Volume ini merekam sudut pandang dari beberapa lembaga internasional yang telah bermitra dengan Indonesia di akhir abad dari penelitian hutan. Ketiga lembaga yang berpartisipasi dalam kompendium ini — CIFOR, Tropenbos, dan World Agroforestry Center — masing-masing setidaknya memiliki paling sedikit 20 tahun eksistensi di Indonesia, dan berkomitmen untuk penelitian kolaboratif dengan berbagai mitra organisasi Indonesia. Di Indonesia, FORDA unggul di antara lembaga-lembaga tersebut.

Beberapa dari kebutuhan dan tantangan penelitian hutan tersebut dalam tahap-tahap pembangunan Indonesia berikutnya akan serupa dengan kebutuhan dan tantangan yang menjadi ciri selama 100 tahun silam; banyak yang lainnya yang akan berbeda. Meskipun demikian, penelitian yang ditinjau sekilas dalam kompendium ini merupakan bagian dari dasar yang akan mendasari penelitian untuk menangani kebutuhan pengetahuan dan informasi selama 100 tahun mendatang. Kebutuhan-kebutuhan itu tampaknya akan semakin mendesak karena tekanan-tekanan terhadap lanskap berhutan Indonesia semakin meningkat.

Kompendium ini merupakan peringatan atas pencapaian-pencapaian di masa lampau seraya melihat masa depan dari hutan-hutan dan kehutanan Indonesia, dalam segala bentuknya, serta terus mengeksplorasi bagaimana kemitraan kami dapat melestarikan hutan-hutan Indonesia dan penduduknya.

Collaborative Research

Photo by Kate Evans/CIFOR

A partnership for forests and people: FORDA and CIFOR

Center for International Forestry Research

When the leaders of Indonesia outbid five other countries to host the head office of the Center for International Forestry Research (CIFOR) in 1993, they believed rightly that hosting the center would yield long-lasting rewards. Indeed, Indonesia reaps the largest share of benefits from CIFOR's work — in partnerships, research, capacity building and knowledge gained.

Working in partnership with Indonesia's Ministry of Forestry and other government agencies, non-government organizations (NGOs), universities, local institutions and the private sector, CIFOR has conducted more than 90 research projects in Indonesia, many of which have been linked to similar research projects around the world. These projects have informed the Indonesian Government and, in particular, the Ministry of Forestry, to develop policies that foster the sustainable management of forests, the biodiversity they embrace and the improved livelihoods of forest communities, while contributing to Indonesia's development objectives.

CIFOR Director General Dr. Peter Holmgren (left), Forestry Minister Zulkifi Hasan (center) and FORDA Director General Dr. Ir. Iman Santoso (right) at the FORDA Campus Open Day in April 2013, one of a series of events held to mark the 100th anniversary of forestry research and development in Indonesia.
Photo by Mokhamad Edliadi/CIFOR

* Further reading: CIFOR. 2012. CIFOR and Indonesia: A partnership for forests and people. Bogor, Indonesia: CIFOR.

Scientists from FORDA conduct research in a mangrove forest in Kalimantan. Photo by Kate Evans/ CIFOR

During the 20 years Indonesia has hosted its headquarters, CIFOR has published and shared its research with international and national forestry communities through journal articles, books and technical briefs. This information is also shared online via CIFOR's website, which is visited more by Indonesians than by citizens of any other country. Since its founding, CIFOR has produced more than 800 publications relating to forests in Indonesia.

CIFOR has conducted research collaboratively in Indonesia with academic institutions and national universities by supporting and supervising numerous postgraduate theses related to CIFOR's research agenda. In the process, CIFOR has supported 40 Indonesian staff in graduate and doctoral theses since 1993. Most pertain to forestry science, making a lasting contribution to forestry in Indonesia. Many of these individuals have gone on to hold senior positions in government, universities and civil society.

CIFOR's mandate may be global, but there is no better laboratory than Indonesia for addressing worldwide tropical forestry issues, and by addressing local issues, such as in the examples presented here, CIFOR and its partners contribute to global solutions.

The power of partnership: Collaborative research that matters

Dr. Ujjwal Pradhan, Regional Coordinator for the World Agroforestry Centre's Southeast Asia Regional Program

In 2013, we celebrate 100 years of forestry research in Indonesia, even as the World Agroforestry Centre (ICRAF) Southeast Asia Regional Program commemorates its 20th anniversary. In post-independence Indonesia, the Forestry Research and Development Agency (FORDA) of the Ministry of Forestry has been central to this research. Of course, the context of pre- and post-independence research and forest management has been very different and the demands of today are much more challenging than when forest research started. But we salute the foresight 100 years ago that predicted the growing importance of forest, trees and agroforestry research.

(back, from left to right) FORDA Director General Dr. Ir. Iman Santoso, ICRAF Regional Coordinator Dr. Ujjwal Pradhan, CIFOR Director General Dr. Peter Holmgren and Forestry Minister Zulfiki Hasan join in the planting of a tree at an event at the FORDA headquarters in Bogor, in April 2013, to mark 100 years of forestry research in Indonesia.
Photo by Mokhamad Edliadi/ CIFOR

In September 2011, then ICRAF Director General Dr. Dennis Garrity and then FORDA Director General Dr. Ir. Tachrir Fathoni celebrate the signing of a memorandum of understanding between their organizations. Photo by Sadewa/ICRAF

Some 20 years ago, the ICRAF Southeast Asia program was hosted within the Bogor campus of FORDA. Now the Southeast Asia program is the largest of ICRAF's regional programs, collaborating with FORDA and other international and national partners. For example, we are supporting FORDA's development of a national agroforestry research strategy, and are training national officials in the Ministry of Forestry as well as in other government agencies. We have completed joint research activities, such as in Yogyakarta on smallholders' teak plantations and in Sulawesi on livelihoods, governance and environment issues, and are about to embark on activities elsewhere in Indonesia. We have also partnered with BAPLAN, RLPS and the social forestry unit. There has been much shared learning between the organizations.

ICRAF has undertaken several important collaborative roles with FORDA, ranging through joint and participatory research, co-authored publications and presentations at key international forums, capacity building (including seconded staff from FORDA to ICRAF), and policy dialogues and formulations. Our organizations have also benefited from joint participation at each other's strategy development meetings. Over the past few years, joint discussions have taken place on ways forward, particularly regarding the activities and synergies regarding the CGIAR research programs (especially on forests, trees and agroforestry).

Based on these foundations, we see the themes of landscape ecology, food security and sustainable livelihoods, climate change, smallholders'

agency, and environmental services as being scientific priorities for joint collaborations and research. Given the changing contexts, time demands that we address the emerging opportunities and challenges with scientific rigor and in partnership together.

In the past couple of years, our collaborative activities centred on the recently established Agroforestry Research Center in Ciamis, West Java. This center was established during the tenure of former FORDA Director General, Bp. Fathoni, and the current Director General, Dr Iman Santoso, continues to guide and nurture this organization. There are few such agroforestry research centers in the world, and we are proud of our association. FORDA and the Ministry of Forestry continue to support the promotion of agroforestry, and indeed, focusing outside of forests can often relieve the pressures on them. ICRAF has a focus on trees and tree products in agricultural landscapes.

The anniversaries of our two organizations provide an opportunity to renew our commitment, reflect on our work and mission, and affirm our pledge to shared learning. As a research coalition fostering the process of knowledge to action, we can look forward and contribute to the growth, prosperity and development of Indonesia in the field of agroforestry.

ICRAF Director General Dr. Tony Simons and former FORDA Director General Dr. Ir. Tachrir Fathoni shake on an agreement at the monitoring and evaluation meeting between FORDA and ICRAF in 2011, also attended by (from left to right) Retno Utaira, then Management Services Leader of ICRAF; Ir. Adi Susmianto Pradhan, Head of the Center for Conservation of Nature and Rehabilitation; Dr. Ujjwal Pradhan, ICRAF Regional Coordinator; Dr. Harry Budisantoso, Head of BPK Ciamis; and Dr. Krisfianti Ginoga, Head of Climate Change Research and Policy.
Photo by Jose Arinto/ICRAF

A brief history of the FORDA–ICRAF research relationship

Robert Finlayson, Ujjwal Pradhan, Meine van Noordwijk, Suyanto, Betha Luisiana, Vinny Iskandar

On 18 April 1992, the Director General of the World Agroforestry Centre (ICRAF), Dr Pedro A. Sanchez, and the Director General of the Government of Indonesia's Forestry Research and Development Agency (FORDA), Dr Wartono Kadri, signed a memorandum of agreement on a cooperative program for agroforestry research. The two organizations agreed to conduct agroforestry research, training activities, information exchange and development activities in accordance with Indonesia's development objectives and ICRAF's goals of mitigating tropical deforestation, land degradation and rural poverty through improved agroforestry systems.

To help achieve this, ICRAF established a regional research program for Southeast Asia. Bogor was chosen as the site of the regional headquarters because of Indonesia's rich history of agroforestry systems, and because of its proximity to sister organizations, such as the newly created Center for International Forestry Research, the Asia-Pacific Agroforestry Network (APAN) of the United Nations' Food and Agriculture Organization, and Bogor Agricultural University. The first office of ICRAF Southeast Asia was inaugurated in February 1993 at the FORDA campus.

Three events had particular significance in developing the guiding principles of the regional research program. The first occurred in August 1992, when the new Southeast Asia regional program team of scientists joined Indonesian colleagues from forestry and agricultural research institutions to select research sites for the international Alternatives to Slash and Burn project, initiated in 1992 at the United Nations Conference on Environment and Development in Rio de Janeiro. The second was an international workshop on ASB research methodology, which the Southeast Asia program hosted in Bogor in February–March 1993. The third was an international training course on land-use systems research methodology for the humid tropics of Asia, co-hosted by the Southeast Asia program and APAN. These events brought together scientists from across the region and the rest of the world to examine the key issues that would help shape the research agenda for Southeast Asia.

In 1995, the memorandum of agreement widened to cover a cooperative regional program on agroforestry research. The Minister of Foreign

ICRAF Regional Coordinator Dr. Ujjwal Pradhan (left), Director of the Centre for Forest Productivity Improvement Research and Development Ir. Bambang Trihartono (center) and Director of Forestry Extension and Human Resources Development at the Ministry of Forestry Dr. Ir. Tachrir Fathoni sit on the panel at the Second Workshop on the National Strategy on Agroforestry Research in Indonesia at the Ministry of Forestry in Jakarta in 2012. Photo by ICRAF

Affairs, Dr. Ali Alatas, gave full authority to the Ministry of Forestry to sign the new agreement on behalf of the Government of Indonesia. The Director General of ICRAF and the Secretary General of the Ministry of Forestry, Dr Oetomo Soedjonopuro, signed the new agreement on 20 January 1995. In the same year, Indonesia's Minister of Forestry, Dr Djamaludin Suryohadikusumo, authorised the relocation of the ICRAF office to the new international facilities built at Darmaga for the Center for International Forestry Research. In 2000, ICRAF also opened an office in the Manggala Wanabakti complex of the Ministry of Forestry in Jakarta, to ensure closer collaboration with senior decision-makers and scientists. ICRAF started using the brand name 'World Agroforestry Centre' in 2002, but did not change its legal identity.

The Southeast Asia program's mandate was to conduct strategic research and to develop and disseminate more effective research methods. Those imperatives remain the same to this day. The team stated their intention to 'identify and concentrate on the most important problems in agroforestry and provide strategic leadership in developing the research base to solve them'. They saw their research bounded by two themes: 1) the development of alternatives to slash-and-burn agriculture; and 2) the rehabilitation of degraded lands.

The Southeast Asia program first set about testing hypotheses applicable to each of the three major ecosystem zones common to the region, with a particular focus on the host country, Indonesia. On the forest margins, the hypothesis was that complex agroforests provided a superior alternative for small-scale farmers. Complex agroforests increased production

sustainability, increased biodiversity, reduced production risks and increased returns to labour compared to the alternatives of continuous food cropping or monocultural plantations. The second hypothesis stated that rehabilitating *Imperata* grasslands with small-scale agroforestry systems would be superior to plantation reforestation in terms of production, equitability and participation. For hilly farmlands, the team hypothesized that there were several pathways to sustainable farming. Among these, contour hedgerow systems initiated through natural vegetative strips provided distinct advantages as a superior, least-cost foundation upon which to build agroforestry-based, conservation farming.

These hypotheses were tested at sites in Indonesia under the auspices of the Alternatives to Slash and Burn international research project, which continues to this day, rebranded as the ASB Partnership for the Tropical Forest Margins. Around the same time, an *Imperata* grassland project began in collaboration with the Australian Centre for International Agricultural Research, which lead to a special issue of the *Agroforestry Systems* journal. Soon after, investigations began into policies concerning tenure and land uses, supported by the Asian Development Bank and the Ford Foundation. Dr AN Gintings of FORDA was actively engaged in the management team and FORDA researchers were much involved in integrated assessment teams that supported both projects.

Research by FORDA staff, Murniati, resulted in a widely cited journal article that posed a two-stage relationship between resource development and forest extraction. Murniati's subsequent doctoral thesis in Wageningen, titled 'From *Imperata cylindrica* grasslands to productive agroforestry', involved Tropenbos International, FORDA and ICRAF. This work contributed to review chapters on the role of mycorrhiza in belowground interactions in tropical agroecosystems and included reference to broader agroforestry issues, published in the *Advances in Agroforestry* series.

FORDA researcher Hesti L. Tata, attached to ICRAF as a PhD candidate in 2005–08, completed her doctoral thesis on mycorrhiza in Dipterocarp enrichment planting in rubber agroforests. Her subsequent research has resulted in a number of articles in international journals, adding considerably to knowledge about rubber agroforests in Indonesia. From 2010 to 2012, Dr. Tata was seconded to ICRAF and worked on two research projects: Rapid Assessment of Ecosystem Services Provided by Sumatran Orangutan Habitat and Cost-Benefit Analysis, and Toward a Biodiverse Rubber Estate: Quick Biodiversity Survey of Bridgestone Sumatra Rubber Estate, North Sumatra.

Since 2012, Dr. Tata has been involved as a post-doctoral researcher with the continuing cooperation on developing agroforestry options for

Leaders from FORDA, the World Agroforestry Centre and the University of Brawijaya join forces at the First National Agroforestry Seminar in Malang on 21 May 2013: (left to right) Ir. Bambang Trihartono, Director of the Centre for Forest Productivity Improvement Research and Development; Dr. Ir. Iman Santoso, FORDA Director General; Dr. Meine van Noordwijk, ICRAF Global Chief Scientist; Prof. Kurniatun Hairiah, Professor, Faculty of Agriculture, Brawijaya University; and Ir. Harry Budi Santoso, Head of BPTA Ciamis. Photo by ICRAF

peatlands. She is researching the domestication and germplasm of *Dyera polyphylla* ('jelutung' in Indonesian), a native peatland tree species. As part of the research, farmers are helping to develop agroforestry demonstration plots of *D. polyphylla* with other existing tree systems, such as coffee and betel nut, oil palm and rubber. The research runs parallel with the Reducing Emissions from All Land Uses project in Tanjung Jabung Barat district, which is funded by the European Union. As the early studies of the ASB Partnership for the Tropical Forest Margins program pointed to major issues in this arena, new projects were started that focused on policies concerning tenure, forest delineation and other land uses, supported by the Asian Development Bank and the Ford Foundation.

Our staff also worked closely with Dr. Krisfianti Ginoga of FORDA in a project in 2004, funded by the Australian Centre for International Agricultural Research, which explored carbon markets focusing on land-use change and forestry activities, with emphasis on smallholders' agroforestry. At the same time, FORDA staff member, Dr. Niken Sakuntaladewi, worked with ICRAF researching 'boundary organizations'. Dr. Sakuntaladewi was a member of a joint research project made up of staff from ICRAF and the Sustainability Science Program at Harvard University called Integrating Knowledge and Policy for the Management

of Natural Resources in International Development: The Role of Boundary Organizations. This study explored how well the boundary organization theory applied in the challenging context of linking knowledge with action to deal with the issues facing Indonesian agroforestry. The team found that boundary organizations could be most generally conceived of as 'negotiation support' institutions that were overtly engaged in the work of constructing both usable knowledge and the social order that creates and utilizes that knowledge.

ICRAF scientists have also been working closely with colleagues at the Directorate General of Forest Planning, Ministry of Forestry (Ditjen Planologi Kehutanan), on the Accountability and Local Level Initiative to Reduce Emission from Deforestation and Degradation in Indonesia project, funded by the European Union. Ditjen Planologi Kehutanan, as the primary partner, has demonstrated consistent commitment sharing essential data. Gathering this data has been a tremendous effort both in terms of resources and coordination between national and regional offices. Together with Mr. Saeful Rahman, a key staff member at Ditjen Planologi, we produced an analysis of Indonesia's land-use and land-cover changes and their trajectories (1990, 2000 and 2005). This map complies with the Tier 2 or higher emissions estimation requirements of the Intergovernmental Panel on Climate Change.

From January 2010 until December 2011, Dr. Retno Maryani was seconded to ICRAF from the Research Centre on Forest Policy and Climate Change. During that time, Dr. Maryani worked with the ICRAF policy unit to analyze REDD+ in Indonesia. She published a working paper, *REDD+ in Indonesia: a historical perspective*, which documents the process of Indonesia's engagement with REDD+ policy since the 1990s until the present. Dr. Maryani at that time also acted as liaison officer between ICRAF and FORDA.

ICRAF has also been working closely with FORDA to assist the establishment of the Agroforestry Research Centre in Ciamis, West Java. The cooperation has included development of the Indonesian National Strategy on Agroforestry Research, and training Ciamis staff in website development and maintenance, English-language scientific writing and research methods. Based on the memorandum signed by the director generals of ICRAF and FORDA, there are three main activities undertaken in collaboration.

1. Methods training (April 2013)
Five methods were trained in parallel:

1. methods for household economics research data gathering and analysis
2. methods for gender research data gathering and analysis

3. methods to measure carbon
4. WaNuLCAS model to study tree and crop interactions and agroforestry systems
5. GenRiver model to assess hydrological function of a watershed.

In total, 31 staff from the Agroforestry Research Center (BPTA) in Ciamis, West Java were trained.

2. Research design and writing workshop (June 2013)
Five resource persons (four scientists from ICRAF and Dr. Hesti L. Tata from FORDA) trained 18 participants. Of the participants, four were from ICRAF, one from the National Research Institute Agency and 13 from FORDA, including eight from BPTA Ciamis, two from FORDA headquarters, and three from outreach forestry research centres in Kupang-East Nusa Tenggara, Aek Nauli in North Sumatra, and Banjarbaru in South Kalimantan. As a result of this activity, at least three abstracts will be submitted to the World Congress of Agroforestry to be held in New Delhi in February 2014.

3. Joint research study (August 2013–April 2014)
Two research proposals from BPTA Ciamis were approved by the Agroforestry and Forestry in Sulawesi project, which is funded by the Canadian International Development Agency. During the period August 2013–April 2014, they will carry out research studies pertaining to pests and diseases in cocoa agroforestry systems and estimating water yields and landscape carbon stocks in one of the sub-catchments of South Sulawesi. As a result of this activity, at least two working papers and two national journal papers will be published in 2014.

Other important collaborations include the inaugural Regional Agroforestry Day in Jakarta in 2011, which was jointly organized with FORDA, attracting representatives from throughout Southeast Asia and Indonesia. ICRAF has also been closely involved with the Working Group on Tenure, which is chaired by Pak Iman Santoso, and the Lombok conference on Forest Tenure Reforms, which was organized with FORDA, the Ministry of Forestry, the Rights and Resources Initiative, and the International Tropical Timber Organization (ITTO). ICRAF is also collaborating with FORDA on social safeguards work, along with partners in the Participatory Monitoring by Civil Society of Land-use Planning for Low-emissions Development project in Papua.

We expect that this close working relationship will strengthen in years to come and we look forward to achieving the common goal of sustainable landscapes and livelihoods in Indonesia.

Further Reading

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Research through development: A Javanese success story

Center for International Forestry Research

"Farmers used to look up to field officers as though they were little gods," CIFOR researcher Levania Santoso said, "but now they see themselves as equal partners in a collaborative forest management scheme."

The field officers work for Perum Perhutani, the state-owned company that manages almost 3 million hectares in Java, including 600,000 hectares of teak plantations. The scheme is locally known as Pengelolaan Hutan Bersama Masyarakat (PHBM).

In the mid-2000s, farmers from four Javanese villages involved with Perum Perhutani benefited from "Levelling the Playing Field", a project managed by CIFOR and the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD). The project sought to give local people the skills they needed to negotiate successful partnerships with more dominant players, such as government agencies and private companies. The aim was to make forest management not just sustainable, but fair in the sense that it recognized the demands of local people.

"Perum Perhutani had been trying to work collaboratively with local communities for many years, but without much success," Santoso

A farmer plants sengon (*Paraserianthes falcataria*) in Central Java. Photo by Levania Santoso/ CIFOR

* Further reading: Roda J-M, Cadene P, Guizol P, Santoso L and Fauzan AU. 2007. Atlas of the wooden furniture industry in Jepara. Bogor, Indonesia: CIRAD and CIFOR.

explained. "The problem stemmed from the fact that the communities had little or no bargaining power and lacked the confidence to say what they thought."

In Indonesia — the project also has sites in Malaysia and the Philippines — researchers from CIFOR, CIRAD and a local university began by encouraging each community to create a common vision and design a micro-project. This didn't have to be forest-related; the aim was to help villagers act collaboratively, communicate better and improve their negotiating skills. Discussions were eventually broadened to include Perum Perhutani. These focused on how they could manage the forests collaboratively, to the benefit of both the company and the local communities.

In areas where state forests are located within village administrative areas, PHBM partnerships allocated 25 percent of the profits of timber harvesting to local communities. In three villages with rich teak resources, the project helped to establish new rules and regulations governing the sharing of the benefits from the forests. As a result, the forests are now better managed and farmers' incomes have risen significantly.

However, in one village, Glandang, the teak had all been cleared just after the fall of the Suharto regime and the villagers lacked the capital to plant trees. A third party — Accor Indonesia, the hotel group — was encouraged to join the partnership. Accor paid for the planting of some 70,000 sengon trees (*Paraserienthes falcataria*) on empty land. When the trees are harvested in 2015, Perhutani will take 40 percent of the profits, the Glandang farmers' group 30 percent, and Accor 30 percent. The hotel group will use the profits to set up an education fund for scholarships and for replanting.

But is this any more than a successful, small-scale development project, empowering villagers with the help of an altruistic donor? According to the project leader, Philippe Guizol of CIRAD, it is.

"There is a strong research element, which is helping us to develop indicators to monitor environmental mediation in developing countries and get a better understanding of the dynamics of collaboration," he said. "For instance, it provides interesting insights into a three-way relationship, and shows how the introduction of a third party has helped to reinforce the original agreement." Now that the villagers and Perhutani see how attractive the project is to outsiders, they are much more appreciative of their collaboration and determined to make it work.

"There are lots of projects in Java doing much the same thing, in terms of empowering villagers," says Santoso, "but we have established a process which enables communities to develop a sophisticated capacity to run their own affairs. This will help us to develop guidelines which will be applicable elsewhere."

Forests and People

Photo by Aulia Erlangga/CIFOR

Understanding the forest

Center for International Forestry Research

In 1996, the Indonesian government demarcated a 320,000-ha area of forest in Bulungan District for CIFOR to use as a long-term research area. The International Tropical Timber Organization (ITTO) funded a 3-year project on forest management and sustainability in a large forest landscape that attracted a number of other partners.

Over the years a unique partnership evolved in the district of Malinau in East Kalimantan. Researchers and local groups collaborated to identify and address the needs of the stakeholders by finding the best ways to manage a large forest.

"The lessons we have learned provided us with baseline information that will support longer-term research," said CIFORs Kuswata Kartawinata, who led the project. "These results are laying the basis for finding negotiated solutions that will last into the future."

On biodiversity, CIFOR's research in Bulungan helped define the priorities of the local people and assist in a wide range of processes, from developing reduced-impact logging guidelines to setting forest conservation policy.

"We have developed a suite of methods to assess biodiversity and landscape information and what matters to local communities," said Doug Sheil, CIFOR's biodiversity specialist.

By using a new technique called multi-disciplinary landscape assessment, project researchers could work out which animals and plants the different groups of local people used or valued and how important these species were to them. These efforts gave special attention to previously marginalized groups such as the Punan, who have traditionally been hunters and gatherers and depend very heavily on the forests. The assessments are now serving the basis for discussions about land use planning. They are also contributing to new forestry practices and regulations that can help to protect those plant and animal species that communities value the most.

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Community members from Langap discuss plants with other members of the field team, East Kalimantan. Photo by Douglas Sheil/ CIFOR

For example, regulations that require concession holders to repeatedly slash all undergrowth and climbers after felling are intended to reduce aggressive weeds to encourage regeneration. In practice, it cuts many useful species, including rattan and timber seedlings. This slashing may be more damaging to the forest than the harvesting itself and we are suggesting that this policy be reviewed, said Doug.

On reduced impact logging, techniques developed allowed companies working in Bulungan to harvest 7-9 trees per hectare and still keep damage to the soil and water resources to a minimum. Controlling how trees fall and how they are taken out of the forest reduced damage to the remaining trees by up to half. This means that the logging companies probably do not need to pay for costly regeneration treatments. Lower operational costs actually outweighed the expense of training and supervision. And the forest workers found that with the right planning they could meet the same daily volume in a shorter time than using conventional techniques.

"Since several companies such as PT Inhutani II and PT Trakindo Utama were involved in the process from the start they feel completely confident about the reliability of the results," said Machfudh, a scientist from Indonesia's Forestry Research and Development Agency (FORDA) seconded to CIFOR, who was closely involved in the research.

Complementing the biodiversity work was sociological research among the Punan people on their attitudes to forest products. This approach has provided key insights into the way forest dwellers regard forest resources and challenged some long-held assumptions.

"Most of the people do not collect forest products on their own initiative," said Patrice Levang, a French scientist seconded to CIFOR from the

Institut de Recherche pour le Développement. "Economic dependency on forest products is seldom the result of free choice; it is often the only option available to forest people to generate cash income."

There are also variations in the degree of dependence on forest products among ethnic groups and individual households. Forest products abound in isolated areas and provide much of the livelihood needs of the Punan hunter-gatherers, while downstream areas have other options available to the local Dayak swidden cultivators like agricultural and off- farm activities. This greater understanding will allow development initiatives to match more closely the attitudes of the forest dwelling communities, and hence greatly increase the likelihood of benefiting them.

Hope for the endangered Javan leopard

Center for International Forestry Research

A Javan leopard caught on a camera trap in Gunung Halimun-Salak National Park, West Java. Photo by CIFOR

Age Kridalaksana, a young Indonesian ecologist in a research station nestled in the thickly forested hills of Gunung Halimun-Salak National Park in Java, gestures excitedly at his computer.

The photos displayed are crisp, the colors striking; the spotted coat and silver-grey eyes instantly recognizable as one of the park's most elusive

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mammals, the Javan Leopard (*Panthera pardus melas)*, recently added to the International Union for the Conservation of Nature's 'Red List' of world's endangered species.

The big cats are usually extremely shy and enigmatic, but this healthy adult male, caught on a camera trap in early 2013 just two kilometers from the research station, seems to revel in his newfound fame. He stretches out, reveals his powerful canines with a huge yawn, then rolls over languidly.

"It's as if he's showing off, like he knows we are there," Age says.

Gunung Halimun-Salak National Park covers 113,000 hectares and has some of the richest biodiversity in Indonesia. Yet, surprisingly, despite visits from scientists across the world, only a fraction of its 61 mammals species, 700 plants and 244 birds species have been extensively recorded. The numbers of Javan leopard remaining in the wild are still unknown, with estimates ranging from 250 to 700.

That is why Age and colleagues from CIFOR and the Bogor Agricultural University (IPB) are here. With assistance from national park staff, they have been monitoring the size and range of leopard populations and their prey.

This is important, says Age, in part because it helps identify potential threats, like whether hunters or poachers are in the area, and if the big cats are moving closer to areas frequented by people.

"We need to understand how human influence is affecting the distribution of leopards and other species in this area," he added.

The presence of large predators is also an indicator of the condition of the forests, a sign that the ecosystem is balanced.

But in Java, the forests are changing. Home to half of Indonesia's population and the epicenter of the country's current economic boom, Java is losing more than 2000 hectares of rainforest a year. Large-scale forest-clearing by mining and palm oil companies, as well as small-holder agriculture and tea plantations, is eating away at what little remains.

This includes forest in protected areas. According to an IPB report, between 1989 and 2004, Gunung Halimun-Salak National Park lost 25 percent of its forest from illegal logging and forest-clearing activities.

"If you lose the habitat, then you risk losing your top predators, which can have a devastating effect on the rest of the ecosystem," said Age. "Monitoring leopard populations now will help the park manage them and their habitat more effectively in the future."

For example, national park staff could scale up efforts to protect locations identified as important breeding and feeding areas. Patrols to prevent illegal hunting and encroachment could be better targeted toward areas where humans and wildlife are more likely to come into contact.

So far, the signs have been encouraging. The 30 camera traps dotted throughout the park have captured over 1000 images of barking deer (*Muntiacus muntjak*), common palm civet (*Paradoxurus hermaphroditus*), plantain squirrel (*Callosciurus notatus*), and Malaysian field rat (*Rattus tiomanicus*) — an abundance of prey for a hungry leopard.

To the delight of the scientists, two other leopards — including a relative of the Javan leopard with a black coat caused by a recessive gene mutation — were also captured on film.

"This is very impressive, considering that only a few hours away is the huge city of Jakarta, which encompasses 20 million people," says Ken Sugimura, a Japanese scientist who leads the CIFOR project.

So far, leopard sightings and incidents of conflict with the 300 communities around the park have been rare.

"So long as their [leopard] habitat is good, I think conflict between wild animals and the surrounding community will not exist," said Iwan Ridwan, a forestry technician at the park.

Research in support of the furniture industry

Center for International Forestry Research

Abdul Latif, the son of farmers in Sinanggul village in Mlonggo, Jepara, has been working in the furniture industry since he graduated from high school about 16 years ago. A graduate from a language academy with a major in English, Latif now owns and manages a small furniture-making workshop in his hometown. He officially opened his business, CV Mebel Jati Jepara, on 13 October 2011. He has 10 regular employees, and takes on up to 60 employees when orders are at their peak. His main orders now come from Europe, especially France.

Women add finishing touches to wooden furniture made in a small workshop in Jepara, Central Java. Photo by Murdani Usman/CIFOR

Latif joined the Jepara Small-scale Furniture Producers Association (APKJ) in 2010, which was initiated as part of the Furniture Value Chain (FVC) project run by CIFOR and supported by the Australian Centre for International Agricultural Research. Born out of research carried out in collaboration with Indonesia's Forestry Research and Development Agency, the Faculty of Forestry of Bogor Agricultural University, Jepara District Government and the University of Melbourne, APKJ sought to build the capacity of Jepara's small-scale furniture makers by conducting training in various areas, including business management and online marketing.

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Through his participation in this association, Latif has been able to broaden his network and increase his access to market information. His involvement also exposed him to the Indonesian government's Timber Legality Assurance System (TLAS) and its implementing regulation.

To comply with the requirements of this new regulation, Latif kept records of his suppliers' business documents and his company's transactions. Usually, small-scale furniture producers do not record their business transactions because of poor management practices and the multiple tasks that owners must perform. The TLAS compliance process taught him that business administration is as important as meeting deadlines for orders, and he has since recruited a manager.

The process was difficult, he reported, because of the number of criteria and his unfamiliarity with the system. But it paid off: on 4 April 2013, his company was granted a legality certificate under the TLAS, making him the first small-scale furniture producer to achieve compliance.

APKJ has emerged as an effective forum for improving its members' capacity to manufacture better-quality furniture, to deal with management issues and to reduce the time to delivery. APKJ has also improved cohesion among small-scale furniture producers and acts as a forum where they can interact, broaden their influence and set targets. APKJ has been able to negotiate with other associations in Jepara, such as the Indonesian Furniture Industry and Handicrafts Association and the Jepara Wood Traders Association. The Jepara District Head has acknowledged the important role of APKJ.

Members of APKJ stated that since joining, they have been exposed to greater opportunities either through improved market access or through the adoption of innovations, such as the use of an internet portal to market their furniture. Half of the APKJ champions accessed loans from Bank Rakyat Indonesia after participating in a financial training course run under the FVC project. Loans granted were in the range of 10–50 million Indonesian rupiah.

In particular, the 120 members of APKJ have noticed economic outcomes related to the project and the association. An impact assessment that compared the performance of members and non-members found that more members are improving in several aspects of their business. In total production, sales and profits, more than 85 percent of APKJ members had seen improvements in the 5 years before the study, compared with only 60–74 percent of non-members.

Under the FVC project, a strategic plan for the furniture industry in Jepara was also created. This plan, titled 'A roadmap for the furniture industry 2013–23', is designed to guide the development of the furniture industry in Jepara, and Jepara District Regulation on this has been drafted.

Landmark findings show mangroves key to fighting climate change

Center for International Forestry Research

After a flight to a seaside town in Indonesia, a group of scientists travels 20 hours by boat to an inland riverine site where they spend a week, waiting for each day's low tide to clamber across a web of roots and knee-deep mud to reach a remote mangrove forest.

So began the grunt work that led CIFOR to pivotal findings in 2011 — pointing to mangroves as ideal repositories for keeping carbon out of the atmosphere and sequestered in forests — that are having significant implications for local and global policies.

Scientists conduct research in a mangrove forest in Indonesia. Photo by Daniel Murdiyarso/CIFOR

The scientists unfurl measuring tape and jot down the circumferences of trees. They unload some 12 kg of stainless steel rods, bore them into the ground, and pry them out to collect core samples: at 1 meter deep, dirt that is gritty with leaf bits, and at more than 11 meters deep, earth that is black and slick as grease.

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Kauffman, J.B. and Donato, D. 2012. Protocols for the measurement, monitoring and reporting of structure, biomass and carbon stocks in mangrove forests. CIFOR, Bogor, Indonesia.

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Slathered in mosquito repellent to guard against dengue fever and malaria, the scientists work quickly as the tide rises. They swim back to the boats. Back in the laboratory, they analyze the carbon in thousands of soil samples from across Southeast Asia. They crunch their numbers and are astounded by the results: mangroves store three to four times more carbon than most tropical forests.

Mangroves occur along the coasts of some 118 countries, but up to half of them have been destroyed in the past half century.

A spike in greenhouse gases has warmed Earth by 0.7°C over the past century, brewing an ever more turbulent blend of storms, floods, landslides, forest fires, temperature extremes and droughts.

"Mangroves are being destroyed at an alarming rate and this needs to stop," said Daniel Murdiyarso, CIFOR Senior Scientist. "There is a lack of awareness of the full implications of mangrove loss for humankind. There is an urgent need for governments to acknowledge their importance and develop better policies to ensure their protection."

Since the mangrove findings were published in 2011, they have received worldwide attention from the media, general public and scientific community. The findings were fed into the Intergovernmental Panel on Climate Change processes as it revised its guidelines for greenhouse-gas inventories in wetlands.

To further enhance the impact of the findings, CIFOR developed the Tropical Wetlands Initiative for Climate Change Adaptation and Mitigation in collaboration with research institutions, donor communities and regional academic partners. This included networking and capacity building across the globe to assess carbon stocks and greenhouse gas emissions from tropical wetlands.

The topic also received attention at the national level. In Indonesia — home to the biggest area of mangroves in the world, with close to 3 million hectares scattered across the archipelago — CIFOR hosted a journalist workshop on wetlands. Some 17 national journalists attended the workshop and the field trip to a mangrove forest, and more than 30 stories were published in major newspapers across the country.

Studying the impacts of forestry research

Center for International Forestry Research

In the late 1990s, CIFOR researchers identified a major problem for Indonesia's natural forests: pulp and paper companies were expanding their processing capacity at a much faster rate than they were bringing plantations online.

CIFOR's research, led by policy scientist Chris Barr, provided civil society organizations with the data and analysis they needed to campaign for reforms of the pulp and paper industry. The Ministry of Forestry introduced a decree to increase the rate at which pulpwood plantations were established. As a result of these and other measures, companies such as Asia Pulp & Paper (APP) and Asia Pacific Resources International Ltd (APRIL) began to increase the areas they set aside for conservation and to accelerate their plantation programs.

In the mid-2000s, CIFOR impact assessment scientist David Raitzer further investigated the extent to which this research has led to changes in behavior and policy by looking at three main pathways: increases in the area of forest land set aside for conservation by companies; increases in the use of fiber from plantations; and the extent to which companies did not expand their processing capacity as a result of CIFOR's research. He interviewed 31 informants in the industry, government and civil society, and they confirmed that Barr's research has had a considerable influence.

For example, APP and APRIL have set aside large areas of forest land for conservation. They have also rapidly increased the amount of land under plantations, partially as a response to the ministerial decree, and partially as a response to the demands of buyers and creditors influenced by advocacy. APRIL officials credited CIFOR and advocacy by non-governmental organizations (NGOs) with virtually all improvements in sustainability made since 2001; and the NGOs confirmed that Barr's research was essential to obtaining environmental commitments from APP and APRIL.

In Papua, CIFOR's research contributed to a reconsideration of the extent and pace of land being allocated for oil palm and timber plantations, as communities learned more about their social, environmental and economic impacts.

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Acacia mangium logs harvested from the PT Riau Andalan Pulp and Paper concession area in Kampar District, Riau.
Photo by Ryan Woo/CIFOR

Boven Digoel is a district in Papua province that had become a target for investment in oil palm plantations and industrial timber estates. CIFOR's research there, published in 2011, found that oil palm development contributed to the economy through tax revenues and employment. However, the plantations were perceived to cause significant environmental damage and conflicts over land.

As a result of CIFOR's study, the Boven Digoel district government postponed authorization of large-scale initiatives until more is known about how to manage their impacts.

CIFOR research also contributed to a reduction by nearly two-thirds of a plan to convert 2 million hectares of indigenous people's land into an industrial agriculture and biofuels estate in Papua's Merauke District. The research, which involved consultations with villages and participatory mapping of the land by local communities, helped to resolve existing conflicts between clans over land tenure. The research outputs have been used extensively by tribal leadership to inform their participation in discussions related to large-scale land acquisition for timber plantations and other estates. The leader of the Malin-Anim tribal community sent a letter to CIFOR indicating that the project greatly improved their understanding of the value and fragility of their natural resources, and strengthened their resolve in negotiations with plantation investors.

The campaigns and reforms that benefited from CIFOR's research helped to save large areas of pristine forest from destruction, either directly through conservation commitments, or indirectly through the substitution of plantation wood for natural forest wood and the reduction in demand for wood from natural forests. This has protected biodiversity and valuable watershed services, such as the provision of clean water for agriculture and human consumption. It has also ensured that large quantities of carbon that would have been released into the atmosphere, had the forests been felled, remain safely locked up. Indeed, the main economic benefits of CIFOR's pulp and paper research largely derive from the reduction in carbon emissions through averted forest loss.

Reducing money laundering in the forestry sector

Center for International Forestry Research

Illegal logging costs governments some US$15 billion a year in lost assets, lost revenues and unpaid taxes. Tens of thousands of people are involved in felling and transporting illegal timber, but most of the profits end up in the hands of a few big players, who launder their ill-gotten gains through the banking system. Research by CIFOR financial analyst Bambang Setiono has raised awareness about the close links between money laundering and forest crime.

It has been clear for many years that the forestry laws in Indonesia, though adequate on paper, have failed to have a significant impact on the hugely profitable trade in illegal timber. Setiono recognized that a new approach was needed. Illegal loggers, like drug traffickers, need to convert the profits they make into assets that have a veneer of respectability, such as real estate, stocks and shares, or oil palm plantations.

Working closely with Yunus Husein, then the head of the Indonesian government's Reporting and Financial Transaction Analysis Centre (PPATK), Setiono proposed that banks should be required by law to inform the government of any suspicious transactions. In 2003, the government

A police officer stands guard as others check one of 62 confiscated containers of illegal timber, at Tanjung Priok port. Photo by Mast Irham/ EPA/Corbis

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introduced a new law, classifying forestry and environmental crimes as 'predicate offences' for money laundering charges.

In 2004, Setiono and Husein managed to get illegal logging onto the agenda of the Asia/Pacific Group on Money Laundering (APG).

"Before this, the APG had focused its attention on traditional money laundering offences, such as drug dealing, currency smuggling and people trafficking," Setiono said. "But at an APG workshop in Brunei, we highlighted the significant role money laundering plays in illegal logging." Following the workshop, the APG asked PPATK to organize a special working group on illegal logging to help member countries in the region to introduce and enforce anti-money laundering laws.

The APG Typologies Report published in 2008 included a section on anti-money laundering and illegal logging for the first time. The message was clear: "Effective money laundering legislation and preventive measures provide strong tools to detect the profits and investigate and prosecute the persons behind illegal logging and prevent financial markets from abuse," the report said.

Besides influencing the APG, Setiono's research has had a significant effect on other organizations. For example, the World Bank began taking the issue more seriously and the Indonesian Working Group on Forest Finance started helping to raise awareness about the significance of Indonesia's money laundering law. The Indonesian police and PPATK have used the law to investigate several cases of illegal deforestation, and in 2008 it led to the conviction of one of Indonesia's leading timber barons.

In 2009, the Central Bank of Indonesia put in place a regulation requiring commercial banks to implement anti-money laundering programs. But it became clear that the banks needed assistance in implementing this regulation. CIFOR quickly stepped in to help and recommended procedures for banks to apply due diligence mechanisms for customers operating in forest-related businesses.

The recommendations stress that banks need particularly to monitor financial transactions related to the forestry sector and to ensure the identity of the real owners of forest-based companies. They also specify the documentation that should be requested by banks to substantiate claims made by companies regarding the sources of their revenues, including the use of geographic information system technology.

These recommendations were followed up in 2010 with the development of guidelines for law enforcement and audit agencies on how best to crack down on money laundering and corruption in the forestry sector. The guidelines were published in 2011.

Seeing REDD in Indonesia

Center for International Forestry Research

Every year some 11 million hectares of forest — an area almost the size of Greece — are destroyed. This destruction is having a dramatic impact not just on wildlife and the livelihoods of forest-dwelling people, but on the world's climate. Deforestation and land clearance are responsible for roughly a fifth of the world's greenhouse gas emissions, making them a major cause of global warming.

In some areas, deforestation and land clearance matter more than in others. "Indonesia is losing almost 2 million hectares of forest a year, but from the point of view of climate change the scale of the problem is worse than these figures imply," explains CIFOR climatologist Daniel Murdiyarso. The disproportionate impact stems from large expanses of Indonesian peatlands being converted to grow oil palm and other crops. In the process, huge quantities of carbon are being released.

Each year, carbon dioxide emissions from peatlands in Southeast Asia amount to around 2,000 million tons. This amount is equivalent to around half of the total emissions caused by land-use change activities — deforestation in tropical countries being the most significant — and 8 percent of global emissions from the burning of fossil fuels. Ninety percent of Southeast Asian peatland emissions come from Indonesia, making the country the third largest emitter of greenhouse gases after the United States and China.

Fires are used to clear peatland in Indonesia. Photo by Ryan Woo/CIFOR

Further reading: Murdiyarso, D. and Herawati, H. (eds). 2005 Carbon forestry: who will benefit? Proceedings of Workshop on Carbon Sequestration and Sustainable Livelihoods, held in Bogor on 16-17 February 2005. CIFOR Bogor, Indonesia.

Murdiyarso, D., Puntodewo, A., Widayati, A. and van Noordwijk, M. (eds). 2006. Determination of eligible lands for A/R CDM project activities and of priority Districts for project development support in Indonesia. CIFOR Bogor, Indonesia.

The scale and significance of peatland conversion to agriculture was highlighted by a series of studies conducted by the Indonesian Forest Climate Alliance and commissioned by the World Bank in 2007. The studies, which involved 12 CIFOR scientists working with researchers from a number of other organisations, investigated how Indonesia might benefit from projects designed to bring about Reduced Emissions from Deforestation and forest Degradation (REDD). The scientists assessed the various approaches required to curb carbon emissions from a range of land uses, including timber production, oil-palm plantations, industrial timber plantations and conservation, on both mineral and peat soils. The findings were discussed at a series of workshops and presented in Bali at the 13th Conference of the Parties to the United Nations Framework Convention on Climate Change.

The magnitude of Indonesia's peatland carbon emissions is a considerable embarrassment to the Government of Indonesia, but Murdiyarso believes that it also represents a considerable business opportunity. "In REDD negotiations," explains Murdiyarso, "Indonesia should be able to use its past emissions as a reference point for future reductions. If it could control peat forest fires, then Indonesia would have much 'hot air' to sell; for example, to countries buying carbon credits to offset their own industrial emissions."

Murdiyarso points out that a similar situation prevailed in Russia when the Kyoto Protocol first came into force. Russia's quota for reducing emissions was 17 percent of the global target, second only to the United States. During the following years, Russia experienced an economic crisis. Its emissions fell dramatically — by default rather than design — and it found itself with plenty of 'hot-air' to sell under the Kyoto Protocol's Joint Implementation and Emissions Trading schemes. If Indonesia could curb peatland fires, it could potentially earn billions of dollars from REDD projects.

Murdiyarso and his colleagues developed an 'architecture' for future REDD projects in Indonesia. They looked at how to establish baselines; how payments might be distributed among different stakeholders; how risks might be shared between buyers and sellers. The study was only a preliminary analysis, but it helped to inform future demonstration activities funded by the World Bank's Forest Carbon Partnership Facility and designed to explore how to make REDD projects work.

CIFOR also worked closely with Ministry of Forestry and Forestry Research and Development Agency (FORDA) staff to develop the REDD-Indonesia website. This one-stop learning portal in Indonesian is designed to raise awareness about REDD within the government, as well as within NGOs, the media, forest communities and other stakeholders. Since the upgrade and relaunch of the site in April 2011, visits have continued to increase, with more than 5000 visitors downloading thousands of publications on REDD every month.

Logging for wildlife

Center for International Forestry Research

Ask conservationists what they think about logging in tropical forests, and many will paint a grim picture. They will tell you how industrial logging has destroyed vast areas of forest, dramatically reduced biodiversity, and frequently been associated with corruption, violence and the abuse of local communities. In many areas, this is precisely what has happened, and it explains why conservationists are often opposed to logging in tropical forests.

But logging needn't be like this. "We've found that well-managed logging can be compatible with wildlife conservation," explains Erik Meijaard, a forest ecologist with The Nature Conservancy and co-author of *Life after logging: Reconciling wildlife conservation and production forestry in Indonesian Borneo*, published in 2005.

Life after logging looks at the way in which individual mammal and bird species react to logging. Based on detailed field research carried out by CIFOR scientists in the Malinau watershed in East Kalimantan, and a review of the literature, the book provides the guidance logging companies need if they are to manage their concessions in a way which benefits wildlife without reducing their profits.

"Our study shows that the loss of dipterocarp trees — which are what logging companies take — actually affects few vertebrate species directly," explains Meijaard. "It is often the activities associated with logging which cause most of the problems."

For example, logging roads make forests more accessible to local people and hunters from outside. It seems that hunting, rather than logging, has led to the decline of targeted species like the clouded leopard and Malayan sun bear. The slashing of ground vegetation after logging, insisted upon by law to encourage regeneration, affects the food resources of terrestrial insectivores. And logging activities often cause soil erosion, which leads to the muddying of rivers and the loss of amphibians and fish.

The species that suffer most from logging tend to be specialists. In evolutionary terms these are often the older species, which evolved at

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The douc langur is one of the many species threatened by logging. Photo by CIFOR

a time of uniform forest cover. For example, yellow muntjac, western tarsier and the Malay civet, all of which are specialist feeders, appear particularly sensitive to logging. In contrast, species such as red muntjac and Malaysian field rat, which evolved more recently in a more open environment, have fared better, as they have a varied diet and are not as fussy about habitat.

Such insights have enabled the researchers to come up with detailed recommendations. They suggest logging companies should design roads in ways that avoid dividing the forest into too many fragments. Sufficiently large areas need be set aside to protect large carnivores, and there should be regulations to control hunting in timber concessions. Certain areas should be left untouched as they are particularly important for wildlife. These include mineral-rich springs and clay soils, abandoned villages and riverside vegetation.

"We're not saying that logged forest will have as high a conservation value as undisturbed forest," says CIFOR ecologist and co-author Doug Sheil, "but logging is one way of maintaining large forest landscapes in a way that is economically productive and far more beneficial for wildlife than many other land uses."

The study has provided logging companies with comprehensive guidelines on reconciling timber production with conservation. The recommendations have also helped to influence and guide a similar study involving the Swedish University of Agricultural Sciences, CIFOR and the Forest Science Institute of Vietnam.

Decentralization: Good for the forests?

Center for International Forestry Research

When the Indonesian government embarked on a program of decentralization in 1999, there were high hopes that the shift in power away from the center would make decision-makers more accountable to the public, render the whole business of government more transparent, and lead to better and more equitable resource management. The extent to which these hopes have been realized was explored by a two-year project in the early 2000s: 'Can decentralization work for forests and the poor?'

The project, carried out in five provinces, was run as a partnership between CIFOR, FORDA, and universities and NGOs in the provinces. The Australian Centre for International Agricultural Research (ACIAR) and the UK Department for International Development (DFID) funded the project.

In Jambi, the project found that there had been very little public consultation during the drafting of forest-related local regulations, leading to increased conflict between local communities and companies involved in plywood and pulp production. As a result, the local government agreed that there should be greater public consultation during the drafting of new laws, and asked CIFOR and its research partner to provide support.

In South Sulawesi, the research raised awareness about the problems associated with revenue sharing and deforestation. As a result, the District Head's office pledged significant funds for a local forestry development project to implement the research findings. In East Kalimantan, the research inspired local stakeholders to establish a multidisciplinary working group on forest and land rehabilitation, with support from the head of the district.

In Papua, the project led to the production of a documentary film, *Suara Masyarakat Papua* (The Voice of the People), in which local villagers shared their views about how forest management could work in favor of the poor. The film was shown to wide acclaim at the Jakarta International Film Festival, the 3rd Congress of Papua's Adat Council and the World Conservation Congress in Bangkok.

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Sudirman, William, D. and Herlina, H., 2005. Local Policy-making Mechanisms: Processes, Implementation and Impacts of the Decentalized Forest Management System in Tanjung Jabung Barat District, Jambi. CIFOR, Bogor, Indonesia.

Ngakan, P.O., Achmad, A., Wiliam, D., Lahae, K. and Tako, A., 2005. The Dynamics of Decentralization in the Forestry Sector in South Sulawesi: The History, Realities and Challenges of Decentralized Governance. CIFOR, Bogor, Indonesia.

Aerial view of a river in Papua. Photo by Mokhamad Edliadi/CIFOR

Partly based on the findings of this project, CIFOR published *Decentralization of forest administration in Indonesia in 2006*, which makes it clear that decentralization had few benefits as far as forests were concerned. In many provinces, the pace at which forests were being cleared — either legally or illegally — increased when district governments were given the power to allocate small-scale logging concessions.

"Decentralization happened very quickly and it was poorly planned and poorly implemented," CIFOR policy scientist Chris Barr explains. "There was certainly a transfer of authority from the center to the districts, but many of the governance problems that were apparent when the center managed the forest estate have simply been replicated at the local level."

While decentralization led to a significant increase in local government receipts from forestry activities, the local communities, who have most to lose when forests disappear, often received little or no payments for the exploitation of 'their' forests.However, decentralization has at least helped to make local communities more visible. "In the past, during the Suharto era, they were completely ignored," explains CIFOR social scientist Moira Moeliono, "but now their voices are being heard. They are no longer docile, as they were in the past, and both local and central governments now recognize that the issue of community land rights needs to be addressed."

There are some significant lessons to be learned from Indonesia's experience and the book offers a number of recommendations. If Indonesia is to avoid a 'tragedy of the commons', governments at every level will need to move beyond the ongoing tug-of-war over the economic rents associated with timber production. Instead, say Barr and his co-authors, they must focus on how responsibility for managing existing and degraded forests should be shared so that the forests, and those who depend on them for their livelihoods and survival, benefit both now and in the future.

Something for (almost) nothing in Kalimantan

Center for International Forestry Research

In west Kalimantan, local villagers have been producing valuable charcoal from trees that grow untended in abandoned areas. *Vitex pubescens*, a tree that springs up on land after fires or on abandoned farms, yields a charcoal that is as good as that from mangrove trees. Rice does not grow well on the land and farmers find weeding the rough fields too labour-intensive. But establishing small local industries to grow *Vitex* for charcoal offers a way of making the land productive again.

The idea of developing a *Vitex* industry originally came in the late 1990s from a local NGO, said CIFOR researcher Wil de Jong. "We work with Yayasan Dian Tama (YDT) and they involved the local Tanjungpura University in Pontianak to explore how the local farmers can best profit from these grasslands," he says.

The collaboration capitalized on the strengths of each partner to multiply its impact. YDT is the pivotal organization; they run the research with the university and CIFOR collaborated to provide the scientific input. YDT used the good rapport they had with the local people and their contacts in the regional government; CIFOR made connections to outside parties. ACIAR funded the project.

The technology needed to produce the charcoal is relatively simple and inexpensive; at most, communities have to invest in constructing kilns. After four years, one hectare of *V. pubescens* could yield up to 18 tonnes of charcoal, which would earn farmers several hundred dollars when sold to charcoal factories in Pontianak, the closest city.

Four villages participated in field trials, helping researchers answer questions about planting methods, seed stock, fertilizer requirements and labor needs. Recognizing the strong market potential, farmers worked with the researchers to find ways to cultivate the trees in small plantations and the

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best way to produce the charcoal. The activity was very attractive to swidden farmers in West Kalimantan because it allowed them to grow the tree alongside their regular fields without much extra work. Another advantage is that *V. pubescens* tolerates fire much better than many other tree crops, reducing the risk that farmers will lose their investment. A positive side effect is that the trees actually form a barrier to the wildfires that plague the area.

"This research is improving the life of the community, so I am making an effort to disseminate the positive impacts of these activities to a large number of parties," said Donatus Rantan, leader of the project at YDT.

Apart from its local impact, the collaboration has greater potential. These grasslands are common in Indonesia and other countries, so the results of this work will have wide-reaching implications, said de Jong.

1 Villagers unload a kiln. Photo by Yayasan Dian Tama

2 The finished charcoal. Photo by Yayasan Dian Tama

3 A *Vitex pubescens* sapling grows in the midst of imperata grass. Photo by Wil de Jong/CIFOR

Money does grow on trees in Sumatra

Center for International Forestry Research

Growing fewer trees can increase the profitability of plantations. This was the startling conclusion reached by CIFOR researcher John Poulsen in 2001.

"Plantation managers just want to make a profit and you can't blame them for that," said Poulsen. "Companies must think in the short term, which goes against the concept of long-term sustainability. Even so, our research shows them that they can increase the profitability of their plantations and still reduce the impact on the environment and the local people."

As deforestation continues, tropical plantations are becoming more important as a source of industrial wood and fuel throughout the tropics. They also reduce pressure on the remaining forest. However, monoculture plantations reduce biodiversity and local peoples access to resources. So two of CIFOR's programs, Plantations and Biodiversity, began to look at ways to balance profitable production with environmental conservation.

CIFOR capitalized on its extensive experience with tropical plantation research by collaborating with the Bogor Agricultural University and the large plantation company PT Riau Andalan Pulp and Paper in Riau, Sumatra, Indonesia. In Indonesia, plantations must set aside 15 percent of a concession as conservation area.

An oil palm plantation adjacent to intact forest in Jambi. Photo by Iddy Farmer/CIFOR

Further reading: Poulsen, J., Applegate, G. and Raymond, D. 2001. Linking C&I to a code of practice for industrial tropical tree plantations. CIFOR, Bogor, Indonesia.

"We found that setting aside 25 percent of the area as natural forest captured about 80 percent of the regional tree species," said Poulsen. "But to have any real benefits, especially for wildlife, these patches need to connect with each other."

In new plantations, Poulsen said the natural forest that is set aside must be carefully sited and well connected by corridors of natural forest. In existing plantations, the remnants of natural forest that still exist must be conserved and reconnected. The good news is that profitability actually increased as more of the concession was set aside, up to the threshold of 25–30 percent. Corridors of natural trees created between the remnants acted as windbreaks. These protected the plantation trees from damage that was expensive to remedy. Plantation trees closer to the corridors also had much less insect damage because the corridors acted as reservoirs for predators that fed on the major pest insects. This increased production.

These two effects alone increased the profitability of the plantation, but corridors can have many more benefits. The mature vegetation in the corridors along rivers and streams reduced run-off and sediment in the water. They can reduce fire damage to the growing trees and also stop weeds invading the plantation area. The 25–30 percent natural forest area also retained up to 90 percent of the original primate species and reduced the production risks, such as sudden outbreaks of disease, normally associated with monocultures.

As well as the environmental advantages, these effects directly benefited the local people, with the indirect benefit to the concession owners of reducing opposition to the plantations. The local people had clear water. The density of the ten most important tree species used by the local communities also increased with the area of forest corridor, so locals could continue to use the forest to collect products such as honey, firewood and medicinal plants, and hunt animals. "We even showed that siting corridors away from roads drastically reduces illegal logging," said Poulsen. "The impact of the work is obvious. Natural forest remnants and corridors in plantations can be used to maintain biodiversity, increase profitability, retain environmental services and minimize social tensions."

Since the approach is cost effective and can even increase profitability, Poulsen said it would be much easier to convince the industry to adopt it. "The research does not argue for plantations but it deals with the real situation. Many governments will plant large-scale industrial plantations despite their possible negative social and environmental impact. So it is critical for us to work with governments and the private sector to find ways to reduce these effects," said Poulsen.

"Linking long-term sustainable ways of working that conserve environmental services, yet still yield immediate economic benefits, will encourage the industry to adopt the methods."

A future for Indonesia's forests?

Center for International Forestry Research

Indonesia's forests are disappearing at an alarming rate. Every year, timber-related industries consume the equivalent of some 50–60 million cubic meters of round wood. Yet the sustainable yield from natural forests earmarked for production is around 8–9 million cubic meters a year, while plantations currently yield less than that. Another 7 million or so cubic meters are probably harvested legally — but not sustainably — from land cleared for new plantations. This still leaves an enormous gap between demand and legal supply. The result is rampant illegal logging, significant loss of income for government and the destruction of resources used by local communities.

In 2005, Indonesia's Ministry of Forestry, CIFOR and DFID's Multistakeholder Forestry Programme (MFP) collaborated on a report on industrial revitalization — one of the five priorities identified by the Ministry for the period 2004–09.

"Three significant studies had already been undertaken during the previous year, related to timber supply and the need to restructure the country's timber industries," explains CIFOR policy scientist Chris Barr, "and senior managers at the Ministry of Forestry asked us to provide a synthesis of their findings and recommendations."

Working closely with FORDA, the Ministry's research branch, CIFOR gathered together analysts who had been involved in the three studies and hired economist Timothy Brown to coordinate the work of the synthesis team. The team decided to present its findings in the form of future scenarios.

"Researchers have been telling policy-makers for years that the country is losing 2 million hectares of forest a year, but this hasn't had great impact," explains Brown. "We decided to look forward and use economic arguments to show what the implications of these losses will be in 10 or 20 years — for the industry, employment, tax revenues and the landscape."

The synthesis team came up with three contrasting scenarios. The first of these — business-as-usual — shows that if current trends continue, illegal

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Further reading: Setiono, B. and Husein, Y. 2005. Fighting forest crime and promoting prudent banking for sustainable forest management: The anti money laundering approach. CIFOR Bogor, Indonesia.

Staff receive training in tracking timber, in Berau, East Kalimantan. Photo by Agung Prasetyo/ CIFOR

logging, forest degradation and declining industrial output are inevitable. The second scenario envisages an increase in plantations and imports. This is an improvement on the business-as-usual scenario, but even with a strong plantations program and a significant increase in imports, illegal logging will continue to be a major problem for at least another 15 years.

The third scenario — favored by the authors — envisages an increase in both plantations and imports, accompanied, crucially, by significant restructuring of the industry's processing capacity. This shows that illegal logging can be brought under control within a reasonably short period of time, but that will only happen if timber-dependent industries reduce their production.

When the report was presented by FORDA to Minister M.S. Kaban in September 2005, it was warmly received. According to David Brown, an economist with MFP, the Minister recognized that the report represented a credible, quantitative assessment of Indonesia's timber industry, and the need to restructure it.

At the meeting it was agreed that CIFOR, FORDA and MFP would organize a national seminar on forest-industry restructuring. This was held in Jakarta in December 2005, and among those who attended were representatives from the ministries of forestry, industry and trade, as well as key individuals from five provincial forestry offices, various industry groups, civil society organizations and donor agencies.

Capacity Building

Photo by Manuel Boissiere/CIFOR

Sustainable forests for sustainable development

Tropenbos International Indonesia Programme

As one of the seven country programs of Tropenbos International (TBI), which is headquartered in Wageningen, the Netherlands, TBI Indonesia has been working in Indonesia since 1987. The program has evolved over the years. Formerly known as Tropenbos International Kalimantan Programme, the initial focus was on silviculture, and later on botanical research associated with establishing a herbarium in Samboja, East Kalimantan. The research soon included wildlife, followed by an increasing focus on the social aspects of forest management. Since 2007, TBI Indonesia has been focusing on models of collaborative management, environmental services, and tenure issues. The role of CSR (Corporate Social Responsibility) in forest enterprises was also studied.

An important milestone reached in 2007 was the Memorandum of Understanding (MoU) with the Government of Indonesia. The Ministry of Forestry extended the MoU in late 2007, requesting TBI Indonesia to expand our work from Kalimantan into Indonesia. This was followed in 2008 by a generous offer from the Forestry Research and Development Agency (FORDA) to share office space in the Bogor FORDA Campus.

TBI Indonesia's research is moving beyond forestry, focusing instead on landscapes as strategic units of intervention. Promoting productive landscapes is the main focus of the 2012–16 phase. Implementing this phase will focus on promoting three main tools: forest landscape

Better governance for forests, Kalimantan
Photo by TBI Indonesia

Planting a tree in Samboja, East Kalimantan. Photo by TBI Indonesia

restoration tools, high conservation value (HCV) assessment toolkits, and the use of geospatial information systems for decisionmaking.

TBI Indonesia maintains its role as honest broker in providing research results with scenarios and alternatives, fostering critical and reflective thinking. Our vision is that well-managed forests, as components of productive landscapes, can simultaneously contribute to the objectives of alleviating poverty, providing ecosystem services and fostering sustainable economic development. It is our objective to ensure that knowledge is used effectively in the formulation of appropriate policies and in the forest management for conservation and sustainable development.

We are enthusiastic about accomplishing our mission to improve tropical forest governance and management in order to support conservation and sustainable development. Our long partnership with FORDA as the anchor institution of forestry research in Indonesia makes us believe that sound contributions can achieve sustainable management of tropical forests for the benefit of people, conservation, and sustainable development.

Funding support for PhD program

Tropenbos International Indonesia Programme

When the new office for Tropenbos International (TBI) Indonesia Programme opened at the FORDA campus in Bogor, it marked the start of close collaboration between TBI Indonesia and FORDA. TBI Indonesia committed to supporting FORDA research projects through its capacity building program. To achieve this goal, supporting partnerships have been established involving three universities in the Netherlands (Wageningen University, ITC Enschede, and Leiden University), one Australian university (Charles Sturt University) and four Indonesian universities (Bogor Agricultural University, Mulawarman University, Gadjah Mada University, and Lambung Mangkurat University).

TBI Indonesia supported Dr. Bernaulus Saragih and Dr. Tien Wahyuni to study in the Netherlands. Their names were added to the list of former PhD students that received support from TBI Indonesia, such as Dr. Kemal Prakoso, Dr. Ruandha Agung Sugardiman, Dr. Bambang Srihadi, and the late Dr. Muljanto Nugroho. Recently, four scientists were selected from FORDA's research centers across Indonesia to receive financial support to complete their PhD: three went to the Netherlands, and one to Australia.

A researcher interviews a collector of young *Zoothera interpres* (Chestnut-Capped Thrush or Punglor Kembang) taken from the Lumut Mountain Protected Forest in East Kalimantan. The species is listed as "Nearly Threatened" on the IUCN Red List. Photo by Hunggul Yudhono S.H. Nugroho/ TBI Indonesia

Researchers set up a portable weather station to collect data for use in land-use change modeling, in East Kalimantan. Photo by Hunggul Yudhono S.H. Nugroho/TBI Indonesia

The four researchers proposed the following topics of research:

1. Integrating customary rights and traditional land use into spatial planning: The use of appropriate modeling for decision support systems (Hunggul Yudhono from the Ministry of Forestry's Forestry Research Institute, Makassar, South Sulawesi)
2. Integrating local land use systems in collaborative management of protected areas (Tri Wira Yuwati from the Forestry Research Office in Banjarbaru, South Kalimantan)
3. Joint optimization of wood and avoiding forest degradation under reduced impact logging (Yonky Indrajaya from the Forestry Research Office in Ciamis, West Java)
4. Forest community development: enhancing corporate social responsibility in Indonesia's forestry sector (Tri Wahyudiyati from the Secretariat of FORDA).

One of the four scientists (Tri Wahyudiyati) expects their research to be completed by the end of 2013, while the rest plan to complete their study in 2014.

These research topics complement Tropenbos International's mission to improve tropical forest governance and management in order to support conservation and sustainable development, especially for the forests of Indonesia. We make knowledge work by providing information and facilitating access to it, by building capacities, strengthening organizations and enabling evidence-based dialogue through collaborative activities with universities and community-based organizations.

Geographic information system capacity building and research support

Tropenbos International Indonesia Programme

The geographic information system (GIS) laboratory of Tropenbos International (TBI) Indonesia Programme was set up in 2008. As a facility designed to help improve capacity and knowledge in the field of GIS, the major goal of the laboratory is to provide infrastructure and services for managing and analyzing spatial data. Data analysis can be crucial support for any research done by a partner institution, especially by researchers of Indonesia's Forestry Research and Development Agency (FORDA), the main partner of TBI Indonesia. The GIS laboratory also provides consultancy services on mapping, surveying, and training.

Activities completed by the GIS laboratory in collaboration with FORDA include:

1. terrestrial survey for the mapping of research forest in Darmaga
2. terrestrial survey for the mapping of Ciromet's trees in Sumedang District
3. terrestrial survey for the mapping of the research forest of Pasir Awi in Bogor District
4. terrestrial survey for the mapping of the research forest of Cikole in Lembang, Bandung District

Researchers undertake a GIS survey as part of the HCV Assessment Project, in East Kalimantan. Photo by Yuli Nugroho/ TBI Indonesia

The GIS laboratory also provides support to FORDA researchers by explaining techniques for acquiring remote sensing data, as well as by helping to analyze the condition of land cover on any research or sample location that may be required. For example, the GIS laboratory supported the research of Prof. Dr. Pratiwi by providing a map of tree species suitability in Pemali and Jratun watershed in Central Java. The laboratory obtained the map by matching tree growth requirements with soil topography and climate precipitation maps. Prof. Dr. Pratiwi's research is continuing in Brantas watershed in East Java and Citanduy watershed in West Java. The GIS laboratory also supported the research of Ir. Endro Subiandono with surveys and data analysis of land cover and land cover change in the mangrove areas of Kubu Raya District, West Kalimantan, and the North Sea of West Java and Central Java.

Under the Institutional Strengthening on Geo Spatial Analysis and Geo Spatial Technology project, TBI Indonesia also provided technical support for establishing FORDA's GIS laboratory. Spatial databases have also been shared and are available to support FORDA scientists' research projects.

Capacity building for people and institutions is one of TBI Indonesia's priorities for better forest governance practices. To support the professional development of GIS operators and analysts, TBI Indonesia has provided training in spatial analysis during class meetings and also through on-the-job training. For example, TBI Indonesia conducted GIS training at Riau University in collaboration with Riau University, FORDA, PT RAPP , and the Riau Forestry Agency. Training was also provided for FORDA staff at the analyst level and for FORDA GIS operators, to improve technical skills for operating ARCGIS software and producing thematic information.

CIFOR national staff capacity building

Center for International Forestry Research

At its headquarters in Bogor, CIFOR currently employs 116 Indonesians: 33 research staff and 83 non-research staff, a number which is forecast to increase. CIFOR recognises that ongoing development strengthens the contribution and professional growth of its staff, in addition to supporting CIFOR's commitment as a centre for knowledge and learning.

Supporting professional development

Since its founding, CIFOR has supported professional development activities either in-house or off-site both in Indonesia and abroad. The activities include individual or group workshops, skills and technical development seminars, and both unit and programme retreats for research and support services. Besides its many technical seminars, CIFOR

Giving Indonesian students experience in the field

Dr Stibniati 'Nia' Atmadja, one of CIFOR's Indonesian researchers, is developing the practical skills of local students. She recruited three Indonesian students to help with her team's field research in the ex-Mega Rice peat land of Central Kalimantan. The research project aims to understand the dynamics of peat fires and local perceptions of REDD+.

Supported by CIFOR, the selected students undertook field research with Nia's team for several months in 2011. In this multidisciplinary team (economics, anthropology, forestry and computer science), students were encouraged to learn from each other and think in interdisciplinary ways. The students benefited from both academic and field mentorship by Nia and her colleague Yayan Indriatmoko — all at no cost to the student. At the end of their internships, the students gain professional experience by presenting their findings to scientists at CIFOR's headquarters in Bogor.

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* Further reading: CIFOR 2012 CIFOR and Indonesia: a partnership for forests and people. CIFOR, Bogor, Indonesia.

offers learning opportunities in areas such as women's leadership and development, communication theory, supervisory skills, personal skills for professional excellence, facilitation, IT and communications skills, proposal development skills, project management and language skills.

Providing space for career development and further study

CIFOR has also provided education loans and flexible work arrangements to its national staff that are pursuing higher education degrees at Indonesian universities and abroad. Of the 116 Indonesian staff currently employed in a research or non-research capacity at CIFOR, 21 are pursuing or have obtained a higher degree while working at the Center. This number is from active staff data, and does not reflect staff who obtained higher degrees while working at CIFOR and left to pursue opportunities in Indonesia and abroad.

Four scientists are currently seconded to CIFOR: one from the Forestry Research and Development Agency, two from Bogor Agricultural University and one from Sam Ratulangi University, Manado. Negotiations are underway with the Ministry of Forestry for another seconded scientist from the Forestry Research and Development Agency.

Forestry Research Collaboration Between FORDA and Partners

Improving sustainable research and development

This volume records the perspectives of some of the international institutions that have partnered with Indonesia over the past century of forest research. The three organizations featured in this compendium — CIFOR, Tropenbos and the World Agroforesty Centre — each have at least 20 years of presence in Indonesia, and are committed to collaborative research with Indonesian partner organizations. In Indonesia, FORDA is pre-eminent among those.

This compendium celebrates past achievements as we look to the future of Indonesian forests and forestry, in all its forms, and continue to explore how these partnerships can help sustain Indonesia's forests and its people.

Celebrating 100 years of forestry research in Indonesia

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