# #5

# Island South-East Asia and New Guinea

*Sumatran orang-utan. The island South-East Asia and New Guinea chapter spans four global biodiversity hotspots. Sundaland supports orang-utan and tiger, the Philippines and Wallacea archipelagos have large numbers of endemic species, and New Guinea has marsupial tree kangaroos and egg-laying echidna.*

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# List of abbreviations and acronyms

| | |
|---|---|
| ACB | ASEAN Centre for Biodiversity |
| ACP | Africa, Caribbean and Pacific developing states (EU categorisation) |
| ADB | Asian Development Bank |
| AHP | ASEAN Heritage Parks |
| APP | Asian Pulp and Paper |
| ASEAN | Association of South-East Asian Nations |
| ASEAN-WEN | ASEAN Wildlife Enforcement Network |
| BIOFIN | Biodiversity Finance Initiative (UNDP) |
| BIOPAMA | Biodiversity and Protected Areas Management project |
| BMZ | Bundesministerium für Wirtschaftliche Zusammenarbeit (German Federal Ministry for Economic Development Cooperation) |
| CBD | Convention on Biological Diversity |
| CEPF | Critical Ecosystem Partnership Fund |
| CITES | Convention on International Trade in Endangered Species |
| CMS | Convention on the Conservation of Migratory Species of Wild Animals |
| $CO_2$ | carbon dioxide |
| COP | Conference of the Parties |
| COREMAP | Coral Reef Rehabilitation and Management |
| CSO | civil society organisation |
| CSR | corporate social responsibility |
| DENR | Department of Environment and Natural Resources (Govt. of the Philippines) |
| DFID | Department for International Development (United Kingdom) |
| DNA | deoxyribonucleic acid |
| EAAF(P) | East Asian-Australasian Flyway (Partnership) |
| EBA | endemic bird area |
| EIA | environmental impact assessment |
| EITI | Extractive Industries Transparency Initiative |
| EU | European Union |
| EUR | euro |
| FAO | Food and Agriculture Organisation of the United Nations |
| FLEGT | Forest Law Enforcement, Governance and Trade (EU) |
| FPIC | free, prior and informed consent |
| FSC | Forest Stewardship Council |
| G200 Ecoregions | Global 200 Ecoregions |
| GDP | gross domestic product |
| GEF | Global Environment Facility |
| GHG | greenhouse gas |
| GIZ | Deutsche Gesellschaft für Internationale Zusammenarbeit (German technical assistance agency) |
| GNI | gross national income |
| HDI | Human Development Indicator |
| HoB | Heart of Borneo |
| HWC | human-wildlife conflict |
| ICCA | indigenous peoples' and community-conserved area |
| ICCWC | International Consortium on Combatting Wildlife Crime |
| IKI | International Climate Initiative, German Ministry for Environment (BMUB) |
| (I)NDC | (Intended) Nationally Determined Contributions |
| INDECON | Indonesian Ecotourism Network |
| INGO | international non-governmental organisation |
| IUCN | International Union for the Conservation of Nature |
| KBA | key biodiversity area |
| KfW | German government-owned international development bank |
| KLC | key landscape for conservation |

| | |
|---|---|
| LNG | liquefied natural gas |
| MAB | Man and Biosphere Programme (UNESCO) |
| METT | Management Effectiveness Tracking Tool |
| MoEF | Ministry of Environment and Forestry (Indonesia) |
| MoNRE | Ministry of Natural Resources and Environment (Malaysia) |
| $MtCO_2e/tCO_2e$ | megatonnes/tonnes of carbon dioxide equivalent (unit of greenhouse gas emission) |
| NBSAP | National Biodiversity Strategy and Action Plan |
| NGO | non-governmental organisation |
| NIPAS | National Integrated Protected Areas System (Philippines) |
| NP | National Park |
| NTFP | non-timber forest product |
| ODA | Official Development Assistance |
| OECD-DAC | Organisation for Economic Cooperation and Development – Development Assistance Committee |
| PA | protected area |
| PES | payment for environmental services |
| PNG | Papua New Guinea |
| PRC | priority region for conservation |
| REDD+ | Reducing emissions from deforestation and forest degradation in developing countries, and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks |
| RSPO | Roundtable on Sustainable Palm Oil |
| SDG | Sustainable Development Goals (UN) |
| SMART | Spatial Monitoring and Reporting Tool |
| UK | United Kingdom |
| UN/UNDP/UNEP | United Nations/Development Programme/Environment Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organisation |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNODC | United Nations Office on Drugs and Crime |
| USA | Unites States of America |
| USAID | United States Agency for International Development |
| VPA | Voluntary Partnership Agreement (signed under the EU FLEGT programme) |
| WAVES | Wealth Accounting and Valuation of Ecosystem Services |
| WCS | Wildlife Conservation Society |
| WDPA | World Database on Protected Areas |
| WHS | World Heritage Site |
| WMA | wildlife management area (Papua New Guinea) |
| WWF | World Wide Fund for Nature |
| YUS | Yopno-Uruwa-Som river basins (Papua New Guinea) |

# 0

# Executive summary

*Raja Ampat, Indonesia. The division of the sub-region into more than 25 000 islands has a defining influence on ecosystems and human societies. It has resulted in the evolution of thousands of endemic species, some found on only a single island, while the long coastline supports a wealth of coastal and shallow marine ecosystems.*

# 0 _ Executive summary

This chapter covers the countries of the South-East Asian archipelago – Indonesia, Malaysia, Timor-Leste and the Philippines, as well as Papua New Guinea (PNG). This diverse region holds two of the world's mega-cities, Jakarta and Manila, hundreds of languages and cultures, and is a major centre of economic growth. Java, in Indonesia, is one of the most densely populated large islands on the planet, while PNG has an average population density of only 16 people per km².

Straddling the equator, the region is entirely tropical, and much of the lowlands would originally have been covered by evergreen tropical forest. These forests have disappeared across much of the region, exploited for timber and cleared for agriculture and industrial development, but the areas that remain – and the island of New Guinea, which retains most of its forest – are amongst the most biodiverse in the world, and of exceptional importance for conservation. Equally important are the region's freshwater lakes and rivers, karst ecosystems and mountains.

The division of the region into tens of thousands of islands has contributed to the evolution of species, many of which are endemic to a single island or group of islands. In the west, the large fauna consists of Asian species such as elephant, tiger, rhino and orang-utan, while in the east the characteristic species are marsupial tree kangaroo, echidna and bird-of-paradise. The most diverse marine ecosystems on the planet are found in the Coral Triangle, which includes most of the marine areas between the islands of the region and extends east to the Solomon Islands. Much of the region's economic activity and population is concentrated within a few kilometres of the coast. As a result, land use, waste disposal and urbanisation all have a major influence on the health of the surrounding marine ecosystems, which are a vital economic resource for the human populations of the region. These issues are explored in detail in the marine chapter.

The governments of the region have in many cases recognised the global value of their nations' biodiversity, and taken action to preserve it. Over 1 500 protected areas (PAs) cover almost 0.4 million km² of terrestrial and freshwater ecosystems, amounting to 13% of the land surface. However, comparison of protected areas with analysis of key biodiversity areas in parts of the region suggests that not all ecosystems and species are adequately represented within the official PA system. In Indonesia, Malaysia and the Philippines there is significant government funding available for at least some of these parks, although resources remain a constraint to effective management of PAs throughout the region. The introduction of SMART patrol systems has helped to focus limited resources on the most urgent issues and threats. Protected areas and other conservation efforts also benefit from the support of the region's diverse and active community of local and international civil society organisations. The role of civil society has expanded in the past two decades, as a result of the generally open and democratic nature of the governments.

Official conservation agencies in the region are also active in the effort to stem illegal hunting and trafficking of wildlife, often working with specialist civil society organisations. The level of awareness about the problem, and the resources and expertise to take action, are significant, but the scale of the problem means that it remains one of the greatest threats to biodiversity.

The role of local communities in conservation varies across the region. There are marked differences in the way the countries have approached land tenure and community management of resources. For example, the fact that PNG recognises communal rights as the basis for land and resource tenure has had a significant impact on both resource exploitation and the designation and management of protected areas. Elsewhere, the rights of indigenous communities were generally usurped by colonial and then post-colonial governments, which prioritised industrial development of their forest and agricultural sectors. Customary and communal rights are increasingly being asserted, however. The Philippines in particular has created mechanisms for mapping and recognising indigenous lands, and for the involvement of local people in the management of protected areas.

Parts of the region are among the most economically advanced in Asia, with a long history of large-scale private sector investment, in logging, mining, and more recently in commercial agriculture, especially oil palm, and tree plantation for fibre. Large-scale industrial agriculture has dramatically changed the landscapes and economies of many parts of the region and this continues to expand in Borneo and New Guinea, with large-scale loss of natural ecosystems and associated biodiversity. However, the region has also seen commitments to environmental and social sustainability, at company level and in some cases with the establishment of voluntary standards which apply to a whole industry. Discussion of green economies and green jurisdictions has become part of the mainstream of policy-making in the land-use sector, although major challenges remain to realise a real shift in the way resources are managed.

There are important opportunities to complement and build on the efforts already underway for improved management of biodiversity and ecosystems in the region. The most important of these strategic approaches are summarised below.


*Spectral tarsier, Sulawesi. Tarsiers are tiny primates with large eyes and extreme adaptations for leaping vertically through the forest. They are only found in the forests of island South-East Asia, in Malaysia, Brunei, Indonesia and the Philippines. They are threatened by forest destruction and the pet trade.*

- Mitigate conflicts and enhance the effectiveness of the existing protected areas network. Focus on more efficient and targeted use of existing resources. Address conflicts with local communities over land and access rights. Secure the support of private business. Capacity building for all stakeholders involved in PA management is essential. In some areas, a review of the protected areas network to identify opportunities and redundancies would be appropriate.
- Encourage greater use of landscape-level approaches. Integrate the needs of biodiversity, communities and business through planning frameworks and multi-stakeholder decision-making. These approaches should aim to ensure the maintenance of biodiversity within landscapes, ecosystem services and livelihood opportunities.
- Intensify action against wildlife crime. There should be a greater effort on investigation and prosecution of key individuals, financiers and other players in the wildlife trafficking trade-chain. Collaboration between governments and specialist non-governmental organisations (NGOs) has proven to be effective and should be scaled up. However, attention should aim at sustainability and the eventual institutionalisation of action against wildlife crime within the appropriate agencies.
- Support the continued growth of the already diverse and rich community of civil society organisations. Strengthen their roles in awareness raising and education, campaigning, grass-roots activism and mobilising citizen science.
- Encourage and build on private sector moves towards more sustainable business practices. Work to remove policy barriers and enhance market incentives for performance.

# 1

## Background

*Giant forest dragon, a common lizard of South-East Asian rainforests. The natural vegetation of most of the sub-region is tropical rainforest, the most biodiverse terrestrial ecosystem on the planet. Although large areas of forest have been cleared, over 1.5 million km² remain, 40 % of it in New Guinea.*

# 1 _ Background

## 1.1 Socio-economic setting

### 1.1.1 Political and administrative context

The region covered by this chapter encompasses Malaysia, Indonesia, the Philippines, Papua New Guinea and Timor-Leste. The first three are members of the **Association of South-East Asian Nations** (ASEAN), an economic and political union, which moved closer towards economic integration in 2015 with the launching of the ASEAN economic community. Timor-Leste and Papua New Guinea are both potential future members of the community. Environmental sustainability is a major theme in ASEAN's socio-cultural community blueprint[1]. It is addressed through the ASEAN Centre for Biodiversity (ACB), ASEAN Wildlife Enforcement Network (ASEAN-WEN), and agreements on trans-boundary haze and pollution, amongst others.

**Malaysia** is the only federation within South-East Asia. It is divided into 13 states and 3 federal territories. Eleven of the states are in Peninsula Malaysia, with the large states of Sarawak and Sabah on the island of Borneo. The country is a constitutional monarchy, formed from the unification of several states and territories in the 1960s. Many of the states still retain their own monarchy, and the states on Borneo, Sabah and Sarawak, have significantly more independence than the others.

**Indonesia** is a secular multi-party democracy, independent from colonial authority in 1945 but ruled by a single president, Soeharto, from 1965 until 1998. Soeharto's rule was associated with the development of a liberal economic model, which included (i) the licensing of exploitation of Indonesia's rich forests and other natural resources, (ii) the successful expansion of healthcare, education and family planning provision to millions of Indonesians, (iii) a major programme of re-distribution of the population from Java and Bali to the outer islands, the transmigration programme, and (iv) the institutionalisation of corruption and cronyism in government and official institutions. The fall of Soeharto in 1998 was associated with the Asian financial crisis and had far-reaching impacts on Indonesia, most significantly a rapid programme of decentralisation of power to the provinces and districts and the birth of multi-party democracy. In 1969, the western half of the island of New Guinea became part of Indonesia after Dutch withdrawal and a United Nations (UN) sponsored referendum.

**Timor-Leste** achieved independence from Indonesia in 2002, after 24 years of occupation preceded by 450 years of Portuguese colonial rule. The people and infrastructure suffered significantly in the violence leading up to independence, and tensions flared again in 2006. However, since then, Timor-Leste has taken back full control of its affairs from the UN, and peaceful presidential and parliamentary elections were held in 2012.

**Papua New Guinea** (PNG) is a multi-party democracy. It became independent from Australia in 1975, but remains a member of the British Commonwealth. In the early 20th century, the country was divided between German and British administered areas, but these were combined under Australian administration after World War I. Traditional social organisation into families and clans remains very important and has a major influence on natural resource management. Central government control is rather weak, especially over the communities on remote islands and the rugged and mostly inaccessible interior. There are significant challenges with the delivery of healthcare and education to the overwhelmingly rural population.

The **Philippines** is a multi-party democracy. The country was part of the Spanish empire for over 300 years, before becoming a colony of the United States of America for the first half of the 20th century. It gained independence in 1946 after occupation by Japan during the Second World War. Despite a sometimes turbulent political environment, the economy has been one of the fastest growing in South-East Asia. The Philippines has played an important role in regional politics, and is a founder member of the UN and ASEAN.

### 1.1.2 Population and livelihoods

The total population of the region is 391 million people, including 261 million in Indonesia, the fourth largest population of any country on the planet, and 103 million in the Philippines[2]. A high proportion of people live in rural areas, but the region also contains two of the world's megacities, Jakarta and Manila. The vast region, totalling over 3 million km², has an average population density slightly higher than mainland South-East Asia, at 129 people per km². This hides spectacular variations, however, even at country level; PNG has a population density of only 16 people per km², while the Philippines has 333 people per km², similar to that of India. Java, with 1 115 people per km², is one of the most populous islands on earth. The interior of the islands of New Guinea and Borneo contain towns and regions that are still accessible only by river or air transport.

Population growth rates in the region are dropping, but remain relatively high: PNG's population increased at a rate of 2.1 % per year between 2010 and 2015, and Timor-Leste's fertility rate was 5.9 births per woman during the same period. However, the largest absolute increases by far over this period were in Indonesia (net increase of over 3 million people per year) and the Philippines (net increase of 1.7 million people per year), with a total net population growth of 5.4 million people per year across the region. While some of this increase in population is absorbed by urban areas through rural-urban migration, the increased pressure on land in rural areas is evident.

The region's ethnic composition provides evidence of successive waves of human colonisation of the archipelago. The inhabitants of New Guinea are Melanesian, closely related to Pacific islanders and representative of early waves of colonisation, perhaps as long as 60 000 years ago. The human population of the rest of the area represents more recent migration from South and East Asia. The difficulty of travel between islands and across the rugged interior of the large islands prompted the evolution and survival of many hundreds of different languages and cultures across the region. Despite the impacts of greater mobility and the emergence of modern nation states with centralised government, the region remains one of the most culturally and linguistically diverse in the world, with the island of New Guinea at the epicentre of linguistic diversity: PNG has over 800 languages[3], and Indonesian Papua a further 272[4]. Elsewhere in Indonesia there are at least 400 languages, with Maluku, Sulawesi and Kalimantan island groups being particularly diverse. In addition, the Philippines has more than 175 extant indigenous languages.[5] In parallel with this ethnic diversity, customary systems of land ownership and natural resource management remain influential in many areas, sometimes in conflict with central government-imposed systems, sometimes integrated with them. These include many customary practices that set aside areas for maintenance of ecological values or put limits on harvesting wild species.

Variations in human development across the region are large, including the highest and lowest Human Development Index (HDI) in the countries covered by this series of studies. Malaysia, with an HDI of 0.779 in 2015 and a per capita gross national income (GNI) of EUR 17 500, is considered a high human development country[6], while Indonesia (HDI 0.684), the Philippines (HDI 0.668) and Timor-Leste (HDI 0.595) are medium HDI, and PNG is low HDI (HDI 0.505, 158 of 188 globally, with a per capita GNI of EUR 1 890)[7]. PNG has only recently joined Indonesia, Timor-Leste and the Philippines in the low-middle income economy category.[8]

### 1.1.3 Economy

All the countries in the region are pursuing economic growth-led models of development, and all have relied heavily on the exploitation of natural resources to generate growth. Indonesia's economy, with a gross domestic product (GDP) of EUR 683 billion in 2014, is more than twice that of Malaysia (GDP of EUR 260 billion in 2014), while Papua New Guinea had a GDP of EUR 13 billion, and Timor-Leste only EUR 1 billion in the same year.[9]

All countries originally had significant natural tropical timber resources, but the Philippines economically exhausted its natural forests in the 1960s and 1970s and is now a minor player in the forest products markets.[10] Malaysia and Indonesia followed a similar trajectory in the 1970s and 1980s, although Indonesia still has significant forest resources in its eastern islands, especially Papua. In some areas, the decline in natural forest production has stimulated growth in planted forests to feed a growing pulp-paper industry, but overall, South-East Asia has declined in importance in the global timber market. Only Papua New Guinea retains an active logging industry, which contributed about 10 % of national GDP[11] in 2005 and remains an important economic activity today.

Minerals, oil and gas are also important contributors to the economies of the region. Indonesia is the world's largest coal exporter and a major producer of liquefied natural gas (LNG). Malaysia also produces significant amounts of LNG, while the Philippines is heavily dependent on the import of fossil fuels but is a major producer of geothermal energy[12]. In all countries, domestic demand for energy is growing rapidly, driven by economic expansion and population growth, so the role of the

(1) http://www.asean.org/wp-content/uploads/images/archive/5187-19.pdf, accessed 20 September 2016.
(2) World Bank population data, available at https://data.worldbank.org/indicator/SP.POP.TOTL, accessed 31 October 2017
(3) Summer Institute of Languages: http://www-01.sil.org/pacific/png/, accessed 13 April 2016.
(4) http://www.ethnologue.com/country/ID/languages, accessed 13 April 2016.
(5) http://www.ethnologue.com/country/PH, accessed 13 April 2016.
(6) http://econ.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20421402~menuPK:64133156~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html#Lower_middle_income, accessed 4 May 2016.
(7) http://hdr.undp.org/en/data, accessed 13 April 2016.
(8) PNG aspires to be an upper middle-income country by 2050: Independent State of Papua New Guinea (undated) Vision 2050. Available at http://www.treasury.gov.pg/html/publications/files/pub_files/2011/2011.png.vision.2050.pdf
(9) http://data.worldbank.org/indicator/NY.GDP.MKTP.CD, accessed 13 April 2016.
(10) http://www.fao.org/docrep/013/i1964e/i1964e00.pdf
(11) Ibid.
(12) https://www.iea.org/publications/freepublications/publication/WEO2015_SouthEastAsia.pdf

*Papua New Guinean islander paddling his dugout canoe to trade fresh vegetables. He will come back with instant noodles, rice, soap and other groceries he would normally have no access to. Papua New Guinea, June 2010.*

region as a fossil fuel exporter is expected to decline. Timor-Leste's economy is largely oil-dependent[13], with oil revenue comprising 80 % of its GDP and 95 % of its state income[14]. The use of the EUR 10 billion petroleum fund generated by fossil fuel extraction is a source of debate within the country, and there are fears that the country will face a crisis if it has not developed a sufficiently diverse and robust economy when reserves begin to dwindle in 2025.

The region has become the global centre of palm oil production, with Indonesia and Malaysia together producing some 52 million tonnes in 2014, which represents over 85 % of global production. Indonesia had 80 000 km² of oil palm plantations in 2014.[15] The lowlands of the Philippines, Peninsular Malaysia and western Sumatra were cleared of forest and converted to plantations in the 19th and early 20th century. The less fertile soils and remote interior of Borneo makes it less attractive for plantation development, and the island is only now being opened up for large-scale agriculture. Clearance and plantation agriculture commenced in limited areas in the coastal lowlands of New Guinea and other islands in eastern Indonesia several decades ago, but these industries have been slow to expand, hampered by lack of infrastructure to access land further inland and distance from markets.

The industry has transformed the landscapes and livelihoods of the lowland mineral soils of Sumatra, Peninsula Malaysia and Borneo, and is increasingly expanding in eastern areas of Indonesia. It has had a profound effect on the national and local economy, infrastructure, population and land use. Smallholder oil palm producers, working either as out-growers for companies or independently, account for about one third of production.

### 1.1.4 Resource ownership and governance

In Malaysia, the Philippines, Indonesia and Papua New Guinea, custom is recognised as a basis for rights to land, but only in PNG has this become the dominant mechanism for land tenure. Elsewhere, state control of land and resources predominates, with varying (and contested) degrees of recognition and protection for customary rights. These systems originate in plural colonial legal systems, which recognised customary law and sought to codify some of it while suppressing other elements.

The land settlements in colonial **Malaysia** (and the forest reserves in Dutch-ruled Indonesia) purported to divide 'owned' land from 'un-owned' land. Un-owned land was claimed by the state and available to be allocated for uses including protection, production or conversion. The process failed to recognise large areas that were under customary ownership, and thus created land-use conflicts between the state and customary communities. These were inherited by independent governments and, in most cases, persist to the present. In Sabah (Malaysia), communities were allowed to make claims over land, but government institutions were unable to process the tens of thousands of claims that resulted. They did however proceed with issuance of concession applications by companies.

**Indonesia**'s 'state forest reserves' cover 72 % of the land surface (90 % in many of the 'outer islands') and fall within the jurisdiction of the Ministry of Environment and Forestry (MoEF)[16]. Settlement and farming is illegal, and exploitation of forest resources is licensed by the government. However, there are some 30 000 settlements[17] within the forest zone, some indigenous, some more or less recent incomers. A 'one map' process[18] has been initiated to compile the relevant spatial data on land use, licences and customary claims as a first step towards identifying and ultimately resolving conflicts. In the meantime, the contradiction between the forest zone map and reality on the ground creates major difficulties in effectively enforcing forestry regulations, including the management of protected areas. Legal changes in Indonesia in 2011 and 2012 started a process working towards the definition and recognition of the rights of local and indigenous communities, and created a new category of forestland, 'customary forest'. Following ministerial regulations in late 2014, local governments have a target of reallocating up to 12.7 million hectares of state forest to indigenous communities. Early indications suggest that around half of this could come from the protected forest estate. However, the government's Indicative Map of Social Forestry, which is used to guide these land-use decisions, is a working document and as such is frequently updated, making it difficult to assess impacts on indigenous communities, forest cover and biodiversity.

The **Philippines** has been more progressive in its approach to customary rights. The Indigenous Peoples Rights Act of 1997 provides for recognition of ancestral domain[19], where rights can be demonstrated through documentation of surviving indigenous community structures and management practice. Once accepted, this can lead to the granting of communal tenure rights over large areas of land and forests. By 2011, ancestral domain claims had been submitted for nearly 4.9 million hectares, or about 81 % of the estimated areas of ancestral domain in the Philippines, and rights had been granted for 1.9 million hectares. Importantly, communities that receive these rights can also be supported to produce an ancestral domain protection plan, addressing their development and livelihood needs in the context of management of their resources. The rights of communities to give or withhold their free, prior and informed consent[20] to projects and developments on their land is also protected.

**Papua New Guinea** is unique in the region in using communal customary ownership as the basis of its land tenure system. Clan groups own 97 % of the land and tenure laws prevent sales but allow clans to hand over the rights to timber resources to the state, which is then allowed to grant concessions to companies to exploit forest resources. In the absence of adequate state provision of infrastructure and services, many clans look to exploit their forest resources as a means to pay for local development[21]. There are also problems with the implementation of the system, and it is estimated that over 5 million hectares have been taken over by logging, mining and plantation companies through contested leases[22]. In a few cases, communities themselves, assisted by civil society organisations (CSOs), manage their forests directly.

In **Timor-Leste**, Indonesia imposed a system of state categorisation of land similar to its own. However, Timor-Leste has a long history of strong family and clan ties to land and natural resources, and although this was disrupted by the events leading to independence, customary ties form the basis of management of as much as 97 % of the land.

## 1.2 Key biodiversity features

### 1.2.1 Geography and climate

The region has a land area of just over 3 million km² and includes the world's second, third and sixth largest islands (New Guinea, Borneo and Sumatra) among a total of 25 000 islands, including 17 000 in Indonesia and 7 000 in the Philippines. This has had a defining influence on the region's biodiversity and its social, political and economic landscape. It is the result of a complex geological history, with some islands formed by folding, caused by collisions between continental plates, some created by volcanoes, and others formed from fragments of continental plate drifting with tectonic movements. The differing geological histories have offered differing opportunities for colonisation and the evolution of endemic species, and this has contributed to the region's extraordinary biodiversity.

The main islands have a central highland area that forms the primary watershed and is the source of large rivers, which, until recently, formed the major transport arteries of the region. In New Guinea, the Carstenz peak (Puncak Jaya in Indonesian) is the tallest mountain in the region, rising to 4 884 m and supporting a permanent, though rapidly shrinking, snowfield.

Topography, soils and location have had a fundamental impact on land use. As the region sits on the western edge of the Pacific ring of fire, tectonic and volcanic features play an important role in geography and livelihoods. Some of the Indonesian islands and the Philippines have active volcanoes, which cause

(13) Ostby, K. (2016) Transition to Non-Oil Economy in Timor-Leste. UNDP, Asia and the Pacific. http://www.asia-pacific.undp.org/content/rbap/en/home/blog/2016/11/24/-RBFSingapore-Transition-to-Non-Oil-Economy-in-Timor-Leste.html, accessed 13 March 2018.
(14) http://laohamutuk.blogspot.com/2013/07/how-long-will-petroleum-fund-carry.html, accessed 12 Feb 2016.
(15) Indonesia Investment: http://www.indonesia-investments.com/business/commodities/palm-oil/item166, accessed 9 May 2016.
(16) The MoEF was created through the amalgamation of two ministries, Environment and Forestry, in 2015 by the newly elected President Joko Widodo.
(17) Sirait M. T, B. White and U. Pradhan (2017). Land Rights and Land Reform Issues for Effective Natural Resource Management in Indonesia. In Shivakoti G. P, U. Pradhan and Helmi (Eds.) (2017). Redefining Diversity and Dynamics of Natural Resources in Asia. Volume 1. Amsterdam: Elsevier. ISBN: 978-0-12-805454-3

(18) See for example: https://www.oxfordbusinessgroup.com/overview/indonesia-introduces-one-map-policy-solution-overlapping-land-claims
(19) Corpuz J. (2011). Legal Pluralism: the Philippine Experience, Chapter 3. In Colchester M. and S. Chao (2011) (Eds.). Diverse Paths to Justice: Legal Pluralism and the rights of indigenous peoples in Southeast Asia.
(20) Free, prior, informed consent (FPIC) enshrines the idea that development decisions must be made with the prior agreement of communities, and that their agreement must be based on adequate knowledge and without any form of coercion. See for example: http://www.forestpeoples.org/guiding-principles/free-prior-and-informed-consent-fpic
(21) http://www.fao.org/docrep/014/am614e/am614e00.pdf
(22) Colchester M. and S. Chao (2011) (Eds.). Diverse Paths to Justice: Legal Pluralism and the rights of indigenous peoples in Southeast Asia.

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*Savanna landscape, Flores, Indonesia. Timor-Leste, southern Indonesia and parts of southern PNG have a strongly seasonal climate, with a long dry season. Here, grassland and woodland dominate, with unique species and ecological communities distinct from the equatorial forests of the rest of the region.*

‹
*The* Rafflesia *family are parasitic plants which grow on vines on tropical rainforest trees through much of South-East Asia. They produce large flowers that emit a smell like rotten flesh to attract flies which pollinate them.*

natural disasters but also produce the fertile soils that support high population densities and some of the oldest civilisations in the region. New Guinea and Borneo lack volcanoes, but New Guinea is vulnerable to seismic activity, which has caused tsunamis and landslides in the past.

The climate of the region is equatorial, with single wet and dry seasons. The daily temperature range throughout the year in this region is between 21 °C and 34 °C, and the average annual rainfall varies between 500 and 4 000 millimetres[23]. The southern islands of Indonesia, Timor-Leste and southern New Guinea have less rain overall and a longer, more intense dry season, which makes them prone to drought.

The region experiences variations in the timing and quantity of rainfall as a result of El Niño-Southern Oscillation cycles, but the effects vary depending on local climatic patterns. In the Philippines, Sumatra and Borneo, El Niño results in extreme dry seasons that are associated with droughts, severe forest and peatland fires, and smoke pollution. Across the southern part of the region (Nusa Tenggara in Indonesia and Timor-Leste), some areas get only 50% of their normal annual rainfall in El Niño years, while others receive more than average. Both situations have implications for food security and health[24]. In PNG, El Niño events are associated with drought and low temperatures at high elevations, leading to water shortages and food scarcity[25].

The Philippines, and to a lesser extent Papua New Guinea, are vulnerable to tropical typhoons. Around 20 typhoons enter the Philippines each year, with four to six per year causing damage to crops, buildings and infrastructure. Typhoons are responsible for 30 % of rainfall in parts of the northern Philippines.

### 1.2.2 Habitats and ecosystems

The natural vegetation of almost the entire area is **forest** (Figure 1.1). The main lowland forest types are evergreen and semi-evergreen in the more tropical climate of the north of the region, and monsoon forest in the more seasonal southern area. The mountains of the larger islands, especially New Guinea, hold significant areas of montane forests. The lowland evergreen forests are the most diverse, while the montane forests support endemic species and potentially new unidentified species as a consequence of their isolation on ecological 'islands' separated from other montane regions. There are smaller areas of heath forest in Borneo, and swamp forest and forest on ultrabasic soils are scattered through the region.

Forests (using a broad definition from the UN Food and Agriculture Organisation, FAO) covered 1.55 million km² or about 50 % of the land surface of the region in 2015. Table 1.1 summarises the distribution of forest cover by country. Indonesia, with almost 1 million km² of forest, holds 60 % of the region's total. PNG is the most heavily forested country, with 74 % of its land covered by forest, while the Philippines is the least forested.

The island of New Guinea, shared between Indonesia and PNG, is by far the most heavily forested large island. The island has 600 000 km² of forest, 76 % of its land area. This huge area of forest represents almost 40 % of all the forest in the region. The second largest area of forest on a single island is on Borneo, shared between Indonesia, Malaysia and Brunei. Borneo has almost 400 000 km² of forest, 53 % of its land area or about a quarter of all the forest in the region.

**Table 1.1** Distribution of forest cover by country in island South-East Asia and New Guinea

| Country | Forest area (thousand km²) | Forest as a % of the area of the country | Forest as a % of total forest cover in island SE Asia |
|---|---|---|---|
| Indonesia | 910 | 50 | 59 |
| Malaysia | 222 | 68 | 14 |
| Philippines | 80 | 27 | 5 |
| PNG | 336 | 74 | 22 |
| Timor-Leste | 7 | 46 | >1 |

*Source: Forest cover data from FAO Global Forest Resources Assessment.*[26]

(23) Monk K.A., Y. de Fretes and G. Lilley (1997). The ecology of Nusa Tenggara and Maluku. Singapore: Periplus Editions.
(24) Barnett J., S. Dessai and R.N. Jones (2007). Vulnerability to Climate Variability and Change in East Timor. AMBIO 36(5), pp. 372-378.
(25) http://devpolicy.org/the-ongoing-impact-of-the-el-nino-drought-and-frosts-in-papua-new-guinea-20160115/, accessed 14 April 2016.

(26) FAO (2015). Global Forest resources Assessment 2015 Desk Reference. Rome: FAO. Available at http://www.fao.org/3/a-i4808e.pdf

*The flame bowerbird is endemic to the forests of southern New Guinea. In a display to attract a mate, males construct a 'bower' and decorate it with objects of the same colour. Around 760 species of birds have been recorded in New Guinea; half are found nowhere else in the world.*

**Peatlands** in the island South-East Asia region cover 244 470 km², 56 % of the area of tropical peatlands globally, and 78 % of South-East Asian peatlands.[27] Most of them (206 950 km², 84 % of the regional total) are in Indonesia, with very large areas of peatland in eastern Sumatra, western and southern Borneo and southern Papua. Malaysia has a further 10 % of the region's peatlands, and PNG has 4 %. It is estimated that South-East Asian peatlands hold 68.5 gigatonnes of carbon, or 77 % of all the carbon stored by tropical peatlands globally.

**Mangroves** are found throughout the region in areas where coastal topography and currents support them. There is a total of 45 830 km² of mangrove in the countries of the region, with Indonesia alone supporting 31 890 km² (21 % of the global total); 7 100 km² are in Malaysia, 4 270 km² in PNG, and 2 570 km² in the Philippines[28]. Indonesia and PNG share the global centre of diversity of mangrove species, concentrated in eastern Indonesia and on the island of New Guinea.

Many of the region's **coastal and inter-tidal habitats** provide vital feeding and resting sites for migrating shorebirds. The East Asian-Australasian Flyway (EAAF) covers 22 countries, including all those in South-East Asia. The flyway is used by millions of waterbirds and shorebirds annually, representing 178 species, 34 (19 %) of which are globally threatened or near threatened. These include the critically threatened spoon-billed sandpiper and Chinese crested tern. For 21 of these species, more than 95 % of their entire global population use the flyway, making them especially vulnerable to hunting, habitat loss and other changes along the route. Protection along migration routes is often patchy, and a recent global study found that 90 % of migratory birds, and 97 % of threatened migratory birds, have gaps in the coverage of critical sites on their migration route.[29] Conservation action along the flyway is coordinated by the flyway partnership (see section 3.1.5).

**Grasslands and wooded savannahs** exist in a few areas, notably the southern-most islands of Indonesia and Timor-Leste, where they are maintained by fire and may be largely anthropogenic in origin, and in the trans-fly area of southern New Guinea, where seasonal inundation limits tree growth.

(27) Page S., J.O. Rieley and C.J. Banks (2010). Global and regional importance of the tropical peatland carbon pool. Global Change Biology 17(2). DOI: 10.1111/j.1365-2486.2010.02279.x

(28) Spalding M., M. Kainuma and L. Collins (2010). World Atlas of Mangroves. Earthscan Books, London.

(29) Runge C.A., J.E.M. Watson, S.H.M. Butchart, J.O. Hanson, H.P. Possingham and R.A. Fuller (2015). Protected Areas and Global Conservation of Migratory Birds. See http://science.sciencemag.org/content/350/6265/1255.full-text.pdf+html





New Guinea is high enough to have **alpine vegetation** above the treeline.

Although lacking the long river systems of mainland South-East Asia[30], the region has significant **freshwater** habitats including lakes, montane and lowland rivers, and a large inland delta in New Guinea. The isolation of these systems on different islands has led to a high degree of species differentiation and endemicity. Of particular note are the 13 large (over 5 km²) lakes of the island of Sulawesi in central Indonesia, which include the deepest lake in South-East Asia (Lake Matano, 590 m)[31]. These deep, isolated lakes, created as a result of Sulawesi's complex tectonic history, all support endemic fish, shrimp and other fauna. Many are little known and threatened, and the Malili lakes complex (Lakes Towuti, Mahalona and Matano in central Sulawesi) has one of the largest concentrations of single-site endemic and threatened species in the region.

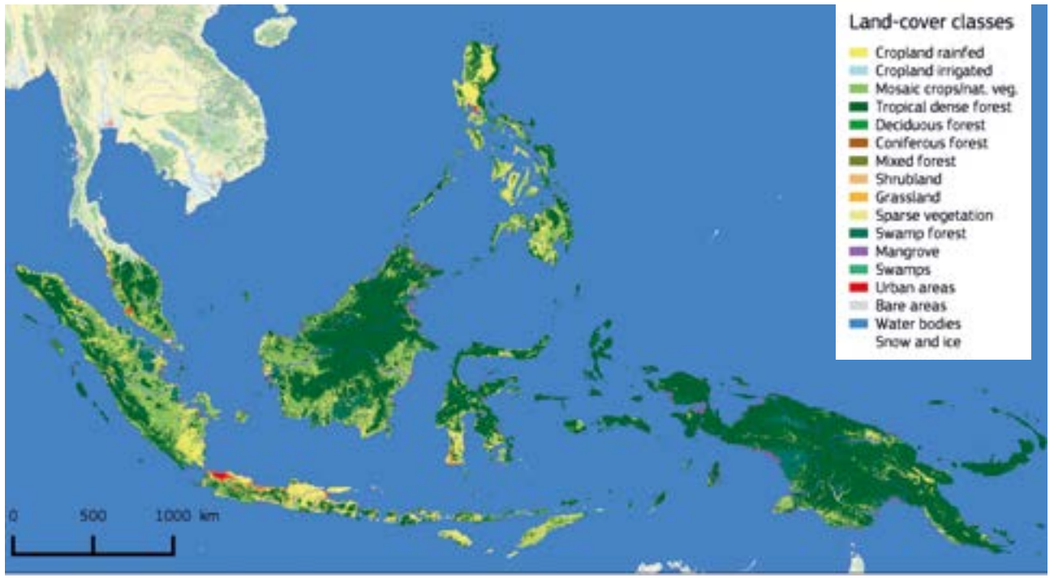
Cave systems, complex drainage and rugged topography associated with **limestone karst** environments occur patchily in Sumatra, Java and Borneo, the islands of central Indonesia, the Philippines and New Guinea. The unique conditions within karst environments and their isolation from other systems have encouraged speciation and led to the evolution of a highly endemic fauna. Outside the caves, the calcium-rich soils and plants support diverse and often endemic snail and *Lepidoptera* faunas. Many karst specialist species are likely to be threatened but have yet to be assessed against International Union for the Conservation of Nature (IUCN) criteria. However, it is already known that some have become extinct.[32]

### 1.2.3 Species diversity, endemicity and extinction risk

The region is exceptionally species-rich, with at least 37 000 species of unique plants and vertebrate animals (mammals, birds, reptiles, amphibians, freshwater fish). The highest number of species is found in the evergreen tropical lowland forests of the largest islands, but the greatest concentrations of endemic and threatened species are on the ecologically isolated mountains, karst outcrops and smaller islands.

Biogeographically, the region is divided into three global biodiversity hotspots: Sundaland, Wallacea, the Philippines; and one global wilderness area: New Guinea (see section 1.2.4). Comparing the hotspots of the region (Table 1.2), Sundaland is the most species-rich but has a lower percentage of endemic species than the Philippines or New Guinea.

**Figure 1.1** Land cover map of the island South-East Asia and New Guinea region




(30) Indonesia's longest river, for example, is 1 143 km, and the country has only eight rivers longer than 500 km, in contrast to the Mekong (4 300 km) and Irrawaddy (2 170 km). From Indonesia IBSAP, 2015.

(31) Whitten T., M. Mustafa and G.S. Henderson (1987). The Ecology of Sulawesi. Periplus, Jakarta, Indonesia.

(32) For example, the extinction of the snail Plectostoma sciaphilum, known only from Bukit Panching, Malaysia, after the hill was quarried by a cement company. See https://news.mongabay.com/2016/06/cement-company-may-have-caused-global-extinction-of-3-snail-species-in-malaysia/

*Proboscis monkeys are only found in the riverine and mangrove forests of Borneo, where they are threatened by hunting and habitat loss. They have partially webbed feet to help them swim, and a complex digestive system to break down the leaves that are the main constituent of their diet.*

**Table 1.2** Total numbers of terrestrial and freshwater species and endemic species in the main taxonomic groups

| | Sundaland | | Wallacea | | Philippines | | New Guinea | |
|---|---|---|---|---|---|---|---|---|
| | Species | Endemic species (%) | Species | Endemic species (%) | Species | Endemic species (%) | Species | Endemic species (%) |
| Plants | 25 000 | 15 000 (60) | 10 000 | 1 500 (15) | 12 000 | 8 000 (60) | 17 000 | 10 200 (60) |
| Mammals | 378 | 173 (46) | 222 | 127 (57) | 204 | 111 (54) | 233 | 146 (63) |
| Birds | 771 | 146 (19) | 711 | 274 (39) | 576 | 195 (34) | 650 | 334 (51) |
| Reptile | 452 | 245 (54) | 222 | 91 (41) | 258 | 170 (66) | 275 | 159 (58) |
| Amphibians | 235 | 182 (77) | 48 | 33 (69) | 101 | 79 (78) | 237 | 215 (91) |
| Total | 26 836 | 15 746 (59) | 11 203 | 2 025 (18) | 13 139 | 8 555 (65) | 18 395 | 11 054 (60) |

*Source: CEPF (2014). Wallacea ecosystem Profile, the Philippines NBSAP, Mittermeier et al (2003).*[33]

(33) Mittermeier, R.A., C.G. Mittermeier, T.M. Brooks, J.D. Pilgrim, W.R. Konstant, G.A.B. da Fonseca and C. Kormos (2003). Wilderness and Biodiversity Conservation. *PNAS* 100(18), pp. 10309-10313. DOI: 10.1073_pnas.1732458100





**Table 1.3** Number of terrestrial and freshwater threatened species by major taxonomic group and country

| Taxonomic group | Indonesia | Malaysia | Philippines | PNG | Timor-Leste |
|---|---|---|---|---|---|
| Mammals | 180 | 65 | 35 | 37 | 1 |
| Birds | 131 | 50 | 89 | 37 | 6 |
| Reptiles | 32 | 29 | 39 | 5 | 0 |
| Amphibians | 32 | 48 | 48 | 11 | 0 |
| Freshwater fish | 72 | 23 | 29 | 13 | 0 |
| Invertebrates[i] | 90 | 77 | 47 | 12 | 0 |
| Plants | 426 | 720 | 238 | 151 | 1 |
| Total | 963 | 1 012 | 525 | 266 | 8 |

*(i) All non-vertebrate animals.*

**Table 1.4** Number of terrestrial threatened species in the countries of the region, by threat category

| Threat category | Indonesia | Malaysia | Philippines | PNG | Timor-Leste |
|---|---|---|---|---|---|
| Critically endangered | 195 | 251 | 105 | 34 | 2 |
| Endangered | 248 | 193 | 122 | 47 | 5 |
| Vulnerable | 520 | 568 | 298 | 185 | 1 |
| Total | 963 | 1 012 | 525 | 266 | 8 |

The large islands of the Sundaland hotspot, joined by land bridges to mainland Asia in recent geological time, share species such as leopard, banteng, Asian elephant, Javan rhinoceros and Sumatran rhinoceros. However, they also have unique species such as Sumatran and Bornean orang-utan[34]. Several species of tarsier, a small primate, are found on the islands of Sundaland, Wallacea and the Philippines, but the isolation of Wallacea has resulted in the evolution of unique animals, including babirusa, anoa, Komodo dragon, South-East Asia's largest butterfly, Wallace's golden birdwing and the world's largest bee, the giant Indonesian megachile bee. Further east, New Guinea, which was never colonised by placental mammals except bats, has affinities with Australian marsupial fauna (wallaby, tree kangaroo, echidna) as well as many unique species, including most of the world's birds of paradise.

Indonesia and Malaysia are among the top five countries in the world for the total number of threatened species, as classified by IUCN (Tables 1.3 and 1.4).

The Evolutionarily Distinct and Globally Endangered project defines a sub-set of threatened species as being of special conservation concern because they have few closely related species or are unique in the way they look, live and behave. There are 161 such species in Indonesia, 108 in the Philippines, 101 in Malaysia, 73 in PNG and 2 in Timor-Leste[35].

### 1.2.4 Geographic priorities for conservation

**Priority regions for conservation**

A number of global analyses have used standardised approaches to identify biodiversity priorities globally. These are summarised in this section, and for the purposes of this study are combined to form a single priority region for conservation. In this region, all terrestrial areas are included in at least one of the analyses, with the result that a single priority region covers the entire area. This is of little use for priority setting within the region, so

(34) A geographically isolated and biologically distinct group of orang-utan in Sumatra was described as a separate species, Tapanuli orang-utan, in November 2017. See Nater, A., M.P. Greminger, A. Nurcahyo, M.G. Nowak, M. de Manuel Montero, T. Desai, C.P. Groves, M. Pybus, T.B. Sonay, C. Roos, A.R. Lameira, S.A. Wich, J. Askew, M. Davila-Ross, G.M. Fredriksson, G. de Valles, F. Casals, J. Prado-Martinez, B. Goossens, E.J. Verschoor, K. S. Warren, I. Singleton, D. A. Marques, J. Pamungkas, D. Perwitasari-Farajallah, P. Rianti, A. Tuuga, I.G. Gut, M. Gut, P. Orozco-terWengel, C.P. van Schaik, J. Bertranpetit, M. Anisimova, A. Scally, T. Marques-Bonet, E. Meijaard, and M. Krützen (2017). Morphometric, behavioural, and genomic evidence for a new orang-utan species. Current Biology 27, pp. 1-12. DOI: http://dx.doi.org/10.1016/j.cub.2017.09.047

(35) http://www.edgeofexistence.org/index.php, accessed 20 September 2016.

**Table 1.5** Link between biogeographic priorities and countries in the region

| Country | Sundaland hotspot | Wallacea hotspot | Papua major tropical wilderness area | Philippines hotspot | East Melanesia hotspot |
|---|---|---|---|---|---|
| Indonesia | x | x | x | | |
| Malaysia | x | | | | |
| Papua New Guinea | | | x | | x |
| Philippines | | | | x | |
| Thailand [i] | (x) | | | | |
| Timor-Leste | | x | | | |

*(i) Thailand contains only a very small part of the Sundaland hotspot, at the southern extremity of the country, south of the isthmus of Kra. Most of Thailand is in the Indo-Burma hotspot, and is discussed in the Greater Mekong regional chapter.*

section 5.1 proposes more focused, landscape-level priorities, referred to as key landscapes for conservation (KLCs).

### Hotspots and key biodiversity areas

All of island South-East Asia is included in four global biodiversity hotspots[36] and a wilderness area (Table 1.5): the Philippines hotspot encompasses the entire Philippine archipelago; the Sundaland hotspot covers all of Malaysia, Brunei Darussalam and Indonesian Borneo, Sumatra and Java; the Wallacea hotspot covers the thousands of islands in central Indonesia including Sulawesi, as well as Timor-Leste; the East Melanesia hotspot includes the islands within Papua New Guinea to the east of New Guinea. New Guinea (Indonesian Papua and Papua New Guinea) is not classified as a hotspot because it does not meet one of the criteria, in that it has lost more than 70 % of its original habitat. Instead, New Guinea is classified as a high-biodiversity wilderness area.[37]

Sundaland, the Philippines and Wallacea hotspots have been the subject of priority setting exercises by the Critical Ecosystem Partnership Fund (CEPF) and Conservation International, leading to the identification of key biodiversity areas (KBAs) and biodiversity corridors in these regions (Table 1.6). In the Philippines, the process was integrated with the Philippines Biodiversity Conservation Priority Setting programme and a review of the National Biodiversity Strategy and Action Plan (NBSAP)[38] in 2000. The analysis formed the basis for a re-assessment of the protected areas (PAs) network in the Philippines, the National Integrated Protected Areas System (NIPAS). The KBA analysis is yet to be formally adopted in other countries of the region[39]. In the Philippines and the Wallacea hotspot, the majority of these KBAs are grouped into landscape-scale corridors, based on identification of large areas of intact habitat. These corridors form the basis of the recommended key landscapes for conservation (KLCs) for this study (section 5.1).

The region also has 18 **Global 200 Ecoregions** (G200 Ecoregions), as defined by the World Wide Fund for Nature (WWF)[40] (Figure 1.2), and 51 **endemic bird areas** (EBAs), as defined by BirdLife International[41] (Figure 1.3). There are 3 tiger source sites in peninsular Malaysia and 12 in Sumatra, Indonesia.

Table 1.6 summarises the number of KBAs, KBA corridors, endemic bird areas and G200 Ecoregions found in each hotspot. The East Melanesia hotspot is not included as it is only partially in the region covered by this chapter.

(36) Mittermeier R.A., P. Robles-Gil, M. Hoffmann, J.D. Pilgrim, T.B. Brooks, C.G. Mittermeier, J.L. Lamoreux and G.A.B. Fonseca (2004). Hotspots Revisited. CEMEX, Mexico City, Mexico.
(37) Mittermeier R.A. et al. (2003). Op. cit.
(38) https://www.cbd.int/doc/meetings/nbsap/nbsapcbw-seasi-01/other/nbsapcbw-seasi-01-ph-en.pdf, accessed 12 May 2016.
(39) See http://www.cepf.net/where_we_work/regions/asia_pacific/wallacea/Pages/default.aspx for the ecosystem profile and details of the ongoing grants funding programme in the hotspot.
(40) Olson D.M., E. Dinerstein, E.D. Wikramanayake, N.D. Burgess, G.V.N. Powell, E.C. Underwood, J.A. D'Amico, I. Itoua, H.E. Strand, J.C. Morrison, C.J. Loucks, T.F. Allnutt, T.H. Ricketts, Y. Kura, J.F. Lamoreux, W.W. Wettengel, P. Hedao and K.R. Kassem (2001). Terrestrial Ecoregions of the World: A New Map of Life on Earth. Bioscience 51(11), pp. 933-938. DOI:10.1641/0006-3568
(41) Stattersfield A.J., M.J. Crosby, A.J. Long and D.C. Wege (1998). As updated by http://www.birdlife.org/datazone/



*The Chocolate Hills, on Bohol island in the central Philippines, are karst (limestone) hills. They are protected under Philippine law, and have been proposed as a World Heritage Site. The area is an important tourism destination, but balancing their protection with pressure to allow mining by artisanal miners and for construction has proved challenging.*

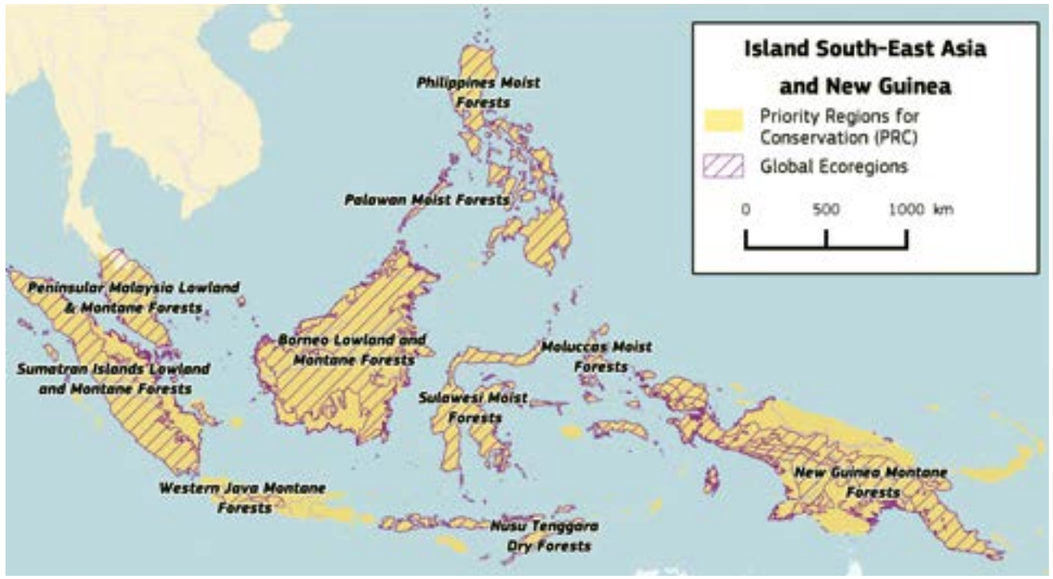
**Table 1.6** Biodiversity priorities identified in island South-East Asia and New Guinea

| Hotspot/wilderness area | Total land area (km²) | No of key biodiversity areas | No of biodiversity corridors | No of G200 Ecoregions | No of endemic bird areas |
|---|---|---|---|---|---|
| Sundaland | 1 600 000 | 63 [i] + 131[ii] | Not identified | 6 | 18 |
| Wallacea | 338 000 | 251 | 10 | 4 | 12 |
| Philippines | 300 780 | 128 | 19 | 3 | 10 |
| New Guinea | 785 783 | Not identified | Not identified | 5 | 11 |

*(i) 63 KBAs have been identified in Sumatra.[42]*
*(ii) 23 important bird areas have been identified in Indonesian Borneo, 53 in Java-Bali[43], 55 in Malaysia[44].*
*All of these would be expected to form the basis for any future identification of KBAs.*
*Source: CI/Haribon/ Department of Environment and Natural Resources.[45]*

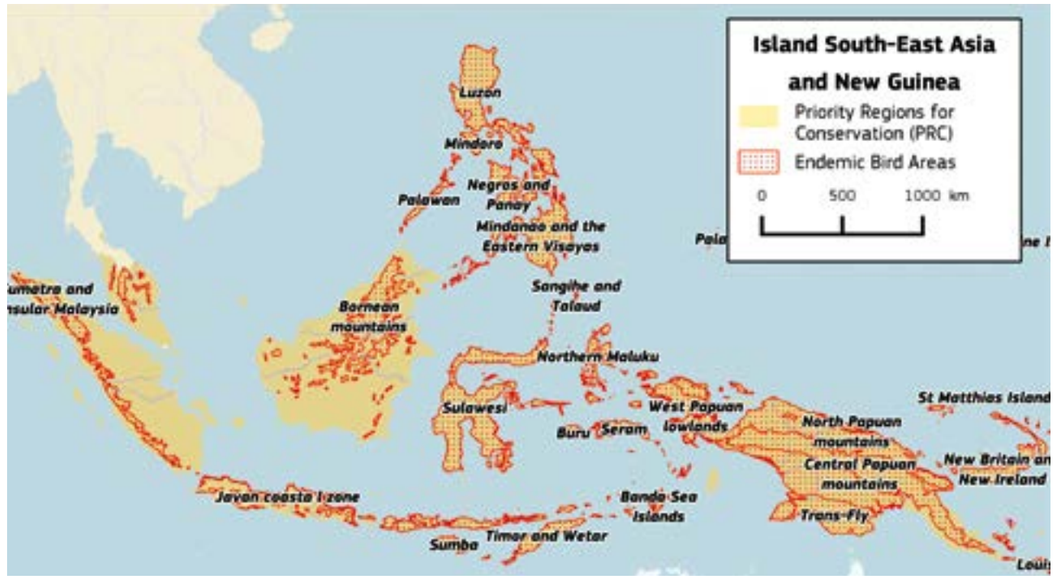
(42) CEPF (2007). Sumatra KBA Analysis. https://library.conservation.org/Published%20Documents/2009/Key%20Biodiversity%20Area%20map%20-%20Sumatra.pdf
(43) BirdLife. EBA book – Indonesia country account.
(44) Aik Y.C., A.C. Sebastian and G.W.H. Davison (2007). Directory of Important Bird Areas in Malaysia. Lynx Edicions, Spain. ISBN: 978-98-39681-39-0.
(45) CI/Haribon/Department of Environment and Natural Resources (DENR) (undated). Priority Sites for Conservation in the Philippines: Key Biodiversity Areas, CEPF

**Figure 1.2** Priority regions for conservation and Global 200 Ecoregions in island South-East Asia and New Guinea




*Note: Not all G200 Ecoregions are labelled. See Annex 1 for a full list.*

**Figure 1.3** Priority regions for conservation and endemic bird areas in island South-East Asia and New Guinea




*Note: Not all EBAs are labelled. See Annex 1 for a full list.*

# 2

# Conservation challenges

*Rajah Brooke's bird-wing butterfly is found in the lowland rainforests of Malaysia, Borneo and Sumatra. In some places the butterflies are captured in large numbers to be mounted as souvenirs and collectables. The species is listed on Annex II of CITES, requiring permits for export.*

# 2 _ Conservation challenges

## 2.1 Key direct threats

### 2.1.1 Unsustainable wildlife hunting

Hunting of wildlife is most often done by local people, and may be used in their own households, to sell in local markets or, in some cases, to supply national and international trade. Typically, exploitation of wild products is seen as a right (especially in PNG where ownership is vested in customary land owners), a necessity (where poor rural populations have no alternative but to use wild resources) or is not recognised as a problem that requires action. However, high-value species are also targeted by specialist hunters who may come from outside the community. The level of dependence on wildlife products varies across the region, influenced by access, availability of alternative sources and cultural factors, including food taboos and preferences. Dependence is probably highest in New Guinea, where a largely rural population still has access to biodiversity-rich forests, and hundreds of wild species have value for a wide variety of practical and cultural uses. There is little informative data on the level and impact of hunting on biodiversity, but there is evidence of declines in populations. Empty forests (i.e. forests which are structurally intact but have a denuded fauna as a result of over-hunting) are common in the Greater Mekong region but not yet widespread in South-East Asia. Nevertheless, trends on disappearance of large mammal and bird faunas have been noted in previously diverse forest areas in the region and can be expected to become more widespread[46].

There is significant demand for wildlife products from markets within the region. In north Sulawesi, Indonesia, a cultural preference for wild meat among an increasingly wealthy urban population is driving unsustainable exploitation for the local market, which threatens the endangered babirusa species (a member of the pig family) and the montane and lowland anoa species (a small relative of the buffalo). One in five households in 6 large Indonesian cities keep birds, many of them caught in the wild[47], which is part of a hobby that is worth an estimated EUR 60 million per year to the local economy[48] and affects over 200 species[49].

Trade of wildlife products to markets outside the region has a long history, but has expanded and intensified in response to the growing demand and improved infrastructure in recent decades. Indonesia, Malaysia and the Philippines are among the 30 countries in Africa and Asia where there is a disproportionately large amount of trafficking of key species to international markets.[50] Hunting of tiger, elephant and rhino in Sumatra, Kalimantan and Malaysia to supply the market for traditional medicine and ornaments in Vietnam and China critically threatens those species. Many of the birds in the region's bird markets are destined for mainland South-East Asia and China. The markets for Sunda pangolin (critically endangered) and Philippine pangolin (endangered) are supplied from the Philippines, Sumatra and Borneo, with trade routes following the major road networks and sea routes between Java, Sarawak, Vietnam and China. Malaysia, and to a lesser extent the Philippines, are transit points for ivory smuggled from Tanzania to Thailand, Vietnam, Hong Kong and China. More recently, Indonesia (and Sri Lanka) has emerged as alternative transit country to Malaysia for ivory. Malaysia is also a transit country (with Thailand) for the transport of rhino horn from Africa to Vietnam and China.[51]

The naturally small populations of species endemic to just one or a few small islands makes them especially vulnerable to exploitation, and ironically their status as a rarity (especially when it is given an official recognition through inclusion on national protected species lists or the IUCN Red List) makes them even more attractive. Trapping poses a severe threat to several species of parrots (e.g. the endangered red-and-blue lory, endemic to a small group of islands in northern Wallacea; and the critically endangered yellow-crested cockatoo, endemic to the southern islands of Wallacea), and reptiles such as the Roti Island snake-necked turtle.

In some areas, damage to crops, livestock or people are the motivation for hunting using guns, traps and poisoning. In most cases the targets are common species that have become pests (e.g. wild pigs, long-tailed macaque), but hunting poses a significant threat to populations of threatened species, including tiger, elephant and sometimes orang-utan and other primates. Human-wildlife conflict is especially acute where rapidly growing populations are pushing back the forest frontier, as in Sumatra.

Finally, a challenge of addressing hunting is the difficulty of establishing what the sustainable level of harvest is, and if a species is declining. Further research is needed on the extent and impacts of hunting.

In addition to undermining livelihoods, loss of species cascades through the ecosystem impacting on other species and ecosystem function: over-hunting of pigeons and fruit bats is thought to reduce long-distance seed dispersal of forest plants[52]; over-hunting of deer and pigs results in increased tiger predation on livestock; loss of elephant from forest ecosystems impacts on the germination and dispersal of some forest tree species.

### 2.1.2 Logging and wood harvesting

Forest cover in the region varies from 75 % in New Guinea to 26 % in the Philippines. The legal but unsustainable timber industry drove the Philippine forests to economic exhaustion in the 1970s and 1980s[53], with agricultural plantations, illegal logging and smallholder farming moving in to clear out abandoned concessions. A similar process has occurred across the lowlands of Sumatra and Borneo, with lowland forest on mineral soils virtually exhausted. In the coastal peat swamps, however, the difficulty of access and lower number of commercially valuable species has resulted in the persistence of forest when it has been cleared elsewhere.

Indonesia saw a massive spike in illegal logging between 1999 and 2005 after the fall of President Soeharto prompted rapid political decentralisation and a failure of central control over the state forests. While much illegal logging was carried out by gangs or labourers working with chainsaws and portable machinery, some illegal logging operations were commercial in scale, with vehicles and heavy machinery. The illegal logging boom slowed down as commercially valuable species within easy reach of roads and rivers were exhausted, and as the central ministry re-asserted control over wayward local governments, including banning the export of roundwood logs[54].

While the timber industry has declined across the Philippines and western Indonesia, licensed logging concessions still operate on the islands of Borneo and New Guinea (Indonesian Papua and PNG). In Indonesian Papua in the late 1990s and early 2000s, a policy allowing local community groups (the kopermas) to log over small areas of forests backfired: the communities sold their rights to commercial operations, which then stripped the forests of valuable species without any regard for sustainable management practices. The scheme was stopped in 2002 as a log export ban was imposed on the province. Nevertheless,

*Pangolin scales, meat and other products are sold in China and Vietnam as delicacies and for their medicinal properties. Once widespread in tropical Asia and Africa, all eight pangolin species are now classified by IUCN as threatened and listed on appendix I of CITES.*


*Babirusa are found on Sulawesi and neighbouring islands. They exemplify the way that the isolation and complex geological history of Sulawesi has encouraged the evolution of unique species. They are classified as threatened by IUCN as a result of hunting and habitat loss.*

(46) Harrison R.D. (2011). Emptying the forest: Hunting and Extirpation of Wildlife from Tropical Nature Reserves. *Bioscience* 61(11), pp. 919-924. DOI: 10.1525/bio.2011.61.11.11
(47) Jepson P. and R. Ladle (2005). Bird-keeping in Indonesia: conservation impacts and the potential for substitution-based conservation responses. Oryx 39(04), pp. 442-448.
(48) Jepson P., R.J. Ladle and Sujatnika (2011). Assessing market-based conservation governance approaches: a socio-economic profile of Indonesian markets for wild birds. Oryx 45(04), pp. 482-491.
(49) http://www.traffic.org/home/2015/9/25/tens-of-thousands-of-birds-illegally-sold-on-the-streets-of.html, accessed 4 May 2016.
(50) Stokes E., S. Hedges, A. Holmes and S. Roberton (2014). A Strategic Approach to Combat Wildlife Trafficking in Africa and Asia. WCS, New York.
(51) Ibid.
(52) Lee T.M., A. Sigouin, M. Pinedo-Vasquez and R. Nasi (2014). The harvest of wildlife for bushmeat and traditional medicines in East, South and Southeast Asia: Current knowledge base, challenges, opportunities and areas for future research. *Occasional Paper* 115. CIFOR, Bogor, Indonesia. Available at http://www.cifor.org/library/5135/the-harvest-of-wildlife-for-bushmeat-and-traditional-medicine-in-east-south-and-southeast-asia-current-knowledge-base-challenges-opportunities-and-areas-for-future-research/
(53) http://www.fao.org/docrep/003/x6967e/x6967e07.htm
(54) Environmental Investigation Agency - Telapak (2005). The Last Frontier: Illegal Logging in Papua and China's Massive Timber Theft. Telapak, Jakarta, Indonesia and Environmental Investigation Agency, London, UK.


*In South-East Asia, conflict with farmers may be a greater cause of elephant deaths than ivory poaching. Elephants are poisoned because they damage crops and property, and occasionally harm people. As elephant habitat is fragmented and lost, the problems are becoming more severe.*

*The climate and soils of much of the region are highly suitable for oil palm. Indonesia and Malaysia together produce about 85 % of the world's palm oil. The industry has boosted income for many farmers, but has caused forest loss, pollution, conflicts and displacement of communities.*

*Orang-utans can live in forest that has been sustainably logged, but when logging is followed by hunting, burning and clearance, they die or move. It may be possible to rehabilitate and release orphan orang-utans, but doing so requires that large areas of suitable habitat survive, and can be protected.*

illegal logging continues, especially focused on the valuable merbau tree[55].

PNG is the only country in the region where logging of natural forests is still an important industry. Land and forest rights are vested in communities that are customary landowners. Around 30 % of the country's forests are classified for commercial production. Commercial logging operations may operate in these forests, with the agreement of the customary landowners and a licence from the national forest authority. In practice, however, there have been problems with inadequate consultation with customary landowners, coercion and manipulation of leaders, or capture of rights and benefits by community elites in collusion with government officials and companies. Thus, although PNG has adequate forestry laws and regulations, and a series of forestry plans and codes of practice have been issued, unlicensed logging is widespread. Even the licensed concessions degrade the forest as the 30-year rotation selective logging system is poorly implemented and policed. The country has also failed to capture additional value from processing the logs itself, with about 80 % of timber exported as round logs, and in 2015 it became the world's largest exporter of roundwood logs. At the same time there has been little progress with certification of sustainable timber – less than 6 % of PNG's forests were independently verified or certified in 2012. PNG is one of the major tropical timber nations that are not negotiating a voluntary partnership agreement (VPA) under the European Union's (EU) Forest Law Enforcement, Governance and Trade (FLEGT) programme.[56] Most of the logging companies operating in PNG are Malaysian-owned and are selling into markets that, so far, are not sensitive to consumer pressure over sustainability and ethical issues.

In Indonesia, the Philippines and Malaysia, the decline of the logging industry has led to the development of industrial timber plantations, which produce feedstock for pulp-paper mills and commercial agricultural plantations (see section 2.1.3 below). Indonesia had 97 896 km² under timber plantation licences in 2012.[57] Although development of timber plantations is supposed to be limited to areas where forest is degraded, licences are sometimes issued for areas where intact natural forest remains, and in these cases the profit from clear-felling these residual stands may be the main motivation for the development of the concession. The paper industry has proved somewhat sensitive to consumer demands, and several of the major companies have made commitments to eliminate fibre from natural forests from their trade chains (see section 3.4).

### 2.1.3 Over-extraction of biomass and non-timber forest products

In addition to wildlife and timber, local populations extract hundreds of wildlife products for household use, local commercial use and to supply international markets.

The use of firewood for heating and cooking has an important impact in regions with limited tree cover and an intense demand for fuel, especially around the towns of Dili, Timor-Leste and Wamena, in Indonesian New Guinea.

International trade in non-timber forest products (NTFPs) has a long history, with sandalwood (*Santalum* species) having been traded from the islands of southern Indonesia and Timor-Leste for hundreds of years, leading to the virtual extermination of the tree in the wild. Currently, over-harvesting affects other species of plants, including rattan from the forests of Borneo, extracted in large volumes for furniture and craft production, and orchids and pitcher plants collected for the exotic plant trade. The trade in the highly valued resins from *Aquilaria trees*, agarwood (*Gaharu*), drives the felling of individual trees throughout the region, resulting in the extinction of the main source species in many areas.

### 2.1.4 Grazing and browsing

Free-range grazing of livestock is not a common land use in most of the region, the exceptions being the grassland savannahs of Timor-Leste and southern Indonesia. Over-stocking with livestock and over-use of fire to manage the grassland can lead to loss of tree cover, soil erosion and incursions of invasive plant species such as *Chromolaena odorata*.

### 2.1.5 Agricultural expansion and intensification

Forests, which have been degraded by licensed or illegal logging, become targets for clearance and development of agricultural plantations – most commonly oil palm, but also rubber or other crops. In the Philippines, Malaysia and Sumatra this process is far advanced, with little forest on high-potential agricultural land still available. In Borneo, the larger islands of central Indonesia[58] and Indonesian Papua the process is ongoing, with companies (sometimes the same companies, or the same groups, which have held logging licences) seeking changes to the status of land to allow for the issuance of plantation development permits. In some cases, these licence applications have been motivated primarily by the value of the timber remaining on the land, and the Indonesian Government has had to put in place regulations on plantation development to prevent companies clearing forest and then abandoning the land. Often the permitting procedures, which include some social and environment safeguards, are not followed and there are cases of corruption in the licensing process. In addition to the direct clearance of forest, the development of these plantations may limit community access to land and water, forcing them to clear new areas.

Indonesia and Malaysia have a policy goal of increasing palm oil production. This can be achieved through intensification and improved productivity from existing plantations, or through

(55) Ibid.
(56) Information in this paragraph is from World Resources Institute at http://www.forestlegality.org/risk-tool/country/papua-new-guinea
(57) Forest Watch Indonesia (2013). Potret Keadaan Hutan Indonesia, 2009-2013. FWI, Bogor, Indonesia.
(58) For example, there are 11.3 million hectares of state forest classified for 'production' in Wallacea, while current logging licences cover only 2.8 million hectares. Ministry of Forestry data for 2011 at http://humasplanologi.dephut.go.id/sekdit/index.php?option=com_content&view=article&id=102&Itemid=109&lang=en, accessed 4 May 2016.

*Logging remains an important industry in PNG, and in parts of Indonesia and Malaysia. A few companies have moved towards certified, sustainable practices, but many other operations damage the forest and cause conflicts with customary land holders.*

*Peat forest fires produce thick, toxic smoke and may continue to burn for weeks, degrading forest, endangering health and disrupting transport. Smoke pollution has become an international diplomatic issue.*

*Pulpwood plantations have expanded rapidly in South-East Asia, to provide raw material for large paper mills in Sumatra and Borneo. Development of the plantations often involves clearance of natural forest and drainage of peatlands.*

expansion of the planted area. In the past, companies have prioritised expansion over intensification, with expansion into forested areas being especially attractive because of the lack of competition with community landowners, and because of the opportunity to secure a one-off income from selling the timber that is cleared to make way for the plantation. As unused, accessible, lowland mineral soils have become unavailable, palm oil companies in Sumatra and Borneo have expanded onto peatlands, where drainage and intensive use of fertiliser is necessary to maintain palm fruit yields, resulting in peat degradation and large-scale greenhouse gas emissions.

Fire is often used to clear land for agriculture, and large-scale or poorly controlled fires, especially in peat, have damaging impacts on natural ecosystems as well as livelihoods. Forests are more vulnerable to fire damage when they have already been degraded by logging or small-scale clearance. In peatland regions, especially the eastern part of Sumatra and southern Kalimantan, fires can enter the peat and continue to burn underground. On top of being very difficult to control, they emit large volumes of toxic smoke and carbon dioxide ($CO_2$)[59], which has severe health impacts and causes economic losses. Forest fires are a major environmental issue in Indonesia, where they contribute more than 100 million tonnes of carbon emissions annually.[60] They can be particularly problematic during El Niño years, which occur irregularly at 2 to 7-year intervals and result in reduced rainfall. During the 1997 El Niño event, around 25 000 km² of Indonesia's peatlands burned, contributing to the largest ever recorded annual increase in global atmospheric $CO_2$.[61] Smoke and haze caused an air pollution crisis across the South-East Asia region, and was associated with 20 million cases of respiratory problems among Indonesians and as many as 48 000 premature deaths across the region. The Indonesia economy lost EUR 15 billion as a result[62], and fires may have caused as many as 100 000 deaths across the region.[63] Fire has been associated with the land holdings of major oil palm companies, but the causes are complex and ultimate responsibility for the burning is disputed between companies, government and smallholders[64].

In PNG, expansion of oil palm and other agricultural commodities into forestlands is so far limited. Much of the oil palm in PNG is established on former coconut plantations, and the majority of it is produced on Roundtable on Sustainable Palm Oil (RSPO)-certified estates. PNG's main palm oil producer and the country's biggest single employer, New Britain Palm Oil, was one of the pioneers of traceable supplies of certified sustainable palm oil.[65]

(59) For example, World Resources Institute (2015). Indonesia's Fire Outbreaks Producing More Daily Emissions than Entire US Economy. http://www.wri.org/blog/2015/10/indonesia%E2%80%99s-fire-outbreaks-producing-more-daily-emissions-entire-us-economy, accessed 13 June 2016.

(60) van der Werf G.R., J. Dempewolf, S.N. Trigg, J.T. Randerson, P.S. Kasibhatla, L. Giglio, D. Murdiyarso, W. Peters, D.C. Morton, G.J. Collatz, A.J. Dolman and R.S. DeFries (2008). Climate regulation of fire emissions and deforestation in equatorial Asia. PNAS 105(51), pp. 20350-20355. DOI: 10.1073/pnas.0803375105

(61) Page S.E., F. Siegert, J.O. Rieley, H.D.V. Boehm, A. Jaya and S. Limin (2002). The amount of carbon released from peat and forest fires in Indonesia during 1997. Nature 420, pp. 61-65.

(62) Varma A. 2003). The economy of slash and burn: a case study of the 1997-1998 Indonesian forest fires. Ecol Economics 46, pp. 159-171.

(63) Study quoted in The Guardian newspaper, 19 September 2016. https://www.theguardian.com/world/2016/sep/19/haze-indonesia-forest-fires-killed-100000-people-harvard-study

(64) See for example CIFOR (2015). Clearing the smoke: The causes and consequences of Indonesia's fires. http://blog.cifor.org/37016/clearing-the-smoke-the-causes-and-consequences-of-indonesias-fires?fnl=en, accessed 13 June 2016.

(65) See for example http://www.newbritainoils.com/palm-oil/ and http://www.leafasia.org/sites/default/files/public/resources/StatusofREDDinPNG.pdf. In 2015, New Britain Palm Oil became a subsidiary of Malaysian producer Sime Darby, and has continued its strong focus on sustainable palm oil.

Small-scale, local agriculture is an important land use across the region because a significant proportion of the population lives in rural areas and depends on a mixture of agriculture, fisheries, livestock and the harvest of wild products for their livelihoods. The highest proportion of rural people is in PNG (97 % rural), followed by Timor-Leste (85 %) and the Philippines (75 %), while Indonesia (61 %) and Malaysia (47 %) are far more urbanised. In some areas, commercial smallholder cultivation of coconut, cacao, coffee, cloves and nutmeg has a long history and the landscape is dominated by permanent 'gardens' with mixed tree species and smaller areas of annual crops. Irrigated rice is the staple food in all except Indonesian Papua and PNG, where sago (in the lowlands) and yams (in the highlands) play an important role, although they are being displaced by imported rice. In less densely populated areas, shifting cultivation is still practised, with cycles of clearance and fallow used to cultivate rain-fed rice, maize and tubers.

The diverse and relatively stable landscapes created by smallholder farming support much more biodiversity than monoculture plantations, although the most sensitive and endangered forest or freshwater species are unable to tolerate this level of disturbance to natural habitats. However, when human population growth is not counterbalanced by urban migration, changed land use or alternative livelihoods, the increasing pressure on resources results in shorter cultivation cycles, increased conversion of forest, and degradation of land and vegetation. In PNG, with high population growth rates and a very high proportion of people in rural areas, clearance by customary landowners of forest on their own land is expected to become increasingly acute. In other parts of the region, the increased pressure of people on land and forests is often a result of immigration from other regions by people seeking land and farming opportunities. In Indonesia, migration from the densely populated islands of Java and Bali to sparsely populated areas including Borneo and Sumatra was organised and supported by the government under the transmigration programme, and local transmigration continues today. Transmigrants are provided with land, but often sell up and move or expand their initial holdings, joining local farmers and spontaneous migrants in seeking new land. A farmer's ability to expand cropland is influenced by his/her ability to secure the labour and inputs (seeds, agrochemicals) required. When commodity prices (e.g. for coffee, cocoa, rubber, nutmeg, cloves, cinnamon) rise, farmers who already produce these crops receive increased profits, which they may invest in expanding their plantations. Alternatively, farmers may secure the backing of wealthy investors who provide them with capital and are paid back with a proportion of the crop. Influential investors may also provide the political protection needed if the land clearance is illegal or disputed. State forests, including protected areas, are often the targets of smallholder expansion because they are perceived as being open access. Land invasions may exploit existing indigenous land claims and take advantage of conflicts between local people and state forest agencies (see section 2.2.5).

The expansion of intensive agriculture is a major driver of the loss of the genetic diversity of domestic plants and livestock[66], with diverse smallholder systems increasingly replaced by high-yielding varieties. This has negative impacts on livelihood resilience, including the ability to adapt to climate change. Policies and resource-use decisions that support biologically diverse landscapes are generally beneficial to both smallholder livelihoods and biodiversity.

(66) The FAO has initiated a major review of global biodiversity for food and agriculture. See http://www.fao.org/nr/cgrfa/biodiversity/sowbfa/en/

*Batu Hijau copper and gold mine in southern Indonesia. Mining is an important source of revenue in all the countries of the region. However, the industry causes multiple social and environmental problems, connected with disposal of waste, pollution of air and water, and displacement of customary landowners.*

### 2.1.6 Oil and gas production and mining

Mining and oil and gas production have local but often severe impacts on the environment as a result of the mine operations and waste disposal. They may also have significant additional impacts as they attract migrants and increase population pressure in otherwise remote regions. Open pit mining for gold, copper and coal, as well as strip-mining for nickel are among the most destructive processes. Assessing the level of threat is complicated by the fact that exploration permits may be issued over very large areas, although only a small proportion of these areas will ever be developed for mineral extraction.

In the **Philippines**, about 30 % of the land area has potential for mining metallic minerals, and 632 mining rights covering 5 000 km² had been issued by 2006[67]. The government has made moves to liberalise the sector and encourage foreign investment, identifying 23 priority mining areas, most of which overlap with key biodiversity areas[68]. The sector is associated with conflicts over land, environmental damage and abuse of human rights, including extra-judicial killings, dispossession of indigenous people, pollution and loss of biodiversity[69]. The problem is made worse because mineral deposits are often located in areas occupied by poor, marginalised and minority groups which may have long-standing grievances against the state. As a result, mining faces opposition from rights groups, the church and environmental groups. It is reported that 14 of the country's 85 provinces have imposed moratoriums on mining, but that recent revision of the mining law forbids such moratoriums.[70]

**Indonesia** is the world's largest coal exporter, and is among the top 10 producers globally of gold, copper, nickel and tin. There are approximately 11 000 current mining licences.[71] A new law on mining in 2009 (which came into effect in 2014) banned the export of raw ore and required companies to process materials in-country, in an effort to maximise revenue and employment. Companies were also required to divest a proportion of foreign owned shares to local companies, and contracting and royalty rules were changed. As a result, many small- and medium-scale mining operations have stopped, and many large-scale mines have reduced output[72]. However, the potential of the sector in Indonesia remains huge, and mining is expected to expand in the medium term. The sector contributed 4.2 % of Indonesia's GDP in 2016, and was a much larger share of the regional economies of the main mining provinces, including biodiversity-rich Papua. Mining is highly capital-intensive and receives significant investment from foreign companies and governments.[73] In the last decade, coal production in Indonesia has increased five-fold to a peak of 458 million tonnes in 2014, although this declined slightly in 2015 and 2016. An additional 50 to 90 million tonnes of coal may have been mined and exported illegally. Although a slump in coal prices between 2012 and 2016 reduced output, Indonesia's commitment to building further coal-fired power stations means that coal mining is expected to expand in the medium term.

Oil and gas contributed 3 % to Indonesia's State revenue in 2016, down from 14% in 2014. Production of oil has declined over the last decade, with the country becoming a net oil importer in 2004, but gas production is increasing and Indonesia is now the 10th largest producer of LNG globally, and the 5th largest exporter. Production is concentrated in western Indonesia (the Sundaland hotspot), although the government is encouraging exploration in the east.[74]

Small-scale, artisanal and often illegal mining is widespread in the region and is often poorly regulated. Tin mined by an estimated 50 000 small-scale miners in Bangka-Belitung (Sumatra, Indonesia) has destroyed protected forests, wetlands and coastal fisheries.[75] The use of cyanide and mercury is widespread and causes severe pollution to watercourses and wetlands, as well as health impacts. Small miners extracting nickel-rich soil have denuded large areas of Buru Island, Indonesia. Local 'gold rushes' cause migration of human population and intense local exploitation of forest resources and land. Coastal black sand mining in the Philippines appears to cause subsidence, increasing the vulnerability of neighbouring communities to sea-level rise and storm surges[76].

Very large areas are allocated for mining exploration (e.g. 66 000 km² in East Kalimantan province, Indonesia[77]) but not all of these areas will be developed for mining. Giant mines, such as the Freeport mine in Papua province have had severe local effects on the montane ecosystems and caused pollution of lowland watercourses through the poor disposal of tailings. Mining (legal and illegal), oil and gas were considered to be the single most important threat to terrestrial KBAs in the Wallacea hotspot.[78]

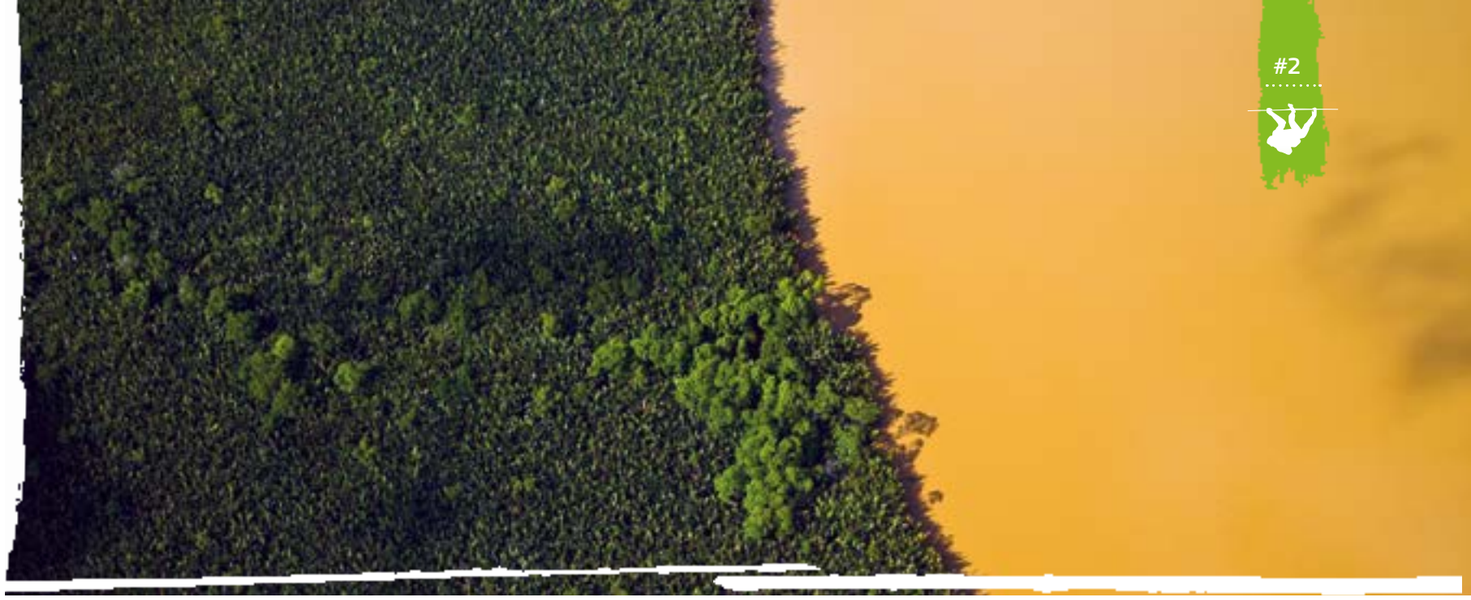
**Timor-Leste**'s Government earned EUR 2.6 billion from extractive industries (primarily oil and gas) in 2012[79], and is one of the most oil-gas dependent economies in the world. Extraction takes place offshore, with the greatest impact on terrestrial biodiversity from the clearing of forest for the construction of processing facilities on the island's south coast. Oil and gas funds are channelled to social and non-profit activities through a petroleum fund managed by the Ministry of Finance and the Central Bank of Timor-Leste.[80]

Mining dominates **PNG**'s economy, as it has contributed around 25 % of GDP and government revenue over the last 30 years [81] and is focused on gold, with some copper and nickel. Most of the extraction takes place in seven large mines. Some of the mines are associated with severe water pollution caused by the disposal of tailings.[82] However, others are run by global companies that have shareholders and markets that are sensitive to environmental and social issues. Those therefore make efforts to minimise and mitigate their impacts (see section 3.4). PNG also exports oil and LNG. The PNG-LNG project, whose operations started in 2014, involves a network of pipelines and a gas production and export facility that is the largest commercial investment in the country[83].

### 2.1.7 Transport and infrastructure

In a region fragmented into thousands of islands, strengthening air, sea and road links is seen as essential for continued economic development, and is prioritised by governments and donors. In many cases, the infrastructure to create these links will be built on peri-urban and agricultural land of low biodiversity value, but some (e.g. hydro dams, roads) will be in areas of

(67) Foundation for Environmental Security and Sustainability (2007). A Double-edged Sword? Implication of Mining for Environmental Security in the Philippines. FESS, Falls Church, VA, USA.
(68) Haribon Foundation (2014). The State of Philippine Birds. Haribon Foundation for the Conservation of Natural Resource, Inc., Quezon City, Philippines. Available at: http://www.birdlife.org/datazone/userfiles/file/sowb/countries/StateofPhilippineBirds.pdf
(69) See for example Philippines: Bishops urge Pope to speak about harmful impact of mining on environment. http://www.indcatholicnews.com/news.php?viewStory=26490>, accessed 5 May 2016. See also campaign information at http://www.yestolifenotomining.org/philippines-activists-hold-week-of-protests-to-oppose-mining-philippines-2015-conference/, accessed 5 May 2016.
(70) http://thediplomat.com/2012/08/from-bad-to-worse-the-philippines-new-mining-law/, accessed 5 May 2016.
(71) PWC (2017). Mining in Indonesia: Investment and taxation guide. May 2017, 9th edition. Price Waterhouse Coopers, Jakarta, Indonesia. Available at: https://www.pwc.com/id/en/energy-utilities-mining/assets/mining/mining-guide-2017-web.pdf, accessed 17 November 2017.
(72) PWC (2017) Ibid.
(73) For example, the International Finance Corporation (IFC) and l'Agence Française de Développement (AFD) provided loans for the development of the Weda Bay nickel mine in Halmahera. The mine site is a biodiversity hotspot and the company has engaged in extensive efforts to document the biodiversity and find ways to offset the anticipated impacts.
(74) PWC (2017) Oil and Gas in Indonesia: Investment and taxation guide. May 2017, 8th edition. Price Waterhouse Coopers, Jakarta, Indonesia. Available at: https://www.pwc.com/id/en/energy-utilities-mining/assets/oil%20and%20gas/oil-and-gas-guide-2017.pdf, accessed 17 November 2017.
(75) Tft (2014) Responsible tin mining in Bangka – the journey begins. http://www.tft-earth.org/stories/blog/responsible-tin-mining-in-bangka-the-journey-begins/, accessed 13 March 2018.
(76) Chaussard E. and S. Kerosky (2016). Characterization of Black Sand Mining Activities and Their Environmental Impacts in the Philippines Using Remote Sensing. *Remote Sens.* 2016, 8(2), p. 100. DOI:10.3390/rs8020100
(77) http://asiafoundation.org/in-asia/2014/10/08/indonesia-now-worlds-largest-exporter-of-coal-for-power-stations-but-there-are-costs/, accessed 5 May 2016.
(78) CEPF (2014). Ecosystem Profile: Wallacea Biodiversity Hotspot. Critical Ecosystem Partnership Fund, Washington, DC. Available at https://www.cepf.net/sites/default/files/ecosystemprofile_wallacea.pdf. Mining affected 81 (41 %) of 197 KBAs assessed in Wallacea, less frequent than hunting/collecting or local agricultural expansion, but with a more severe impact on the KBAs where it did occur.
(79) Moore Stephens LLP (2015). Timor-Leste Extractive Industries Transparency Initiative: Independent EITI Reconciliation report for the Year 2013. Available at: http://www.eiti.tl/secretariat/reports/tl-eiti-reports/finish/21-english/221-tl-eiti-report-2013
(80) See https://www.mof.gov.tl/budget-spending/petroleum-fund/, accessed 21 September 2016.
(81) https://www.surrey.ac.uk/ces/files/pdf/Glenn_Banks_presentation.pdf
(82) http://wwf.panda.org/what_we_do/where_we_work/new_guinea_forests/problems_forests_new_guinea/mining_new_guinea/ok_tedi_forest_new_guinea/, accessed 6 May 2016.
(83) http://pnglng.com/project/economic-benefits.html, accessed 6 May 2016.



*The Kinabatangan is the longest river in the Malaysian province of Sabah. Water quality has declined as a result of deforestation in the catchment and the establishment of oil palm plantations and mills, which discharge effluent into the river and waste from the growing population in waterside villages. Pollution impacts on water users, including the tourist industry and local people.*

conservation significance. The location of roads will have a significant influence on the pattern of future land clearance and resource exploitation. In Timor-Leste, a large oil terminal project includes the development of highways along the south coast and linking the north and south. This is likely to increase access to the forests of the central mountains and may increase exploitation for firewood or land.

On small islands and in coastal regions, the development of roads can severely impact on marine environments: coral rock may be mined as a substrate for road building, coastal ecosystems destroyed to make way for road development, and run-off from disturbed water catchments can cause sedimentation in coastal marine ecosystems. These regions are also the focus for development for tourism, which can deplete water supplies, create waste management problems, and cause soil erosion that leads to coastal sedimentation and damage to coral reefs.

Although urban areas cover a small fraction of the total land area, they have a large ecological footprint, as they extract water, food and energy from surrounding landscapes, and dump waste and pollutants into terrestrial, freshwater and marine ecosystems. Indonesia has the largest area of urban land in South-East Asia, totalling 10 000 km² in 2010, home to 94 million people or 39 % of the population. Three-quarters of this urban land is on Java, centred on the mega-city of Jakarta, which grew by 7 million people between 2000 and 2010 to a total of 23 million. The Philippines does not have such a large percentage of its population in urban areas, but most of them are in Manila (pop. 16.5 million).[84] Malaysia's urban population grew by 4 % per year between 2000 and 2010, the fastest in the region.[85]

Urban expansion is concentrated in coastal regions, some of it on land created by in-filling coastal and near-shore marine habitats. This can have a dramatic effect on migratory birds, particularly those using the East Asian-Australasian Flyway, which includes all the countries of the region. Migratory shorebirds have particular conservation requirements: they depend on the availability of resting and feeding sites located along their migration routes. As these sites may be widely separated, the loss of one site may break the chain, resulting in higher mortality and reduced breeding success.

### 2.1.8 Invasive species

At least 237 invasive species have been recorded in the region[86], with the highest number in Indonesia (181), followed by the Philippines (148) and Malaysia (145). Amongst a large number of invasive plants are the shrub *Chromolaena odorata* and the thorny bush Prosopis spp., which degrade grasslands and out-compete local species, and the creepers Lantana spp. and Mikrania micratha, which smother trees in open forest and other habitats. Deliberate introductions that have become invasive include the tree Acacia nilotica, which now occupies over 70 % of the savannah area of the Baluran National Park (NP) in Java, having been introduced as a firebreak[87].

Isolated for long periods, the biodiversity of Sulawesi and New Guinea is more vulnerable to competition, disease and predation by introduced species than many other islands. Common carp, two species of tilapia, and other fish introduced into the lakes of central Sulawesi pose a threat to endemic freshwater life[88].

Invasive species already have a major impact on agricultural production, and thus on food security and livelihoods. They are estimated to cost EUR 25.7 billion per year in South-East Asia[89], and the threat of further invasion as a result of deliberate and accidental introduction is significant and inadequately addressed[90]. Wild ecosystems are vulnerable to invasive species introduced as agricultural commodities, weeds or for biological control. Wild ecosystems may also provide refuges for invasives where they persist, despite attempts to eradicate them from production land.

(84) World Bank (2015). East Asia's Changing Urban Landscape: Measuring a Decade of Spatial Growth. Urban Development Series. Washington, DC: World Bank. DOI: 10.1596/978-1-4648-0363-5. Licence: Creative Commons Attribution CC BY 3.0 IGO.
(85) Ibid.
(86) Global Invasive Species Database, http://www.iucngisd.org/gisd/search.php, filtered for country, accessed 20 September 2016. The CABI database lists 694 species, 32 bacteria, 18 fungi, 134 insects, 46 vertebrates, 29
(87) Garsetiasih R. and H. Siubelan. The Invasion of Acacia nilotica in Baluran National Park, East Java, and its control measures. In McKenzie P. (Ed.) (2003). The Unwelcome Guests: Proceedings of the Asia-Pacific Invasive Species Conference. FAO, Bangkok. Available at http://www.fao.org/docrep/008/ae944e/ae944e07.htm#bm07.3
(88) Parenti, L. R. and B. Soeroto (2003). Adrianichthys roseni and Oryzias nebulosus: Two new ricefishes (Atherinomorpha: Beloniformes: Adrianichthydae) from Lake Poso, Sulawesi, Indonesia. *Ichthyological Research* 51, pp. 10-19.
(89) UNEP, https://www.unenvironment.org/news-and-stories/story/invasive-species-huge-threat-human-well-being
(90) Paini D., A.W. Sheppard, D.C. Cook, P.J. De Barro, S.P. Worner and M.B. Thomas (2016). Global threat to agriculture from invasive species. PNAS, 113 (27). DOI: 10.1073/pnas.1602205113



### 2.1.9 Pollution of freshwater ecosystems

Pollution is a particular problem in freshwater ecosystems and is widespread throughout the region as a result of agricultural practices, urbanisation, infrastructure development and mining. The nutrient-poor lakes of central Sulawesi, a centre for endangered species, are threatened by clouding and eutrophication caused by fish farms, sewage and run-off from agriculture.[91] The disposal of mine tailings into rivers has had severe effects on freshwater biodiversity, especially when mines are located in the headwaters of river systems. Examples of serious pollution include the Ok Tedi copper and gold mine in PNG, which polluted the Fly river after dams built to contain mine waste (tailings) were breached, causing declines in fish populations and increased human health problems.[92]

### 2.1.10 Climate change

The predicted impacts of climate change on human livelihoods and economies are complex. In agriculture, some gains are predicted, but overall production is expected to decline across Asia.[93] Models predict that rainfall will increase across the region, but local topography and weather patterns will play a role. The southern islands of Indonesia and Timor-Leste are expected to experience a longer dry season and more intense rainfall in the wet season, which may lead to soil erosion, declines in agricultural productivity, sedimentation and floods. The impacts of sea-level rise will be exacerbated by increased frequency and intensity of tropical storms.

The direct impacts on biodiversity will include changes in the physical environment and ecosystem processes, which will impact differently on each species, depending on its ecological niche and ability to tolerate changed conditions. Most species will experience a change in their breeding, migrating and feeding environment, and will therefore be exposed to new competitors, diseases and parasites. For some, the 'envelope' of environmental factors within which they can live will shift to a higher altitude or higher latitude and if the species is sufficiently mobile, the shift is not too fast, and there is suitable habitat along the way, then theoretically it could follow the shift to occupy a new range. However, for many species, their environmental envelope will cease to exist, or the conditions that would allow them to shift with it will not be present, resulting in local extinction.

In addition to the direct effects, biodiversity will be impacted as a result of human responses to climate change. These will include changes in agricultural practices and inland migrations of population, away from eroding coastlines.

In addition to being vulnerable to climate change, Indonesia is a major emitter of greenhouse gases (GHGs), two-thirds of it coming from land use and forestry sources (including degradation of Indonesia's large peatlands). PNG also has a very high proportion of GHG emissions from land use and forestry, but low overall emissions. Land use and forestry is a relatively insignificant source in Malaysia and the Philippines.

Malaysia and the Philippines are relatively minor contributors to global GHG emissions overall and sequester carbon when considering land use alone (hence the negative figures for net carbon emissions for these countries in Table 2.1). PNG is an

(91) Parenti and Soeroto 2003 in CEPF (2014). Ecosystem Profile: Wallacea Biodiversity Hotspot. Critical Ecosystem Partnership Fund, Washington, DC.
(92) http://wwf.panda.org/what_we_do/where_we_work/new_guinea_forests/problems_forests_new_guinea/mining_new_guinea/ok_tedi_forest_new_guinea/, accessed 10 May 2016.
(93) Krishnamurthy, P. K., K. Lewis, C. Kent and P. Aggarwal (2015) Climate impacts on food security and livelihoods in Asia. A review of existing knowledge. World Food Programme, Bangkok. Available at: http://documents.wfp.org/stellent/groups/public/documents/newsroom/wfp281745.pdf

*Climate change is predicted to alter rainfall patterns and storm intensity across the region, with negative impacts on livelihoods and local economies. Land-use change is one of the main sources of greenhouse gas emissions in Indonesia and PNG, with the burning of drained peatland being especially damaging.*

**Table 2.1** Greenhouse gas emissions

| Country | Total GHG emissions 2013 (all sources) ($MtCO_2e$) | GHG emissions from land-use change and forestry 2013 ($MtCO_2e$) | GHG emissions 2013 ($tCO_2e$ per capita) |
|---|---|---|---|
| Indonesia | 2 160.64 | 1 416.30 | 8.60 |
| Malaysia | 163.24 | -139.91 | 5.54 |
| Papua New Guinea | 70.85 | 54.42 | 9.69 |
| Philippines | 111.29 | - 60.32 | 1.14 |
| Timor-Leste | - | - | - |

*Source: World Resources Institute* [94]

## 2.2 Drivers of threats

### 2.2.1 Emphasis on economic development

even smaller contributor of emissions, although its low total population makes its per capita emission amongst the highest in the countries covered by this study, even higher than Indonesia. Indonesia's land-use-based emissions are far higher than any other country covered by the study, but when overall emissions are considered, Indonesia is 3rd behind China and India.

The countries in the region are committed to liberalising their economies and encouraging foreign investment, with export-led growth boosting the manufacturing, services, and agricultural and extractive industries.[95] All except PNG and Timor-Leste have well-developed services and manufacturing sectors, but the expansion of natural resource-based industry continues to be a critical element of government plans to fuel continued economic growth, and especially to address inequalities in wealth and employment opportunities between regions within their

([94]) CAIT Climate Data Explorer (2015). World Resources Institute, Washington, DC. Available online at: http://cait.wri.org, accessed 3 May 2017

([95]) OECD (2014). Southeast Asia Investment Policy Perspectives. Available at https://www.oecd.org/daf/inv/investment-policy/Southeast-Asia-Investment-Policy-Perspectives-2014.pdf





countries[96]. In 2014, natural resource exploitation (mineral, oil, gas, forestry) contributed 2.9 % of GDP for the Philippines, 6.3 % of GDP for Indonesia, 8.2 % for Malaysia and 29.6 % for PNG[97], but was a far more significant contributor to the economies of some of the remoter regions within these countries. These developments create pressure to reduce obstacles to investment, including social and environmental safeguards, further weakening mechanisms that are already inadequate, and intensifying the threat to biodiversity from resource extraction described in sections 2.1.2 and 2.1.3. This pressure is exacerbated by the creation of the ASEAN economic community, with its emphasis on moving towards a single market within the region (excluding PNG, which is outside the zone, and Timor-Leste, whose application to join the block has not yet been accepted). Malaysia (and Vietnam, among the countries covered by this study) is a member of the proposed Trans-Pacific Partnership, a free trade agreement between 12 Pacific Rim countries[98] that contains strong safeguards against illegal wildlife and timber trafficking in the current drafts. These include agreements to 'effectively enforce environmental laws', 'fulfil obligations under the Convention on International Trade in Endangered Species (CITES)', and 'take measures to combat and cooperate to prevent trade in wild fauna and flora that has been taken illegally'[99].

### 2.2.2 Population pressure on resources

As national populations become larger and wealthier, domestic demand for food and energy is increasing rapidly – for example, 20 % of Indonesian oil palm is consumed by the domestic market[100]. In South-East Asia, the increase in energy use per capita, and a shift from traditional biomass for cooking and heating to modern alternatives, has caused energy demand to increase 250 % since 1990. This growth in energy demand is expected to continue and, despite an increase in the use of renewables, will result in the expansion of coal and other fossil fuel use, with three-quarters of power plants under construction being coal fired.[101] As a consequence, South-East Asia's $CO_2$ emissions are expected to double by 2035. Increasing demand for food makes the issues of food security and food sovereignty more acute, and national governments have responded by supporting industrial-scale food production schemes, such as the 16 000 $km^2$ Merauke Integrated Food and Energy Estate in Indonesian Papua[102].

While the economies of the region are growing at a rate that in some cases equals the growth of the Mekong countries and China, there are significant challenges to delivering development (i.e. access to markets, healthcare, energy, communication, education and other services) across territories that are large, sub-divided into islands or by mountain ranges, and culturally complex and diverse. As a result, it is poverty and the lack of alternative sources of income, rather than accumulation of wealth, which is driving an unsustainable use of resources in regions such as eastern Indonesia, parts of the Philippines, PNG and Timor-Leste. In these areas, communities are highly dependent on their immediate environment, and the physical limits to resources – especially fertile agricultural land, fresh water, biomass energy and timber – present particular challenges. These pressures have resulted in the development and persistence of many customary mechanisms to limit resource use, including taboos on the harvest of particular species in certain locations, closed seasons, and recognition of exclusive clan or household control over areas for hunting, collection and farming. However, these mechanisms have become less effective as populations have grown and the economy, which would originally have relied on barter and mutual assistance, has become more cash-orientated. With the degradation of local environments, products that would once have been available, such as timber and fresh water, may now have to be imported, despite the high transport costs. In response to this increasing need for cash, islanders are forced to focus on high-value products such as parrots, mammals, hardwoods and gold, driving a cycle of over-exploitation to fulfil short-term needs. Isolation also limits access to innovation and information, which might assist poor rural populations in finding solutions or alternatives.

### 2.2.3 Weak governance

The countries in the region are all within the third quartile of the corruption perceptions score, with rankings ranging from 54 (Malaysia) to 139 (Papua New Guinea) out of 168 countries (Table 2.2). The natural resources sector is particularly prone to corruption, including bribery, fraud, conflicts of interest (regulators and regulatory institutions benefitting from resource exploitation), and state capture (disproportionate influence over regulatory decisions by companies).[103] These practices undermine considerations of equity, sustainability and the use of objective data in decision-making, and weaken the mechanisms

([96]) See for example Malaysia's plan for economic corridors, http://www.mycorridor.malaysia.gov.my/IC/Pages/Introduction.aspx; Indonesia's MP3EI, http://www.indonesia-investments.com/projects/government-development-plans/masterplan-for-acceleration-and-expansion-of-indonesias-economic-development-mp3ei/item306

([97]) http://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS, accessed 5 May 2016. No figures are available for Timor-Leste.

([98]) The USA pulled out of the agreement on 23 January 2017, and the future of the agreement was unclear as of mid-2017.

([99]) See https://ustr.gov/about-us/policy-offices/press-office/press-releases/2015/october/summary-trans-pacific-partnership, accessed 22 April 2016.

([100]) http://www.indonesia-investments.com/business/commodities/palm-oil/item166, accessed 6 May 2016.

([101]) International Energy Agency (2013). Southeast Asia Energy Outlook. Available at: https://www.iea.org/publications/freepublications/publication/SoutheastAsiaEnergyOutlook_WEO2013SpecialReport.pdf

([102]) See *Jakarta Post* newspaper report: Govt to revive food estate project in Papua, 16 April 2016 at http://www.thejakartapost.com/news/2015/04/16/govt-revive-food-estate-project-papua.html, accessed 26 May 2016.

([103]) UNDP (2008). Tackling corruption, Transforming Lives: Accelerating Human Development in Asia and the Pacific. UNDP, Colombo. Available at http://www.undp.org/content/dam/undp/library/corporate/HDR/Asia%20and%20Pacific%20HDR/RHDR_Full%20Report_Tackling_Corruption_Transforming_Lives.pdf

**Table 2.2** Corruption perception index scores, 2016

| Country | Corruption perception score 2016 (0: highly corrupt to 100: very clean) | Ranking 2016 (from 1: least corrupt to 168: most corrupt) |
|---|---|---|
| Malaysia | 49 | 55 |
| Indonesia | 37 | 90 |
| Philippines | 35 | 101 |
| Timor-Leste | 35 | 101 |
| Papua New Guinea | 28 | 136 |

*Source: Transparency International Corruption Perceptions Index 2016* [104]

designed to limit negative impacts of economic development, such as land-use planning, zoning, environmental impact assessment and licensing the exploitation of natural resources. Corruption may be difficult to prove or to challenge, especially where there is a lack of transparency, inadequate or disputed data, poor public participation, limited capacity or bias on the part of the institutions contracted to undertake environmental impact assessments (EIAs), and limited capacity on the part of the agencies charged with the enforcement of environmental regulations. In PNG, limited capacity and political expediency has been blamed for the repeated re-working of regulations on the environmental impacts of mines, leading to significant impacts on river systems from tailing disposal.[105] The consequence is that the most valuable places for biodiversity are not necessarily protected; unsympathetic land management practices are used, and damage to ecosystem services from development projects is much greater than it should be. In Indonesia, despite huge efforts to prevent and prosecute corrupt officials, fear of corruption was blamed for slow progress in the disbursement of funding offered by Norway for progress on reducing greenhouse gas emissions.[106]

### 2.2.4 Civil unrest, conflict, insurgency

Armed conflict and insecurity interferes with the rule of law and accountable decision-making, and promotes unsustainable short-term resource exploitation as a consequence of poverty, insecurity and displacement of populations. State duties such as management of protected areas and enforcement of regulations on wildlife exploitation may become ineffective, and resource extraction may be intensified to fund insurgency. The region has suffered a number of local conflicts, including in Indonesia (Aceh, Maluku, Papua), PNG (Bougainville), Timor-Leste (during the struggle for independence from Indonesia) and the Philippines (Mindanao).

### 2.2.5 Unsustainable use driven by tenure insecurity and conflict

All the countries in the region, except PNG, vest control of forest resources on the state (see section 1.1.4), with varying provisions for the recognition of pre-existing rights. Problems arise when land-use regulations and zonation negatively impact on the livelihoods of rights holders, especially when this involves the state creating protected areas or granting permission for external investments, such as logging concessions or industrial agriculture, without their knowledge or agreement.

In **Indonesia** there are numerous conflicts over the forest zone, and land invasions (such as in the Lore Lindu and Kerinci-Seblat National Parks) are partly motivated and justified by the conflict over land rights. Recent successful legal challenges to the authority of the state over forestlands (see section 1.1.4) have complex, and somewhat unpredictable, consequences for biodiversity conservation. They have the effect of weakening the legal status of state forest areas that have not been through the full process of gazetting (estimated to be 75 % of state forests), and while these decisions appear to open the door to recognition of local communities' rights to manage forests, they raise questions about where the boundaries of customary forest rights are, and what limits can be imposed on how they are managed. Indigenous peoples' organisations are actively promoting awareness of the court decision, but are themselves wary of creating a 'land rush', which triggers conflict and spurious claims, and results in areas of community land being handed over to companies. It is not yet clear if national parks and other protected areas in Indonesia, which are all part of the state forest zone, will face claims from neighbouring customary communities, nor how they will handle them.

In **Malaysia** the situation varies between states. In Sarawak and Sabah, mechanisms exist for the registration of 'native customary rights', but parallel systems allowing state control and allocation of land (for example, as a national park) creates legal plurality within which state and corporates have been able to assert their priorities. Customary rights have been progressively eroded, and the resulting disenfranchisement and conflict undermines livelihoods and park management.[107] In Peninsula Malaysia there is legislation granting occupancy and use rights to indigenous communities, but legal changes have weakened these rights, and land development projects have failed to take them into account, resulting in numerous conflicts. In protected areas, the attempts to regulate indigenous rights have resulted in rules that appear unnecessarily restrictive in some cases, but also have loopholes allowing the continued over-harvest of threatened species.[108]

At least 96 of the 128 key biodiversity areas and 69 of the 99 protected areas in the **Philippines** overlap with ancestral lands. The land and resource rights of 'indigenous cultural communities' are protected under the Indigenous Peoples' Rights Act, and where these overlap with a protected area the customary landowners have a responsibility to maintain the PA, with the assistance of the country's Department for Environment and Natural Resources (DENR). In practice, indigenous participation in PA Management Boards may be limited by (i) capacity to engage with the language and issues discussed, (ii) access to meetings, and (iii) legitimacy as a representative of all indigenous peoples and conservation.[109]

**Timor-Leste**'s single national park includes a number of settlements, lands and resources that are essential to community livelihoods; zonation has been proposed in an attempt to integrate the needs of people and conservation.

**Papua New Guinea** has a customary land tenure system enshrined in law, which gives local landowners a veto over land-use change – conservation or investment – in their territory. This makes a traditional protected areas network based primarily on state control of land an inappropriate model for the country. In practice, the participation of communities in decisions on allocation of conservation areas, mining and logging rights has been uneven (see discussion on protected area management in PNG, section 3.1.2), and there is suspicion of government motives, reinforced by experience of conflict and failure to deliver on Reducing emissions from deforestation and forest degradation (REDD+) programmes. In contrast to the other states in the region, therefore, the challenge for conservation in PNG is not how to strengthen the rights of customary landowners, but how to work with landowners and government authorities to develop a protected area framework which respects customary land ownership and control while effectively leveraging the resources of state agencies.

#2

*Eclectus parrot, from eastern Indonesia, New Guinea and the Solomon Islands, in a bird market in Bangkok. The illegal trade in wild species from the region is global in scope, but also feeds a large internal market. Wildlife are caught and traded alive as pets, for competitions, and gift exchanges.*

(104) See http://www.transparency.org/news/feature/corruption_perceptions_index_2016#table, accessed 9 May 2017.
(105) https://www.surrey.ac.uk/ces/files/pdf/Glenn_Banks_presentation.pdf, accessed 6 May 2016.
(106) https://ig.ft.com/sites/land-rush-investment/indonesia/
(107) Forest Peoples Programme (2008). Malaysia: Securing Indigenous Peoples' Rights in Conservation – Reviewing and promoting progress in Sabah, Malaysia.
(108) Aziz S.A., G.R. Clements, D.M. Rayan and P. Sankar (2013). Why conservationists should be concerned about natural resource legislation affecting indigenous peoples' rights: lessons from Peninsula Malaysia. Biodiversity Conservation 22, pp. 639-656. DOI 10.1007/s10531-013-0432-5
(109) Springer J. and F. Almeida (2015). Protected Areas and the Land Rights of Indigenous Peoples and Local Communities. Rights and Resources Initiative, Washington. Available at http://www.rightsandresources.org/wp-content/uploads/RRIReport_Protected-Areas-and-Land-Rights_web.pdf

# 3

## Ongoing conservation efforts

*Greater bird-of-paradise. Most of the 42 species of birds-of-paradise are endemic to New Guinea. In many of them the males have extraordinary plumage and elaborate courtship displays. They are hunted for their feathers, which are used for decoration by local clans.*

# 3 _ Ongoing conservation efforts

## 3.1 Government

### 3.1.1 Institutions for conservation

The national governments of all the countries in the region have established dedicated agencies responsible for biodiversity conservation, and there are many other agencies that have an influence on natural resource management and development planning, thus impacting on conservation. Table 3.1 summarises the main institutions responsible for conservation in each country.

*Laguna del Bay frog, Sierra Madre National Park, Luzon, Philippines. This frog is only found in lower montane and lowland forests on Luzon Island. Outside protected areas it is threatened by logging and the polluted streams where it lives.*

**Table 3.1** Summary of the division of responsibility for conservation between government agencies

| Country/agency | Mandate |
|---|---|
| Indonesia | |
| Ministry of Environment and Forestry (MoEF) | Management of the national forest estate, including zoning, issuance of exploitation licences and conservation. |
| Directorate-general of Ecosystem and Natural Resources Conservation of MoEF | Creation and management of terrestrial protected areas, enforcement of wildlife protection regulations; CITES management authority; Ramsar Convention Administrative Authority. |
| Directorate-general for Climate Change Control of MoEF | Climate change policy and coordination of REDD+ implementation. |
| Indonesian Institute of Sciences | Biodiversity data management; CITES scientific authority. |
| Malaysia[i] | |
| Ministry of Natural Resources and Environment (MoNRE) | Oversees management of natural resources, including exploitation and extraction, conservation, planning of land and water management, climate change; Ramsar Convention Administrative Authority. |
| Biodiversity and Forest Management Department of MoNRE | CITES central management authority for policy. |
| Department of Wildlife and National Parks Peninsular Malaysia of MoNRE | Creation and management of national parks in Peninsular Malaysia; CITES management authority for wildlife, except fish and marine species in Peninsular Malaysia. |
| Department of Fisheries, Malaysia | CITES management authority for fish and marine species. |
| Forest Department Sarawak | Creation and management of national parks in Sarawak; CITES management authority for all species in Sarawak. |
| Sabah Wildlife Department | Creation and management of national parks in Sabah; CITES management authority for all non-marine species in Sabah. |
| State Forestry Departments (Peninsular Malaysia) | Management of state parks and forests in each of the states. |
| Forest Research Institute of Malaysia of MoNRE | Convention of Biological Diversity (CBD) clearing-house mechanism, national focal point. |
| Papua New Guinea | |
| Conservation and Environment Protection Authority (CEPA)[ii] | Conservation of flora and fauna, establishment of protected areas including implementation of the 2014 PA policy; establishment of a biodiversity trust fund; Ramsar Convention Administrative Authority. |
| PNG Forests Authority (reports to the Minister of Forestry) | Development, monitoring and enforcement of forestry sector regulations; implementation of REDD+ pilot projects; CITES scientific authority for flora. |
| National Fisheries Authority | CITES scientific authority for aquatic species. |
| Climate Change and Development Authority | Coordination of climate change and REDD-related action; climate compatible development policy. |
| Philippines[iii] | |
| Department of Environment and Natural Resources (DENR) | CITES management and scientific authority for terrestrial wildlife; CBD Clearing-House Mechanism's national focal point. |
| Bureau of Fisheries and Aquatic Resources Department of Agriculture | CITES management and scientific authority for aquatic and marine wildlife. |
| Biodiversity Management Bureau of the DENR | Management of terrestrial protected areas; Ramsar Convention Administrative Authority. |
| Timor-Leste | |
| National Directorates for the Environment, International Environmental Affairs and Climate Change Biodiversity in the Ministry of Commerce, Industry and Environment | Environment policy, strategic environmental assessments and EIAs. |
| National Directorate for Protected Areas of the Ministry of Agriculture and Fisheries | Management of national parks and protected areas and to ensure the protection and conservation of nature and biodiversity, CBD Clearing-House Mechanism's national focal point. |

*(i) Due to its federal system, Malaysia has multiple agencies and departments divided between Peninsular Malaysia, Sabah and Sarawak.*
*(ii) CEPA was created in 2014, replacing the Department of Environment and Conservation.*
*(iii) https://www.cbd.int/information/parties.shtml, accessed 13 March 2016.*

### 3.1.2 Protected areas

#### PA coverage

In total, the countries of the region have created 1 524 terrestrial PAs, covering nearly 390 000 km², or about 13 % of the land area of the region. Nearly three-quarters of this area is in Indonesia, which has the largest protected area network by far; the largest network as a proportion of total land area is in Malaysia. The smallest PA network by area is in Timor-Leste, but this still comprises 9 % of the country's total land area, while PNG's PA network only amounts to 3 % of the total area of the country (Table 3.2). There are important reasons, discussed below, why the conventional PA approach is less relevant in PNG.

**Table 3.2** Summary of protected area coverage

| Country | Total land area (km²) | No of terrestrial PAs[1] | Area of terrestrial PAs[2] (km²) | % land area in PAs |
|---|---|---|---|---|
| Indonesia | 1 906 536 | 535 | 279 296 | 15 |
| Malaysia | 331 699 | 690 | 61 072 | 18 |
| Papua New Guinea | 467 401 | 52 | 14 467 | 3 |
| Philippines | 298 763 | 218 | 32 740 | 11 |
| Timor-Leste | 15 007 | 29 | 1,309 | 9 |
| Total | 3 019 405 | 1 524 | 388 984 | 13 |

*Source: World Database on Protected Areas (WDPA), accessed May 2016. Note that data on the WDPA is submitted by national governments and may in some cases be incomplete and inaccurate, and may not include community-managed or customary protection.*

*([1]) Some PAs have marine and terrestrial components. 'No of terrestrial PAs' is an estimate based on the total number of PAs (from WDPA), minus the PAs described as 'marine'.*

*([2]) 'Area of terrestrial PAs' is the total area of land in all PAs, from WDPA.*

The development of the region's system of protected areas was not planned: some areas were originally established by colonial powers as watershed or hunting reserves, others were added more recently. This means that there is not necessarily a good representation of all the habitats and biodiversity within the PAs. KBAs, which are identified on the basis of the presence of threatened species, provide a useful picture of the current distribution of threatened biodiversity against which to measure PA coverage. Table 3.3 shows the coverage of KBAs by protected areas for the regions where KBAs have been identified. Of the 477 KBAs, 145 (30 %) are included in official protected areas, with the highest proportion in Sumatra (40 % protected); the lowest is in Indonesian Wallacea (13 % protected).

<

*The villose pitcher-plant is only found in high altitude forests on Mount Kinabalu, Borneo. The region has many thousands of species that are only found on single islands or mountains. Protecting this diversity is a major challenge for the design and management of protected areas.*

**Table 3.3** Overlap of protected areas and key biodiversity areas

| Country/region | No of terrestrial KBAs | No of terrestrial KBAs protected | % terrestrial KBAs protected |
|---|---|---|---|
| Malaysia | KBAs not defined | - | - |
| Indonesia (Sumatra) | 63 | 25 | 40 |
| Indonesia (Wallacea) | 251 | 63 | 13 |
| Papua New Guinea | KBAs not defined | - | - |
| Philippines | 128 | 45 | 35 |
| Timor-Leste | 35 | 12 | 34 |
| Total | 477 | 145 | 30 |

*Sources: Philippines[i], Indonesia (Sumatra)[ii]; Indonesia (Wallacea) and Timor-Leste[iii].*

*(i) Mallari N.A.D., N.J. Collar, P.J.K. McGowan and S.J. Marsden (2015). The Philippines protected areas are not meeting the biodiversity coverage and management effectiveness requirements of Aichi target 11. Ambio, 45(3), pp. 313-322. DOI: 10.1007/s13280-015-0740-y*

*(ii) CEPF (2007). Conservation Outcomes Map: Sumatra. Available at: https://library.conservation.org/Published%20Documents/2009/Key%20Biodiversity%20Area%20map%20-%20Sumatra.pdf*

*(iii) CEPF (2014). Ecosystem Profile: Wallacea Biodiversity Hotspot. Critical Ecosystem Partnership Fund, Washington, DC.*

In **Timor-Leste**, protected KBAs are those covered by the regulations of the UN Transitional Administration for East Timor, as the draft Decree on Biodiversity has not yet been passed.

There are opportunities in **Indonesia** and **Malaysia** to expand the PA network in order to address these gaps in coverage. Both countries have substantial forest areas outside the PA network, which are often extremely important for biodiversity but are increasingly threatened by conversion to industrial agriculture and pulp plantation. More than a third (36 %) of Malaysia is classified as permanent forest reserves, which are managed by the State Forestry Departments.[110]

In **PNG**, the 2014 Protected Areas Act recognises the need for improved surveying, mapping and monitoring of biodiversity as a basis for establishing priorities and ensuring that the PA network is representative. Importantly, it also supports research to identify opportunity costs and areas where communities are interested in sustainable resource management.

The **Philippines** is the only country in the region that has undertaken a review of coverage and representativeness across its PA network, and sought to integrate PA management with local land rights and management. The 1992 NIPAS Act 'lays down the basis for planning, managing, regulating, and financing the conservation of protected areas in support of sustainable development' and establishes the legal framework for an integrated approach to the identification and management of protected areas, including the recognition of the rights of indigenous communities, establishment of multi-stakeholder management boards and the delegation of some management roles to local governments. The act allows for the evaluation, reclassification and, if appropriate, degazetting of PAs created previously. A 2008 revision allowed for the expansion of the network to accommodate KBAs identified after the first NIPAS Act. While there are still shortcomings in the coverage, and especially in the quality of management of PAs[111], the Philippines's system represents one of the few comprehensive efforts to review and rationalise a PA national network, an effort that could usefully be carried out in other countries covered by this study. The approach has attracted the support of several major long-term donors (see section 3.5), and the government has continued to try and address shortcomings in management through the Protected Areas Master Plan and New Conservation Areas in the Philippines Project[112].

#### PA funding

Overall, the Governments of **Malaysia**, **Indonesia** and the **Philippines** provide significant funding for at least some of their protected areas, although there are issues about how effectively it is used. On the other hand, allocations in **Timor-Leste** and **PNG** are much lower.

Objective measurements of whether the funding in the three larger countries is adequate are difficult to find, but a study that focused on the required levels of funding for effective tiger

([110]) Department of Wildlife and National Parks Peninsula Malaysia (2008). National Tiger Action Plan for Malaysia.
([111]) Mallari N.A.D. et al. (2015). Op. cit.
([112]) Ibid.

conservation[113] concluded that a prominent national park in **Malaysia** had about 50 % of the required level of funding, while two state-level protected forests had less than 20 % of the required funding. In **Indonesia**, the national parks (in Sumatra) received 100 % or more of the estimated required funding, 90 % of which came from the government. An assessment of the funding of 11 terrestrial national parks in Indonesian Wallacea[114] found that, in 2014, EUR 10 million, or EUR 7.04 per hectare, was provided by government (with up to 30 % estimated to originate from donor funding to government). This sum per hectare is broadly equal to that found in Sumatra, which is from EUR 5.38 per hectare to EUR 9.23 per hectare, and well above a 2006 estimate of the required funding of EUR 2.28 per hectare for Indonesian national parks.[115] A study of the protected area network in the **Philippines**[116] estimated that central government funding amounts to an average of only EUR 0.79 per hectare. Although it does not make an estimate of the required funding, it pointed to a lack of adequate financial resources for all 61 sites surveyed. Another study reported funding levels in the Philippines of between EUR 0.01 per hectare and EUR 5.80 per hectare.[117] It is important to note that funding levels at high profile PAs are unlikely to be representative of the system as a whole – for example the relatively good funding cited for Indonesian national parks does not reflect the situation in the large number of wildlife sanctuaries and nature reserves, which are typically without any dedicated funding or staffing. In 2016, the Indonesian Ministry of Environment and Forests reported that its budget for protected area management was being cut from EUR 53 million to EUR 46 million per year, and announced that a trust fund model was being considered to help meet the shortfall, building on the successful example of the Raja Ampat marine conservation area[118].

**Timor-Leste**'s single national park receives a small budget, but the other protected areas and forest reserves receive nothing beyond the funding provided to the National Directorate for Protected Areas for its personnel and office costs[119]. **PNG** provides only limited funding for its protected area network. Throughout the region there are examples of PAs collaborating with local communities and businesses to increase revenue by offering services to tourists. These relationships raise revenue for the PA, benefit the local economy, and by doing so reduce conflicts between the PA and the local community, potentially reducing the need for expensive protection efforts. Komodo National Park, in Indonesia, and Mulu National Park, in Sarawak, Malaysia, have gone further and outsourced tourist management to private companies[120,121]. Other potential forms of revenue that are being considered include environmental services and carbon payments[122], and PNG's 2014 protected areas policy sets out a plan for the creation of a trust fund and revenues from environmental services[123]. Trust funds that accept donations from multiple sources, such as the Mama Graun Conservation Trust Fund in PNG, Kehati in Indonesia or the Foundation for the Philippine Environment, are examples of mechanisms that could be supported or used as models for similar local funds. However, the feasibility of interest-only trust funds in the current global low-interest environment needs examination. Donors in Indonesia (e.g. KfW, a German-owned development bank, with MoEF) have experimented with debt-for-nature swaps that focused on enhanced protected area management with funding used to create a trust fund.

## PA effectiveness

Despite the extensive network of protected areas in Malaysia, Indonesia and the Philippines, and the relatively high levels of funding invested in some of these PAs, they are not as effective as they could be in protecting biodiversity[124]. In **Malaysia**, a review noted that parks are not managed optimally (mostly because they are underfinanced), highlighting the lack of a shared system for PA management across the country, insufficient understanding of the economic value of the PAs and insufficient incentives for state governments to invest in PA management.[125] In the Philippines, a review of Management Effectiveness Tracking Tool (METT) evaluations of 61 protected areas concluded that the state of management is poor, with average METT scores of 58 %[126]. PAs had management plans, but they were not relevant or appropriate for the challenges faced; multi-stakeholder PA management boards exist, but engagement of local governments and communities was weak; and in many cases the poor management resulted in open access and conflicts with local stakeholders. The survey found that inadequate staff numbers, limited capacity of staff, limited financing and weak governance caused these problems. It also noted that identifying and addressing the issues was made more difficult by the lack of an integrated system for monitoring and evaluating management performance. A survey in **Indonesia** in 2011[127] found that 'virtually all national park management is not yet effective', with weak institutions, uncertain legal status, poor management of conflict, poor management planning and limited capacity, leaving large areas of PAs unmanaged and unprotected. Out of 571 conservation areas, only 182 had a management plan that had been officially adopted, 87 had a plan that had not been adopted, and 252 (sic) did not have a plan at all.[128]

Actions taken to improve management effectiveness include the implementation of the Spatial Monitoring and Reporting Tool (SMART). In the Philippines the system, known as the Lawin Forest and Biodiversity Protection System[129], has been rolled out nationally, while in Indonesia it is being implemented in specific protected areas but its use may be expanded.

Conflict between customary land claims and PAs is common in Indonesia, and is particularly apparent in Indonesian Papua, where 96 % of land and 85 % of settlements are inside the boundaries of the forest estate[130], creating legal contradictions that are only manageable because the regulations are not effectively enforced across most of this vast area. PAs, including Indonesia's largest national park (Lorentz, 25 050 km$^2$) and largest wildlife reserve (Mamberamo-Foja, 20 000 km$^2$), have been declared within these state forests. Designating land that is claimed by communities as a PA provides legal protection for the community and the forest from aggressive expansion of logging and plantation operations. However, such designation limits development options, and may also be an obstacle to the recognition of customary rights[131], despite the fact that park zonation can accommodate some traditional use. There is evidence that traditional institutions and practices for natural resource management remain strong in Indonesian Papua[132], but these mechanisms sometimes require additional support, especially when faced with external challenges.

In **PNG**, post-independence conservation policy was originally based on a view that centralised, government-driven protected areas would be the cornerstone of conservation action. This had limited impact because the land is owned by communities under PNG's strong customary land tenure. The 32 wildlife management areas (WMAs) created were ineffective because they were unmanaged, and so did not regulate the clearance of habitat, hunting or exploitation. In some cases, they were landowners opposed to the WMAs, while in others the WMA status was used to assert controversial tenure rights. In addition, WMA boundaries were often changed or ignored in issuing licences for resource exploitation[133,134]. In 2014, the government issued a new protected areas policy[135], which draws on the lessons from the YUS (Yopno-Uruwa-Som river basins) conservation area (section 3.3.2) and addresses many of the problems with WMA, including:

- the establishment of PAs with the free, prior and informed consent of customary landowners;
- allowing new categories of protected areas, including 'community conservation areas', gazetted by local government, where cultural, livelihood or no-take zones can accommodate customary practice, as defined in a

(113) Walston J., K.U. Karanth and E.J. Stokes (2010). Avoiding the Unthinkable: What will it cost to Prevent Tigers Becoming Extinct in the Wild? Wildlife Conservation Society, New York.
(114) CEPF (2014). Op. cit.
(115) Ministry of Environment (2006). Protected Area Funding in Indonesia: A Study Implemented under the Programmes of Work on Protected Areas of the Seventh Meeting of the Conference of Parties on the Convention on Biological Diversity. State Ministry of Environment of Republic of Indonesia, Jakarta.
(116) GIZ (2014). Protecting Our Children's Future. Addressing Threats and Issues in Biodiversity Conservation.
(117) Mallari N.A.D. et al. (2015). Op. cit.
(118) https://news.mongabay.com/2016/09/indonesia-exploring-new-model-to-fund-national-parks/
(119) CEPF (2014). Op. cit.
(120) http://komodonationalpark.org/pnk/index.php, accessed 16 June 2016.
(121) The approach in Komodo was ultimately unsuccessful. See Cochrane J. (2013). Exit the Dragon? Collapse of co-management at Komodo National Park, Indonesia.
(122) For example, see WWF-Indonesia (2014). Rewetting of tropical peat swamp forest in Sebangau National Park, Central Kalimantan, Indonesia. Project Design Document for Validation under CCBA. Available at http://database.v-c-s.org/sites/v-c-s.org/files/140725_SNP%20Peat%20Rewettting%20Project%20-%20CCB%20PDD%20-%20V06.pdf, accessed 16 June 2016.
(123) Independent Republic of New Guinea (2014). Policy on Protected Areas. Conservation and Environment Protection Agency. Waigani, PNG.
(124) See studies of deforestation in PAs in Borneo (Gaveau D., M. Kshatriya, D. Sheil, S. Sloan, E. Molidena, A. Wijaya, S. Wich, M. Ancrenaz, M. Hansen, M. Broich, M.R. Guariguata, P. Pacheco, P. Potapov, S. Turubanova and E. Meijaard (2013). Reconciling Forest Conservation and Logging in Indonesian Borneo. PLOS one. doi.org/10.1371/journal.pone.0069887) and Sumatra (Gaveau D., H. Wandono and F. Setiabudi (2007). Three decades of deforestation in southwest Sumatra: Have protected areas halted forest loss and logging, and promoted regrowth? Biol. Cons. 134(4), pp. 495-504. http://dx.doi.org/10.1016/j.biocon.2006.08.035
(125) UNDP http://www.my.undp.org/content/malaysia/en/home/operations/projects/environment_and_energy/enhancing-effectiveness-and-financial-sustainability-of-protecte.html, accessed 26 May 2016.
(126) Results of the study are in: Republic of the Philippines (2014). The Fifth National Report to the Convention on Biological Diversity. Available at: https://www.cbd.int/doc/world/ph/ph-nr-05-en.pdf, accessed 17 November 2017. A global survey of METT evaluations describes scores between 33% and 67% as 'basic management is in place, considerable improvement is needed'. Ref: Leverington, F., K. Lemos Costa, J. Courrau, H. Parvese, C. Nolte, M. Marr, L. Coad, N. Burgess, B. Bomhard and M. Hockings (2010). Management effectiveness evaluation in protected areas – a global study. Second edition 2010. Brisbane: U. Queensland.
(127) RAPPAM-METT survey, quoted in BAPPENAS (2016). Indonesian Biodiversity Strategy and Action Plan 2015-2020. National Development Planning Agency, Jakarta.
(128) These figures imply that either the total number of protected areas should be 521, not 571, or that there is an error in the number of protected areas without management plans.
(129) See: DENR Launches Mobile App designed for better monitoring of protected areas, www.denr.gov.ph/news-and-features/latest-news/2488-denr-launches-mobile-app-designed-for-better-monitoring-of-protected-areas.html, accessed 24 March 2017.
(130) IUCN, 2011. http://www.iucn.org/about/work/programmes/forest/?8066/Clarifying-land-rights-as-a-pre-condition-for-pro-poor-REDD-in-Papua-Province-Indonesia, accessed 25 May 2016.
(131) For example, WWF state that '[Wasur national park] has achieved greater recognition of customary rights than almost any other conservation area in Indonesia. Indigenous people are free to hunt and collect certain animals and plants, while they contribute traditional knowledge and advice to park planning.' http://wwf.panda.org/what_we_do/where_we_work/new_guinea_forests/conservation_new_guinea_forests/protection_forests_new_guinea/protected_areas_new_guinea_forests/protected_areas_establishment/, accessed 25 May 2016.
(132) Sheil D., M. Boissière and G. Beaudoin (2015). Unseen sentinels: local monitoring and control in conservation's blind spots. Ecology and Society 20(2), p. 39. http://dx.doi.org/10.5751/ES-07625-200239
(133) Melick D.R., J.P. Kinch and H. Govan (2012). How Global Biodiversity Targets Risk Becoming Counterproductive: The Case of Papua New Guinea. Conservation and Society 10(4), pp. 344-353. DOI: 10.4103/0972-4923.105559
(134) One exception to the problems of WMAs was the 2009 creation of a conservation area under PNG's 1978 Conservation Areas Act. Conservation area status offers greater protection than a WMA, safeguarding the land as well as wildlife, and making landowners and the government co-managers. See Ellis J.A. (1997). Race for the Rainforest II. Applying Lessons Learned from Lak to the Bismarck-Ramu Integrated Conservation and Development Initiative in Papua New Guinea. PNG Biodiversity Conservation and Resource Management Programme, Waigani.
(135) Independent State of Papua New Guinea (2014). Papua New Guinea Policy on Protected Areas. Conservation and Environment Protection Authority, October 2014, Waigani, National Capital District, PNG. Available at http://www.pg.undp.org/content/dam/papua_new_guinea/docs/environment%20and%20energy/DEC%20signed%20PNG%20Protected%20Areas%20Policy-lowrespgs.pdf

*Siamangs are large gibbons which live in forests in Sumatra and the Malay peninsula. They are classified as endangered by IUCN, with the principal threats to their survival being deforestation and forest degradation, including forest fires, and hunting for the pet trade.*

*A conservation official in Indonesia helps to release a whale shark after serving a warning on fishers who had trapped it for sale to an aquarium. The world's largest fish, whale sharks are classified as endangered and protected by law throughout the region. Whale shark encounters are the focus of several eco-tourism ventures.*

community-level land-use planning process;
- ensuring that legislation for sectors such as mining and logging must recognise protected areas;
- the management of protected areas based on customary arrangements, with the oversight of a management board which includes representatives from the community and government;
- addressing the need for compensation, benefit sharing, conflict resolution and funding mechanisms, including a biodiversity trust fund and Payment for Ecosystem Services (PES) schemes.

### Transboundary protected area initiatives

International boundaries often bisect areas of high biodiversity importance. There are long land borders between Indonesia and Malaysia in Borneo, and between Indonesia and PNG in New Guinea. Transboundary actions in Borneo (e.g. between Lanjak Entimau, Sarawak and Betung Kerihun NP, Kalimantan) are facilitated by the Heart of Borneo (HoB) initiative[136], a joint programme of the Governments of Indonesia, Malaysia and Brunei, which proposes that an area equivalent to 51 % of the land of Borneo be allocated for protected areas or reduced impact logging[137]. There are five main programmes: (1) transboundary management, (2) protected area management, (3) sustainable natural resource management, (4) ecotourism development, and (5) capacity building. Within the HoB region there are five protected areas in Malaysia, including Kinabalu NP, three in Indonesia, including Kayan Mentarang NP, and one in Brunei.

In southern New Guinea, the Wasur National Park (Indonesia) and the Aramba, Tonda Extension and Weriaver areas (PNG) protect over 20 000 km² of seasonally flooded savannah grassland and woodland in the Transfly ecoregion.[138]

## 3.1.3 Tackling unsustainable exploitation of wildlife

Section 2.1.1 noted that hunting, harvesting and the trade in wildlife products is a significant threat to some species in the region, and that it is caused by unsustainable exploitation for local use and by an increasing demand and ease of access to markets, inside and beyond the region.

All the countries in the region have regulations in place to protect the trade of species, and institutions are charged with enforcing these regulations, but the regulations are not always consistent or up to date. In Malaysia, for example, flying-fox bats are protected in Sarawak, have no protection in Sabah and are subject to bag limits for hunting in Peninsula Malaysia. The agencies charged with enforcing wildlife trade regulations are universally poorly funded and equipped. In some cases they have been able to stretch limited resources by collaborating with non-governmental organisations (NGOs) specialising in the issue – see for example the support to Tiger Protection Conservation Units organised by Fauna & Flora International, and Wildlife Crime Units by Wildlife Conservation Society (WCS) in Indonesia (section 3.3.2) – and there has been some action, for example to identify and prosecute traders of pangolin, tiger and ivory in Sumatra, or to prevent consumption of babirusa and primate meat in the bushmeat markets of North Sulawesi. The three ASEAN members, Indonesia, Malaysia and the Philippines, have national Wildlife Enforcement Network nodes, part of the ASEAN-WEN network, and are supported by the International Consortium on Combatting Wildlife Crime (ICCWC). These networks have raised the profile of wildlife crime and developed capacity, but they have not resulted in significant additional resources being applied to the problem from governments.

Data gathering and sharing is key to successful investigation and enforcement. The main international NGOs working against wildlife trafficking in South-East Asia (e.g. WCS, Traffic, Freeland, Environmental Investigation Agency) use the same software to manage their data, which has allowed them to develop a system of cross-referencing each other's databases without compromising the confidentiality of individual databases. The use of deoxyribonucleic acid (DNA) testing has expanded with the advent of cheap, rapid tests, and can help determine species and even produce information on the population from which a wildlife product came, depending on the availability of comparison databases. To date, testing has not been on a wide scale – for example only 18 of 117 seizures of ivory globally between 2000 and 2015[139] were tested – but it is starting to be used to identify whether elephant ivory is from Asian or African sources.

In addition to raising the profile of the wildlife trafficking problem, lack of capacity amongst enforcement staff remains a challenge. NGOs, directly and through support to the ASEAN-WEN network, have delivered training and technical support to enforcement agencies in the ASEAN countries of the region.

The appropriate listing of species in trade under the CITES convention is important for raising the profile of the species and to push other countries to take action against international trade. Listing, or changes to the listing, may be justified as new information emerges about threats and populations.[140] The CITES management authorities of member country governments have a key role to play in compiling the necessary information and formally proposing the changes at meetings of the CITES. Malaysia's federal structure creates particular problems in formulating a shared position on international issues – for example Sarawak supports the inclusion of the tree ramin on appendix 2 of CITES, while Sabah opposes the move.

## 3.1.4 National and local policies

All the countries in the region have a National Biodiversity Strategy and Action Plan (NBSAP). These documents vary in quality and in the impact they have on decision-making. An example of an effective multi-stakeholder approach is the Indonesian NBSAP, which was revised for the 2015-2020 period and produced collaboratively by the three main agencies responsible for biodiversity conservation and management in the country – the Indonesian Scientific Institute, the Ministry of Environment and Forestry, and the National Development Planning Body, with the latter taking responsibility for integrating the plan within major sectoral policies. The process of revision included a review of key sectoral policies and 22 regional stakeholder meetings. Indonesia has also led on development of timber legality standards, in a process that started with the requirements of the EU's

(136) See http://wwf.panda.org/what_we_do/where_we_work/borneo_forests/
(137) The HoB area, although large, is biased towards mountain areas and does not adequately address the protection of lowland forests, including the habitat of orang-utan and Asian elephant. A recent analysis proposes that more efficient mechanisms with lower opportunity costs are possible if stakeholders can collaborate and be flexible. See Runting R.K., E. Meijaard, N.K. Abram, J.A. Wells, D.L.A. Gaveau, M. Ancrenaz, H.P. Possingham, S.A. Wich, F. Ardiansyah, M.T. Gumal, L.N. Ambu and K.A. Wilson (2015). Alternative futures for Borneo show the value of integrating economic and conservation targets across borders. Nature Communications 6. DOI:10.1038/ncomms7819
(138) http://www.wwf.org.uk/wwf_articles.cfm?unewsid=1219, accessed 28 May 2016.

(139) See BBC Wildlife Magazine, 12 April 2016, 'Ivory Smuggling: 9 things you should know', available at http://www.discoverwildlife.com/news/ivory-smuggling-9-things-you-should-know; and Environmental Investigation Agency information sheet, Large Scale Ivory Seizures v.3, August 2017. Available at https://eia-international.org/wp-content/uploads/Large-Scale-Ivory-Seizure-Map-2000-July-2017.pdf , accessed 13 March 2018.
(140) For example, Horne B.D., C.M. Poole and A.D. Walde (2012) recommend that 13 turtle species be included in CITES Appendix II, and 25 species transferred from Appendix II to I.

*Village leader, Maluku, Indonesia, where traditional institutions are important in the management of natural resources. Customary systems are widespread in the region, but are not always recognised by government. Harmonising official regulations with local systems can lead to better results for conservation and livelihoods.*

FLEGT VPA, but which now involves compulsory certification of legality across the industry. The standard is recognised as a major step forward in excluding illegal timber from the supply chain, particularly for export. However, questions remain about how thoroughly it considers more fundamental issues, such as the rights of indigenous and local communities who are the customary owners and users of much of the forestland[141]. The scheme focuses only on the legality of the timber, not the sustainability of its production, which is the subject of separate, voluntary, certification.

Also in Indonesia, as an alternative to releasing logged-over concessions for clearance, the Indonesian Ministry of Forestry initiated ecosystem restoration licences in 2004. By 2013, 12 such licences had been granted, covering 4 800 km$^2$ of forest. A further 4 (covering another 3 000 km$^2$) were in process in mid-2017, and there is an indicative allocation of 26 950 km$^2$ of state forestland for such concessions[142]. The largest ecosystem restoration licence is held by the pulp-paper company APRIL.

As a federation, Malaysia has a highly decentralised system of government, with decisions on forestry, land use and conservation issues vested in the states. The 11 peninsula states share some features of law and policy, including a single Wildlife Protection Act, while Sarawak and Sabah have their own Wildlife Protection Ordinance and Wildlife Conservation Enactment, respectively.

Malaysia and Indonesia have agreed upon action plans for their most emblematic endangered species – tiger, Asian elephant and orang-utan. These actions plans have been developed through intensive multi-stakeholder processes and have succeeded in attracting significant donor support for the species and ecosystems that support them[143].

All the countries in the region except Timor-Leste have put in place policies in connection with REDD+. PNG was a founder of the Coalition of Rainforest Nations, which proposed the creation of the REDD mechanism at the Conference of the Parties of the United National Framework Convention on Climate Change (UNFCCC-COP) in 2005. Progress with government and inter-governmental level efforts to reduce emissions and put in place payment mechanisms has been slow, partly because of problems with the management of the process and failure to engage with all the relevant agencies.[144] As a result, the potential for REDD+ to contribute funding to protected areas has yet to be realised. Nevertheless, there are voluntary sector projects that have started to generate funding from REDD+ (section 3.3.2), and the potential for REDD+ to contribute to incentives for sustainable resource management remains.

(141) Rainforest Action Network (2014). False Assurances: A briefing for international buyers and customs authorities on how Indonesia's timber legality verification system fails to protect community rights. RAN, San Francisco.
(142) Silahahi M. (2013). Ecosystem Restoration Concession (ERC) Development in Indonesia. Presentation. https://www.cbd.int/doc/meetings/ecr/cbwecr-2014-04/other/cbwecr-2014-04-presentation-day2-06-en.pdf, accessed 4 May 2016.
(143) For example, the National Tiger Action Plan for Malaysia (Department of Wildlife and National Parks Peninsula Malaysia, 2008) was developed jointly between the partners of the Malaysian Conservation Alliance for Tigers (MYCAT): DWNP, Malaysian Nature Society, TRAFFIC SEA, WCS – Malaysia Programme and WWF-Malaysia.
(144) Babon A. and G.Y. Gowae (2013). The Context of REDD+ in Papua New Guinea: Drivers, agents and institutions. CIFOR, Bogor, Indonesia. Available at http://www.cifor.org/library/4153/the-context-of-redd-in-papua-new-guinea-drivers-agents-and-institutions/



**Table 3.4** Number of sites listed under international agreements and conventions

| Country | Ramsar[i] | MAB[ii] | WHS (natural)[iii] | ASEAN HP[iv] | EAAFP[v] |
|---|---|---|---|---|---|
| Indonesia | 7 | 11 | 4[vi] | 6 | 2 |
| Malaysia | 6 | 2 | 2 | 3 | 2 |
| Papua New Guinea | 2 | 0[vii] | 0[viii] | Not in ASEAN | 1 |
| Philippines | 6 | 3 | 3 | 8 | 3 |
| Timor-Leste | Not a party | Not a party | 0 | Not yet in ASEAN | 0 |
| Total | 21 | 16 | 9 | 17 | 8 |

*Key to conventions and agreements: Ramsar: the convention on wetlands; MAB: UNESCO's Man and Biosphere programme; WHS: UNESCO Natural World Heritage Sites under the World Heritage Convention; AHP: ASEAN Heritage Parks, declared under the ASEAN convention; EAAFP: East Asian-Australasian Flyway Partnership.*

*(i) http://www.ramsar.org/sites-countries, accessed 28 May 2016.*
*(ii) http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/asia-and-the-pacific/, accessed 28 May 2016.*
*(iii) http://whc.unesco.org/en/list/&order=country#alphaC, accessed 28 May 2016.*
*(iv) http://chm.aseanbiodiversity.org/index.php?option=com_wrapper&view=wrapper&Itemid=110, accessed 28 May 2016.*
*(v) PNG and Timor-Leste are not members of the Flyway Partnership, although PNG has designated sites. See http://www.eaaflyway.net/about/, accessed 28 May 2016.*
*(vi) One WHS, 'Tropical Rainforest Heritage of Sumatra', which covers three large national parks in Sumatra (Leuser, Kerinci and Bukit Barisan Selatan), is on the 'site in danger' list.*
*(vii) There is a proposal to create a biosphere reserve on the Sogeri Plateau, PNG.*
*(viii) PNG has one cultural heritage site, and there are eight sites on a tentative list, pending formal proposals.*

In many areas, governments – independently or with the support of Official Development Assistance (ODA) donors – disburse significant resources to local community development and infrastructure activities through local governments and sectoral ministries. In Timor-Leste and Indonesia, village governments also have their own development budgets. In areas of high biodiversity, these funds can be linked to criteria and to technical assistance, which discourage negative environmental impacts and incentivise positive ones. Ideally, this is done through linking disbursement to a locally owned development planning process, which takes into account environmental aspects. The Green District Development Programme in Indonesia is an example of such an approach[145]. However, its impacts are likely to have been positive for the environment generally but not necessarily for PAs or threatened biodiversity.

### 3.1.5 International agreements and mechanisms

**Biodiversity-related conventions**

The countries in the region (with the exception of Timor-Leste) are party to the major biodiversity-related conventions and agreements (Tables 3.4 and 3.5). In addition, an informal, voluntary agreement, the East Asian-Australasian Flyway Partnership, operates in the region and across East Asia and the Greater Mekong (further details are in the synthesis report). A regional agreement allows for the declaration of ASEAN Heritage Parks.

**Other international agreements**

The Extractive Industries Transparency Initiative (EITI)[146] sets standards for the publication of data on financial flows from extractive industries to governments. While not directly addressing environmental concerns, the initiative aims to reduce corruption and increase benefit-sharing in the sector, thus

(145) Rambe, V. and S. Johnsen (2013). Indonesia Sustainable Natural Resources Management through PNPM Green Investments. World Bank, Jakarta. Available at: https://openknowledge.worldbank.org/handle/10986/21128
(146) EITI is a multi-stakeholder forum of governments, industry and civil society, with a donor-supported multi-donor trust fund to provide training and capacity development. See http://www.worldbank.org/en/news/feature/2014/11/19/indonesia-is-first-asean-country-to-achieve-eiti-compliance, accessed 5 May 2016.

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Filoboletus *mushrooms in the forests of Kerinci-Seblat, Indonesia. The area is a national park, ASEAN heritage park and part of a World Heritage Site.*

**Table 3.5** Status of the biodiversity-related conventions in the region

| Country | CITES[i] | CMS[ii] | CBD[iii] | UNFCCC[iv] |
|---|---|---|---|---|
| Indonesia | Accession | Non-party[v] | Ratified | Ratified |
| Malaysia | Accession | Non-party[vi] | Ratified | Ratified |
| Papua New Guinea | Accession | Non-party[vii] | Ratified | Ratified |
| Philippines | Ratified | Party | Ratified | Ratified |
| Timor-Leste | Non-party | Non-party | Accession | Accession |

*Key to conventions: CITES: Convention in International Trade in Endangered Species of Wild Fauna and Flora; CMS: the Convention on the Conservation of Migratory Species of Wild Animals; CBD: Convention on Biological Diversity; UNFCCC: United Nations Framework Convention on Climate Change.*

*(i) https://cites.org/eng/disc/parties/chronolo.php?order=field_country_official_name&sort=asc, accessed 28 May 2016.*
*(ii) http://www.cms.int/en/parties-range-states, accessed 28 May 2016.*
*(iii) https://www.cbd.int/information/parties.shtml, accessed 28 May 2016.*
*(iv) http://unfccc.int/essential_background/convention/status_of_ratification/items/2631.php, accessed 28 May 2016.*
*(v) Indonesia is not party to the Bonn Convention but has signed the agreement on marine turtle.*
*(vi) Malaysia is not party to the Bonn Convention but has signed the agreement on marine turtle.*
*(vii) PNG is not party to the Bonn Convention but has signed agreements on marine turtle, cetaceans and dugong.*

encouraging greater transparency and accountability for social and environmental impacts. Timor-Leste was recognised as EITI-compliant in 2010, and Indonesia in 2014. The Philippines and PNG are also implementing the EITI but are not yet compliant. Malaysia is not a member.[147]

**UNFCCC: Nationally Determined Contributions** (NDCs) are country-level commitments to reduce greenhouse gas emissions, and are submitted by national governments to the UNFCCC.[148] All of the countries in the region except the Philippines have submitted NDCs (Philippines submitted an Intended NDC document in October 2015, but the country's NDC document was not available in November 2017). In its NDC, Indonesia reiterates its commitment to a 26 % reduction in greenhouse gases by 2020, or 41 % with international support, to be achieved mainly through land-use change, spatial planning, sustainable forest management and ecosystem restoration. Malaysia commits to reducing GHG emissions from its economy (measured as the emissions intensity of GDP) by 45 % by 2030 (35 % unconditionally, 10 % with assistance), relative to a baseline of 2005. The Philippines INDC commits to a 70 % reduction by 2030, also partly conditional on external assistance, but does not refer to significant forestry actions as part of delivering this; only the expansion of the National Integrated Protected Areas system. PNG notes that with its low population density and large areas of forest, the opportunities for mitigation of emissions are limited. The NDC does not offer specific targets for overall reductions in emissions, but commits to 100 % renewable energy (carbon free) by 2030.

The **UN's Sustainable Development Goals** (SDGs), adopted by the Heads of State, including all the countries in the region in September 2015, recognise the links between biodiversity and sustainable development. Goal 14 (life under water) and 15 (forest conservation, land degradation, conservation of wild and domestic biodiversity) are directly relevant to biodiversity, while 7 (energy), 8 (work and economic growth), 9 (industry and infrastructure) and 11 (sustainable cities and communities) address broader drivers. The SDGs specifically recognise wildlife trafficking as a key issue.[149]

The **Forum of Ministers and Environment Authorities of Asia Pacific**, convened by the United Nations Environment Programme (UNEP), provides opportunity for ministers and high-level representatives from the region to gather and discuss regional priorities and solutions towards pressing sustainability challenges, as an input to the United Nations Environment Assembly. The first forum was held in May 2015, where 'maintaining biodiversity and sustainable provision of ecosystem services' was identified as one of the seven key priorities for the region.

### ASEAN Regional Programmes

Indonesia, Malaysia and the Philippines are members of ASEAN, and Timor-Leste is expected to join soon. Members of ASEAN implement the wildlife trade law enforcement programme ASEAN-WEN, the ASEAN Heritage Parks programme, and are served by the ASEAN Centre for Biodiversity (ACB; structure and programmes of the ACB are discussed in more detail in the Greater Mekong chapter). Coordination on environmental issues in ASEAN is achieved through the meeting of ASEAN senior officials on forestry and ASEAN senior officials on the environment. ACB's work is supported by the EU (for example through the Biodiversity Conservation and Management of Protected Areas in ASEAN project), Deutsche Gesellschaft für Internationale Zusammenarbeit (German technical assistance agency) (GIZ) and KfW (see section 3.5).

## 3.2 Community-based conservation

The **Philippines** has the clearest regulatory framework for indigenous people to establish claims to territory and to receive assistance in planning and executing its management (see section 3.1.2, above). The new conservation areas in the Philippines project, funded by the United Nations Development Programme's Global Environment Facility (UNDP-GEF), aims to support indigenous communities to map, inventory and plan the management of their territories in a conscious effort to plug gaps in the Philippines protected areas network.[150]

In Sabah, **Malaysia**, indigenous peoples' and community-conserved areas (ICCAs) are intended to build on the links between indigenous peoples' land and sustainable resource management. One ICCA has been created, on the border of Kinabalu National Park, and another has been proposed, on the border of Crocker Range National Park[151].

Although many communities are the de facto managers of land and resources in **Indonesia**, the country lacks a clear mechanism for recognising their rights and formalising their role as managers. A series of licences are available to communities and other groups to manage areas within the national forest estate, but the process of obtaining them is onerous, and they grant only conditional rights to plan and exploit forest resources, without recognising wider rights to make long-term decisions on the

(147) https://eiti.org/countries, accessed 5 May 2016.
(148) NDCs are available on the UNFCCC's NDC Registry, http://www4.unfccc.int/ndcregistry/Pages/All.aspx. The Philippines' INDC document is available at http://www4.unfccc.int/submissions/INDC/Published%20Documents/Philippines/1/Philippines%20-%20Final%20INDC%20submission.pdf
(149) Goal 15 on the sustainable use of terrestrial ecosystems includes commitment 15.7: 'Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products'. https://sustainabledevelopment.un.org/post2015/transformingourworld, accessed 22 April 2016.
(150) http://pbcfi.org.ph/newcap, accessed 4 May 2017.
(151) SaBC & GDF (2010). Formulating the Sabah Criteria for ICCAs (Ed: M.A. Sham). Biocultural Diversity and Conservation Learning Platform Briefing Notes, Vol. 5. Available at http://www.bbec.sabah.gov.my/japanese/downloads/TEK_study_2011/05%20Formulating%20the%20Sabah%20Criteria%20for%20ICCAs.pdf

*The Awane Clan, in PNG, manage their forest sustainably, producing timber using a portable sawmill. The timber provides cash incomes while the forest continues to provide the clan with food, medicine, craft and building materials.*

use of the forest. A 2012 constitutional court case has led to the recognition that customary forests (as defined in the constitution) should be separate from the state forest. This raises the prospect of hundreds of communities being able to claim the right to manage their forests themselves. It is not yet clear what mechanisms might be put in place to ensure that any such management is sustainable.

In **Timor-Leste** there are strong traditions of customary land management, including ownership of resources and limits on extraction. They have not been formalised within state regulations, and there are not yet initiatives that can be described as community conservation.

Clan and customary ownership systems dominate resource management in **Papua New Guinea**, but the extent to which they result in conservation of resources is not clear. Conservation programmes have now demonstrated that customary practices and conservation management can be integrated (see section 3.3). The new protected areas policy (see section 3.1.2) defines customary ownership as the basis for conservation action.

## 3.3 Civil society

### 3.3.1 CSOs capacity in the region

Civil society organisations are generally free to form, raise funds and operate in all the countries of the region, without the severe state restrictions found in, for example, some of the Mekong countries. Nevertheless, the different history and political character of each country influences the ways in which CSOs engage with biodiversity conservation.

**Indonesia** has had an active and diverse CSO community since the change of government in 1998, with several thousands of CSOs operating and networks formed around issues (e.g. the anti-mining coalition, the participatory mapping network) and regions (e.g. the Nusa Tenggara Uplands Development Consortium, and Sunda Kecil-Maluku network).

In **Malaysia**, a broad space for CSO activity is defined in the constitution but, in practice, freedom to pursue particular issues and agendas is limited by many other laws and regulations.[152] NGO activity and the level of collaboration with government vary between states. The Peninsula states and the Sabah Government are more open to NGO collaboration, allowing them to collaborate on wildlife law enforcement, for example, while the Sarawak Government has traditionally been against NGO involvement, though this attitude is reported to have softened in recent years.

The **Philippines** has a vibrant CSO community, with an estimated 170 000 CSOs registered in 2009.[153] Philippine CSOs have a strong tradition of work on service delivery for marginalised communities, and political and campaigning work on human rights and environment. Government tolerance of CSO activity was at its lowest during the martial law period (1972-1986), but their role was recognised again after the overthrow of President Marcos in 1986.

In **Papua New Guinea**, churches are an important part of the CSO community, providing an estimated 40 % of basic education and 50 % of health services[154], working through NGOs such as Caritas PNG and the Adventist Relief and Development Agency. A significant proportion of foreign aid is channelled through church organisations. Beyond those, the local NGO community is sparse and poorly networked, with recent growth attributed to availability of donor funds. The dominance of clans and customary land-holding in PNG means that land holding groups have started to formalise their structures and become one component of civil society – an example of this is the YUS Conservation Organisation, which is an association of customary landowners that advocates for conservation and community development needs on behalf of the YUS communities, including through participation in the YUS Conservation Area Management Committee. Some PNG CSOs have moved beyond service delivery and representation of specific groups to address issues such as governance, corruption, logging and mining.

Since independence in 2002, the number of CSOs in **Timor-Leste** has grown dramatically, with the number registered at the NGO Forum growing from 14 in 1998 to 449 in 2013[155], and many more unregistered social organisations. A large international NGO community was present in Timor-Leste post-independence, focused on peace building and relief, but the focus has now shifted to building capacity within Timorese NGOs.

Some CSOs have stable finances and highly professional management, but many face challenges, especially in terms of their capacity to plan, find reliable sources of funding and take effective action. Local CSOs tend to be weaker than national ones but have better local knowledge. Generic capacity limitations for local CSOs working on conservation are in the following areas:

- Articulating the links between conservation action and community development;
- Situation analysis and strategic planning, exacerbated by language and information barriers;
- Limited knowledge of law, regulations and policy processes;
- Limited knowledge of techniques for advocacy, research, investigation and analysis;
- Uneven geographic coverage, with CSOs concentrated in urban centres;
- Co-opted or funding-driven agendas, for example service delivery for donors;
- Weak management and limited staff capacity, including poor gender balance, limited democracy and transparency, high staff turnover and poor succession planning.

### 3.3.2 CSO programmes and activities

CSOs in **Indonesia**, **Malaysia** and the **Philippines** are working in countries with well-developed government institutions, significant protected area networks, professionalised conservation agencies, and large and sophisticated corporate sectors. Working for biodiversity conservation in these countries requires a high level of understanding of legal issues, policy processes and technical issues. In response, CSOs have tended to specialise, focusing, for example, on illegal wildlife trade, conservation education, community-based forest management, the palm oil, pulp-paper or mining sectors, or on particular species, ecosystems or protected areas. In Indonesia for example, there are CSOs dedicated to the conservation of Kerinci-Seblat and Gunung Leuser National Parks, and long-term programmes of support for Lore Lindu and Manupeu-Tanandaru National Parks.

Where laws and regulations do not allow sufficient opportunities for CSOs to engage, they may form pressure groups and conduct campaigns. A particularly successful model in recent years has been the collaboration between campaign NGOs based in markets that are sensitive to public opinion (e.g. in North America, Europe, Australia) and local NGOs based in the targeted region, which can investigate and document environmental and social abuses by the companies producing goods – timber, palm oil, paper, coffee, etc. – for these markets. Such campaigns can result in buyers and producers cancelling purchases from producers, rather than risk negative publicity in their key markets, and can put great pressure on producers to address the concerns. Major players in the palm oil industry trade chain in Indonesia and Malaysia have now gone far beyond their voluntary RSPO obligations, with far-reaching commitments to exclude deforestation and social conflict from their supply chains (see section 3.4). Major players in the pulp and paper sector[156] have also made important commitments, and there are certification schemes for coffee, cocoa and other products. However, monitoring the commitments made by companies and sustaining the pressure on them requires continued resources and commitment, and the local NGOs can find themselves over-stretched.

The context for international conservation NGOs in Indonesia, Malaysia and Philippines is also very different from PNG and Timor-Leste, with a diverse and active local NGO community present, even though there are gaps in capacity and knowledge. International NGOs (INGOs) tend to play a role as mentors, funders and collaborative partners to local NGOs, aiming to build capacity and hand over projects to the local partners.

(152) International Center for Non-profit Law, http://www.icnl.org/research/monitor/malaysia.html, accessed 28 May 2016.
(153) Macasaet S.D. and E. Hartay (2011). Achieving accountability through public and self-regulation initiatives: The Philippines. European Center for Non-profit Law. http://www.icnl.org/programs/global/gf2011/materials/NGO%20Certification%20in%20the%20Philippines.pdf

(154) Asian Development Bank (2015). Civil Society briefs: Papua New Guinea. See http://www.adb.org/sites/default/files/publication/173264/csb-papua-new-guinea.pdf
(155) CEPF (2014). Op. cit.
(156) For example, sustainability commitments by APRIL and Asia Pulp and Paper, both very large pulp-paper producers based in Indonesia.



*The Leuser ecosystem, Sumatra, has been the subject of long-term conservation efforts by government and NGOs, with major donor support. These have helped to limit deforestation, although there are ongoing threats from plans to build roads and expand commercial agriculture.*

**Table 3.6** Uptake of sustainability certification by oil palm and timber industries

| Country | RSPO members (oil palm growers only) | Current FSC certificates |
|---|---|---|
| Indonesia | 51 | 364 |
| Malaysia | 27 | 230 |
| Philippines | 0 | 0 |
| Papua New Guinea | 2 | 6 |
| Timor-Leste | 0 | 0 |

*Source: FSC website, RSPO website, accessed 31 May 2016.*

CSOs have been responsible for important innovations in conservation, including the creation of a new type of forest management licence for restoration concessions by the Indonesian Government; re-definition of biodiversity conservation priorities and the protected areas network in the Philippines (Haribon, and Conservation International); successful ecotourism ventures in Sumatran national parks threatened by illegal logging (Indonesian Ecotourism Network and local CSOs); and the creation of new protected areas in Malaysia, Indonesia and the Philippines.

CSOs have been pioneers of REDD+ schemes aimed at voluntary markets, and have piloted the use of verification schemes such as Plan Vivo and the Voluntary Carbon Standard in the region, as well as innovating mechanisms that transmit the potential REDD benefits back to community landowners[157]. Fauna & Flora International, NTFP-exchange and Pan-Nature worked with local partners in Indonesia, the Philippines, Cambodia and Vietnam, with EU funding, to implement the 'community carbon pools' project, facilitating communities to receive payments for the carbon benefits from the collective management of forests. WCS is developing a similar approach in PNG. Other long-term initiatives include attempts to influence land-use planning at district level (e.g. The Nature Conservancy's work in East Kalimantan, Borneo).

**Timor-Leste** has few CSOs with explicit environmental objectives. The main one, Haburas, works with local communities on sustainable resource management, including within the country's national park. Campaigning NGO La'o Hamatuk is active in researching and publicising policy issues, with a strong focus on the oil and energy sector, and the transparency of the country's petroleum fund. Among international conservation NGOs, BirdLife International and RARE[158] played an important role in the establishment of the country's only national park, but only one international conservation NGO, Conservation International, is still active, working on marine issues. However, the environment, ecosystem services and land rights are so important for the livelihood, security and development of the rural poor in Timor-Leste that many local and international NGOs in the field of human development are addressing environmental concerns, such as forest loss and soil erosion. The work of most organisations focuses strongly on grassroots empowerment and service delivery, with relatively few making the connections to policy and advocacy work at national level.

The difficulty of working over a wide geographic area in **PNG** means that NGO initiatives tend to focus on specific locations and address multiple issues in those communities. A leading example is the YUS conservation area programme, managed by the Tree Kangaroo Conservation Programme.[159] A review of the lessons from the YUS experience[160] highlighted the importance of local participation and leadership, government commitment at all levels, and projects with long-term horizons and a commitment to flexible working based on establishing a good relationship with local people. An example of this approach is the use of community-level land-use plans and regulations supported by a ranger team, made up of local landowners, who patrol and report violations requiring resolution through the village court system.

Other examples in PNG are (i) WCS's work with highland communities to develop more intensive, sustainable farming methods, and to encourage a change from reforestation with exotic species to an emphasis on natives; (ii) conservation agreements with communities on Manus Island to deliver village development programmes in response to their declaration of their forests to be logging-free; (iii) The Nature Conservancy's work with Almami local-level government in the Adelbert Mountains, combining participatory management planning and conservation agreements with a cooperative that has fair trade certification[161]; and (iv) the Tenkile Conservation Alliance's work with 50 villages in the Torricelli Mountain Range[162].

Some PNG CSOs have a thematic focus, notably the PNG Eco-forestry Forum, and the Centre for Environmental Law and Community Rights, both of which are involved in assisting communities to secure rights and put in place sustainable management. CSO activity in PNG is highly dependent on external funding, through churches or other donors. Sustaining funding for incentive payments to communities in return for protecting their forest is a particular concern. The Mama Graun Conservation Trust Fund is one response: this investment fund aims to continue the payments for management of conservation areas in the long term[163], and has now expanded to include six Melanesian countries.

## 3.4 Private sector initiatives

The region has a large, diverse and growing private sector. An indication of the sector's engagement with environmental issues can be obtained from the uptake of certification schemes, sustainability policies issued by individual companies and corporate social responsibility (CSR) efforts.

### Certification

Table 3.6 gives an indication of the level of uptake of the main certification schemes for oil palm and timber in the region. The large number of RSPO members in Malaysia and Indonesia reflect the enormous importance of the industry in those countries. The very limited number of Forest Stewardship Council (FSC) certificates in PNG suggests limited interest in sustainability in the industry, in contrast to the country's large logging industry.

### Sustainability policies

Since 2010, there have been dramatic shifts in the environmental and social policies of companies in the oil palm and pulp-paper sector.

Oil palm companies (producers and traders) have made a number of individual commitments, and by 2015 60 % of the global palm oil trade was under sustainability commitments. The two companies that dominate pulp and paper production in South-East Asia, Asian Pulp and Paper (APP) and APRIL, were the subject of highly critical campaigns for their logging of natural

(157) For example, Fauna & Flora International has created local associations in Indonesia to transfer funds to communities.
(158) See https://www.rare.org/about#.WBCKT4WcFpk
(159) http://www.zoo.org/tkcp/managingyus, accessed 20 September 2016.
(160) Beehler B. and A.J. Kirkman (Eds.) (2013). Lessons learned from the field: achieving conservation success in Papua New Guinea. Conservation International, Arlington, VA, USA.
(161) Menazza S. (2010). Conservation law benefits communities and biodiversity, Papua New Guinea. Available at www.TEEBweb.org
(162) See https://www.rare.org/about#.WBCKT4WcFpk
(163) https://www.conservationgateway.org/Documents/CaseStudyMamaGraun.pdf, accessed 28 May 2016.

forest; both have now made sustainability commitments. In 2012, APP launched a sustainability roadmap – Vision 2020, which has 11 policy areas including forest and biodiversity conservation. The forest conservation policy commits APP to remove all natural forest products from its supply chain, to protect high conservation value forests and peatlands, and to respect community rights and implement free, prior and informed consent (FPIC).[164] APRIL followed suit, and released the second iteration of its forest conservation policy in 2016, announcing 'APRIL eliminates deforestation from its supply chain'.[165] APRIL also manages a 1 500 km² ecosystem restoration concession in the peatlands of Riau, in eastern Sumatra, in partnership with NGOs Fauna & Flora International, The Nature Conservancy and social development consultant Bidara[166], and is involved in supporting the management of Indonesia's newest national park, Zamrud, in Sumatra[167].

There are some regulatory obstacles to implementation of corporate sustainability commitments. In Indonesia, for example, companies are required by law to develop the entire concession, and are penalised for 'setting aside' land, even when it is forested.

### Corporate social responsibility and private sector conservation initiatives

Many extractive industries and plantation companies have significant corporate social responsibility (CSR) programmes focused on community development. These can be aligned with PA management objectives, for example by working with the CSR programme on the promotion of sustainable non-timber forest products use or alternative protein sources to replace over-hunting. Indonesian law requires state-owned enterprises and companies investing in exploitation of natural resources, as well as the mining, oil and gas industries, to operate CSR programmes[168]. CSR programmes are typically directed towards communities around the operational areas of the companies, but they include contributions to government conservation activities, such as support by Chevron to a national park in Java (through Conservation International), and support to government tree-planting programmes (Japanese car manufacturers, Indonesian cigarette companies). The sums involved can be significant: Bank Negara Indonesia, an Indonesian bank, spent EUR 7 million on CSR in 2014.[169]

Malaysia is making efforts to encourage CSR. Companies listed on the Malaysian Stock exchange are required to declare their CSR and are scored on its quality through the Environment, Social and Governance Index. Publicly owned Malaysian companies lead the way in developing CSR: there are annual awards for CSR performance, and there are tax incentives for CSR spending. Environment is one of the four main themes of CSR reporting. Examples of environmental CSR in Malaysia include (i) APPCO group raising EUR 27 million from 120 000 donors to be channelled through WWF Malaysia for over 90 conservation projects[170], (ii) HSBC's support to a 'forest rehabilitation and peatland management' project, and (iii) the South-East Asia Rainforest Research project of the Royal Society, which works in the Danum Valley[171].

In the Philippines, examples of CSR include support from Shell Philippines Exploration to the Malampaya Foundation on the establishment of marine protected areas in Palawan[172].

Some mining companies have made efforts to address the environmental and social problems that have been associated with the industry (section 2.1.6). An example is Exxon-Mobil, which is taking an active role in mitigating such impacts and collaborating with local communities to support sustainable resource management.[173]

The private sector has the potential to be a significant source of finance for protected areas. Mechanisms include direct payments to compensate for damage to biodiversity, payments for environmental services[174], or biodiversity offsets for damage that cannot be mitigated. An innovative mechanism to connect private sector funding and PAs is the Malua Biobank in Sabah, Malaysia, which sells 'biodiversity conservation certificates' to companies wishing to promote a more environmentally responsible image. A portion of the proceeds capitalises a trust fund, which will support restoration of a forest reserve in Borneo that

(164) https://www.conservationgateway.org/Documents/CaseStudyMamaGraun.pdf, accessed 28 May 2016.
(165) http://www.aprilasia.com/en/, accessed 31 May 2016.
(166) http://www.rekoforest.org/partners, accessed 21 Sep 2016.
(167) APRIL and Indonesia's Ministry of Environment and Forestry collaborate to manage Zamrud National Park in Siak, Indonesia. See http://technology.risiinfo.com/environment/asia-pacific/april-and-indonesias-ministry-environment-and-forestry-collaborate-manage-zamrud-national-park-siak-indonesia
(168) Juniarto C.B. and A.D. Riyandi (2012). Corporate Social Responsibility Regulation in Indonesia. See http://www.ibanet.org/Article/Detail.aspx?ArticleUid=103427a1-0313-4d6c-b7f7-c5deb0bedbb5, accessed 5 May 2016.
(169) American Chambers of Commerce in Indonesia. Strengthening Indonesia's Competitiveness: Business Investments in Sustainability, CSR and Inclusive Growth. Available at https://www.uschamber.com/sites/default/files/legacy/international/files/APEC_Program_Strengthening_Indonesias_Competitiveness.pdf, accessed 31 May 2016.
(170) http://www.appcogroup.asia/news-regional/appco-malaysia-helps-raise-us-36million-to-support-forest-conservation, accessed 31 May 2016.
(171) http://www.about.hsbc.com.my/hsbc-in-malaysia/community, accessed 31 May 2016.
(172) Shell Global: Conserving the Coral Triangle, further information at: http://www.shell.com/sustainability/environment/biodiversity/biodiversity-in-action/conserving-the-coral-triangle.html, accessed 17 November 2017.
(173) See for example the Exxon-Mobil PNG LNG Environmental and Social Management Plan (ESMP) at http://pnglng.com/commitment/plans-and-reporting/environmental-and-social-management-plan/production.html
(174) For example, British American Tobacco funds forest protection and watershed rehabilitation on Lombok, Indonesia, which benefits the farmers who sell to the company. See http://www.fauna-flora.org/wp-content/uploads/FFI_Lombok_LPFNCaseStudy_November12_2014.pdf, accessed 16 June 2016.





**Table 3.7** Net ODA receipts to the countries of the region, 2011-2015

| Country | Net ODA (EUR million) | | | | |
|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 |
| Indonesia | 84.69 | -67.23 | 9.77 | -236.62 | 3.62 |
| Malaysia | 18.62 | 6.38 | -102.15 | -7.54 | -12.69 |
| PNG | 429.08 | 410.15 | 384.31 | 357.08 | 350.23 |
| Philippines | -174.54 | -22.62 | 160.85 | 485.69 | 410.69 |
| Timor-Leste | 187.00 | 161.46 | 153.23 | 141.08 | 114.31 |
| TOTAL | 544.85 | 488.15 | 606.00 | 739.69 | 866.15 |

*Note: Negative numbers are where repayments on ODA loans exceed income/receipts.*
*Source: OECD (2017).*[175]

has the largest unfragmented population of orang-utan left in Malaysia[176,177]. Private sector management of private land for conservation is rare in the region, but an exception is the Tambling wildlife nature conservation programme, in Sumatra, which combines protection of a section of Bukit Barisan Selatan National Park, under agreement with the park authority, with the management of neighbouring private land for ecotourism and tiger rehabilitation.[178]

## 3.5 International agencies and donors

Levels of aid dependence are low in the large and growing economies of Malaysia and Indonesia. In these countries, net development aid receipts from the Organisation for Economic Cooperation and Development's Development Assistance Committee (OECD-DAC) countries have declined, and aid as a percentage of gross national income is less than 0.05 %. The Philippines is following a similar pattern, but receipts of foreign aid spiked in 2014 in response to typhoon Haiyan. Timor-Leste is more aid-dependent, with net aid flows of around EUR 207 million per year from 2010-2014, equivalent to 6 % of GNI. PNG remains the highest aid recipient in the region, although even here aid has declined by 30 % over 20 years, from EUR 692 million per year in the 1990s to less than EUR 438 million currently[179], around 4 % of GNI (Table 3.7). The Government of PNG plans to become a donor to neighbouring countries in the Pacific by 2030, and already supports joint programmes with the Solomon Islands.

Australia contributed 80 % of aid to PNG in 2011, but this has also declined in recent years as a result of changes in Australian foreign aid policy. The World Bank and New Zealand contribute most of the remainder. Other countries in the region receive aid from a wider variety of sources.

Non-traditional development aid is increasingly important in the region and includes aid from non-OECD-DAC countries (such as China), private philanthropic organisations and corporates.

Table 3.8 summarises net aid disbursements of over EUR 7.6 million per country in 2014. Australia is by far the largest net contributor of ODA in the region, followed by the United States of America (USA), the EU and United Kingdom (UK). Much of the assistance to Indonesia (including aid from Germany and Norway) is in connection with REDD+ projects.

(175) OECD (2017). Geographical Distribution of Financial Flows to Developing Countries 2017: Disbursements, Commitments, Country Indicators. OECD, Paris. Available at http://www.keepeek.com/Digital-Asset-Management/oecd/development/geographical-distribution-of-financial-flows-to-developing-countries-2017_fin_flows_dev-2017-en-fr/
(176) Malau Biobank is a collaboration between Sabah State Government and New Forests. See https://www.cbd.int/financial/offsets/malaysia-offsetmalua.pdf
(177) Halley M. (2015). Case Study on New Forests' Malua Biobank Initiative. See http://www.stateoftheapes.com/wp-content/uploads/2016/03/New-Forests%E2%80%99-Malua-BioBank-Initiative.pdf
(178) http://inilahallam.com/index.php?page=single_page&staticId=3, accessed 23 September 2016.
(179) Prizzon A. (2014). The age of choice: Papua New Guinea in the new aid landscape. ODI, London. Available at https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9396.pdf

*Children dressed as endemic species from the Talaud Islands, Indonesia. Inhabitants of the region's many small islands are often familiar with their local species, but may not know that they are unique. Communication has proved an effective way of generating pride in local species and support for their conservation.*

**Table 3.8** Net ODA disbursements from DAC countries and EU institutions, 2015

| Country | Net ODA (EUR million) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | EU | Australia | Canada | France | Germany | Japan | Korea | New Zealand |
| Indonesia | 38.54 | 286.92 | 10.85 | 51.15 | 239.62 | -768.54 | 30.46 | 7.00 |
| Malaysia | 1.46 | 1.62 | 0.08 | 4.00 | 7.38 | -37.15 | 0.38 | 0.23 |
| Papua New Guinea | 16.85 | 320.38 | 0.00 | 0.00 | 0.69 | 2.85 | 1.38 | 15.08 |
| Philippines | 7.92 | 71.15 | 12.15 | -10.62 | 25.08 | 54.08 | 33.85 | 4.92 |
| Timor-Leste | 8.85 | 48.46 | 0.23 | 0.38 | 5.62 | 14.85 | 6.92 | 11.46 |
| Total | 73.62 | 728.54 | 23.31 | 44.92 | 278.38 | -733.92 | 73.00 | 38.69 |

**Table 3.8** (continued)

| Country | Net ODA (EUR million) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Norway | Spain | Switzerland | UK | USA | Others | Total |
| Indonesia | 24.69 | -11.46 | 10.85 | 23.38 | 100.38 | -1.69 | 42.15 |
| Malaysia | 0.23 | -0.23 | 0.08 | 6.62 | 3.46 | 0.62 | -11.23 |
| Papua New Puinea | 1.85 | 0.08 | 0.00 | 1.15 | 6.15 | 61.08 | 427.54 |
| Philippines | 1.31 | 0.92 | 1.23 | 10.69 | 192.54 | -47.08 | 358.15 |
| Timor-Leste | 2.23 | 0.00 | 0.00 | 0.08 | 13.69 | 10.38 | 123.15 |
| Total | 30.31 | -10.69 | 12.15 | 41.92 | 316.23 | 23.31 | 939.77 |

*Source: OECD (2017).*[180]

(180) OECD (2017). Ibid.

## Bilateral donors

### European Union

The EU provides bilateral aid to the Philippines, Timor-Leste and Papua New Guinea. Indonesia and Malaysia have not been eligible for bilateral aid since 2014 but qualify for assistance under thematic budgets. PNG and Timor-Leste are members of the Africa, Caribbean and Pacific (ACP) country grouping, and so qualify for European Development Fund assistance.

The EU has a long history of supporting forestry, environmental and conservation projects in the regions, including the Leuser ecosystem conservation project, Indonesia; eco-forestry initiatives in PNG; and protected area management in the Philippines, including the NIPAS programme. In total, the EU allocated EUR 82.5 million to the region in 2014, of which EUR 12.9 million was for 'multi-sector/cross cutting', which includes environment.

EU allocations in the multiannual indicative plans for the three bilateral aid countries total nearly EUR 627 million for the period 2014-2020, with the environment mainstreamed within the focal sectors, which include sustainable energy and job creation, rural development, water, education[181] and good governance.

Since 2010, the main projects (>EUR 1 million EU investment) in the fields of biodiversity, global climate change and sustainable economy, represent a total investment of over EUR 58 million (although some of this is shared with other regions). The bulk of the investment (9 projects, >EUR 30 million) is related to climate change, with 6 projects (>EUR 11 million) on sustainable consumption and 3 larger projects (>EUR 15 million) addressing biodiversity issues.

Biodiversity-focused projects include (i) the management of KBAs for conservation and ecosystem services (Philippines), (ii) the newly launched law enforcement and demand management of wildlife in Asia programme (regional – see below), and (iii) support to capacity building on multi-lateral environmental agreements in ACP countries (PNG and Timor-Leste). The Biodiversity and Protected Areas Management (BIOPAMA) project, implemented by IUCN in the ACP-Pacific region, is active in PNG and Timor-Leste, with its second phase from 2017 until 2022.

The EU was the initiator and funder[182] of the ASEAN regional centre for biodiversity conservation project with DENR. It later became the ASEAN Centre for Biodiversity[183], a key institution promoting cooperation in biodiversity conservation and a reference in the region. The Biodiversity Conservation and Management of Protected Areas in ASEAN project is a 5-year (2017-2022), EUR 10 million programme which will support ACB's work with ASEAN member states on biodiversity conservation, especially the management of ASEAN heritage parks[184]. The ASEAN-EU Enhanced Partnership 2013-2017 lays out the intention to collaborate on a wide range of issues, including water resource management, biodiversity conservation, implementation of multilateral environmental agreements, air

(181) European Union (2015). European Union – Papua New Guinea National Indicative Programme for the period 2014-2020. Available at http://eeas.europa.eu/papua_new_guinea/documents/nip_png_signed_2014-2020_en.pdf

(182) A grant to the Philippines Department for Environment and Natural Resources for an Asian Regional Centre for Biodiversity Conservation (ARCBC) of EUR 9.5 million, 1999-2004.

(183) The ACB was launched on 27 September 2005 as a permanent ASEAN institution. A financing agreement between the European Commission and the ASEAN Secretariat provided EUR 6 million for the establishment and initial operations of the ACB, 2005-2010.

(184) Information from a presentation made by the Delegation of the European Commission to Manila, March 2017

pollution and climate change. The EU also funds a regional programme, SWITCH-Asia, with an overall funding volume of over EUR 300 million[185], which aims at promoting green growth by encouraging more sustainable consumption and production in Asian industries and markets. The programme has provided 90 grants to projects in 22 Asian countries, with an average grant size of EUR 1.7 million. Within the island South-East Asia region, it operates in Indonesia, Malaysia and the Philippines. A second regional programme, funded jointly with the Government of Germany, is the Sustainable use of peatland and haze mitigation in ASEAN, which has an overall funding volume of EUR 24.5 million. The programme targets peatlands in Indonesia, Malaysia and the Philippines, as well as the countries covered in the Greater Mekong chapter.

In response to the wildlife trafficking crisis, the EU is funding a joint project of CITES and the United Nations Office on Drugs and Crime (UNODC): the Asia wildlife enforcement and demand management project, which commenced in May 2016. The 4-year, EUR 5 million project will work in South Asia (Bangladesh, Bhutan, India, Nepal and Sri Lanka), South-East Asia (Indonesia, Malaysia, the Philippines), the Greater Mekong (Cambodia, Lao PDR, Myanmar, Thailand, Vietnam) and China, with a focus on national-level frameworks, capacity for investigation and prosecution, regional collaboration, enforcement in key protected areas and raising the awareness of decision-makers.[186]

The EU is a funder of the World Bank-led Wealth Accounting and Valuation of Ecosystem Services (WAVES) partnership on Natural Capital Accounting (see under World Bank, below), and the Critical Ecosystem Partnership Fund (see below).

### Australia

Australian ODA was cut by 40 % in 2015, but most of the cuts fell on programmes in Africa; aid to neighbouring PNG and Timor-Leste was cut the least.[187] Aid to Indonesia is seen as part of a transition to an economic partnership, and emphasises governance and capacity building in support of the national medium-term development plan. Australia's previously significant investments in REDD+ preparedness and forest carbon-related projects in Indonesia have ceased; however Australia remains the largest ODA donor to PNG and Timor-Leste. Aid to both countries focuses on governance, the justice systems, infrastructure, health and education, with no direct support for forestry or environmental issues.

### Germany

Germany, through GIZ and KfW, has a long history of providing support to the forestry and natural resource sector in South-East Asia, particularly in Indonesia and the Philippines (in addition to Vietnam and Laos in the Greater Mekong). Relevant ongoing programmes include (i) institutional strengthening for biodiversity conservation in ASEAN (GIZ, delivered through the ASEAN Centre for Biodiversity); (ii) a small grants programme for ASEAN heritage parks in Indonesia, Myanmar and Vietnam (KfW, implemented by ACB); the Integrated Tiger Habitat Conservation Programme (BMZ, the German Federal Ministry for Economic Development Cooperation, through KfW, and implemented by IUCN); and (iii) the Forest and Climate Support Programme (Forclime) in Indonesia, which supports forest conservation and improved rural livelihoods around two national parks, and REDD+ demonstrations. In the Philippines, the GIZ-funded National Management Effectiveness and Capacity Assessment study under the Protected area management enhancement project has assessed the management and capacity of 61 protected areas, and the KfW funds a forest conservation project in Sierra Madre.

The German International Climate Initiative[188] (IKI) has a biodiversity-funding component which supports programmes in Indonesia, including (i) the development and management of ecosystem restoration concessions in three locations (2012-2019, EUR 8.1 million, KfW), (ii) the protection and management of the Leuser ecosystem in northern Sumatra[189] (2013-2019, EUR 8.5 million, KfW), and (iii) the protection and management of peat swamp areas in Sumatra as REDD+ demonstration sites (2008-2012, EUR 1.4 million, GIZ). A two-country project in Indonesia and Malaysia supports the development of green economic models under the Heart of Borneo initiative (2015-2019, EUR 4.3 million, WWF). In PNG, the IKI funds the development and designation of the YUS conservation area (see section 3.3.2) (2008-2013, EUR 4.8 million, KfW), while in the Philippines, the fund supports (i) enhanced protected area management (2012-2017, EUR 9 million, GIZ), (ii) a forest protection programme on Panay island (2010-2017, EUR 5.9 million, GIZ), and (iii) several coastal resource management and climate change-related programmes.

### Japan

Japanese net ODA is negative because of repayments in loans, including a large climate change programme loan to Indonesia. However, Japan has funded the collaborative management of national parks in Indonesia, and biodiversity research and collection management by the Indonesian Institute of Sciences. Support to Malaysia includes support to biodiversity conservation in Sabah, and within oil palm estates. Aid to the Philippines focuses on infrastructure and rehabilitation of disaster areas, but includes two forest/sustainable development-focused projects. In Timor-Leste, a single project on sustainable natural resource management included work on customary management systems.

### USA

United States Agency for International Development (USAID) has a large portfolio of work in Indonesia, supporting governance, democracy and health. In the environment sector, the Indonesia Forest and Climate Support project addressed (i) land-use planning, green economy development, forest and species conservation, and reduction of carbon emissions; (ii) the FOREST programme addressed reduction in carbon emissions from land-use change; and (iii) conservation of threatened species. USAID work in the Philippines concentrates on poverty and governance, but includes the Partnership for Biodiversity Conservation Programme, working on environmental law enforcement, and a number of projects supporting improved management of specific sites. Regionally, USAID supports the tiger conservation MYCAT secretariat office in Malaysia jointly with the Save the Tiger Fund.

### UK

The United Kingdom's Department for International Development (DFID) implements the GBP 250 million, 10-year Forest Governance, Markets and Climate Programme.[190] It is explicitly linked to the EU FLEGT programme and provides support to the VPA negotiation process and in-country capacity building.

### Norway

Norway has led donors supporting climate mitigation in the region, notably through the EUR 769 million agreement between Norway and Indonesia, with payments contingent on planning and policy change initially, and eventually on verified emissions reductions.[191]

## UN agencies

UN agencies act as development partners, channelling funding from other donors, including the EU. In 2014 they disbursed EUR 55.2 million in the region.[192] The **United Nation's Development Programme**'s (UNDP) work in Indonesia focuses on the Millennium Development Goals, concentrating on poverty reduction, democratic governance, crisis prevention and recovery, and environment and energy. The latter mainly focuses on alternative energy but includes work with communities on climate change adaptation in some of the driest and most vulnerable areas of southern Indonesia, and watershed rehabilitation. The UNDP also administers funding from the Norwegian Government to support REDD+ implementation in Indonesia. In Malaysia, assistance is channelled through government agencies, and focuses on poverty reduction for marginalised communities, governance and empowerment. In the environment sector, one UNDP-GEF project addresses the management of a 2 600 km² landscape in Sabah, connecting three key protected areas: Maliau Basin conservation area, Danum Valley conservation area, and the Imbak Canyon conservation area. In the Philippines, the UNDP works on governance, poverty, energy, environment and health. The environment portfolio includes the project 'expanding and diversifying the national system of terrestrial protected areas in the Philippines' (NewCAPP), which will strengthen customary and local conservation areas and measures, as well as working on management capacity and sustainable financing for protected areas. The UNDP is also working on mainstreaming biodiversity at two levels: with local government units into production landscapes, and into poverty reduction through the Philippines Poverty Environment Initiative.

The UNDP in PNG works on poverty reduction, democratic governance, crisis prevention, and also on environment and energy. The environment and energy theme includes work on REDD+ climate change adaptation, the GEF small grants programme, and the Forest Carbon Partnership REDD+ readiness. In Timor-Leste, it works on governance, including with the police and judiciary, and crisis management. Environmental work is focused on community resilience, including the use of sustainable bio-mass energy and climate change adaptation.

UNDP's Biodiversity Finance Initiative (BIOFIN)[193], launched in 2012, is a global partnership addressing the biodiversity finance challenge, enabling countries to measure their current biodiversity expenditures, assess their financial needs in the medium term and identify the most suitable finance solutions to bridge their national biodiversity finance gaps. BIOFIN is active in 31 countries worldwide, including Indonesia, Malaysia and the Philippines.

Across the Asia-Pacific region, the **United Nations Environment Programme** (UNEP) supports countries in implementing multilateral environmental agreements on biodiversity, including marine-related issues. A EUR 38 million project is working in the 'rimba' corridor of central Sumatra to demonstrate how Indonesia can meet its development targets through green economic development, sustainable management of critical landscapes and enhancing forest ecosystem connectivity. In Indonesia, UNEP is also implementing a GEF-funded project focused on introducing enhanced FSC certification at landscape level by incorporating ecosystem services. A project on controlling invasive species is being implemented in Cambodia, Indonesia, the Philippines and Vietnam, where efforts towards

(185) http://www.switch-asia.eu/programme/facts-and-figures/, accessed 20 September 2016.
(186) http://www.unodc.org/brussels/en/unodc-cites-asia-wildlife-enforcement-and-demand-management-project.html, accessed 17 June 2016.
(187) Lowry Institute for International Policy, http://www.lowyinstitute.org/issues/australian-foreign-aid, accessed 29 May 2016.
(188) https://www.international-climate-initiative.com/en/nc/projects/projects/, accessed 18 April 2016.
(189) http://www.international-climate-initiative.com/en/projects/projects/details/climate-change-mitigation-and-species-conservation-in-the-leuser-ecosystem-of-sumatra-380/?printview=printProjectAsPdf, accessed 18 April 2016.
(190) http://www.ipeglobal.com/case-study/monitor-implementation-of-the-forest-governance-markets-and-climate-programme-12.php, accessed 3 May 2017.
(191) Only EUR 46 million of this funding was released by March 2016, after 5 years of collaboration, but significant institutional and legal changes have been made. See https://ig.ft.com/sites/land-rush-investment/indonesia/, accessed 20 September 2016.
(192) UN agency disbursements in EUR million, 2014: Indonesia 19.8; Malaysia 2.1; Philippines 18.6; PNG 7; Timor-Leste 7.6.
(193) http://www.biodiversityfinance.net/home

*Grismer's rock gecko was discovered in 2012 in a forested karst landscape in Perak, peninsula Malaysia. The species is not considered threatened because it occurs within a protected archaeological site. The discovery shows how our knowledge of biodiversity is far from complete, emphasising the need to take a precautionary approach to land-use and development planning decisions.*

*Helmeted hornbill. This large hornbill is dependent on the lowland tropical forests of the region. It is an example of a previously widespread and relatively common species that has declined dramatically because of hunting. The casque on its beak is in demand for carving and for its purported medicinal properties. The species is now classified as critically endangered.*

controlling invasive species in protected and production forests are being supported.

**UNESCO** (the UN's Educational, Scientific and Cultural Organisation) manages the biosphere reserves and world heritage park programmes globally. In the region it facilitates a programme on biosphere reserves for environmental and economic security, which focuses on enhancing the livelihoods of communities around biosphere reserves, taking a micro-finance approach.

The **UNODC** has adopted wildlife and forest crime as one of its areas of activity, and facilitates the ICCWC. It is implementing the Asia wildlife enforcement and demand management project (see above, and further information in the synthesis report).

### Multilateral development banks

#### World Bank

Current World Bank projects in the Philippines do not support the forestry/biodiversity sector, but focus instead on energy, transport, water, climate change and post-conflict reconstruction. In the past the World Bank was a major supporter of the Philippines rationalisation of its protected areas system (the NIPAS process), and the 'conservation of priority protected areas project' provided EUR 15 million from 1994 to 2002, focused on the legal strengthening of PAs, the establishments of a Protected Area Management Board, management plan development, tenure rights recognition and socio-economic development. The project was implemented by the DENR with a consortium of NGOs. An associated project supported by the World Bank with Danida, 'Technical Assistance for Improving Biodiversity Conservation in Protected Areas', developed a biodiversity monitoring system, which is now being implemented in many protected areas.

In PNG, the World Bank supported two technical assistance projects in the mining sector, which aimed to 'create an enabling environment for sustainable mining, with a special focus on environmental and social aspects'.[194] Otherwise, it has provided no support for environmental projects, focusing only on governance, poverty, infrastructure and enterprise development.

World Bank activities in Indonesia are also focused on energy, water and enterprise development. Environmental work includes the long-term Coral Reef Rehabilitation and Management (COREMAP) programme, but the conservation of terrestrial ecosystems is no longer supported. The World Bank has provided significant support to the Indigenous Peoples Alliance (EUR 2 million, 2012-2015, funded through the special facility of the Forest Investment Programme) for 'sustainable indigenous livelihoods in forest areas', focusing on participatory planning of forest resource management, income development and participation in forest policy formulation.

World Bank activities in Timor-Leste focus on support to agriculture, infrastructure, health and nutrition.

The World Bank and UNEP are both working on mechanisms to incorporate the value of ecosystems into the economic analysis that underpins policymaking through approaches such as total economic valuation[195], mapping essential natural capital[196], and natural capital accounting[197], including the World Bank-led WAVES partnership[198]. UNEP's natural capital evaluation approach also makes the links between environmental degradation and disaster risk, using the results to influence the risk analysis and financial products of the financial industry. The Partnership for Environment and Disaster Risk Reduction promotes the link between sustainable environmental management and disaster risk reduction.[199]

#### ADB

The Asian Development Bank's (ADB) support to Indonesia focuses on infrastructure, transport, water and power, but also includes projects on the management of Baluran and Bali Barat National Parks (Java and Bali), community-based REDD+ pilots, the Heart of Borneo initiative, as well as marine projects. Work in the Philippines has a similar focus, but with environmental issues addressed through the Integrated natural resources and environment project, which works on integrated watershed management. Support to PNG and Timor-Leste focuses on infrastructure, energy and health with no significant environmental component.

### Multi-donor funds

#### GEF

The Global Environment Facility (GEF) has allocated EUR 133 million to the five countries of the region in its current 5-year cycle. Almost 70 % (EUR 92 million) is allocated for biodiversity conservation, and of that 48 % goes to Indonesia, 25 % to the Philippines, and 12 % each to Malaysia and PNG, with only 2 % for Timor-Leste. Eight GEF projects relevant to biodiversity conservation, representing EUR 21.4 million of GEF support, are currently under implementation in the region, four of them in the Philippines and two each in Indonesia and Malaysia. A further nine (four in Indonesia, two each in Malaysia and the Philippines, one in PNG), worth EUR 50 million in GEF grants, have been endorsed and are awaiting implementation.

#### CEPF

The Critical Ecosystem Partnership Fund[200] (CEPF) provides small grants for civil society conservation action in biodiversity hotspots. Between 2001 and 2006, CEPF's first phase of investment in the region, in Sumatra, Indonesia, provided EUR 7.7 million through 71 grants to CSOs. A second programme in the Philippines (2002-2007) funded 59 grants totalling EUR 5.4 million for work in Eastern Mindanao, Palawan and the Sierra Madre. The major achievements of both programmes included expanding the protected area network, catalysing policy action to strengthen natural resource management, and strengthening institutions to improve governance and transparency in decision-making. CEPF is currently active in the Wallacea hotspot (Indonesia and Timor-Leste), where a EUR 4.6 million grant programme is under way, focused on the lakes of central Sulawesi, terrestrial and marine KBAs in north Sulawesi, Nusa Tenggara Timur, central and northern Maluku, Timor-Leste, and the lowland and karst landscapes of south Sulawesi.

(194) See http://www.worldbank.org/en/results/2012/04/17/papua-new-guinea-mining-sector-institutional-strengthening-technical-assistance-project, and http://projects.worldbank.org/P102396/pg-second-mining-sector-inst-strengthening-ta?lang=en&tab=overview, accessed 29 May 2016.

(195) Pascual U. and R. Muradian (2010). The economics of valuing ecosystem services and biodiversity. Chapter 5 in The Economics of Ecosystems and Biodiversity. TEEB, London. Available at: http://www.teebweb.org/wp-content/uploads/2013/04/D0-Chapter-5-The-economics-of-valuing-ecosystem-services-and-biodiversity.pdf

(196) For example, Dickson B., R. Blaney, L. Miles, E. Regan, A. van Soesbergen, E. Väänänen, S. Blyth, M. Harfoot, C.S. Martin, C. McOwen, T. Newbold and J. van Bochove, J. (2014). Towards a global map of natural capital: key ecosystem assets. UNEP, Nairobi, Kenya.

(197) http://www.worldbank.org/en/topic/environment/brief/environmental-economics-natural-capital-accounting, accessed 9 September 2016.

(198) WAVES, Wealth Accounting and Valuation of Ecosystem Services, brings together a broad coalition of UN agencies, governments, international institutes, non-governmental organisations and academics to implement Natural Capital Accounting (NCA) where there are internationally agreed standards, and develop approaches for other ecosystem service accounts. WAVES is funded by the European Commission, Denmark, France, Germany, Japan, the Netherlands, Norway, Switzerland and the United Kingdom, and is overseen by a steering committee. See https://www.wavespartnership.org/, accessed 9 September 2016.

(199) As promoted by the Partnership for Environment and Disaster Risk Reduction, http://drustage.unep.org/disastersandconflicts/what-we-do/risk-reduction/ecosystem-based-disaster-risk-reduction/what-we-do/partnership-environment, accessed 13 March 2018.

(200) CEPF is a joint initiative of l'Agence Française de Développement, Conservation International, the European Union, the Global Environment Facility, the Government of Japan, the MacArthur Foundation and the World Bank. See http://www.cepf.net/Pages/default.aspx

# 4

## Lessons learned

*Gunung Mulu National Park, Malaysia, is famous for its dramatic karst formations and caves. Its rich biodiversity includes 3 500 vascular plants, 20 000 invertebrates, a colony of over 3 million free-tailed bats, and many endemic species.*

# 4 _ Lessons learned

Island South-East Asia and New Guinea holds some of the most diverse and threatened terrestrial ecosystems on the planet. It is also a region of economic and social extremes, including some of the fastest growing economies and most densely populated islands in the world, but also some of the poorest and most remote. Conservation of biodiversity must address the pressures created by rapidly increasing demand from growing markets, as well as the lack of options and alternatives for the marginalised rural poor. This section highlights the lessons learned from efforts to protect biodiversity and to promote more sustainable resource use in the region, forming a basis for the strategic approaches described in section 5.

## 4.1 Protected areas

Protected areas are increasingly important as a refuge for viable populations of some of the planet's most threatened species[201], and should therefore remain at the heart of strategies to ensure the survival of biodiversity. However, PAs in the region generally lack adequate resources, capacity and political support. In many cases, ecosystems have survived more because of their remoteness or unsuitability for agricultural development than because they are effectively managed and protected.

Key lessons and promising approaches in protected areas are listed below.

- Overall, PA effectiveness is low, but there are models of successful patrolling and enforcement. These need to be scaled up and institutionalised, accompanied by improved monitoring against higher standards of management. The Spatial Monitoring and Reporting Tool (SMART)[202] system of monitoring the enforcement effort and responding to threats has been piloted in several PAs but should be adopted across national PA networks.
- Although there is substantial government spending on PAs in Indonesia and Malaysia, resources are concentrated in a sub-set of high-profile PAs rather than being distributed across the network according to need, leaving most sites unmanaged and unprotected. Government support needs to be scaled up and complemented by additional sources, including, for example, private sector sponsorship and payment for ecosystem service mechanisms, trust funds and debt-for-nature swaps.
- Few PAs are without cases of conflict with local communities. In some (perhaps most) cases these conflicts could be mitigated or resolved by accommodating local needs, without compromising biodiversity conservation objectives. Managing these 'unnecessary' conflicts distracts from addressing genuine threats. Where conflicts concern access to land and resources, participatory negotiation of external and internal (zonation) boundaries of PAs have been shown to be successful in the region. However, scaling-up these approaches is limited by inflexible regulations and limited capacity for negotiation and mediation of conflicts.
- Local governments often view PAs as an obstacle to local economic development. Demonstrating value through economic analysis and creating mechanisms for local economies to capture some of that value or to be compensated through revenue transfers from the centre, is essential to boost local acceptance of PAs.
- Assigning international status to a protected area, as a World Heritage Site, a biosphere reserve, a Ramsar site or an ASEAN heritage site, may help to increase political will (through the prestige and international attention associated with designation) and funding (through promotional value leading to greater donor support, and increased tourism revenue).[203]
- Protected area systems have evolved in an ad hoc manner. Only the Philippines has carried out a system-wide review of how well species and ecosystems are covered by its PAs. Similar reviews would be valuable in Indonesia and Malaysia to identify important gaps in coverage and opportunities for the creation of new PAs, as well as to contribute to re-balancing the allocation of resources across the network. Where possible, a degree of redundancy (i.e. species and ecosystem covered in several sites across their range) is required to (i) allow for the impacts of climate change and unpredictable events (fire, disease, natural and man-made disasters), (ii) anticipate the discovery of new species and changes in taxonomy, and (iii) ensure that the full genetic variety within a species is captured.
- In addition to the creation of new government-managed PAs, there are opportunities to expand the use of community-managed reserves, private land holdings or sympathetic management under corporate land concessions. National protected area networks should be viewed as consisting of conventional government-managed PAs *plus* those managed by other stakeholders.

(201) But see, for example, Walston J., E.J. Stokes and S. Hedges (2016). The Importance of Asia's Protected Areas for Safeguarding Commercially High Value Species. In Joppa L.N., J.E.M. Bailie and J.G. Robinson (Eds.) Protected Areas: Are they Safeguarding Biodiversity? Conservation Science and Practice No 15, Wiley, London.
(202) SMART Annual Partnership Report 2015, http://smartconservationtools.org/wp-content/uploads/2016/01/SMART-2015-Annual-Report.pdf
(203) Conradin K., M. Engesser and U. Wiesmann (2015). Four decades of world natural heritage – how changing protected area values influences the UNESCO label. J. Geog. Soc. Berlin 146(1).





*Harvesting coffee, Flores, Indonesia. Many communities manage biodiverse landscapes with mosaics of agriculture and natural ecosystems. Landscape approaches can provide a way to support these traditional systems to adapt to changing external pressures and opportunities.*

## 4.2 Landscape conservation approaches

Landscape approaches offer opportunities to address development and conservation issues simultaneously. They aim to achieve biodiversity conservation without compromising economic development and livelihood goals by working with multiple stakeholders across a mosaic of land uses and jurisdictions.[204] They can alleviate pressure on PAs, addressing the drivers of threats, such as unsustainable land use or poor land-use planning, rather than only trying to deal with the immediate problems through enforcement. Landscape approaches also maintain and improve connectivity between PAs, allowing populations of large and wide-ranging species to remain viable when individual PAs are insufficient to support them. Rather than being limited to conventional PAs, landscape approaches offer the opportunity to work with the private sector and community actors using financial incentives, safeguards and planning controls, certification, land tenure and resource management rights. Landscape approaches are supported by national-level policies and programmes that encourage sustainability in key sectors, including industrial agriculture, extractive industries and infrastructure.

Key lessons and approaches for landscape-scale conservation are described here.

- Integrated land-use and development planning, as well as a platform or mechanism to allow for multi-stakeholder engagement, are the basis for landscape-level management, as they allow different interests and priorities to be accommodated. Formal status and authority may be required for landscape-level institutions and processes to allow representatives of government agencies to move outside their sectoral agenda. Links with national agendas, such as the sustainable development goals, or disaster risk reduction can increase acceptance of proposed approaches.
- Setting objectives, action planning and monitoring in landscapes requires good, though not necessarily sophisticated, data on biological features, ecological processes, land use and land suitability, social values and rights, and legal constraints (such as zoning and licensing).
- There have been significant voluntary commitments from some of the largest land-using industries and companies in the region, including oil palm and pulp paper. These provide a basis for discussion on how delivery on commitments can support sustainable land use in specific landscapes.
- In PNG, landscape approaches are the most promising conservation approach, offering a way to recognise

(204) There is extensive literature on landscape approaches. The CBD has adopted 10 principles for landscape approaches: continual learning and adaptive management; common cause entry point; multiple scales; multifunctionality; multiple stakeholders; negotiated and transparent chain logic; clarification of rights and responsibilities; participatory and user-friendly monitoring; resilience; strengthened stakeholder capacity. See Sayer J., T. Sunderland, J. Ghazoul, J-L. Pfund, D. Sheil, E. Meijaard, M. Venter, A.G. Boedhihartono, M. Day, C. Garcia, C.V. Oosten and L.E. Buck (2012). Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. PNAS 110(21), pp. 8349-8356. See http://www.cifor.org/publications/pdf_files/articles/ASunderland1302.pdf

*Sunda pangolin confiscated from smugglers, Indonesia. Both Philippine and Sunda pangolin are threatened by the illegal trade. Law enforcement has resulted in large seizures, but the trade continues, and the region is also a transit point for shipments of African pangolins to markets in China.*

*A local NGO in Flores, Indonesia, works with farmers to increase income from sustainable coffee production. The work is part of a project to involve local people in conserving a forest, which is home to the critically endangered Flores hawk-eagle and a vital water catchment for the district.*

customary land rights while addressing the unsustainable use of some resources, especially over-hunting of key species. These approaches could be highly relevant to Indonesian Papua, where the same customary systems of tenure and resource use exist, although under a very different legal and policy framework.

- Significant commitments have been made by individual companies and industry groups on the social and environmental sustainability of their operations and trade chains (section 3.4). Achieving real change involves (i) independent monitoring, (ii) sanctions from buyers if the companies fail to meet their commitments, (iii) technical assistance to companies and continued market pressure, as well as (iv) addressing legal constraints to the adoption of more sustainable approaches. These roles require cooperation between NGOs, government and companies.
- Extractive industries have a significant impact on local environments where they work, and often on water quality and quantity throughout a water catchment. The EITI (section 3.1.5) addresses environmental issues indirectly, but can help reduce the opportunities for rent seeking and corruption, which undermine environmental standards. The industry has a large number of players, and regulation and enforcement of EIAs and safeguards are essential to limit the environmental impacts.
- Providing people with adequate transport and communications is a challenge in the archipelagic regions of Indonesia and the Philippines, and for accessing the interior of New Guinea, Borneo and Sumatra. However, roads, pipelines and power infrastructure damage ecosystems, and allow access for resource extraction and the spread of invasive species. Impacts can be reduced through careful siting and design, which need to be based on good quality strategic environmental assessments and EIAs.
- Valuing biodiversity and ecosystem services using a 'natural capital' approach enables recognition of the important role they play in local economies, and helps to identify the costs of externalised impacts from economic development programmes.

## 4.3 Wildlife crime

Although wildlife crime in this area has not yet had the impact on biodiversity that it has had in the Greater Mekong region, there is already significant pressure on some species. The range of target species and the intensity of exploitation can be expected to increase as demand rises and sources closer to the main global markets are exhausted.

Key lessons and approaches regarding wildlife crime are listed below.

- The hunting of high-value species for trade is typically a specialist activity, with few people having the necessary skills. It is sometimes carried out by specialist teams who are not resident in the areas where they hunt. Hunting is difficult to detect in the field, and law enforcement requires intelligence gathering, informant networks within local communities and mechanisms to follow up on reports. Action by authorities on wildlife crime is sporadic and given low political priority. Limited capacity, corruption and lack of resources undermine the effectiveness of law enforcement efforts.
- Subsistence hunting and collecting is a problem for many species in areas of high human dependence on natural resources, shrinking forests and growing human populations, especially in New Guinea and parts of Borneo. Where strong indigenous systems prevail, control can be based on local practices, including rules on target species, hunting methods and the timing of hunting[205], with sanctions imposed by traditional leaders and decision-makers. In other cases, the support of official authorities will be needed to police the agreement. Monitoring catch rates and wildlife populations may be necessary to support decision-making.[206]
- Some hunting and trapping is a response to human-wildlife conflict. Techniques for reducing conflict with threatened species including tiger, elephant and orang-utan exist[207,208,209], but need to be more widely promoted through training and support to farmers. In critical areas, compensation payments for crops destroyed and livestock killed might be considered if farmers can demonstrate they have taken reasonable precautions to protect their interests.
- In tiger ranges, the hunting of deer and pigs reduces the wild prey base, leading tigers to attack livestock and bringing them into contact with people. A combination of enforcement and alternative sources of protein and income for communities is needed in these cases.

## 4.4 Civil society

The CSO community in the region is diverse and growing, especially in the Philippines and Indonesia. It includes NGOs, religious and social organisations, and others, but it could play an even greater role in biodiversity conservation if there was further investment in capacity building and networking.

Key lessons and approaches for civil society are listed below.

- National and local CSOs are increasingly playing a role in organising communities, advocating policy change to national and local governments, and monitoring the actions of the private sector. Capacity and resources remain a challenge, but there are many opportunities for cross learning and networking within the region.
- There are different and sometimes opposing views between CSOs focused on human rights and community issues, and those working on biodiversity conservation. Both approaches are important, and critical reflection and sharing of ideas and experiences by these groups should be encouraged.
- A large body of experience and methodologies is available for CSO-capacity building and could be adapted to the

(205) An example is the concept of 'wildlife banks' pioneered by the YUS conservation areas project, which builds on the customary use of taboos as a mechanism for limited hunting.

(206) Steinmetz R., S. Srirattanaporn, J. Mor-Tip and N. Seuaturien (2014). Can community outreach alleviate poaching pressure and recover wildlife in South-East Asian protected areas? J. Applied Ecol. 51(6), pp. 1469-1478.

(207) Campbell-Smith G., R. Sembiring and M. Linkie (2012). Evaluating the effectiveness of human-orang-utan conflict mitigation strategies in Sumatra. J. Applied Ecology 49(2), pp. 367-375. DOI: 10.1111/j.1365-2664.2012.02109.x

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(209) Hedges S. and D. Gunaryadi (2009). Reducing human-elephant conflict: do chillies help deter elephants from entering crop fields. Oryx 44(1), pp. 139-146. DOI:10.1017/S0030605309990093

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*Pressure from investors, buyers and consumers has resulted in a dramatic shift in the policies of oil palm companies since 2015; 60% of the world's palm oil was produced under sustainability commitments in 2015. Monitoring and verifying that improved practice is being implemented is challenging in remote, inaccessible rural areas.*

^

*Tapanuli orang-utan, described as a new species of orang-utan in 2017. Advances in the knowledge of the taxonomy and distribution of species are essential for planning the development and management of protected areas.*

languages and specific needs of the region.[210] Projects such as the AHP small grants programme[211] and the CEPF[212] offer useful lessons on combining multi-stakeholder planning, grants and technical assistance for grant implementation.

## 4.5 The private sector

The private sector has huge impacts on land use, resource use, finance and policymaking. In more remote regions, corporates are often the main providers of basic services to communities, offer employment opportunities and are closely linked to local governments. They thus have a strong influence over local decision-making, including land-use licensing and resource management. Progressive companies can work with government to promote green/sustainability agendas, but others may delay and undermine pro-environment change.

Key lessons and approaches in the private sector are described below.

- The voluntary commitments made by some sectors and companies are primarily from those selling into markets that are sensitive to environmental and social messages. Companies selling into less selective markets have little incentive to adopt such commitments, and can undermine these initiatives. To prevent this, government needs to incorporate key elements of voluntary sustainability commitments into legislation. Companies have a role to play with site, national and international-level lobbying of decision-makers and regulators to adopt the initiatives they have pioneered.[213]
- Despite significant CSR spending by some companies, little effort is invested in avoiding, rehabilitating or offsetting the impacts of industrial agriculture and mining.[214] There is potential for CSR funding to be re-aligned to address conservation priorities more effectively.

## 4.6 Access to data and information

The lack of adequate, valid data is a constraint for (i) species priority setting, (ii) assessment of PA networks, (iii) judging the effectiveness of PA management, and (iv) evaluating the contribution to biodiversity conservation from landscape and other conservation approaches. Similarly, information on ecosystem services, and the impacts on them from different land-use activities, is essential for managing ecosystems and communicating their importance to decision-makers. Access to basic data on biodiversity, including in spatial form, is critical to enable decision-makers to assess and plan for conservation, and to evaluate the impacts of their decisions.

Key lessons and approaches on data and information are described below.

- As a global biodiversity hotspot, the region has attracted the attention of scientists from around the world but also has a number of national experts. However, national education systems have failed to maximise the potential of local students, and research and publication on the region remains dominated by foreign scientists.[215] The availability of survey and taxonomic expertise, and the resources to deploy them, falls far short of what is needed to compile even basic information on the distribution and status of most species.
- Data that is collected is often not shared or published in a timely way, nor are the results made available to policy-makers and PA managers in a form that is relevant to the decisions they need to make. Many institutions and agencies have biodiversity databases but these are often patchy in coverage, have poor quality or out-of-date data and are incompatible. The national clearing-house mechanisms mandated by the CBD have been a focus of projects and donor assistance but have not yet addressed this need successfully.
- Important site-specific data may come from biodiversity surveys carried out as part of major development projects (for example, EIAs for mining projects). Such data is especially valuable when it comes from poorly known biodiversity-rich areas outside the PA network. Data needs to be collated and made available more widely. Phase 2 of the IUCN BIOPAMA project (see section 3.5) will develop and improve baseline terrestrial and coastal inventories to guide planning, designating and managing protected areas. It will also enable more accurate reporting, including the mapping of protected area networks, important biodiversity values and management effectiveness assessments.

(210) Examples include (i) BES-Net: http://www.besnet.world; (ii) Capacity for Conservation: http://capacityforconservation.org/; and (iii) Scherl L.M. and A.J. O'Keeffe (2016). Capacity Development for Protected and Other Conserved Areas in the Pacific Islands Region: Strategy and Action Framework 2015-2020. Gland, Switzerland: IUCN. vi + 42pp

(211) Implemented by the ASEAN Centre for Biodiversity, funded by KfW and BMU. See http://environment.asean.org/acb-germany-asean-launch-programme-on-biodiversity/, accessed 15 June 2016.

(212) CEPF has active CSO small grants programmes in the Greater Mekong and Wallacea hotspots, and has in the past funded CSOs in Sumatra.

(213) A good example of this was the Indonesian Palm Oil Pledge. However, the initiative was dissolved in mid-2016, stating that its aims had been achieved (see: http://www.palmoilpledge.id/en/) although observers noted that there were fears of investigation by the Indonesian Monopolies Commission (e.g. https://news.mongabay.com/2016/07/under-government-pressure-palm-oil-giants-disband-green-pledge/).

(214) IUCN Policy on Biodiversity Offsets. See http://cmsdata.iucn.org/downloads/iucn_biodiversity_offsets_policy_jan_29_2016.pdf, accessed 18 June 2016.

(215) As an indication of the issues about the quality of universities, the region has only 2 universities in the top 50 Asian universities (both in Malaysia), and 9 in the top 100 (another 3 in Malaysia, 2 each in Indonesian and the Philippines). None are in the global top 100. QS Top Universities, http://www.topuniversities.com/university-rankings/asian-university-rankings/2016#sorting=rank+region=+country=122+faculty=+stars=false+search=

# 5

## Strategic approaches

*Komodo dragons are the largest living lizards, growing up to 3 metres long. Around 5 700 are found on islands in the Komodo National Park, Indonesia, which is a World Heritage Site. The park is the focus of a major tourism industry, with over 50 000 visitors every year.*

# 5 _ Strategic approaches

## 5.1 Priority geographies

Biodiversity and ecosystems are not distributed evenly across island South-East Asia and New Guinea. While the priority regions for conservation (PRCs, see section 1.2.4) show the importance of the entire South-East Asian archipelago and New Guinea, Key Landscapes for Conservation (KLCs) are identified to highlight the areas of highest priority. KLCs should be considered as priorities for the funding of conservation-related actions, and should also be areas where potentially damaging projects (particularly infrastructure and large-scale land-use change) should be subject to specific scrutiny for biodiversity impacts.

The definition of KLCs relies on existing analyses, which are only as good as the available data, so there could be important areas that are not included. In addition, large-scale maps do not effectively capture linear ecosystems (e.g. rivers, mangroves) or fragmented ecosystems (e.g. karst).

### 5.1.1 Defining KLCs in the region

No analysis is available that applies a consistent approach to priority-setting across the whole region at landscape level. Therefore a combination of approaches was used, all of which achieved the aim of identifying landscape-level geographic priorities (Table 5.1).

*Peat swamp forests are rich in biodiversity, and their soils store large amounts of carbon which is released when they are drained and burned. They are threatened by clearance for the development of oil palm and timber plantations, and illegal logging.*

**Table 5.1** Data sources for KLC identification in island South-East Asia and New Guinea

| KLC | Analyses used |
|---|---|
| Philippines | CEPF: key biodiversity area corridors[i] |
| Timor-Leste and central Indonesia (within the Wallacea biodiversity hotspot) | CEPF: key biodiversity area corridors[ii] |
| Western Indonesia (Sumatra, Java), Peninsula Malaysia | BirdLife International: endemic bird areas[iii], IBAs (Ujung Kulon, Simeulue, Nias and Siberut); Wildlife Conservation Society: tiger source sites[iv]; Wich et al.: Sumatran orang-utan range[v] |
| Borneo | Endemic bird areas<br>Struebig et al.: Borneo mammal distribution data[vi] |
| Indonesian New Guinea | CI/CSIRO draft report: interim KBAs[vii], CI: protected areas |
| Papua New Guinea (mainland) | Alcorn and Beehler: Conservation needs assessment from 1993[viii,ix] |
| Papua New Guinea (islands) | BirdLife International: Endemic bird areas |

*(i) CEPF (2001). The Philippines Hotspot Ecosystem Profile*

*(ii) CEPF (2014). Op. cit.*

*(iii) Stattersfield A.J., M.J. Crosby, A.J. Long and D.C. Wege (1998). Endemic Bird Areas of the World. Priorities for biodiversity conservation. BirdLife Conservation Series No 7. BirdLife International, Cambridge.*

*(iv) Walston J., K.U. Karanth and E.J. Stokes (2010). Avoiding the Unthinkable: What Will it Cost to Prevent Tigers Becoming Extinct in the Wild? Wildlife Conservation Society, New York.*

*(v) Wich S.A., I. Singleton, M.G. Nowak, S.S.U. Atmoko, G. Nisam, S.M. Arif, R.H. Putra, R. Ardi, G. Fredriksson, G. Usher, D.L.A. Gaveau and H.S. Kühl (2016). Land-cover changes predict steep declines for the Sumatran orang-utan (Pongo abelii). Science Advances, 4 March 2016, DOI: 10.1126/sciadv.1500789*

*(vi) Struebig M.J., A. Wilting, D.L.A. Gaveau, E. Meijaard, R.J. Smith, The Borneo Mammal Distribution Consortium, M. Fischer, K. Metcalfe and S. Kramer-Schadt (2015). Targeted Conservation to Safeguard a Biodiversity Hotspot from Climate and Land-Cover Change. Current Biology 25(3), pp. 372-378. DOI:.org/10.1016/j.cub.2014.11.067*

*(vii) Williams K.J., R.J.L. Storey, R.E. James, R.D. Schroers, K. Rosalind Blanche, D.K. Mitchell, N. De Silva, N. Kemp, S.J. Richards, D.P Faith, P. Langhammer and C. Margules (2008). Key Biodiversity Area Identification and Delineation in the New Guinea Wilderness. DRAFT REPORT. CI-CSIRO Technical Report Series No 4, December 2008. Melanesia Centre for Biodiversity Conservation and CSIRO Sustainable Ecosystems, Atherton.*

*(viii) Alcorn L.B. and B.M. Beehler (1993). Papua New Guinea – Conservation Needs Assessment Parts 1&2. Available at http://www.sprep.org/att/irc/ecopies/countries/papua_new_guinea/85.pdf*

*(ix) An approach proposed by stakeholders consulted for PNG was to identify areas which fall into at least two of the three available priority setting analyses: (1) Alcorn L.B. and B.M. Beehler (1993). Ibid; (2) Lipsett-Moore G., E. Game, N. Peterson, E. Saxon, S. Sheppard, A. Allison, J. Michael, R. Singadan, J. Sabi, G. Kula and R. Gwaibo (2010). Interim National Conservation Assessment for Papua New Guinea: Protecting Biodiversity in a changing climate. Pacific Island Countries Report No. 1/2010; (3) Potapov P., A. Yaroshenko, S. Turubanova, M Dubinin, L. Laestadius, C. Thies, D. Aksenov, A. Egorov, Y. Yesipova, I. Glushkov, M. Karpachevskiy, A. Kostikova, A. Manisha, E. Tsybikova and I. Zhuravleva (2008). Mapping the world's intact forests by remote sensing. However spatial data for (2) was not available, and (3) does not address the biodiversity value. Therefore only (1) was used.*

## 5.1.2 KLCs in island South-East Asia and New Guinea

The total area identified as KLCs is over 1.2 million km². The areas identified are fragmented, with many of them on islands or mountain ranges, and so they are arranged into nine groups (Figure 5.1, Table 5.2). The KLCs capture the extraordinary diversity across the region, from lowland tropical rainforest to alpine ecosystems in New Guinea.

The KLCs include some of the largest protected areas in South-East Asia, including Lorentz in Indonesian Papua (25 000 km²) and Kerinci-Seblat (13 700 km²) in Sumatra. Overall, however, only 221 733 km², or about 17 %, is within officially declared protected areas (IUCN category I to IV, based on data held in the World Database on Protected Areas) (Figure 5.2, Table 5.3).

*Rote myzomela, confined to a small island in southern Indonesia, was described as a distinct species in 2017. Two other birds (an owl and a fantail) have also been described from the island recently. More work is needed to understand the true diversity of species in the south-east Asian archipelago, and conservation priority setting will need to be revised periodically to incorporate new discoveries.*

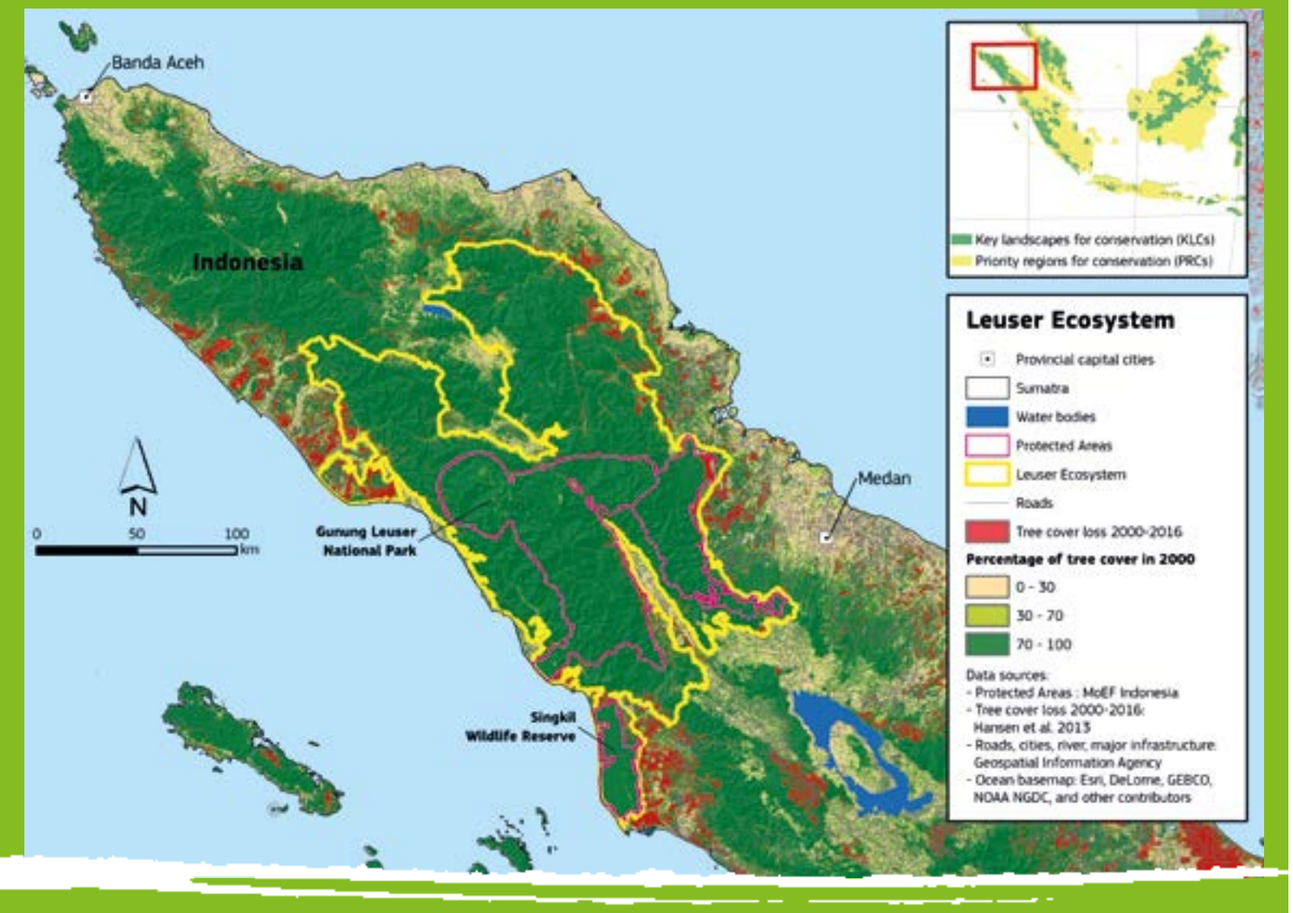
**Table 5.2** List of KLCs in island South-East Asia and New Guinea (see map, Figure 5.1)

| Map # | KLC | Total area of KLC (km²) | Country (ISO code) | Special features |
|---|---|---|---|---|
| 1 | Indonesian Borneo | 153 715 | IDN | Montane and hill dipterocarp forest, karst systems, high diversity of endemic and threatened species, including Bornean orang-utan, Siamese crocodile, proboscis monkey. |
| 2 | Timor-Leste | 10 970 | TLS | Lowland and hill monsoon forest, grassland, endemic and threatened species include long-necked turtle, geckoes, delias butterflies. |
| 3 | Indonesian Wallacea | 218 939 | IDN | Tropical lowland, hill and montane forests, karst systems, dry forests, grasslands, lakes, high number of endemic species, including babirusa, Komodo dragon, anoa, maleo. |
| 4 | Philippines | 136 385 | PHL | Sierra Madre corridor: tropical evergreen forest, mid- and upper-montane forest, wetlands, coastal ecosystems, largest remaining forest cover in the Philippines, endemic biodiversity.<br><br>Palawan Corridor: tropical evergreen forest, montane forest, karst and karst forest, high plant endemicity, including an endemic genus, large numbers of endemic and threatened species from other taxa.<br><br>Eastern Mindanao corridor: tropical evergreen forest, last dipterocarp forests in the Philippines, high diversity of endemic plants, birds, mammals.<br><br>Other Philippine corridors: wetlands, tropical evergreen and montane forests, island endemic species. |
| 5 | Indonesian Sundaland | 168 301 | IDN | Hill dipterocarp and lower montane forest, Sumatran rhinoceros, Sumatran tiger, Sumatran orang-utan, Javan rhinoceros, and a high diversity of threatened and endemic mammals. |
| 6 | Peninsula Malaysia | 57 185 | MYS | Lowland and hill dipterocarp forest, tiger source sites, including an increasing population at Endau-Rompin, Sundaland forest birds. |
| 7 | Papua New Guinea | 267 521 | PNG | Mangrove, swamp forest, lowland rainforest, hill and montane forest, alpine heath and grassland, marsupial mammals, endemic birds including birds of paradise, high diversity of forest species with many endemics. |
| 8 | Indonesian Papua | 193 707 | IDN | As for PNG (above) |
| 9 | Malaysian Borneo | 66 669 | MYS | Lowland, montane and hill dipterocarp forest, karst systems, high diversity of endemic species, including Bornean orang-utan, Hose's civet. |
| | Total | 1 273 397 | | |

**Table 5.3** Protected area coverage of KLCs in island South-East Asia and New Guinea

| Map # | KLC | Area covered by protected areas (km²) | % of KLC area covered by protected areas | Total number of protected areas in KLC | Important protected areas (all national parks unless stated otherwise) |
|---|---|---|---|---|---|
| 1 | Indonesian Borneo | 32 793 | 21 % | 9 | Betung Kerihun, Kayan Mentarang, Danau Sentarum, Tanjung Puting, Sebangau, Gunung Palung, Kutai |
| 2 | Timor-Leste | see note[i] | see note[i] | see note[i] | Nino Konis Santana |
| 3 | Indonesian Wallacea | 25 043 | 11 % | 64 | Bogani Nani Wartabone, Lore-Lindu, Gandang Dewata, Komodo, Wakatobi, Aketajawe-Lalobata, Manusela |
| 4 | Philippines | 24 480 | 17 % | 41 | Sierra Madre: Northern Sierra Madre Natural Park, Palawan: Coron Islands, El Nido-Taytay managed resource protected area, Malampaya Sound, St Paul's subterranean river, E. Mindanao: Agusan Marsh, Mt Hamiguitan Range wildlife sanctuary Others: Mounts Iglit-Baco, Mt Guiting-Guiting |
| 5 | Indonesian Sundaland | 40 209 | 23 % | 79 | Gunung Leuser, Kerinci Seblat, Bukit Barisan Selatan, Bukit Tigapuluh; Way Kambas, Ujung Kulon, Meru Betiri, Baluran, Siberut |
| 6 | Peninsula Malaysia | 7 176 | 12 % | 9 | Taman Negara, Belum-Temengor landscape, Endau-Rompin landscape |
| 7 | Papua New Guinea | 0[i] | 0 %[i] | 0[i] | Tonda wildlife management area, Crater mountain, Hunstein range |
| 8 | Indonesian Papua | 83 489 | 43 % | 33 | Lorentz, Cyclops mountain nature reserve, Foja-Mamberamo wildlife reserve, Jayawijaya wildlife reserve, Wasur |
| 9 | Malaysian Borneo | 8 541 | 12 % | 53 | Batang Ai, Pulong Tau, Usun Apau, Mount Kinabalu, Lanjak Entimau wildlife sanctuary |
| | Total | 221 733 | 17 % | 288 | |

*(i) 'Protected areas' are PAs listed on the World Database of Protected Areas and classified as IUCN categories I to IV. In PNG, only 2 PAs are classified in these categories (most are unclassified). In Timor-Leste 1 PA is classified as Cat. V, the rest are unclassified.*




## Box 1 _ Aceh forests and Leuser Ecosystem (part of KLC 5)

The Leuser Ecosystem is the 'last place on earth' that supports an intact assemblage of South-East Asia's unique large fauna, including Sumatran rhino (critically endangered), Sumatran orang-utan (critically endangered), Sumatran tiger (critically endangered) and Sumatran elephant (critically endangered), all co-existing in the same forest. It forms part of the Sundaland biodiversity hotspot, and the Tropical Rainforest Heritage of Sumatra UNESCO World Heritage Site.

The Leuser Ecosystem is the largest remaining intact forest area on the island of Sumatra, covering over 26 000 km$^2$, including large areas of deep peatland and providing a critical store of carbon. It is an essential asset for the economic development of Aceh province, providing a total economic value of at least EUR 270 million per year. Over 4 million people live in and around the ecosystem and use its natural resources and ecosystem services to support their livelihoods.

The forests of the region are under pressure from clearance for industrial agriculture and by smallholder farmers, exacerbated by road building. Hunting to supply the illegal wildlife trade is a threat to some species.

Priority interventions for conservation include: protected area management, landscape-level land-use planning, combatting illegal wildlife trade, and working with the private sector (agricultural commodity companies and extractive industries) to reduce deforestation and negative impacts.



**Figure 5.1** Priority regions for conservation and key landscapes for conservation in island South-East Asia and New Guinea

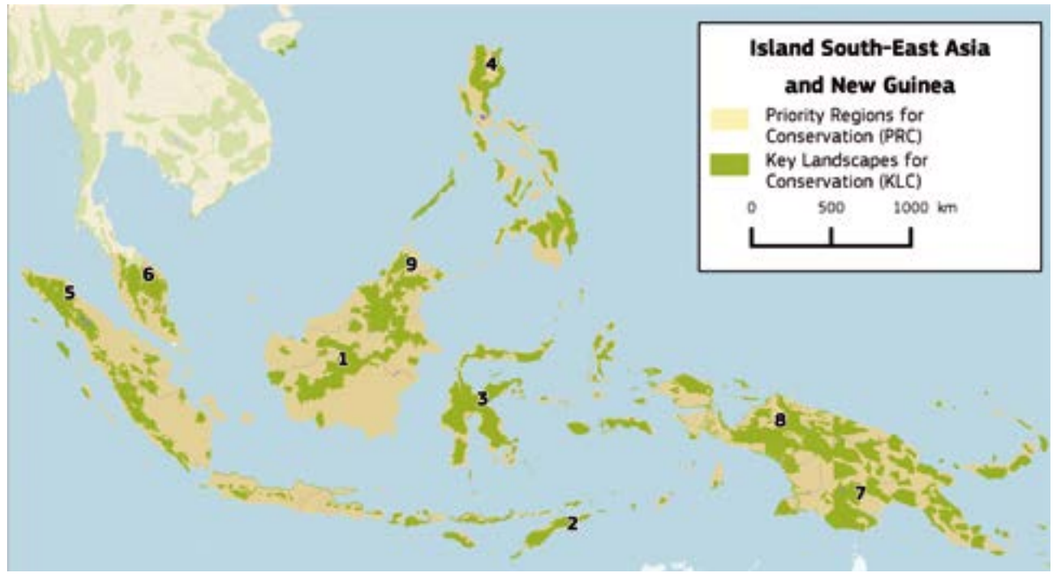
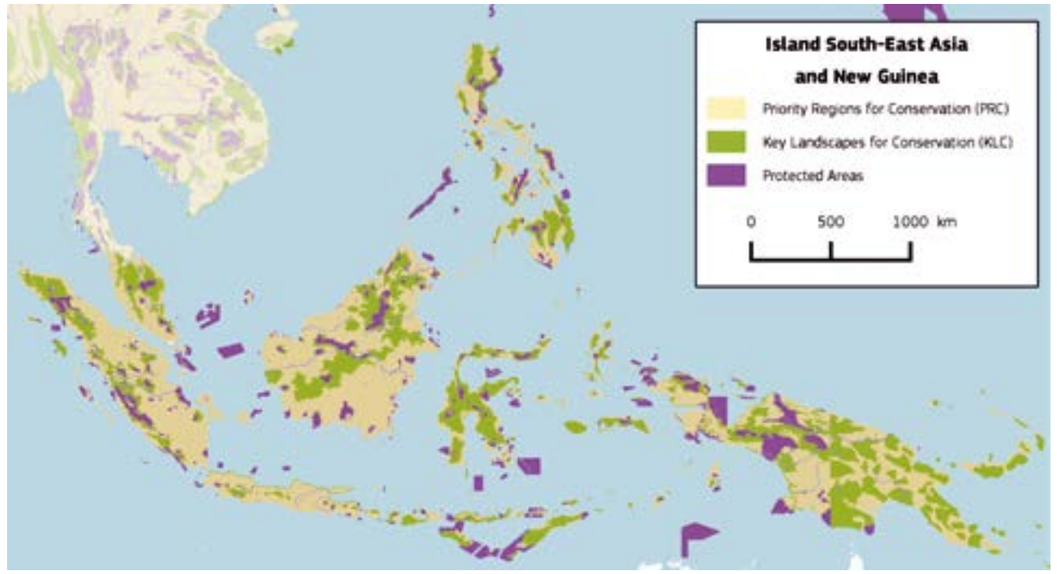



**Figure 5.2** Priority regions for conservation, key landscapes for conservation and protected areas (IUCN categories I to IV) in island South-East Asia and New Guinea



*Bako National Park, Malaysia. The region's 1 500-plus protected areas are vital for the conservation of biodiversity and the provision of ecosystem services. However, the protection and management of these areas is often inadequate. Protected areas need political support, secure funding and stronger management agencies.*

## 5.2 Strategic approaches to addressing the main pressures on biodiversity and ecosystems

### 5.2.1 Mitigate conflicts and enhance the effectiveness of protected areas

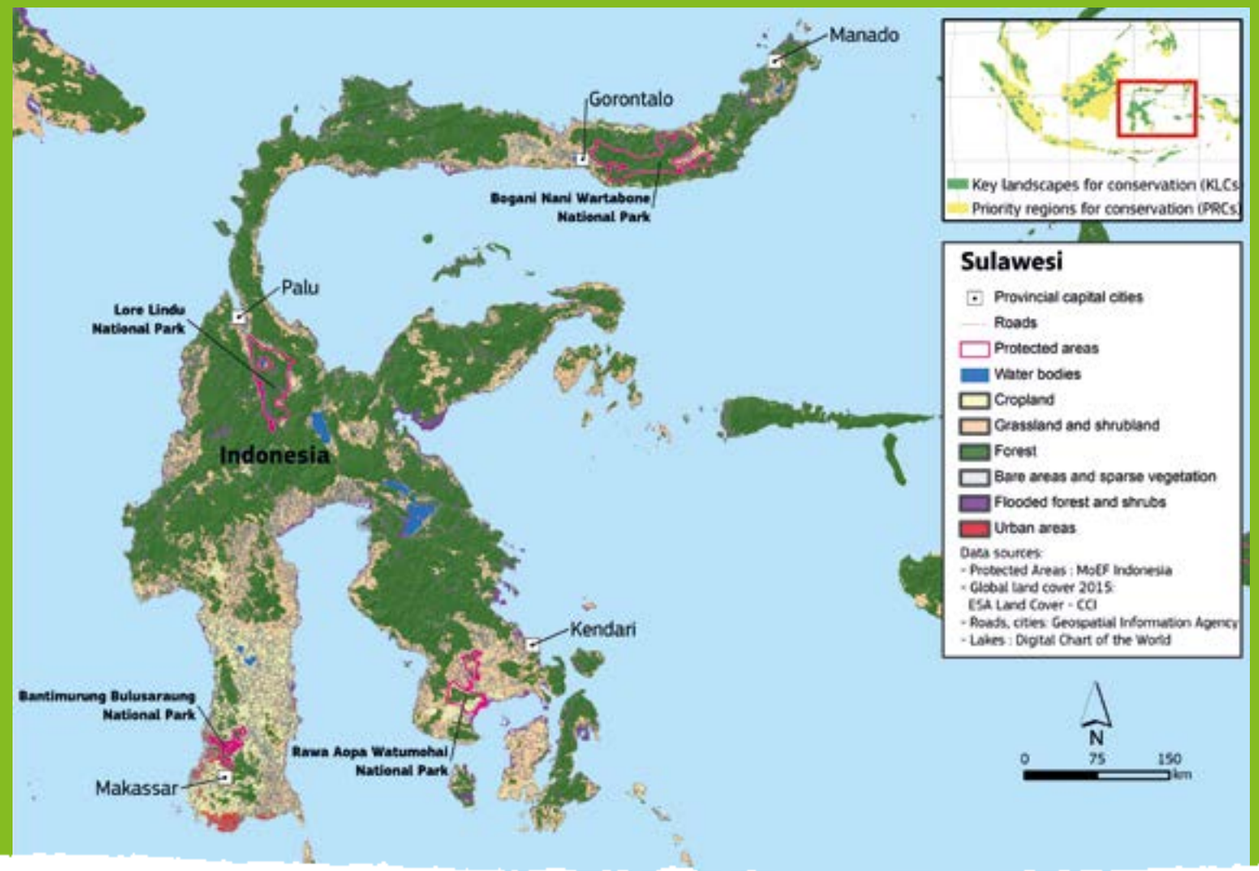
All the countries in the region have put in place systems of official protected areas and wildlife protection regulations. Over 1 524 PAs cover 388 984 km², or 13 % of the land surface. A minority of PAs, in Malaysia and Indonesia, have relatively high levels of funding and staffing, but these well-endowed PAs are unusual. Other PAs in Indonesia and Malaysia, as well as those in Timor-Leste, the Philippines and PNG, generally lack adequate funding for management. In addition to funding, the challenges that PAs face include a lack of appreciation of their economic and social values, competition for land and resources from other sectors, and failure to adequately accommodate local interests in their designation, leading to conflicts with local communities and authorities. Overall, therefore, PAs are failing to protect the threatened biodiversity that depends on them.

The highest short-term priority is to improve the effectiveness of patrolling and the enforcement of regulations in PAs in order to halt the attrition of habitats and wildlife.

- Make better use of existing resources to strengthen the presence of PA staff in the field, whether engaged in patrolling, community liaison or monitoring. Increase the use of technical solutions such as satellite images, fixed-wing drones and microlight aircraft, but integrate them with field data (e.g. through the SMART system).

Medium-term actions should address the conflicts between PAs with communities and local governments, build capacity within the PA management profession and review the overall PA network.

- Address conflicts and build supportive relationships with neighbouring land users, building on existing experience of participatory planning, boundary delineation and collaborative management. Create opportunities for community members to work with PA staff on patrols and other schemes, and seek partnerships with local governments and the private sector to mitigate threats.
- Engage corporate neighbours as supporters. For the PAs surrounded by corporate landholders, the identification of boundaries and potential positive and negative cross-boundary effects (for example, lowered water levels as a result of abstraction, incursion of fire, wild elephants and pigs raiding crops) can be a basis for negotiation. Collaborating and supporting a PA can be an important part of CSR or sustainability commitments, especially for land-based and extractive industries.
- Strengthen competency-based capacity development for staff and partner organisations, and build the institutional capacity to learn and adapt. Align capacity development targets with the needs of the PA (as defined in the management plan, for example) and monitor delivery and effectiveness. Support the work already initiated (e.g. Indonesia, the Philippines) in order to professionalise PA management and to recognise it as a career distinct from other types of forest management.
- Undertake a review of the PA network, with reference to the coverage of threatened species, KBAs and the models of climate change impact, taking account of community and privately managed areas. Identify priorities and opportunities for the expansion of new protected areas.




## Box 2 _ Endemic island biodiversity (KLCs 3 and 4)

Wallacea refers to the biogeographical region that marks the transition zone between the Asian and Australasian flora and fauna. It is named after Alfred Russell Wallace, the famous naturalist and explorer who identified the process of natural selection at the same time as Charles Darwin. Within Wallacea, species have evolved to fill niches normally occupied by other species groups in Asia. The entire region has been designated a biodiversity hotspot. The Philippines island group is another biodiversity hotspot in the same transition zone, north of Wallacea, that has similar characteristics.

The region's thousands of islands support highly diverse biological communities with many unique species: >50% of mammals, 40 % of birds and 65 % of amphibians found in Wallacea do not occur outside the hotspot. For the Philippines the numbers are >60 % of mammals, 35 % of birds and 68 % of reptiles. Many of these species are endemic, not just to the hotspot but to single islands or mountains within it. Such species are highly vulnerable to habitat loss, hunting and other pressures.

Sulawesi in Indonesia is Wallacea's largest island, and home to 72 endemic species of mammals and 98 endemic species of birds. These include the lowland and mountain anoa (a unique dwarf buffalo species), the babirusa (a large hairless pig with distinctive tusks), and the maleo (a ground-nesting bird). In the Philippines, Palawan is arguably the most important island.

Priority interventions: protected area management, forest management outside protected areas and combatting the illegal wildlife trade.

*A village elder at a scrubfowl egg nursery, Haruku, Indonesia. Moluccan scrubfowl bury their eggs in sand and leave them to hatch. In the past, people ate many of the eggs, threatening the scrubfowl's survival. Collaboration between an NGO and local traditional leaders has led to the revival of traditional protection for the species.*

Longer-term actions should aim to establish PAs as a national asset, worthy of public support and government commitment and funding.

- Seek to strengthen long-term public and political support for PAs through research, engagement and a campaign of awareness on their economic, social and cultural values.

### 5.2.2 Encourage the use of landscape approaches

Large areas of natural and semi-natural habitat remain outside protected areas in the region, providing important ecosystem services, economic goods and, in many cases, supporting significant populations of biodiversity. The ecosystem functions of these landscapes are eroded by over-exploitation of resources, expansion of commercial agriculture and linear infrastructure (roads, pipelines, power lines, fences). Although the latter has a smaller 'footprint' on the landscape, it acts as a conduit for access by hunters or farmers. Landscapes surrounding and connecting PAs allow larger wildlife populations to move and inter-breed, providing an important buffer against local extinctions.

Landscape approaches are necessarily multi-stakeholder, and involve negotiation of trade-offs between conservation priorities, local resource management and private sector interests. While they offer an opportunity to integrate conservation management and economic development, in practice weak governance, lack of institutional capacity, conflicts, sectoral agendas and difficulty of enforcing planning and licensing conditions all pose significant obstacles to successful implementation.

In PNG, where 90 % of land is under customary ownership, conventional state-run PAs are not appropriate. However, landscape approaches that build community management capacity and support integration of development and sustainability concerns appear to be successful.

Landscape approaches should be seen as part of the medium-term solution to addressing the challenges for PAs and wildlife crime noted above.

- Identify opportunities and priorities for landscape approaches, including consideration of opportunities to maintain habitat connectivity between important PAs and for threatened species (for example, to manage landscapes to accommodate the needs of tiger or elephant [216]), and to enhance ecosystem services and ecological processes.
- Encourage key stakeholders to identify shared interests in sustainable management of landscape resources, including, for example, (i) clarifying and strengthening the land rights of local and indigenous communities, (ii) enabling private sector companies to deliver on sustainability commitments or certification, and (iii) working with local government to capture revenues from tourism and ecosystem services.
- Expand the use of mechanisms for sustainable management of land and forests. This should include licensing community-based forest management, applying environmental, planning and safeguard regulations, ecosystem restoration concessions (Indonesia), and the greening of local development funding.
- Build the economic and social case for sustainable landscape management through the valuation of natural capital, social and biological research, and dissemination. This should lead to recommendations for policy change in support of stronger institutions and mechanisms for integrated planning and management at landscape level.
- Build on existing models in PNG to support the development of effective, sustainable landscapes as the main approach to biodiversity conservation, both in PNG and across New Guinea. Use and adapt experience from PNG to inform the development of conservation in Indonesian Papua, which is culturally similar but politically very different. Consider the relevance of lessons from PNG to the management of community forests and lands by communities in Timor-Leste.

### 5.2.3 Mainstream action on wildlife crime across enforcement and policymaking institutions

Across South-East Asia, wildlife crime is one of the most serious threats to biodiversity. It involves the illegal and unsustainable collection of thousands of species; and yet the market for wildlife products is growing. In island South-East Asia, the trade has generally had less attention than habitat loss as an issue requiring action. In some cases, it is still associated with subsistence and culturally-rooted behaviour. However, pressure on wild resources is intensifying as those in the Greater Mekong countries are exhausted. Current efforts at investigation and enforcement need to be continued and expanded, and the political profile of the issue and the threat it poses to livelihoods, economies and health need to be increased. Agencies with the power to investigate, arrest and prosecute need to treat the issue as a significant problem.

The short-term priority is to continue action against wildlife crime.

- Continue and scale up joint action between NGOs, wildlife conservation agencies and law enforcement agencies. This should focus on key transit points and securing prosecutions of key actors in the trade chain.

In the medium term, the priorities are to increase the activity of official agencies and reduce the reliance on NGOs and one-off operations.

- Support initiatives for data sharing between law enforcement agencies and specialist NGOs. Expand existing mechanisms for coordination (e.g. CITES, the ICCWC, ASEAN-WEN) that provide platforms for information sharing.
- Support the enhancement of capacity and resources for wildlife law enforcement, including investigation, seizures, processing cases, and handling confiscated animals and products. Link increases in resources with systems for improved accountability and incentives for performance.
- Maintain the political profile of the issue, especially on the scale of the problem and the number of species involved, by raising it in global, regional and national forums.

In the longer term, action is needed to strengthen legal frameworks and prevent the emergence of wildlife farming. (See the Greater Mekong chapter for further discussion of the threat posed by wildlife farming.)

- Strengthen national legal frameworks against wildlife crime by ensuring that national laws and regulations are aligned with the IUCN Red List and address all species being sourced or in transit in the country. Ensure coordination between different programmes addressing this issue (e.g. EU/UNODC and USAID programmes).
- Prevent the emergence of damaging wildlife farming in the region. The farming of threatened species has not developed in the region to the same extent as the Greater Mekong. There is an opportunity to prevent the development of wildlife farming, at least for threatened or near-threatened species, species that closely resemble them, and for species where stock would have to come from the wild.

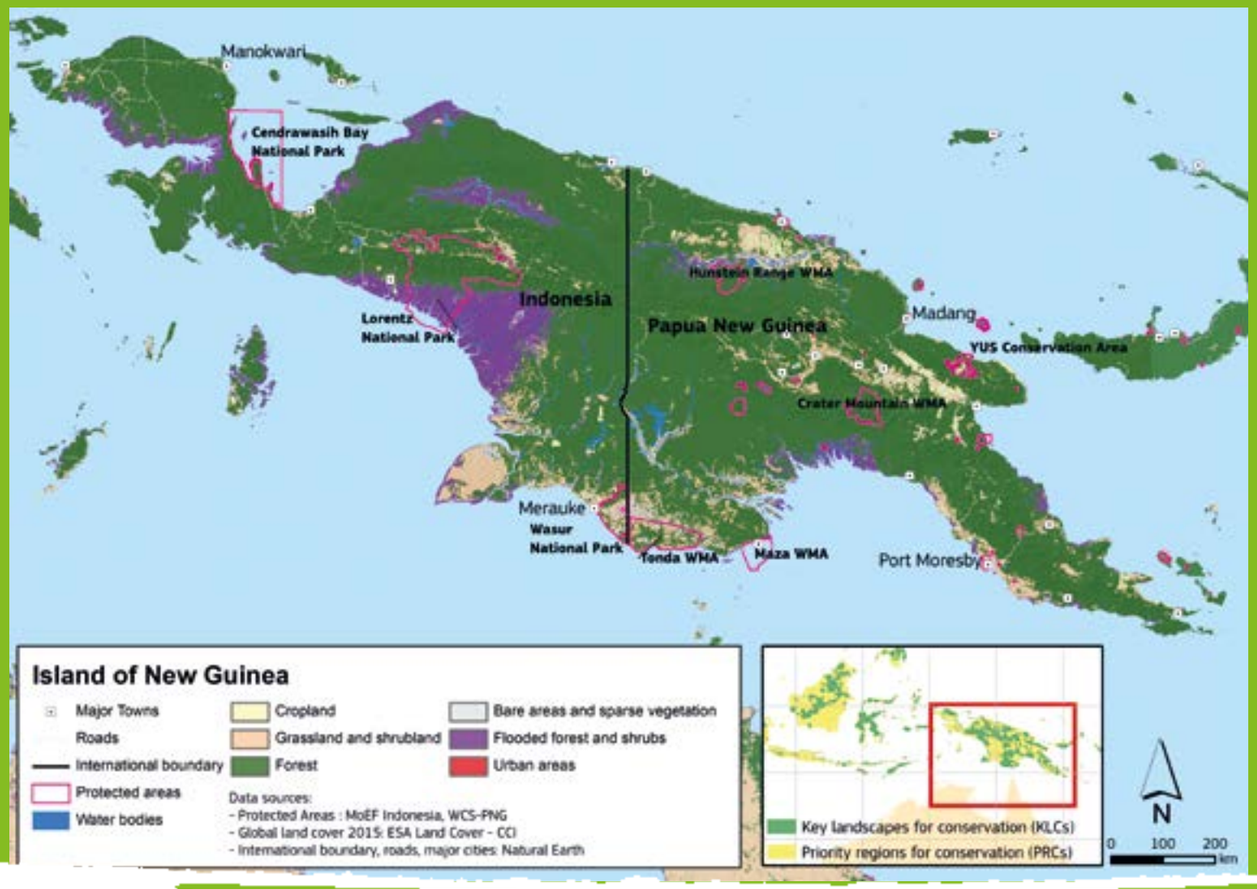
In addition, in specific areas, unsustainable local hunting and killing in response to human-wildlife conflict (HWC) need to be addressed.

- Promote evidence-based approaches to mitigating HWC, thereby reducing it as an impetus for poisoning, trapping and shooting.
- Address unsustainable subsistence and local hunting through community-based planning and the enforcement of local regulations, act on HWC (where relevant), and provide alternative income and protein sources.

### 5.2.4 Strengthen the role of civil society and the private sector in biodiversity conservation

Indonesia, the Philippines and Malaysia have generally strong, diverse civil society communities, with many thousands of organisations, and an active community of environmental groups. In PNG and Timor-Leste, the CSO community is less well developed, but is growing and gradually becoming less dependent on international NGOs for direct support. This provides a strong base for encouraging CSOs to play an increasingly effective role in environmental issues, but there are challenges in terms of resources and capacity that still need to be addressed.

([216]) Walston J., E.J. Stokes and S. Hedges (2016). Op. cit.




## Box 3 _ Island of New Guinea (KLCs 7 and 8)

New Guinea is the second largest island in the world (after Greenland), covering two countries: Papua New Guinea (PNG) and the Indonesian provinces of Papua and West Papua. It supports around 5 % of the world's species, of which two-thirds are endemic to the island.

New Guinea also supports the largest remaining intact forest landscape in Asia, covering >65 % of the area of the island or 288 000 km$^2$. It includes the largest protected area in South-East Asia, Lorentz National Park, which is 25 056 km$^2$. Habitats in New Guinea range from the permanent ice fields and alpine vegetation of Puncak Jaya, the tallest mountain between the Himalayas and the Andes (4 884 m), through rainforests to marine ecosystems.

Alongside its substantial biodiversity, New Guinea has huge cultural diversity, with over 850 languages recorded in PNG alone (12 % of the languages of the world) of which 839 are extant. PNG is also notable for the strength of its traditional tenure system under which ~97 % of all land remains under customary ownership (with the customary title often held at a clan or household level). The division of land into thousands of communal areas presents a challenge to conventional land-use planning for development or conservation purposes.

Major development challenges include: new infrastructure (road, mines, oil and gas projects), expansion of agriculture and forestry concessions, and unsustainable subsistence use associated with a growing rural population. These developments are further complicated by the alienation of customary land and the various social challenges which these developments bring to remote, ethnically diverse, subsistence communities.

Priority interventions include: community-based conservation and natural resource management, landscape-level land-use planning to mitigate impacts; engagement of local communities in development planning to reduce land development conflicts; and securing intact landscapes and ecosystems from deleterious development.



*Land and natural resources in Papua New Guinea are largely owned by local communities. Some of the most successful conservation efforts have focused on working with village and clan-level customary institutions to encourage the sustainable hunting and harvesting of wild species.*

Indonesia is the largest economy in South-East Asia, and with the Philippines and Malaysia has a large and dynamic private sector. In PNG, by contrast, the private sector is dominated by resource extraction – mining, logging and, in some areas, plantations – with a relatively slow growth of services and production. Timor-Leste is slowly growing its private sector, but remains heavily dependent on oil for generating state revenue. The opportunities for engaging with the private sector thus vary between countries, but include 'greening' of business operations, e.g. sustainable management of plantations, certification and CSR schemes.

For CSOs, the priority actions are focused on the development of capacity.

- Build capacity for local CSOs and capacity-building providers to develop and deliver their own CSO capacity development programmes in the region. This should focus on responding to changes within policy frameworks, the funding situation and the issues. Encourage collaboration between CSOs, and state and private sector stakeholders.
- Work towards the 'graduation' of CSOs, with a structured programme for withdrawal and continued support for fundraising, strategic planning and project management. However, funding will always be a challenge for CSOs, and support should shift from project funding to the establishment of sustainable grant-making facilities.

Governments, industry and CSOs can play a role in broadening and strengthening corporate sustainability commitments.

- Support mechanisms for independent oversight of voluntary commitments and compliance with regulations by private sector actors in high-priority industries. Engage with planning and licensing mechanisms, and strengthen links between field investigation and international campaigns targeting consumer-facing companies and finance institutions.
- Work with government and industry to address perverse incentives and legal constraints to the implementation of corporate sustainability commitments.

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*Snake-necked turtle* Chelodina mccordi *was originally known only from Roti Island, Indonesia. Collecting for the international pet trade decimated the population, which may now be extinct in the wild. Another population of the species was described from Timor-Leste in 2007, but vigilance is required to ensure that these animals do not suffer a similar fate.*

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*Sumatran rhino was once widespread in South-East Asia, but is now almost extinct in the wild. Its survival depends on the success of current efforts to protect its forest habitat, prevent poaching, reduce the demand for rhino horn and increase the breeding success of the tiny captive population.*

### 5.2.5 Improve data, knowledge and learning in support of biodiversity conservation

Adequate data on biodiversity, ecosystem services, the threats to them and the impacts of conservation measures are fundamental requirements for policy development and conservation management. There have been many survey and research projects, but the scale and complexity of the region means that the coverage of species and sites, as well as issues, is inadequate to support decision-making. Where data does exist, it is often difficult to access and may not be updated or well maintained. Finally, government agencies, businesses and civil society organisations, which need this information in the planning and evaluation of their activities, do not necessarily have the expertise to use it effectively.

Priority strategic approaches focus on efficient collection of new data as well as improved management and communication.

- Complete the identification of key biodiversity areas (in Borneo, Java, New Guinea), establish a mechanism to maintain and update KBA information, and make it available to policy-makers, development planners and academics.
- Undertake priority research and action planning for conservation-dependent species and ecosystems. Use the results to propose changes to legislation and priorities for conservation action. Ensure that the requirements of migratory species are addressed, including through regional and international coordination.
- Promote integrated multidisciplinary research that addresses sustainability, impacts of land-use change and the value of ecosystem services from both economic and social perspectives. Establish mechanisms to disseminate results for policy-makers and other users.

## 5.3 Conclusion

Of the regions covered by the *Larger than Tigers* study, the island South-East Asia and New Guinea region has the greatest diversity and the largest number of endemic species. Combined with the marine diversity of the Coral Triangle, this is an area of exceptional global importance. Conservation in this region has a long history, with many large and very important protected areas and, in some cases, with significant resources being invested into their protection and management. There are also leading examples of empowerment of indigenous and local people to manage their own resources or to collaborate with others. The countries of the region generally have a diverse and active civil society, with relatively high levels of awareness of environmental issues amongst the public, and a growing domestic nature tourism industry. There are important examples of private sector initiatives to mitigate the impacts of their own activities and to contribute to wider efforts for conservation.

The region has a huge variation in levels of income and economic development. The challenges of achieving sustainable economies include tackling both poverty and the growing demand from increasing wealthy urban populations. There is a significant demand for resources from the region's own populations, but also increasing pressure from international companies seeking to invest in the expansion of agriculture and plantation forestry, with the islands of New Guinea and Borneo currently the frontier of expansion.

Governments are facing the challenge of integrating the rights and needs of local people, the values of ecosystems and biodiversity, and the interests of investment and economic development within their planning and policy frameworks.

There are numerous opportunities for donors and expert organisations to contribute to biodiversity conservation in the region through funding, support to research and policy development, and building the capacity of resource managers (communities, officials and private sector) and institutions.