European Commission

LARGER THAN TIGERS

Inputs for a strategic approach to biodiversity conservation in Asia

Synthesis report

International Cooperation and Development

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LARGER THAN TIGERS

Inputs for a strategic approach to biodiversity conservation in Asia

SYNTHESIS REPORT

This study, *Larger than Tigers: Inputs for a strategic approach to biodiversity conservation in Asia,* is the operational response of the Wildlife Crisis Window, an integral part of the 'EU Biodiversity for Life' (B4Life) flagship initiative. B4Life is a conceptual framework to ensure better coherence and coordination of EU actions in the area of biodiversity and ecosystems. B4Life was defined in 2014 with the purpose of highlighting the strong linkages between ecosystems and livelihoods in view of contributing to poverty eradication. It aims to tackle drastic biodiversity loss by promoting good governance of natural resources, securing healthy ecosystems for food security, and supporting innovative ways to manage natural capital in the framework of a green economy.

Bornean orang-utan, Tanjung Puting National Park, Indonesia. An iconic species used globally to mobilise support for conservation, the population of these unique apes has declined sharply as a result of forest loss, hunting and fires. Climate change may further reduce the area of suitable habitat.

n many Asian cultures the tiger tops the lion as the king of all beasts. Symbolising power and strength, it also holds the potential for great violence and destruction. Asia's rich natural tapestry treads an equally fine balance, defining whether its people and communities simply survive or are able to thrive.

Asia is home to over half of the world's population and almost one fifth of its land mass. These richly diverse terrestrial, freshwater and marine ecosystems have witnessed rapid population and economic growth. A large number of species are on the brink of extinction, and the population and available habitat of thousands more are dramatically declining.

The European Union has long recognised the precious links between human development and our natural environment and is leading global efforts for conservation, as one of the largest contributors to biodiversity-related development assistance. The 2017 European Consensus on Development underlines the importance of integrating environmental considerations across all sectors of development cooperation and reiterates our commitment to address them together with our partners.

This report highlights Asia's great natural capital and provides valuable information and analysis in support of a strategic approach to halting environmental degradation and biodiversity loss in the region. As its title suggests, the problem extends far beyond the survival of iconic animals such as tigers, orang-utans, elephants or rhinos. Vanishing species are important components of complex natural ecosystems that provide water and food, regulate climate, process waste products, pollinate crops, and support a growing tourism industry. Some of these services can only be replaced at a significant cost, while others are simply irreplaceable.

The European Union is committed to supporting partner countries to mainstream biodiversity and ecosystems conservation into their own actions. You can read more about the many positive initiatives taking place across the region thanks to our partnerships with governments, civil society, businesses, and ordinary citizens.

This report will further help the EU and our partners to make informed decisions when developing policies, plans and programmes at national and regional level. I would like to thank everyone who contributed to its findings and I look forward to working with all our partners to ensure that the world's precious natural resources continue to be a source of great strength for many years to come.

Brussels, April 2018

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List of abbreviations and acronyms

ACB	ASEAN Centre for Biodiversity
ADB	Asian Development Bank
AFD	Agence Française de Développement
ASAP	Asian Species Action Partnership
ASEAN	Association of South-East Asian Nations
B4Life	Biodiversity for Life
CDB	Convention on Biological Diversity
CEPF	Critical Ecosystem Partnership Fund
CI	Conservation International
CITES	Convention on International Trade in Endangered Species
CMS	Convention on Migratory Species
CoP	Conference of the Parties
CSO	civil society organisation
CSR	corporate social responsibility
CTI-CFF	Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security
EBA	endemic bird area
EBSA	ecologically or biologically significant marine area
EIA	environmental impact assessment
ESZ/ESA	ecologically sensitive zones or areas (India)
EU	European Union
EUR	euros
FAO	Food and Agriculture Organisation (United Nations)
FLEGT	Forest Law Enforcement, Governance and Trade
FSC	Forest Stewardship Council
G200	Global 200 ecoregions
GDP	gross domestic product
GEF	Global Environment Facility
GHG	greenhouse gas
GSLEP	Global snow leopard and ecosystem protection programme
GSP	General Scheme of Preferences (EU)
GTI	Global Tiger Initiative
HDI	Human Development Index
ICCWC	International Consortium on Combatting Wildlife Crime
IFC	International Finance Corporation
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Inter-governmental Panel on Climate Change
IPIECA	International Petroleum Industry Environmental Conservation Association
IUCN	International Union for the Conservation of Nature
IUU	illegal, unreported and unregulated fishing
KBA	key biodiversity area
KLC	key landscape for conservation
km	kilometres
LME	large marine ecosystem
METT	Management Effectiveness Tracking Tool
MoU	Memorandum of Understanding
MPA	marine protected area
NBSAP	National biodiversity strategy and action plan
NGO	non-governmental organisation
PA	protected area
PDR	(Lao) People's Democratic Republic
PNG	Papua New Guinea
REDD+	Reducing emissions from deforestation and forest degradation, and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks
RSPO	Roundtable on Sustainable Palm Oil
SDG	Sustainable Development Goal
SEA	strategic environmental assessment
SLCU	Snow leopard conservation unit

SMART	Spatial Monitoring and Reporting Tool
TCL	tiger conservation landscape
TEEB	The Economics of Ecosystems & Biodiversity
TNC	The Nature Conservancy
UN/UNDP/UNEP	United Nations/Development Programme/Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNODC	UN Office on Drugs and Crime
USAID	United States Agency for International Development
USD	United States Dollars
VPA	Voluntary Partnership Agreement
WCPA	World Commission on Protected Areas
WAVES	Wealth Accounting and Valuation of Ecosystem Services
WCS	Wildlife Conservation Society
WEN	Wildlife Enforcement Network
WWF	World Wide Fund for Nature

#0

Executive Summary ▶

The emerald swallowtail butterfly is found in primary forest throughout South-East Asia, from Myanmar to the Philippines. It is kept in butterfly houses throughout the world.

#0 _ Executive Summary

The European Union's Consensus on Development is closely aligned to the United Nations' 2030 Agenda, set in 2015 and structured around five pillars (the '5Ps'): 'peace', 'planet', 'people', 'prosperity', and 'partnerships'. Nowhere is this framework more important than in Asia, home to over half of the world's population, where the world's fastest-growing economies are developing in the midst of exceptionally diverse and in some cases fragile terrestrial and marine ecosystems.

Many of the greatest environmental challenges in Asia are associated with the extraordinary changes that have occurred across the region over the last 30 years – conversion of natural habitats to intensive agriculture and urban landscapes; demand for minerals, timber and other resources to feed industries that supply regional as well as global markets; growing demand for energy, food and water from an increasingly wealthy, urbanised population, with a commensurate increase in waste and pollution; and a huge escalation in the appetite for wildlife products, from ivory to bear bile, fuelling intense exploitation of biodiversity that extends beyond the borders of the region. Despite extraordinary advances in human welfare, parts of the region continue to struggle with poverty and marginalisation, with remote rural areas often the least developed. In such areas, biodiversity is a direct and irreplaceable component of livelihoods and its loss further undermines community resilience and security.

The sustainable management of resources is not a new concept in many parts of the region, with wise resource use built into many of the customary norms and practices of the region's thousands of indigenous groups. Many of these practices have been weakened or have disappeared entirely, however, as a result of cultural change, assimilation or through conflict with the regulations imposed by modern States and private capital. Only Papua New Guinea bases its resource management on recognition of customary communal rights, although several countries in the region are moving towards greater community involvement and, in some cases, recognition of these rights. The relationship between State, customary communities and resources has been reflected in the way protected areas have been established, with highly centralised conservation regimes moving towards more collaborative management arrangements in many cases.

Governments in the region have responded to the biodiversity crisis by establishing a very significant network of protected areas – around 6 926 covering over 3 million km² of terrestrial and freshwater ecosystems in the 25 countries covered by this study, and a further 1 972 marine protected areas covering about 200 881 km² in the six South-East Asian countries which form the Coral Triangle. They have put in place agencies and regulations to protect these areas, to prevent the over-exploitation of species, and to plan and manage the allocation of land and resources. Civil society and the private sector have started to play a more active role in the protection and management of these areas, raising awareness of the causes and impacts of the environmental crisis, and alternative ways of taking action.

The continued pressure on the environment, degradation of ecosystem services and loss of species demonstrate that these efforts, while important, are not sufficient to prevent biodiversity loss. While the opportunities and priorities vary between countries and sub-regions, three broad themes emerge across the region, and structure this report: protected areas, sustainable management of landscapes and seascapes, and the illegal and unsustainable wildlife trade.

Protected areas (PAs)

The existing network of protected areas covers many outstanding places, but (a) it does not adequately cover all the region's threatened species and ecosystems; (b) in many cases individual PAs are being degraded, and so are failing to ensure the long-term survival of biodiversity. The poor performance of many PAs results from a lack of funding and capacity, but also from ineffective use of available resources. Strategic approaches to addressing these issues include:

- improve the effectiveness of protection using innovative methods which combine technology and on-the-ground patrolling;
- ensure increased funding and investment in the capacity of PA management institutions, to reflect the true value of the services they provide, globally and regionally;
- establish alternative financing mechanisms to provide sustained long-term funding;
- review the coverage of species and ecosystems by national PA networks (e.g. in comparison to key biodiversity areas), to identify priorities and opportunities for expanding networks. As part of the review, take into account the contribution of traditional, community and private PAs;
- facilitate greater involvement of local governments and communities, as well as other stakeholders. This would help to minimise pressures and conflicts, while taking advantage of opportunities for synergy;
- work through international institutions and processes, including the CBD and CITES, to recognise and support the efforts made by countries to improve the effectiveness of protected areas.

Wakhan National Park, Afghanistan. Asia's high mountains and glaciers feed some of the world's biggest rivers, providing water for millions in the lowlands, often thousands of kilometres away. Protected areas in these remote landscapes help to ensure that these essential services are maintained.

Landscapes and seascapes

Protected areas alone are too small and isolated to conserve all components of biodiversity and the hugely valuable ecosystem services that biodiversity provides. Outside protected areas (and often surrounding them), biodiversity-rich landscapes and seascapes are managed by communities, the private sector and government. Encouraging sustainable management that allows the preservation of biodiversity alongside economic activity contributes to sustaining PAs as well as maintaining ecosystem services that are of crucial importance locally, nationally and regionally. These areas are also vital to maintain the diversity of crops and livestock, which is lost in industrial monoculture agriculture. Integrated multi-use approaches are better established in marine conservation, but need to be strengthened and to be more integrated in the case of terrestrial conservation. Landscape and seascape approaches should include and support wider green economy initiatives, a range of policies and programmes addressing the need for economic activities to take account of their true environmental and social impacts, and promote a shift to sustainable production and consumption. Strategic approaches to addressing these issues include:

- identify priorities and opportunities for landscape and seascape-level initiatives. Assess the value of the ecosystem services and products provided by landscapes and seascapes, to demonstrate the importance of managing them sustainably. This includes identification of transboundary ecosystems and mechanisms for international cooperation on their management;
- strengthen and make better use of national and local policies, including aligning conservation policies with those focused on economic development. Share best practice and encourage the development of more effective strategic environmental assessment as a key tool for landscape and seascape-level planning;
- strengthen and promote wider adoption of sustainability standards across the private sector. Improve monitoring, and reinforce changes with incentives (e.g. greater market access, reduced tax burden) for high-performing companies, and disincentives for destructive ones;
- ensure that the management of landscapes and seascapes considers climate change. This should include the contribution that sustainably managed landscapes and seascapes make to climate resilience and adaptation, and anticipation of the likely impacts on important biodiversity and ecosystem services. Sustainable management of landscapes and seascapes should be linked with international commitments, for example under the United Nations Framework Convention on Climate Change (UNFCCC).

Government officials destroy confiscated tiger and clouded leopard specimens, and elephant tusks, Indonesia, 2016. Greater regulation, improved enforcement, awareness raising and private sector support have resulted in increasing action against the illegal trade, but it remains one of the greatest threats to Asia's biodiversity.

Irrawaddy dolphin and fishermen, Myanmar. The dolphins herd fish towards the boats, in an extraordinary, mutually beneficial relationship. The dolphin population is declining, a result of drowning in drifting nets and pollution of the river. A recently created protected area and control of damaging fishing may help, but upstream dams and intensive human use remain a threat.

Illegal and unsustainable wildlife trade

Over 5 000 species of wild plants and animals are known to be used and traded across Asia, and exploitation of biodiversity is an essential element of rural livelihoods. In some cases, however, the level of use exceeds the capacity of the resource to recover, and unsustainable exploitation has become a serious threat to many species. Demand is exacerbated by rapidly growing urban centres in the region, and beyond. The trade in ivory, rhino horn, shark fin and tiger parts has received considerable international attention, but the populations of many other species, including the world's most traded animal, the pangolin, as well as rosewood, agarwood, sea cucumbers and manta rays, are also declining. In some cases, this exploitation is illegal under national laws, or international trade is restricted under global agreements such as CITES.

As a result of intense over-exploitation, parts of Asia already have 'empty' forests, steppe or reefs: ecosystems that are relatively intact, but where components of biodiversity, such as economically important animals and plants, have been removed. This has negative impacts on local livelihoods as well as on biodiversity. Environmental crime, including wildlife trafficking, is now recognised as a major transnational crime[1], along with trafficking of people, drugs and weapons. Trafficking has collateral impacts through encouraging corruption, tax evasion and money laundering, the introduction of harmful invasive species, and criminal engagement with other transnational crimes.

There are numerous actions and initiatives on this issue, but they need to be scaled up and extended to address the rapid growth of illegal trade. Strategic approaches to addressing these issues include:

- improve enforcement by (i) intensifying efforts to investigate and take action against wildlife trafficking, (ii) strengthening existing mechanisms for inter-agency and transboundary cooperation, and (iii) encouraging greater cooperation between wildlife protection specialists and other relevant agencies;
- work to increase the risk of prosecution and sanctions for traders and financiers, and closure of illegal wildlife markets and sources of supply;
- address human-wildlife conflict, which is used as a justification for persecution of wildlife and is one source of products for the illegal trade;
- strengthen and sustain behaviour-change campaigns targeting consumer markets and consumers themselves;
- work through international agreements (especially CITES) and institutions to strengthen international cooperation on wildlife crime.

The roles of civil society, media organisations and the private sector

While many of the strategic actions described above entail working with communities and governments, civil society and the private sector have a role to play in each of the three key thematic areas. Facilitating a greater, more strategic role by these actors is a priority in itself.

The opportunities for **civil society** engagement across the region are generally increasing, although the situation varies between countries. Indonesia, India and the Philippines already have a large, sophisticated and dynamic civil society, including many groups active on environment and sustainability issues. These groups contribute to a national dialogue on sustainable management of landscapes, seascapes and biodiversity, and make efforts to hold government and private sector to account. In other countries civil society is nascent, or more restricted, but nevertheless there are opportunities for it to play a greater role. Strategic approaches to increasing the role of civil society include:

- maintain or enhance support to civil society capacity development. Secure funding and improved capacity are urgent needs for civil society in most countries in the region. Capacity development should be a continuous process of learning and adaptation. As most donor and government funds are delivered within a project framework, this calls for a broad, long-term vision of civil society capacity building, with individual projects contributing where they can, and coordination between donors;
- support civil society action to increase awareness and transparency about the social and environmental impacts of private sector actions, including the positive impacts of moves towards greater sustainability;
- in countries where civil society has less freedom to operate, promote its role as a partner of government in development efforts through processes such as the Forest Law Enforcement, Governance and Trade (FLEGT) initiative of the EU. This can build greater trust with governments and lead to easing of restrictive regulations.

With the growth of mobile and online communications across the region, **media organisations** have moved beyond being a source of information to become a means of engaging citizens with issues and efforts to address them, including helping to resolve conflicts over natural resources. Evidence-based environmental journalism is a skill that requires honing through training, mentoring and support for content production. Collaborations between media and CSOs in particular offer unique opportunities for environmental and biodiversity reporting to reach a wider public and engage communities in positive action. In countries with relatively strict limitations on independent media, environmental journalism often has wide acceptance and presents opportunities for cooperation between government agencies and civil society.

The **private sector** is a key stakeholder in environmental issues. Rapid economic growth and expansion of the private sector has generated wealth but has also contributed to unsustainable land- and resource-use, pollution, and the growing demand for energy that has decimated the region's biodiversity. Appropriation of land for commercial development has caused conflict with local communities, displaced traditional farmers and threatens protected areas. The private sector also provides the services (transport, communications, financial transactions) used by wildlife traffickers. However, regulations, markets, investors and perceptions of scarcity and risk are encouraging many companies to put greater emphasis on sustainability and positive social impacts in their operations. There are now many examples of efforts to promote sustainable best practices in such key industries as oil palm, pulp-paper, mining, cement and energy, as well as initiatives to restrict access for wildlife trafficking. Strategic approaches to maximise the positive impact of the private sector include:

- work with leading companies and governments to create conditions (regulations, financing, markets) which support positive private sector actions;
- expand use of the EU's position as a market and trading partner to promote more sustainable business practices.

In promoting greater attention to biodiversity, ecosystem services and sustainable development across the 25 countries covered by this study, the EU is in line with its commitment, and the commitment of its Member States, to equitable and sustainable social development globally, while helping to address the root causes of poverty, insecurity, migration and extremism. The EU is an important market and a valued development partner for many of the countries in the region. In collaboration with EU Member States, other development partners, civil society and the private sector, it is in a strong position to provide leadership and support to the development of more sustainable futures across the continent. The EU supports developing countries to shift their economies and societies towards more sustainable production and consumption, and has moved to address its own global footprint, for example with the FLEGT initiative, which focuses on promoting trade in legal timber and supporting countries to improve their forest governance systems.

(1) For example, by the UN Office on Drugs and Crime, http://www.unodc.org/southeastasiaandpacific/en/what-we-do/toc/index.html

#1

Background ▶

Leopards are found across Africa and Asia in a range of habitats from deserts and mountains to tropical forest. They are amongst the most successful and adaptable of the cats, but their global population is nevertheless declining as a result of habitat degradation and hunting.

#1 _ Background

The European Union (EU) Biodiversity for Life (B4Life) flagship initiative aims at contributing to the preservation of global biodiversity by fully integrating biodiversity and ecosystem conservation with socio-economic development and poverty eradication. To further this aim in Asia, the EU wishes to engage in supporting the capacity of the region to safeguard biodiversity, maintain natural capital and optimise ecosystem services, while minimising the impact of climate change and contributing to the emergence of a green economy.

This study provides inputs to guide a strategic approach to biodiversity conservation in Asia. It describes the key features of biodiversity in the region, identifies the main threats to its survival, compiles lessons learned from past and present activities, identifies priority needs and proposes strategic approaches appropriate for support by the EU and other donors, the governments of the region and their civil society.

The study covers 25 countries in Asia, which together comprise:

- 26.6 million km², 18 % of the Earth's land area,
- almost 3.9 billion people, 53 % of the world's population,
- a gross domestic product (GDP) of EUR 12 895 billion, 23 % of the world's GDP,
- 5 316 threatened species, 22 % of the globally threatened species, including 1 038 (20 %) species classified as 'critically threatened'.

This synthesis report summarises the social, economic and environmental situation before describing the biodiversity and ecosystems, the threats to them, current conservation efforts and lessons learned. Finally, the report proposes a set of priority strategic approaches to address the most critical threats. More detailed information is available in the regional analysis.

Throughout this synthesis report there are references to the sub-regional groupings which each form a chapter in the regional analysis, as listed in Table 1.1.

TABLE 1.1 Countries covered by the study, and groupings covered by the regional analysis

Central Asia	East Asia	South Asia
Afghanistan	Mongolia	Bangladesh
Iran	China	Bhutan
Kazakhstan	(Russian Far East)*	India
Kyrgyzstan		Nepal
Tajikistan		Pakistan
Turkmenistan		Sri Lanka
Uzbekistan		
Greater Mekong	**Island South-East Asia**	**Marine (Coral Triangle)**
Cambodia	Indonesia	Malaysia
Lao PDR	Malaysia	Indonesia
Myanmar	Papua New Guinea	Timor-Leste
Thailand	Philippines	Papua New Guinea
Vietnam	Timor-Leste	Philippines
		(Solomon Islands)*

**The report includes some information on the Russian Far East, because of its importance for tigers and transboundary ecosystems shared with China and Mongolia, and on the marine ecosystems of the Solomon Islands as they are part of the Coral Triangle. See the East Asia and Marine chapters in the regional analysis for further details.*

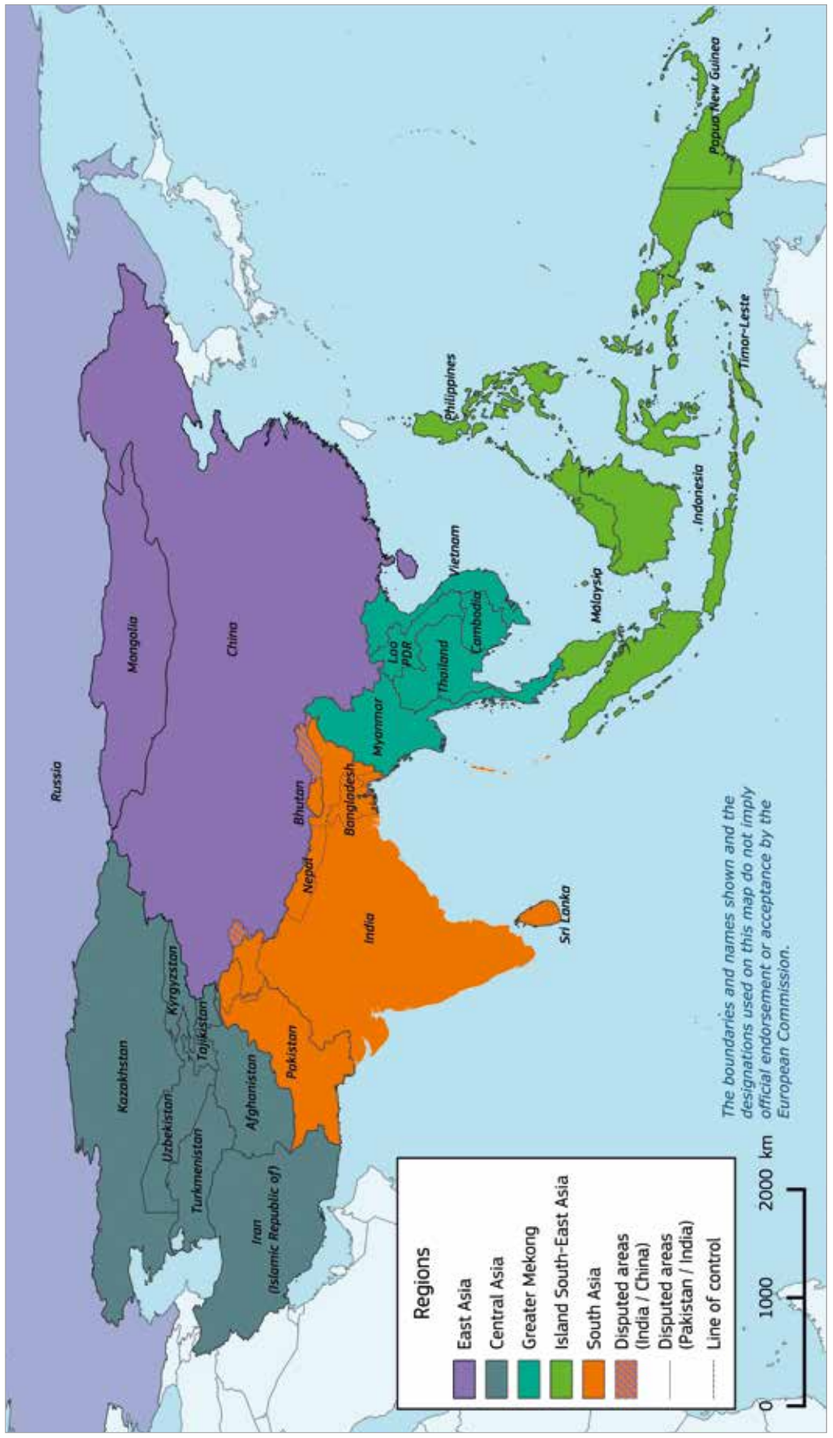


FIGURE 1.1 Map of the regions covered by the study

The region's diverse freshwater ecosystems are under pressure from over-exploitation, pollution, dams and drainage. The Red-crowned roofed turtle has declined as the rivers it lives in have been degraded. The largest population, with only about 400 females, is in the Chambal River Sanctuary, India. A breeding programme has been started for the species.

Extracting starch from sago palm, New Guinea. Sago palms are an important food source for many local communities, and customary management ensures a continuous supply. In some areas, commercial agriculture plantations have destroyed sago swamps and displaced the communities who use them, while in other places supply of subsidised rice has led to the abandonment of local management.

1.1 Socio-economic context of the region

Over half of the world's population live in the study region. This proportion is rising, with 20 of the 25 countries having population growth rates above the global average of 1.18 %. Annual population growth ranges from 0.38 % per year (Thailand) to 3.02 % (Afghanistan). Population models predict that the populations of China, Thailand and Sri Lanka will peak and start to fall around 2030, with Vietnam following in 2050. Overall, however, population in the region will continue to grow from 3.9 billion in 2016 to reach 5 billion by 2030. India is predicted to overtake China as the world's most populous nation around 2022.[2]

Thirty-six of the 71 largest cities in the world (those with over 5 million inhabitants) are within the region, with 43 % of the population living in urban areas in 2014 (ranging from 74 % in Malaysia, followed by Iran and Mongolia, to 13 % in Papua New Guinea, one of the lowest rates globally)[3]. This proportion is growing at over 2 % per year in China, Bangladesh, Bhutan, Nepal, Thailand, Timor-Leste and Vietnam, and at 3.1 % in the Lao PDR, one of the fastest urbanisation rates in the world. Supplying the energy, water, food and other resource needs of these burgeoning urban populations is an increasingly important source of pressure on the region's biodiversity and ecosystems.

At the same time, this growing demand underscores the vital importance of the services provided by natural ecosystems. The value of these services (and the costs which result from degrading them) is under-estimated by economic models and in decision-making applied by the governments of the region. A key theme throughout this study is how to take into account the real economic value of ecosystem services in land-use and development decision-making.

Twelve of the 15 countries in the world that recorded gross domestic product (GDP) growth of over 5 % in 2015 are in the region, among them China (the second largest economy in the world), India (also a major global economy), and four of the five Greater Mekong countries. Economic development has translated into improved living conditions for hundreds of millions of people, with 14 of the 21 countries of the region for which data is available achieving average annual Human Development Index (HDI) growth of over 1 % between 1990 and 2014, well above the global average of 0.73 %. Globally, only 38 countries in total had high rates of improvement in the Human Development Index in this period.[4]

Despite the rapid growth of economies and urban populations, rural poverty and lack of alternatives to unsustainable exploitation of resources remains an important driver of biodiversity loss. Poorer, marginal regions are often also the richest in biodiversity, making strategies to enhance livelihoods at the same time as securing biodiversity all the more vital as a conservation approach.

The contribution of agriculture to GDP is falling across the region but smallholder agriculture and fisheries (especially in South and South-East Asia) and livestock (in Central and East Asia) remain an important source of employment in many countries. Exploitation of timber from natural forests was a driver of early economic development in Indonesia, Malaysia and the Philippines but now makes a far smaller contribution to the economy of these countries, remaining important at a national level only in Papua New Guinea (PNG) and Myanmar. Agricultural commodities are now the main land-based products, with palm oil in the tropical lowlands, and rubber, coffee, coconut and many others more widely. Plantation forestry has expanded rapidly to feed pulp mills, and as a result of schemes for watershed protection and reforestation in China and Vietnam. Capture fisheries and aquaculture are especially important in the Bay of Bengal, where they are valued at over EUR 31 billion[5] and throughout the Coral Triangle, where they contribute between 1.2 % (Malaysia) and 6.8 % (Solomon Islands) to national GDP, and make up over 10 % of exports from PNG and the Solomon Islands. Fish is an extremely important source of protein in the region, making up over 30 % of animal protein consumed in Bangladesh, Malaysia and Thailand, and over 50 % in Indonesia and Sri Lanka.[6]

The region's increasing demand for energy has created opportunities for Bhutan and Lao PDR to develop hydropower and export it to neighbouring countries. The region also has large hydrocarbon and mineral reserves, and their exploitation is important to economies throughout the region, making up an especially high proportion of GDP in Mongolia, Timor-Leste and Papua New Guinea.

(2) Source: World Bank data, accessed at https://data.worldbank.org/indicator/SP.POP.TOTL, 17 October 2017.
(3) UN Dept. Soc. and Econ. Affairs. World Urbanisation Prospects, 2014. See https://esa.un.org/unpd/wup/Publications/Files/WUP2014-Highlights.pdf
(4) UNDP. Trends in the human development index, 1990-2014. See http://hdr.undp.org/en/composite/trends

(5) Bay of Bengal LME. (2015) Results and Achievement of the BOBLME Project [Brochure].
(6) Asian Development Bank (2014). Regional state of the Coral Triangle – Coral Triangle marine resources: their status, economies, and management. Mandaluyong City, Philippines.

Komodo, Indonesia. Reef-building corals thrive in shallow tropical seas, and the Coral Triangle is the global epicentre of reef diversity. Reefs and associated ecosystems support millions of people, but are under intense pressure from unsustainable and damaging fishing practices, sedimentation, mining and ocean acidification associated with climate change.

The Sundarbans, in Bangladesh and India, are the world's largest mangrove ecosystem, with important populations of tiger and Ganges and Irrawaddy dolphins. Mangrove swamps trap river sediment, store very large volumes of carbon, support economically important fisheries, and buffer the land from storms and floods.

Asiatic wild ass, Mongolia. Animals which live in the region's extensive steppes and cold deserts need to be able to move in response to variations in rainfall and cold weather. Asiatic wild ass are threatened because their movements are disrupted by roads and railways, hunting and competition with domestic animals for pasture and water.

1.2 Key biodiversity features of the region

The region covered extends over 7 100 km from north to south, and a similar distance east to west. It encompasses the world's highest peaks, in the Himalayas, and one of only three tropical snowfields, in New Guinea. The Yangtze, Yellow, Ob[7], Mekong, Indus, Salween and Brahmaputra are among the world's longest rivers. Ecologically, much of the world's temperate grasslands (steppe), half the world's cold deserts, and significant areas of sub-tropical forests and tropical rainforest are found in the region. Marine ecosystems include the world's most diverse mangrove forests and coral reefs, as well as seagrass beds, seamounts and shallow seas, which support very large numbers of fish and other marine species, and significant economic activity.

1.2.1 Global conservation priorities

The exceptional diversity, uniqueness and vulnerability of the region's species and ecosystems is underlined by all the main analyses of global biodiversity priorities. The results of these analyses are reviewed briefly below, and the methodology used to integrate them and derive the geographic priorities for this study is described in section 5.1.

Hotspots and high-biodiversity global wilderness areas[8]: The analysis of global hotspots was developed by Conservation International[9,10] using criteria combining richness, uniqueness and threat. (A hotspot is an area with at least 1 500 species of endemic vascular plants, 0.5 % of the global total, but which has lost at least 70 % of its original natural vegetation.) Globally, there are 36 hotspots, containing 43 % of the world's bird, mammal, reptile and amphibian species, yet covering only 2.3 % of the world's land surface. Asia has 13 hotspots, 11 of them included in the scope of this report (Annex 1). The hotspot analysis only includes terrestrial habitats, and does not cover marine biodiversity. The island of New Guinea is not classified as a hotspot because it retains more than 30 % of its natural vegetation. However, it is of unique importance for biodiversity, with more than 0.5 % of the Earth's vascular plant species, large (>10 000 km²) areas of contiguous habitat and a very low human population density (<5 people/km²). As a result, it is defined as a high biodiversity global wilderness area.[11]

Global 200 ecoregions[12,13]: The Global Ecoregions analysis divides the globe into 26 terrestrial, freshwater and marine biomes, or major habitat types. Biomes occur across the globe in seven biogeographic realms. An ecoregion is the area occupied by one of the 26 biomes within a specific biogeographic region. Using categorisation of the world's ecoregions, the World Wide Fund for Nature (WWF) identified the 238 ecoregions that were most representative of their biome within their geographic realm[14], taking into account species richness, endemism, higher levels of taxonomic uniqueness (e. g. endemic genera or families), extraordinary ecological or evolutionary phenomena, and global rarity of the major habitat type. This sub-set is known as the Global 200 ecoregions, or G200, and 67 (28 %) of them are within the area covered in this report: 43 terrestrial, 17 freshwater and 7 marine (Annex 1).

Endemic bird areas (EBAs)[15]: EBAs are identified by BirdLife International, based on the original breeding ranges of land bird species that have a global distribution of less than 50 000 km². An EBA is the area covered by the overlapping ranges of at least two such species. There are 356 globally, 100 of them (28 %) in the region covered by this report.

Tiger Conservation Landscapes (TCLs): Tiger Conservation Landscapes are identified by a consortium of conservation organisations concerned with tiger conservation. They are areas which have evidence of the presence of tigers over the last 10 years, and where the area of habitat exceeds a minimum threshold.[16] Seventy-six TCLs have been identified, with 15 of them prioritised because they make an especially

(7) The Ob has is headwaters in Mongolia and China, but flows north out of the region through Russia.
(8) http://www.conservation.org/How/Pages/Hotspots.aspx, viewed 2 February 2016.
(9) Website with summary info on hotspots: http://www.eoearth.org/view/article/150569/
(10) 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: Earth's Biologically Richest and Most Endangered Ecoregions. CEMEX, Mexico City, Mexico, 390 pp.

(11) Mittermeier R.A., C.G. Mittermeier, T.M. Brooks, J.D. Pilgrim, W.R. Konstant, G.A.B. da Fonesca and C. Kormos (2003). Wilderness and Biodiversity Conservation. *PNAS* 100(18), pp. 10309-10313, available at http://www.pnas.org/content/100/18/10309.full
(12) Academic paper on the Global 200 ecoregions: 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, pp. 933-938.
(13) Website with summary of ecoregions and map: http://www.worldwildlife.org/science/wildfinder/ and list of ecoregions http://wwf.panda.org/about_our_earth/ecoregions/ecoregion_list/
(14) http://www.worldwildlife.org/biomes
(15) 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 7. BirdLife International, Cambridge. See http://www.birdlife.org/datazone/info/pubEBAs
(16) Sanderson E., J. Forrest, C. Loucks, J. Ginsberg, E. Dinerstein, J. Seidensticker, P. Leimgruber, M. Songer, A. Heydlauff, T. O'Brien, G. Bryja, S. Klezendirff and E. Wikramanayake (2006). Setting Priorities for the conservation and Recovery of Wild Tigers: 2005-2015. The Technical Assessment. WCS, WWF, Smithsonian and NFWF-STF, New York-Washington DC. Available at assets.panda.org/downloads/finaltcltechnicalassesmentlow.pdf

Periyar National Park, India. A study of 6 of India's 47 tiger reserves valued ecosystem services including water, carbon sequestration, fodder, pest control and nutrient cycling at between EUR 114 million and EUR 243 million per reserve per year. Intangible values need to be made 'visible' through economic analysis and communication.

Nilgiri tahr in the Western Ghats, India. Less than 2 000 of this endemic sheep survive. Isolated mountain ranges such as the Western Ghats create ecological 'islands' where unique species and ecosystems evolve, but small populations and limited ranges make them vulnerable to pressures such as habitat loss, hunting and climate change.

important contribution to tiger conservation. All of them are covered by this report, 40 (11 priority) in South Asia, 20 in the Greater Mekong region, 15 (3 priority) in South-East Asia, and 2, including the world's largest, in eastern Russia and North-East China.

In a related study[17], 42 **tiger source sites** were identified. Source sites meet the following criteria: (i) higher densities of tigers than the surrounding landscapes; (ii) evidence of current reproduction; (iii) the potential to support >25 breeding females alone or with other source sites in the TCL; (iv) within a TCL that has an overall potential to support >50 breeding females; (v) genuine commitment to prevent further human incursion exists; (vi) conservation capacity exists or there is a commitment to establish it immediately; (vii) a legal framework for the prevention of hunting of tigers and their prey exists. India has 18 of the 42 source sites, Indonesia has 8, and the Russian Far East has 6. The remaining 10 are distributed between Nepal, Bangladesh, Lao PDR, Thailand and Malaysia.

Large marine ecosystems (LMEs): LMEs are ocean areas of 200 000 km^2 or more, adjacent to the continents, in coastal waters where primary productivity is generally higher than in open ocean areas[18]. Eleven LMEs have been defined for Asia's oceans: Sea of Okhotsk, Sea of Japan, Yellow Sea, East China Sea, Oyashio Current, Kuroshiro Current, South China Sea, Sulu-Celebes Sea, Indonesian Sea, Gulf of Thailand and Bay of Bengal. Relatively recent work on marine biodiversity has led to the delineation of the Coral Triangle, a biogeographic region defined by >500 species of zooxanthellate (reef-building) corals[19] which holds the world's most diverse coral reefs. Other taxa follow similar patterns.[20] The Coral Triangle encompasses the Sulu-Celebes and Indonesian Sea LMEs, as well as the waters surrounding Papua New Guinea and the Solomon Islands. The Bay of Bengal LME has less coral but is of global importance for its fish species diversity, a function of the complex interaction of marine and freshwater systems, climate and topography. It also holds the largest expanse of mangrove forest in the world, the Sundarbans.

(17) Walston, J., J. G. Robinson, E. L. Bennett, U. Breitenmoser, G. A. B. da Fonseca, J. Goodrich, M. Gumal, L. Hunter, A. Johnson, K. Ullas Karanth, N. Leader-williams, K. MacKinnon, D. Miquelle, A. Pattanavibool, C. Poole, A. Rabinowitz, J. L. D. Smith, E. J. Stokes, S. N. Stuart, C. Vongkhamheng. H. Wibisono (2010). Bringing the Tiger back From the Brink – the Six Percent Solution. http://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.1000485

(18) http://www.lme.noaa.gov/

(19) Veron J.E.N., L.M. Devantier, E. Turak, A.L. Green, S. Kininmonth, M. Stafford-Smith and N. Peterson (2009). Delineating the Coral Triangle. *Galaxea, the Journal of Coral Reef Studies* 11, pp. 91-100.

(20) Allen G.R. (2007). Conservation hotspots of biodiversity and endemism for Indo-Pacific coral reef fishes. *Aquatic Conserv: Mar. Freshw. Ecosyst.* DOI:10.1002/aqc.880.

Ecologically or biologically significant marine areas (EBSAs): EBSAs are areas of global importance within the world's oceans, identified based on criteria agreed by the parties to the Convention on Biological Diversity (CBD)[21]. There are five EBSAs in the regions covered by these reports, in Sri Lanka, Indonesia, Papua New Guinea (2), and the central Indian Ocean basin.

1.2.2 Threatened species

The diversity of landscapes and ecosystems is more than matched by the diversity of wild species, many of them found only within the region and some restricted to single islands, mountains, lakes or reefs. The rapid rate of land-use change and other pressures (section 2) has resulted in 5 316 species being classified as globally threatened on the International Union for the Conservation of Nature (IUCN) Red List[22]: 1 038 of them critically endangered, 1 512 endangered and 2 766 vulnerable. The totals for threatened species by country (Annex 2) partly reflect the intrinsic biological diversity of the countries, and partly the extent of habitat destruction and other threats that are present. Highest are Malaysia (1 283 Red List species, including 261 critically endangered), Indonesia (1 281, including 207 critically endangered), China (1 115, including 187 critically endangered) and India (1 065, including 155 critically endangered).

1.2.3 Ecosystem services

Ecosystem services are the benefits people obtain from the functioning of natural ecosystems. They are an essential component of the green, blue and circular economies, and can be categorised into four broad groups: provisioning, regulating, supporting and cultural services.[23] Across Asia these services include those of global importance, such as climate mitigation through carbon storage and sequestration, as well as those benefitting local communities and individuals. A summary of ecosystem services within the Asia region is shown in Table 1.2.

Despite the tremendous importance of ecosystem services to the economy and livelihoods, they are frequently unrecognised and undervalued and, as a result, may be damaged or destroyed as a consequence of economic development activities and human population expansion. In other cases, traditional systems for maintaining these services have broken down as a result of state-imposed land zones, cultural and economic modernisation

(21) https://www.cbd.int/ebsa/about

(22) http://www.iucnredlist.org/, accessed July 2016.

(23) Millennium Ecosystem Assessment (2005). Ecosystems and human well-being: synthesis. Island Press, Washington, DC.

Table 1.2 Examples of key ecosystem services in Asia

Type of service	Ecosystem service	Beneficiaries	Notes
Provisioning	Water for drinking, irrigation, industrial use, energy generation	Entire population	Critical for the intensive irrigated agricultural systems of the region and the growing urban populations. Hydropower is increasingly important as an energy source and export commodity (e.g. for Bhutan, Lao PDR).
	Fisheries in freshwater and marine systems	Local fishers, fish consumers, island and coastal communities, associated economic actors	Especially important in the region's major lakes and rivers (e.g. the Mekong), and for the nations in the Coral Triangle.
	Biomass energy	Rural communities	Minor, but significant for some remote communities.
	Timber, poles and other construction material	Timber traders, forest owners, crafts-people	Important in rural areas; significant natural forest timber industries survive in PNG and Myanmar.
	Food, medicine and other products from, e.g. plant parts, resins, fruits, animal parts, honey	Rural households, traders, urban consumers	Significant source of subsistence for rural households (e.g. in PNG and elsewhere), and an important economic resource supplying the trade in wild products across the region.
	Grazing and fodder for livestock	Local livestock herders and, indirectly, consumers of milk, meat	Locally important across the region, supports significant economic activity in parts of East and Central Asia.
Regulating	Absorption of nutrient pollution, other pollutants in wetlands	Local populations, economic activity	Important service in areas where management of growing volumes of industrial and urban waste is poor.
	Reduction of disaster risk (flooding, landslide) through absorption of run-off and mitigation of storm surges	Local populations, economic activity, especially in mountainous areas. Population centres in low-lying coastal regions	Increasingly important as linear infrastructure and communication networks expand, especially in areas of extreme topography, and low-lying coastal regions. Closely linked to the provision of reliable water supplies.
	Reduction of soil erosion, sedimentation and desertification through stabilisation of soils	Local populations, economic activity, especially in mountainous and arid areas	Important, especially in arid regions of East and Central Asia and in high-intensity rainfall regions, also for the protection of vulnerable near-shore reefs and seagrass beds.
	Control of pest species through predation, natural limits on populations	Farmers, livestock herders	Significant in traditional farming areas
Supporting (nutrient cycling, crop pollination)	Composting and release of nutrients from dead matter, replenishment of soil fertility, including through seasonal flood regimes	Farmers in areas of traditional agriculture and the major floodplain agricultural regions	Seasonal flooding by large rivers maintains soil fertility.
	Pollination of agricultural crops	Farmers growing commodities which rely on insect, bird or bat pollination	Crops including vegetables, fruits, edible oils, coffee and cardamom.
	Source of novel genetic material for crops (e.g. olives, fruits)	Global	
	Carbon sequestration	Global	Tropical rainforests and tropical peatlands are especially important because of their high carbon stock and vulnerability to fire and land-use change
Cultural (spiritual, recreational)	Recreation	Local populations, especially urban populations using natural areas	Important, mainly in coastal areas and near urban centres.
	Tourism using natural spaces (beaches, coastal habitats)	Global tourists, local people engaged in the tourism economy	Important, mainly in coastal areas and specific tourist destinations inland.

Woman in a village, Nepal. Thirty percent of Nepal's GDP comes from remittances from family members, mostly men, who travel abroad to work. As rural people are increasingly involved in the external economy, there are changes in the ways that men and women manage forests and land.

and urbanisation, population growth, industrialisation and unsustainable agricultural practices. A challenge with many services (e.g. water supply) is that there is spatial or temporal separation between land managers who can influence the quality of ecosystem services and the beneficiaries who may be willing to pay for the service. In other cases, the services (e.g. clean air, clean beaches) are difficult to quantify or manage, and may be perceived differently by, for example, local people and foreign visitors.

The key to integrating the protection and management of ecosystem services into government land-use and development planning is information on the values of these services and the impacts of change. The EU-supported Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services[24] is producing regional assessments which will include a thorough analysis of ecosystem services for Central Asia and Asia-Pacific, due to be completed in 2018. Studies by The Economics of Ecosystems and Biodiversity (TEEB)[25], the World Bank-led Wealth Accounting and Valuation of Ecosystem Services (WAVES) partnership[26] and UNEP, covering approaches such as total economic valuation[27], mapping essential natural capital [28] and natural capital accounting are also available.

([24]) See ipbes.net/

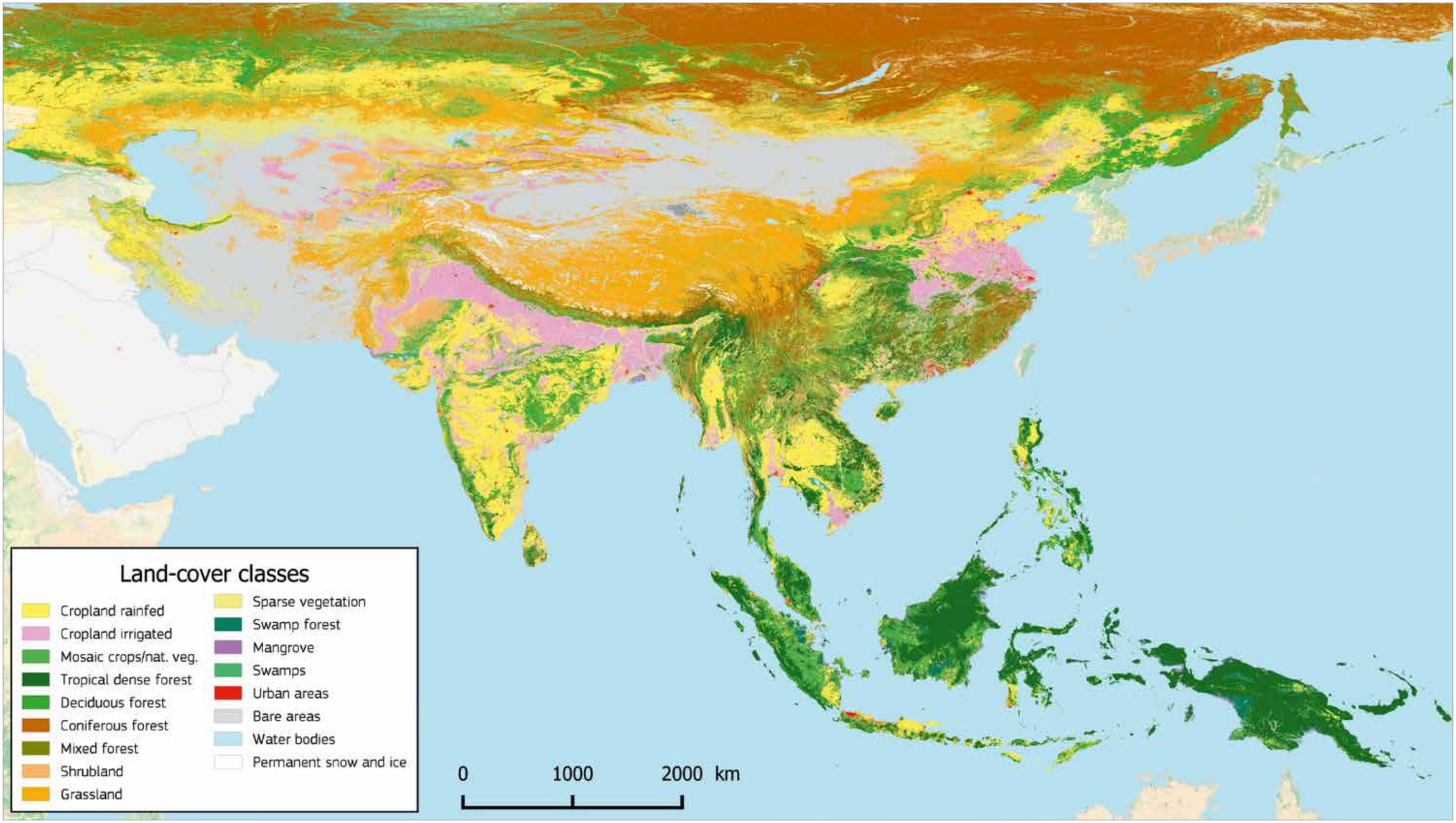
([25]) TEEB studies and TEEB-inspired studies are available for ASEAN, the Philippines, Thailand and India. See http://www.teebweb.org/resources/ecosystem-services/

([26]) 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 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 overseen by a steering committee. See https://www.wavespartnership.org/, accessed 9 September 2016.

([27]) Pascual U. and R. Muradian (2010). The Economics of valuing ecosystem services and biodiversity. Chap. 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

([28]) 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 (2014). Towards a global map of natural capital: key ecosystem assets. UNEP, Nairobi, Kenya.

Figure 1.2 Land-cover map of the study area



Adapted from the CCI (Climate Change Initiative) Land Cover Map developed by the European Space Agency, 2015

#2

Conservation challenges

Rhinoceros hornbills live in the sundaic lowland forests of southern Thailand, Malaysia, Brunei and Indonesia. They range over large areas of forest in search of fruiting trees, but their population is declining as a result of forest clearance and fragmentation.

‹
Snare and animal remains. Snaring often results in the death of non-target species. Poaching to supply the demand for illegal wildlife products has resulted in the disappearance of large mammals from some forests in Asia, and the decimation of the populations of orchids, butterflies, reptiles and other valuable species.

^
Gill rakers from manta and other ray species for sale. Hunting of rays has reduced the populations of these fish in many of the tropical seas of Asia, as fishermen respond to increasing demand for gill rakers for their reputed medicinal properties.

#2 _ Conservation challenges

2.1 Direct threats to biodiversity

This section summarises the four main types of threats that are present across the region, and briefly describes other threats that are recognised as important in one or two of the sub-regions. The chapters in the regional analysis discuss the threats to biodiversity in more detail. The classification of the impact of threats as **severe** or **very significant** is intended as a general indication of the relative importance of these threats to biodiversity in each region.

2.1.1 Wildlife crime and unsustainable exploitation

Impact at sub-regional level

All regions, and in marine ecosystems: severe: unsustainable, unmanaged, and often illegal exploitation of species are some of the main threats to biodiversity, along with agricultural expansion and unsustainable infrastructure development.

Pressure

Exploitation of biodiversity is an essential element of many rural livelihoods, but the rapid expansion of communications and transport networks has linked the most remote ecosystems with the markets supplying the mega-cities of Asia, as well as to Europe and the United States of America. Over 5 000 species of wild plants and animals are known to be used and traded across Asia, as traditional medicinal products (e.g. bear gall bladder, tiger bone, gecko, rhino horn, pangolin parts, *dendrobium* orchids)[29], culinary delicacies (e.g. freshwater turtles, pangolin, swiftlet nests, sea cucumbers, marine fish), ornaments and clothes (e.g. tiger and leopard skins, elephant ivory, crocodile), and exotic pets (e.g. freshwater turtles, snakes, birds, primates, live reef fish). These markets can be domestic, but in large measure the exploitation is to serve international markets. Lao PDR, Thailand, Vietnam and China are the four countries with the greatest volume of illegal wildlife trade in Asia (import, export and transhipment), and with Cambodia, India, Indonesia, Malaysia, Myanmar, Nepal and Philippines are among the 30 top countries in the world for the supply and trafficking of elephant, rhino, turtle and big cat products[30]. However, the illegal wildlife trade chains extend to all of the countries covered by this study, including the transhipment of products from Africa through South-East Asia. Trade chains also extend to Europe and North America, including the shipping of live wildlife for the pet market (and often the aquarium market as well, for marine species).

Unsustainable exploitation of marine animals (sometimes also illegal, and unmanaged) is the norm in most of the region's near-shore waters. It affects fish, invertebrates and their habitats (reefs and other near-shore habitats). Animals are used for food, medicine, curios or in the pet/aquarium trade. Destructive fishing affects almost all reefs in the Philippines, Malaysia, Indonesia and Timor-Leste[31], and 60 % of reefs overall. Offshore, illegal, unreported and unregulated (IUU) fishing affects high-value species such as tuna, sharks and rays, with marine turtle and other species caught as by-catch (see Box 1).

Trafficking wildlife products across international borders and to markets is a highly organised and increasingly valuable business, estimated to be the fourth largest illegal trade after drugs, weapons and human trafficking. The illegal fishing industry has been linked with human trafficking and forced labour[32], and there are other links between wildlife trafficking, corruption and organised crime.

Commercial farming of threatened wildlife has developed in response to growing demand and the diminishing availability of wildlife products. The industry is poorly regulated and can result in additional pressure on wild populations to provide breeding stock, and because farms can be used to 'launder' animals caught in the wild. In some cases, farming increases demand rather than reducing the hunting of wild animals.

Impacts

- Large, highly valuable and charismatic species such as tiger, elephant and rhino have been driven to the edge of extinction by hunting and habitat loss, leading to disruption of ecosystems and loss of potential tourism value.
- Many species of previously common animals and plants have become locally and economically extinct.
- Resources that once supported small industries, such as animal furs from Mongolia, and which were important for subsistence use by poor, rural communities, are depleted and the economic benefit that might come from sustainable uses of biodiversity, such as ecotourism, diminished. Over-fishing is an important cause of impoverishment amongst coastal communities in the region.
- The Greater Mekong forests in particular are in danger of becoming 'empty forests' with tree cover but without many of the plants and animals that should occur there, as a result of unsustainable hunting and collecting[33].
- Illegal and unregulated trade facilitates the spread of diseases, parasites and harmful alien invasive species, with significant negative impacts on ecosystems and ecosystem services.
- Wildlife crime and the profits from it are linked to other criminal activities and corruption, contributing to insecurity and undermining resource governance.

(29) http://www.traffic.org/cop13/pdf/cop13briefing_SoutheastAsia.pdf
(30) Stokes E., S. Hedges, A. Holmes and S. Roberton (2014). A Strategic Approach to Combat Wildlife Trafficking in Africa and Asia. WCS, New York.
(31) Asian Development Bank (ADB) (2014). Regional state of the Coral Triangle – Coral Triangle marine resources: their status, economies, and management. Mandaluyong City, Philippines.
(32) US Department of State. The Intersection Between Environmental Degradation and Human Trafficking. June 2014. Washington, DC.
(33) FAO (undated). Forest Biodiversity Conservation: GMS Forest Policy Brief No 3. http://www.fao.org/fileadmin/templates/rap/files/NRE/policybrief3.pdf

Whitetip reef shark, Indonesia. Globally, as many as 100 million sharks are killed annually, far above the level that their slow reproduction can sustain. The loss of sharks may have impacts on the populations of other species in marine ecosystems, causing ecological and economic damage.

Box 1. Conservation of sharks, skates, rays and chimaeras – the chondrichthyan fish

There are an estimated 1 250 sharks, rays and related species, including some freshwater species such as the Mekong freshwater stingray. Many are now threatened because they are targeted or caught as bycatch in the expanding global trade in fins, meat, liver oil, leather and *mobulid* ray gill plates[a,b]. The highest levels of catches of sharks and rays globally occur in the waters of Indonesia and India, with Pakistan, Malaysia, Sri Lanka and Thailand all ranking in the top 20 in the world. Many of these fish are caught by boats from other nations, and are sold on the international market. Myanmar, Malaysia, Indonesia and Thailand are among the top 10 world exporters of shark products or shark fins. Many are taken illegally, and fishery management regulations and enforcement have not kept pace with the rapid growth of the trade.

Sharks and rays are especially vulnerable to over-exploitation because of their low reproductive output and long life-cycle, and Asia is critical for the conservation of a large number of species. They can be an important source of protein for coastal communities, and the shark fin trade to distant markets can undermine local food security and livelihoods.

The International Plan of Action for Conservation and Management of Sharks (defined as all *chondrichthyan* fishes), adopted by the UN Food and Agriculture Organisation (FAO) in 1999[c], provides a useful framework for the protection of species and management of populations, but progress in implementing the plan has been disappointing[d]. The Convention on Migratory Species also provides a platform for action, although only one country covered by this study (Philippines) is a signatory of the MoU on Migratory Sharks[e] (see Annex 3). A new 10-year global conservation strategy for sharks and rays[f] identifies priorities for reversing the decline in the region. Three areas in Asia are identified as priorities: the China seas, the Indo-Pacific biodiversity triangle, which has the highest number of sharks and rays in the world, and the Northern Indian Ocean, especially the Bay of Bengal. The priority conservation needs identified are:

- increased legal protection and recovery planning for endangered species;
- adoption of regulations to limit catches and reduce by-catch (Indonesia's ban on manta ray hunting is an important example: see Box 5);
- strengthened international trade control measures in line with the CITES standards (legal, sustainable and traceable), including through appropriate CITES listings, development and use of non-detriment findings, management of species and enforcement of CITES rules;
- expanded monitoring of catches and law enforcement efforts, and management of species;
- expanded field research to clarify the status of data-deficient species, improve knowledge of life stages and seasonal movements, and identify critical areas (habitats, aggregation sites, migratory corridors), to inform conservation planning and the design and management of marine protected areas (MPAs).

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a: FAO (2014). The State of the World Fisheries and Aquaculture: Opportunities and Challenges. UN Food and Agriculture Organisation, Rome.

b: Dent F. and S. Clarke (2015). State of the global market for shark products. FAO Fisheries and Aquaculture Technical Paper No 590. United Nations Food and Agriculture Organisation, Rome, 187 pp.

c: FAO (1999). International Plan of Action for the conservation and management of sharks. UN Food and Agriculture Organisation, Rome.

d: Fischer J., K. Erikstein, B. D'Offay, S. Guggisberg and M. Barone (2012). Review of the Implementation of the International Plan of Action for the Conservation and Management of Sharks. FAO Fisheries and Aquaculture Circular No 1076. UN Food and Agriculture Organisation, Rome, 120 pp.

e: http://www.cms.int/sharks/en/legalinstrument/sharks-mou

f: Bräutigam A., M. Callow, I.R. Campbell, M.D. Camhi, A.S. Cornish, N.K. Dulvy, S.V. Fordham, S.L. Fowler, A.R. Hood, C. McClennen, E.L. Reuter, G. Sant, C.A. Simpfendorfer and D.J. Welch, D.J. (2015). Global Priorities for Conserving Sharks and Rays: A 2015-2025 Strategy.

Oil palm and acacia plantation, Indonesia. Strong global demand for vegetable oils and plant fibre is driving rapid expansion of plantations in Asia, replacing biodiversity-rich forests and mixed farming landscapes with intensively managed monocultures.

Deforestation for coffee, Vietnam. Coffee is one of the most traded global commodities, with Vietnam, Indonesia and India major producers. Traditional methods of planting coffee bushes under a tree canopy have been replaced in many areas by complete clearance, and coffee cultivation is a major driver of deforestation in hill regions, including within some protected areas.

2.1.2 Agricultural expansion and land-use change

Impact at sub-regional level

Island South-East Asia, Greater Mekong: severe: Rapid expansion of commercial agriculture, including tree crops, is the main cause of land-use change.

South Asia, East Asia, Central Asia: very significant: Agricultural expansion is an important cause of land-use change and habitat loss, though not generally on the scale of Island South-East Asia and the Mekong regions.

Pressure

Agriculture has transformed the landscapes of much of the region. Large-scale land conversion for oil palm, rubber, fibre and other industrial crops has replaced virtually all the natural forest of the tropical lowlands of peninsula Malaysia, the Philippines, Sumatra and Vietnam. The process is on-going in Borneo, Myanmar and New Guinea. Clearance by small-holders and smaller-scale commercial farms for staple foods (e. g. rice, sago, yams) as well as the development of tree-crop plantations has impacted natural habitats across the region, particularly in the densely-populated areas of India, western Indonesia, the Greater Mekong and eastern China. Livestock is an important use of the extensive grasslands of central and east Asia, with over-grazing and poor land management a problem in many areas.

Land clearance in the tropics is often associated with fire, which can cause additional pollution and impacts on human health, especially where it involves the burning of tropical peatlands.

Impacts

- Widespread loss of natural habitats – tropical forests, wetlands, grasslands, peat-lands, mangrove – and associated species, with further degradation caused by the development of infrastructure and influx of people associated with large-scale agricultural projects.
- Soil erosion (especially in northern grasslands, e. g. Mongolia), drying of peatland leading to fires, health impacts and greenhouse gas (GHG) emissions, disruption of hydrology. In coastal areas, poor soil management leads to sedimentation and severe impacts on near-shore reefs and seagrass beds, impacting fisheries and tourism potential.
- Water pollution and air pollution, often downstream and outside the plantation areas, so that they affect local communities but not the operations of the business.
- Loss of crop and livestock genetic diversity, as well as loss of wild biodiversity, when diverse, small-holder landscapes are replaced by intensive monoculture agriculture.
- Displacement of local people and conflict over access to land, especially in areas with weak land rights (most places in the study region). Displaced people may move and clear new land, causing further deforestation.
- Fragmentation of habitats within protected areas (PAs), and isolation of PAs, caused by illegal land conversion and degazettement (removal of legal protection).

Road building, Lao PDR. Rapid improvements in transport and communications are connecting remote regions with global business and markets, creating opportunities but also posing significant challenges to traditional and informal resource management practices.

Peat fire in Borneo. Peat fires are made worse by land drainage and climatic conditions, and are a sympton of conflict over land rights, unplanned development and weak enforcement. Fires degrade ecosystems, releasing large volumes of carbon, while smoke causes health problems and economic disruption.

Srisailam dam, Krishna river, India. The dam generates electricity and supplies water, but also forms a barrier to fish migration. Tens of thousands of dams have been constructed in Asia, especially in China and India. They may affect natural flood and sedimentation cycles, cause flooding, leading to damage to local livelihoods and loss of freshwater species.

2.1.3 Extractive industries, energy and infrastructure

Impact at sub-regional level

South Asia, East Asia, Greater Mekong: severe: Rapid industrialisation and urbanisation, spurred by population and economic growth, is driving road building and damming of the regions' main rivers.

Island South-East Asia, Central Asia: very significant: Major infrastructure projects are under way or planned, and mining poses significant threats in specific locations.

Pressure

The mining of coal, gas, oil, limestone and minerals is expanding, driven by rising energy needs, export-led growth strategies and the construction boom, often in remote locations and increasingly in the marine environment. The economies of Timor-Leste, PNG and Mongolia are all highly dependent on mining and thus vulnerable to global commodity price fluctuations. Mining is a major driver of the construction of new roads, railways, pipelines and power lines across remote areas. The impact on habitats (especially tropical forest or open grassland) caused by mining-related infrastructure is far wider than the 'footprint' of the infrastructure itself, because it alters water and nutrient flows as well as migration routes.

Impacts

- Large-scale loss of forest as a result of strip and open-pit mining, exacerbated by failure to enforce regulations on rehabilitation of land, post-mining. Loss of marine biota from sea-floor mining.
- Extinction of unique, highly specialised organisms in karst environments when their habitats are destroyed by the cement industry.
- Downstream pollution of water and marine environments from toxic mine wastes, impacting freshwater systems and human health, especially from poorly managed illegal mining.
- Violations of land rights, for example in the Philippines, where mining is associated with violence and the displacement of local people.
- Pressure on water resources and land as a result of the influx of people to remote areas.
- Increased isolation of PAs, due to infrastructure barriers (including roads).

2.1.4 Dams, polders and water abstraction and diversion

Impact at sub-regional level

East Asia, Greater Mekong, South Asia: severe: Few major rivers are not dammed, there are major water-diversion schemes in operation, with more proposed, and large schemes for coastal polders.

Island South-East Asia, Central Asia: very significant: Dams and water schemes are locally important.

Pressure

The damming of rivers for irrigation and hydro-electricity attracts large-scale finance and is an attractive solution to the growing demand for power. There are at least 82 existing and 149 planned projects on the Mekong and its tributaries[34], and Lao PDR intends to make the export of hydro-electricity a significant commodity. China has an estimated 85 000 major dams[35] and almost all the large rivers have been dammed in multiple locations[36]. Dam construction in the Indian Himalaya may result in a density of one dam for every 32 km of river channel, the highest in the world.[37] Inter-river-basin transfers of water are planned for India and China. Chinese companies and banks are now the biggest builders and financiers of dams globally, involved in 330 dams in 74 countries, including Lao PDR, Cambodia, Malaysia and Myanmar.[38]

Impacts

- Inundation of land upstream of dams leads to habitat loss and displacement of people, indirectly causing further land clearance.
- Interruption of seasonal floods which deposit fertile silt downstream of the dam, and replenish lakes and wetlands. The seasonal formation of sandbanks used by birds and turtles for nesting is disrupted.
- Salt intrusion, which reduces agricultural productivity, as a result of reduced flows in delta regions (e. g. in Bangladesh, Vietnam). The problem is made worse by rising sea levels.
- Changes to the temperature, flow and nutrient load of the water, making it unsuitable for aquatic species that depend on very specific environmental conditions.
- Lower breeding success and greater mortality among migratory fish (which includes 87 % of the fish species in the Mekong, for example) which cannot complete their journeys.
- Decline of important lake fisheries, such as Tonle Sap in Cambodia, because of changes in river levels and nutrient loads. Modelling of the impact of the proposed 11 dams on the Lower Mekong on fisheries suggests that replacing the lost fish protein would require a 25 % increase in land and water for food production in Cambodia and Lao PDR.[39]
- Reduced food for people and shorebirds using shallow marine and inter-tidal habitats, as they are drained to allow industrial and urban expansion. The dynamics of mud flats in delta regions are further disturbed when upstream dams reduce the sediment load carried by the river in flood.

(34) The WWF Living Mekong Programme gives a total of 82 existing and 149 planned projects: Cambodia 4/33; Lao PDR 11/32; Vietnam 30/65; Thailand 11/0; Myanmar 21/15; China 5/34.
(35) There are an estimated 50 000 dams on the Yangtze alone.
(36) https://www.internationalrivers.org/resources/spreadsheet-of-major-dams-in-china-7743
(37) Pandit M.K. and R.E. Grumbine (2012). Potential effects of ongoing and proposed hydropower development on terrestrial biological diversity in the Indian Himalaya. *Conservation Biology* 26(6), pp. 1061-1071.
(38) https://www.internationalrivers.org/campaigns/china-s-global-role-in-dam-building
(39) Orr S., J. Pittock, A. Chapagain and D. Dumaresq (2012). Dams on the Mekong River: Lost fish protein and the implications for land and water resources. *Global Environmental Change* 22(4), pp. 925-932. http://dx.doi.org/10.1016/j.gloenvcha.2012.06.002

Plastic waste on the shore of the Parañaque and Las Piñas Critical Habitat and Ecotourism Area, a Ramsar site, Manila, Philippines. By 2050, 60 % of the people in the region will live in urban areas. Inadequate management of the waste that urban areas produce causes severe local pollution and is part of the global problem of plastics and toxins in marine ecosystems.

Cashmere goats, Munkhkhairkhan National Park, Mongolia. The goat population of Mongolia has quadrupled, to 60 % of all livestock, as herders shift to producing cashmere for the lucrative Chinese market. Goat-grazing combined with climate change has degraded over half of Mongolia's rangelands.

A ranger clears Mimosa pigra, an invasive species from tropical America, in Tram Chim National Park, Vietnam. There are hundreds of invasive species in Asia, including fish, insects, plants and fungi. They cause EUR 25 billion worth of damage to agriculture every year, as well as threatening many native ecosystems and endemic species.

2.1.5 Other direct threats

This section briefly reviews other direct threats to biodiversity, which are important in individual sub-regions and are discussed in more detail in *Larger than Tigers: Regional Reports*.

Aquaculture *(significant threat in parts of South Asia, Greater Mekong, Island South-East Asia)*: Shrimp is the most traded seafood globally (by value), and Vietnam recently surpassed Thailand as the world's largest exporter of shrimp[40], with major markets in the EU and North America, although Japan and internal markets are also important. It is also Bangladesh's second largest export. More than half of all shrimps are grown in aquaculture ponds in coastal regions.

Clearance for aquaculture is the main driver of loss of mangroves and tidal mud flats. There is a continuing need for new land for aquaculture as disease and parasite loads reduce productivity in existing ponds after a few years, forcing abandonment. Coastal communities in areas cleared of mangroves are more vulnerable to tidal surges and tsunamis, and suffer from salt-water intrusion into agricultural land and domestic water supplies. Traditional extensive aquaculture can be compatible with biodiversity, for example by providing feeding opportunities for migrating shorebirds.

Logging, illegal timber trade *(significant threat in parts of Greater Mekong – especially Myanmar, Cambodia, Lao PDR – and Island South-East Asia – especially Indonesia, Malaysian Borneo, Papua New Guinea)*: The logging of tropical hardwoods, coupled with agricultural expansion, was one of the main drivers of land-use change in the tropical lowlands of the region historically, but is now confined to the economic and geographic margins. Commercial logging is associated with degradation of forest cover, and facilitates increased access for illegal logging and smallholder agriculture, often leading ultimately to the conversion of forestland to agricultural plantation.

Legal logging industries exist in Indonesia, Lao PDR, Myanmar and Malaysia, and are especially important in PNG. Demand in China, India, Vietnam and elsewhere (in part for processing and selling on to western markets) has caused the economic extinction of rosewood and merbau over large areas of the region. Logging bans in Cambodia, China, Mongolia, the Philippines, Thailand and Vietnam have shifted the source of timber to other countries, and resulted in high levels of cross-border timber trafficking. Legal logging industries are sometimes used to 'launder' timber from illegal logging and land clearing. The expansion of paper-mill capacity with an inadequate sustainable supply from plantations is a driver of natural forest logging in Island South-East Asia.

Over-grazing, unsustainable livestock rearing *(significant threat in parts of East Asia – China, Mongolia – and most Central Asian countries)*: Livestock herding poses threats to biodiversity through competition with wild species for food, degradation of rangeland as a result of overgrazing and/or trampling, killing of predators considered to be a threat to livestock, disturbance, and run-off from grazing grounds that results in organic pollution and eutrophication of rivers, lakes and other surface waters.

In China, livestock herding is becoming sedentary, and the erection of fences in steppe land disrupts the long-distance migration of large mammals. Ecological communities are damaged by the widespread killing of burrowing mammals believed to reduce grazing quality.

Herding livelihoods are also threatened by over-stocking and poor management of extensive grazing. Transhumant herders in Mongolia possess increasingly large herds, which show signs of lower productivity and nutritional stress.

Invasive alien species and diseases *(a threat throughout the region, including in marine ecosystems, which interacts with other threats in complex ways, making the impact difficult to quantify)*: There are hundreds of invasive alien species. They affect all habitats, but wetlands are especially vulnerable, with introduced fish species threatening the unique, endemic fauna of isolated lakes and river systems (e. g. grass carp in Inle Lake, Myanmar; common carp and tilapia in the lakes of central Sulawesi, Indonesia). Introduced plants out-compete native vegetation and alter the structure and species composition of ecological communities (e. g. water hyacinth, alligator weed, *Mimosa*, *Lantana*).

Introduced disease pathogens are a risk to specific groups, for instance with the fungal disease chytridiomycosis, which has devastated amphibian populations in many parts of the world. Contact between domestic and wild animals can result in disease transmission (e. g. foot-and-mouth disease in wild ungulates, canine distemper in big cats, tuberculosis in elephants, avian influenza in wild geese), with wildlife more susceptible because of other stresses, such as lack of food or shelter.

Invasive species and diseases pose huge problems for farmers, herders and fish-farmers, with human activity, including the illegal wildlife trade, facilitating the spread of disease and alien species. The economic cost of invasive alien species in South-East Asia alone is estimated at over EUR 25 billion per year.[41]

Settlement and urbanisation *(significant threat in parts of all sub-regions, but especially in East Asia – China – and the Greater Mekong)*: The expansion of settlements and urban centres can be at the expense of agricultural land, wetlands and other natural habitats, often including inter-tidal habitats. The environmental impact of urban zones is far wider than its physical footprint, with water, energy, material, food and waste disposal needs affecting land and resource use over the entire land and marine area of the region. A high percentage of urban growth is in coastal regions, with pollution and sedimentation severely affecting near-shore marine habitats.

Growing wealth and leisure time in China and elsewhere is fuelling the rapid growth of tourism, resulting in fast-developing facilities and posing challenges in terms of supply and management of resources, waste and energy in popular natural sites and coastal areas.

Pollution *(significant threat in parts of all sub-regions, but especially in East Asia – China – and Island South-East Asia – air pollution in Indonesia)*: Aquatic biodiversity (freshwater and marine) is affected by changes in water chemistry and food availability as a result of sewage, agricultural runoff, waste from aquaculture, shipping discharges, industrial chemicals and urban waste. The impacts are greatest in lowland and coastal areas, especially near urban and industrial centres. Mining is

(40) Portley N. (2016). SFP Report on the Shrimp Sector: Asian Farmed Shrimp Trade and Sustainability. Sustainable Fisheries Partnership Foundation, 22 pp. Available from www.sustainablefish.org

(41) https://www.unenvironment.org/news-and-stories/story/invasive-species-huge-threat-human-well-being

the source of high levels of pollution[42], particularly for rare earth minerals, including radioactive materials[43], which contaminates soils and aquatic systems through poorly managed waste disposal, creating hotspots of pollution in remote locations. Agriculture causes pollution through the use of high levels of pesticides, fertilisers and antibiotics. The use of banned pesticides is common, although the use of agrochemicals is decreasing in some areas[44]. In combination with changes in water temperature, sedimentation from land-based run-off causes bleaching of corals leading to the loss of coral reefs.

Air pollution is also a serious problem which has significant economic and welfare impacts. The inhabitants of the region's growing mega-cities suffer from high levels of air pollution from vehicle emissions and smoke from power-generation and refuse burning. Annual fires in peatlands in Indonesia, a result of illegal land clearance, exacerbated by El Niño events, cause respiratory problems, premature deaths, and curtail social and economic activity[45].

Climate change *(varying impacts across the region, interacts with other threats)*: The Intergovernmental Panel on Climate Change (IPCC) forecasts a 2.4 to 2.7°C rise in mean annual temperature, a 7 % increase in wet season rainfall and a drier dry season by the end of this century[46] for South-East Asia. Sea levels may rise by 70 cm by 2100[47], and the impacts will be reinforced by increased frequency of storms and surges. Central Asia has been identified as having significant signs of warming, with Tajikistan likely to experience the greatest impacts from climate change in the sub-region[48], and Cambodia and Myanmar identified as most at risk in South-East Asia. In Mongolia permafrost is warming and melting[49], and precipitation has increased in intensity[50], while there are indications of increased air temperature, drought and precipitation in Yunnan province, China.

Climate change affects biodiversity directly because it alters the physical parameters of the environment. This affects the species composition and structure of ecological communities, and allows the spread of new diseases and parasites. Opportunities for species to move as the changing climate causes shifts in vegetation zones will be limited by habitat fragmentation. Species limited to islands, mountains, and specialised habitats such as karst caves are especially vulnerable. Marine species will suffer from increased storm damage to reefs, greater ocean acidity affecting reef construction, and coral bleaching as a result of warming. Permafrost melt in the sub-Arctic affects the delicate water balance of steppe grasslands and forests in northern Mongolia and China. Changes in plant communities have caused blue sheep and then snow leopards to move to lower elevations, leading to increased human-wildlife conflict as a result of crop raiding and livestock predation.[51]

Human populations and livelihoods will be severely affected by climate change, especially through increased storm events, salt intrusion, erosion and floods in coastal regions. The densely populated coastal regions of the Bay of Bengal (eastern India, Bangladesh, Myanmar) and the communities in the lower Mekong Delta (Cambodia, Vietnam) are especially vulnerable to extreme weather events, while subsistence farmers and livestock herders in several areas experience reduced productivity as a result of intensified droughts or rainfall. These pressures will cause shifts in patterns of human population, land use and economic activities, which will in turn impact natural ecosystems and biodiversity.

2.2 Drivers of threats to biodiversity and ecosystems

The central driver of threats to biodiversity in the region is the complex interaction between growing human populations, increasing wealth leading to greater demands for resources, and the pursuit of capital-intensive economic growth. Governments are unable to respond adequately to the pressures on natural resources because mechanisms for governance are weak, while the role of both communities and the private sector in driving sustainability is undermined by conflicts over rights and access and the prevailing incentives encouraging over-exploitation. Changes in human societies and economies beyond the boundaries of the region – in Europe, North America, and the wealthier nations in Asia, for example – are also responsible for driving the intensification of resource use. Equally, demand within the region, for example for elephant ivory and pangolin scales, causes over-exploitation on other continents (such as Africa).

(42) Xu X., H. Cai, D. Sun, L. Hu and K.E. Banson (2016). Impacts of Mining and Urbanization on the Qin-Ba Mountainous Environment, China. *Sustainability* 8, pp. 488.
(43) http://www.theguardian.com/sustainable-business/rare-earth-mining-china-social-environmental-costs
(44) https://www.giz.de/expertise/downloads/giz2011-en-agrobiodiversity-china.pdf
(45) See the Island South-East Asia report, section 2.1.5.
(46) CEPF (2012). Ecosystem Profile: Indo-Burma Biodiversity Hotspot, 2011 Update. Critical Ecosystem Partnership Fund, Washington, DC.
(47) IPCC 5th Assessment Report, quoted by Raitzer D.A., F. Bosello, M. Tavoni, C. Orecchia, G. Marangoni and J.N.G. Samson (2015). ADB in Southeast Asia and the Economics of Global Climate Stabilisation. Asian Development Bank. Available at http://www.adb.org/sites/default/files/publication/178615/sea-economics-global-climate-stabilization.pdf
(48) World Bank (2009). Adapting to Climate Change in Europe and Central Asia. [Afghanistan was not part of the study.]
(49) Zhao, L., Q.B. Wu, S.S. Marchenko, and N. Sharkhuu (2010). Thermal state of permafrost and active layer in Central Asia during the International Polar Year. *Permafrost and Periglacial Processes*, 21(2), pp. 198-207.
(50) Batima, P., L. Natsagdorj, P. Gombluudev and B. Erdenetsetseg (2005). Observed Climate Change in Mongolia. AIACC working paper 12. http://www.start.org/Projects/AIACC_Project/working_papers/Working%20Papers/AIACC_WP_No013.pdf
(51) Aryal A., D. Brunton, J. Weihong and D. Raubenheimer (2014). Blue sheep in the Annapurna Conservation Area, Nepal: habitat use, population biomass and their contribution to the carrying capacity of snow leopards. *Integrative Zoology* 9, pp. 34-45. DOI: 10.1111/1749-4877.12004.

Waste from electronic products, Manila. The 25 countries covered by this report will be home to around 5.5 billion people in 2050. On average, urban people use more resources than rural people because of differences in diet, energy use and waste production. Providing for this growing urban population without exhausting natural resources is a huge challenge.

2.2.1 Population growth, changing consumption patterns and the drive for economic development

The 25 countries covered by this report hold 53 % of the global human population (see section 1.1). By 2050, the total number of people in the region will increase by over 720 million, and 60 % of people will be living in urban areas.

In 2015, the economies of the region (measured as GDP) grew on average 4.6 %, with growth ranging from 1–2 % (Afghanistan, Kazakhstan) to over 7 % (India, Cambodia, Lao PDR, Myanmar, Uzbekistan). In some cases (Papua New Guinea, Mongolia, Iran, Kazakhstan, Turkmenistan), countries depend heavily on extractive industries for revenue, making it even more difficult to address environmental concerns. The development of liberal market economies is accelerated by the formation of economic unions (such as the Association of South-East Asian Nations – ASEAN – economic community) and free trade agreements. Some of the most rapid growth in investment occurred in the countries that have become more accessible to external investment in the last decade, including Myanmar, Lao PDR and Cambodia. Between 2000 and 2010, foreign direct investment in Cambodia grew five-fold, from EUR 114 million to EUR 602 million, while in Lao PDR it grew from EUR 23 million to EUR 269 million. A fifth of investment flowing into South-East Asia originates in the European Union, with China and investors from within the region (e.g. Singapore and Hong Kong) also playing a significant role. Rubber, biofuels and sugar are the crops that attract the largest investments.[52]

These changes in population size, urbanisation and economic growth represent a significant and ongoing shift in the relationship between people and their natural resources. As traditional societies have been integrated into trade chains that connect the most remote regions with markets in the growing urban centres, customary ways of managing resources have been replaced. The consumption habits of wealthier urban populations have changed, with increased demand for meat and dairy products, which require more land to produce than the equivalent amount of plant protein. In South-East Asia, the increase in energy use per-capita and the shift from traditional biomass for cooking and heating to modern alternatives caused energy demand to increase by 250 % since 1990. Although the growth in renewable energy has been spectacular, it will not keep pace with growth in demand. As a result, three-quarters of power plants under construction in South-East Asia are coal-fired[53].

Burgeoning cities also need land, and large areas of near-shore marine ecosystems are being drained and claimed for development. In response to the demands of these growing populations, governments have initiated large-scale projects, or encouraged private sector investment, in energy, agriculture and extractive industries projects, with associated infrastructure development.

The developments described above impact on biodiversity and ecosystem services in several ways. Species are exploited directly, their habitats are degraded by pollutants and invasive alien species, or lost altogether through conversion for intensive production or urban expansion. The economic opportunities from land and trade in wild products increase the pressure on protected areas and other natural habitats from both legal challenges (for example, the PA downgrading, downsizing and degazettement tracking database[54] has records of 141 instances of downgrading or downsizing protected areas in Cambodia, Vietnam, Thailand and Myanmar) and illegal hunting and collecting.

(52) Polack E. (2012). Agricultural land acquisitions: a lens on South-east Asia. IIED, London. http://pubs.iied.org/pdfs/17123IIED.pdf, accessed 5 March 2016.
(53) International Energy Agency (2013). Southeast Asia Energy Outlook. Available at: https://www.iea.org/publications/freepublications/publication/SoutheastAsiaEnergyOutlook_WEO2013SpecialReport.pdf
(54) PADDD is the Protected Area downgrading, downsizing and degazettement tracking database http://www.padddtracker.org/view-paddd

Spraying crops by a steel plant, China. Throughout the region, legal and policy frameworks exist to ensure that environmental impacts are considered in planning decisions, but poor data, lack of monitoring and weak enforcement mean that the long-term or wider impacts are often not considered, to the detriment of local biodiversity and communities.

Houses built inside Botum Sakor National Park, Cambodia, for villagers moved to allow development of a coastal resort. Where local and customary rights and resource management practices are not recognised by government and investors there are often negative impacts on livelihoods and biodiversity.

2.2.2 Weak governance of natural resources

All of the countries covered by these reports have signed the relevant international environmental conventions, adopted sustainable and equitable use of biodiversity as a principle for resource management, and established regulatory frameworks and institutions for the management of natural resources, both for conservation (protected species, protected areas, marine parks) and controlled exploitation (impact assessments, licensing for exploitation, mitigation and restoration of impacts). However, the ongoing loss of species and deterioration of ecosystems indicates that resource governance is not yet sufficiently effective.

Poor resource governance is associated with incomplete and inadequate legal instruments, limited capacity, limited or ineffective use of resources (see section 3.1 for further information on resources for protected areas), and the low political priority afforded to conservation and sustainable management. Underlying the low priority afforded to environment is the perception that sustainable resource management conflicts with (short-term) economic interests, and that natural resources and ecosystem functions are essentially free goods. This perception is reinforced by the failure of economic analysis to adequately quantify or account for the costs of ecosystem degradation and loss of species. Finally, regulation and decision-making is undermined by corruption and cronyism, with the natural resources sector particularly prone to bribery, fraud, conflicts of interest (regulators and regulatory institutions benefitting from resource exploitation), and state capture (companies having disproportionate influence over regulatory decisions)[55].

These problems undermine considerations of equity, sustainability and use of objective data in decision-making. They weaken mechanisms designed to limit negative impacts of economic development, such as land-use planning, zoning, environmental impact assessments (EIAs) and licensing the exploitation of natural resources. In addition, the prevalence of decision-making based on short-term (typically annual and five-year) political and planning cycles tends to undervalue ecosystem services and underestimate negative environmental impacts.

2.2.3 Insecurity of tenure and inequitable access to resources

At the level of small holders and communities, as well as large-scale investors, security of access to resources is a pre-requisite for investment of time and funds in long-term, sustainable management. In some countries, customary systems of resource management (including marine management) would once have provided strong, locally recognised rights to farmers, fishermen and hunters. These systems have been weakened as a result of the expansion of the power of nation-state governments, integration with global markets, migration, political and cultural change, and assimilation. Where customary systems have disappeared, they are generally not replaced by formal, legal recognition for individual or communal rights. Only in Papua New Guinea are traditional resource rights recognised as a basis of all land and resource ownership nationwide, while only the Philippines has instituted a system of recognition and registration of customary rights that is strong enough to protect landowners against expropriation by other interests. In Afghanistan, customary rights remain important as a basis for land ownership and in India, although the Forest Rights Act[56] is intended to protect customary rights of forest dwelling groups, it has been poorly implemented[57]. Elsewhere in South Asia, there have been poor results despite the existence of mechanisms for recognising land rights: in Pakistan and Bangladesh, inefficient, expensive and corruption-prone systems of land titling and registration have led to insecurity[58]. In Nepal, despite a progressive community forest programme, blurred tenure and forest-use rights have contributed to perceived open access and degradation of government-managed forests.

Private sector investors also require security of tenure to enable them to invest in business development. Typically, the development of mechanisms for licensing businesses to use land and resources has been prioritised by government, as it is a pre-condition for further growth and investment, and a basis for taxation. However, these rights are often focused on maximising exploitation and revenue flows, rather than sustainable use. Some regulations even discourage sustainable practices: Indonesian concession licence regulations, for example, penalise companies for not cultivating parts of their concession (such as high biodiversity forest patches).

Insecurity of tenure drives short-term, competitive approaches to resource management, encouraging over-harvesting rather than sustainable off-take or investment in long-term management. In combination with rural population growth and commercialisation of ecosystems, tenure insecurity causes environmental degradation, which in turn leads to further impoverishment and becomes a driver of out-migration. Failure to recognise or protect local rights when granting commercial rights to land or fisheries causes conflict and contributes to rural poverty.

Environmental degradation is both a driver and a consequence of insecurity in the region. Political strife undermines governance of resources and leads to open-access, with armed groups sometimes exploiting ecosystems to finance their operations (e.g. in Myanmar). In South Asia, civil unrest and insurgency, associated with political instability in Assam, and an unchecked influx of refugees from Bangladesh have been directly linked to poaching of the Indian rhino in the Kaziranga National Park[59]. Furthermore, insurgency is linked with deforestation in North-East India and along the border between Pakistan and Afghanistan.

(55) 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

(56) The landmark legislation laid the foundation for more democratic forest governance through the recognition of individual and community forest and resource rights. It entitles individuals, families or communities to rights over land and forest and, importantly, empowers the Gram Sabha, or village assembly, with initiating the process of claims and recognition of rights.

(57) Oxfam India Policy Brief (2015). Implementing the Forest Rights Act: Lack of political will?

(58) USAID Country Profile for Bangladesh.

(59) Lopes A. (2014). Civil unrest and the poaching of rhinos in the Kaziranga National Park, India. *Ecological Economics* 103, pp. 20-28.

#3

Ongoing conservation efforts

Peatland forest canopy. Global mechanisms to address climate change and promote sustainability have changed the way that ecosystems are valued, and have created new options for conservation of Asia's biodiverse forests.

#3 _ Ongoing conservation efforts

Indawgyi Lake, Myanmar, is a UNESCO biosphere reserve, an ASEAN Heritage Park, and a Ramsar site. The lake's freshwater turtles, waterbirds and local fishing industry are threatened by unregulated fishing and gold mining in the catchment. Enforcement, education and the introduction of community-managed no-fishing zones and eco-tourism have helped to address these threats.

Across the region, governments, civil society organisations (CSOs) and communities are engaged in efforts to protect, manage and optimise the benefits from their natural resources. Three types of responses stand out as of particular importance for efforts to maintain biodiversity and ecosystem services: protected areas, landscape and seascape approaches, and addressing the growing threat from illegal wildlife hunting and trafficking.

3.1 Protected areas

Protected areas are the last hope of survival in the wild for many threatened species and intact ecosystems in Asia, and remain the most important approach to conservation of biodiversity. However almost all PAs face very significant challenges, including habitat loss and over-exploitation of biodiversity and, in some countries, officially sanctioned infrastructure projects, extractive industries and industrial agriculture inside their boundaries. The 25 countries covered by this study have declared around 6 926 protected areas, covering over 3 million km² or 11 % of the land surface of the region.[60] The proportion of each country's territory declared as PAs varies between 0.4 % (Afghanistan) and 51 % (Bhutan), though the figures for several Central Asian countries are likely to be incomplete. Cambodia, Lao PDR, Thailand, Mongolia, Sri Lanka, Nepal, Bhutan, Malaysia and Tajikistan have all declared 17 % or more of their land surface as PAs, the agreed figure under the CBD Aichi[61] targets.

3.1.1 Protected area coverage

Extensive PA networks are important, but so is the representation of the full diversity of ecosystems and species within the PA network. Comparison of the distribution of PAs with the actual distribution of threatened and endemic species is possible in regions where key biodiversity areas (KBAs)[62] have been defined, and shows that the current coverage by PAs cannot be expected to effectively conserve all biodiversity and ecosystems, as many KBAs or portions of them are not protected. For example, in the Greater Mekong countries, between 33 % and 83 % of KBAs are within protected areas; and in Island South-East Asian countries, between 13 % and 40 % of KBAs are within protected areas[63]. A similar conclusion was reached by an analysis of the representation of land-cover types and threatened vertebrates[64] in the Indo-Burma hotspot (corresponding to the Greater Mekong in this report), which concluded that protected area coverage should be increased to 21 % of the region's land area, requiring an additional 102 000 km², primarily in Myanmar (36 900 km²) and Cambodia (14 500 km²). Similar studies have identified the need for expansion of PA networks in Mongolia and China.

Regional initiatives and programmes have helped highlight the importance of groups of sites, both protected and unprotected, for particular groups of species. The East Asian-Australasian Flyway Partnership[65], a voluntary initiative that includes governments, NGOs and businesses, aims to protect the sites along a globally important route for the annual migration of waterbirds, which extends over 22 countries from within the Arctic Circle to Australia and New Zealand, encompassing East and South-East Asia. Among the countries covered by this study, Bangladesh, Cambodia, China, Indonesia, Malaysia, Mongolia, Myanmar, the Philippines, Thailand and Vietnam are all members of the partnership[66]. PNG has yet to join but has proposed a site under the flyway network. The Partnership has working groups focused on the conservation of specific species and groups of species, including cranes, ducks and shorebirds.

There have been some actions led by governments, in some cases with the support of NGOs, to create new protected areas to fill the gaps in coverage. The Philippines has conducted a detailed analysis of gaps in coverage and made proposals for new protected areas. In other countries, the expansion of community-managed reserves and, in a few cases, privately owned reserves are helping to address the problem. There are over 100 community-managed protected areas in China, usually established on sacred forest or collective land and protected by local culture, beliefs and religion (see also section 3.2.3, on the role of community-managed areas in landscapes).

The largest expansion of protected areas in recent years has been in the marine realm, with the creation of large marine protected area (MPA) networks in some countries. MPAs operate at a variety of scales, from small, local sites to huge open sea reserves, and are generally sub-divided and managed as multiple-use areas, with management and harvesting rights delegated to specific groups. Within the six Coral Triangle countries (Malaysia, Indonesia, Timor-Leste, Philippines, PNG, Solomon Islands), 1 972 MPAs covering about 200 881 km² have been established, with efforts between the countries to standardise MPA development, implementation and effectiveness. One of the most extensive networks is in the Philippines, where local governments have established around 1 600 community MPAs, and 28 others have been declared nationally.

3.1.2 Protected area effectiveness

Protected areas need resources, planning, and effective implementation of management programmes, including action against the threats which necessitated the creation of the PA in the first place. Measuring PA effectiveness is currently uncoordinated and sporadic, both within countries and across the region, but it is clear that there are significant challenges. For example, a quarter of the land inside South Asia's protected areas is classified as human-modified, with habitat conversion rates inside protected areas often indistinguishable from that on unprotected lands[67,68], and the rate of conversion of intertidal estuaries in the Yellow Sea is the same inside and outside protected areas[69]. An assessment of China's protected areas concluded that while 14 % of the country is officially protected, less than 2 % of the country was under effective protection.[70]

Across the region, PAs are reported to be underfunded and, in some cases, highly dependent on donor projects and NGO fund-raising. Only in Thailand does data suggest that a minority of PAs (all high-profile national parks) receive funding that is adequate on a USD-per-km² basis. At the other extreme, Cambodia (with 26 % of its land area declared as PAs) provides a small budget for infrastructure only, leaving PA monitoring and field operations dependent on technical support and funding from international NGOs and projects. Between 2010 and 2015, Myanmar allocated around EUR 1 million per year for PAs, an average of EUR 19/km². However only 20 out of 36 PAs receive any funding, at a level which varies from EUR 1.50/km² to over EUR 1 000/km². Donor funding was 59 % of total funding for PAs in Myanmar during the same period.[71]

(60) Note that data for PA numbers and area are partly reliant on the World Protected Area Database, which presents data submitted by governments but is known to be incomplete in some cases.
(61) The Aichi Biodiversity Targets are part of the Strategic Plan for Biodiversity 2011-2012 adopted by the parties to the Convention on Biological Diversity in 2010. At global level they consist of 5 strategic goals and 20 targets, which provide a framework for the development of national targets and National Biodiversity Strategies and Action Plans. The 5 strategic goals address mainstreaming biodiversity; reducing pressure and promoting sustainable use; safeguarding ecosystems and species; enhancing the benefits from biodiversity and ecosystem services; and enhancing implementation. Further information: https://www.cbd.int/sp/targets/default.shtml
(62) Key biodiversity areas are sites identified on the basis of the presence of significant populations of unique or globally threatened species and ecological communities. KBAs have been identified for most of the world's biodiversity hotspots (section 1.2.1), using criteria agreed by the global KBA partnership. Ref: IUCN (2016). A Global Standard for the Identification of Key Biodiversity Areas.
(63) This comparison does not mean that all KBAs should become protected areas. There are several other potential mechanisms for securing the biodiversity within them, including community and private management. However, KBAs provide the best available base pine against which to judge the coverage of national PA networks.
(64) Tantipisanuh N., T. Savini, P. Cutter and G.A. Gale (2016). Biodiversity Gap Analysis of the protected areas system of the Indo-Burma Hotspot and priorities for increasing biodiversity representation. *Biological Conservation* 195, pp. 203-213.
(65) http://www.eaaflyway.net/about/the-partnership/, accessed 20 September 2016
(66) http://www.eaaflyway.net/about/the-partnership/partners/
(67) Symes W.S., M. Rao, M.B. Mascia and L. Roman Carrasco (2015). Why do we lose protected areas? Factors influencing protected area downgrading, downsizing and degazettement in the tropics and subtropics. *Global Change Biology* 22(2), pp. 656-665.
(68) Clark N.E., E.H. Boakes, P.J.K. McGowan, G.M. Mace and R.A. Fuller (2013). Protected Areas in South Asia Have Not Prevented Habitat Loss: A Study Using Historical Models of Land-Use Change. *PLOS ONE*. http://dx.doi.org/10.1371/journal.pone.0065298.
(69) Murray, N.J., R.S. Clemens, S.R. Phinn, H.P. Possingham and R.A. Fuller (2014). Tracking the rapid loss of tidal wetlands in the Yellow Sea. *Frontiers in Ecology and the Environment* 12(5), pp. 267-272.
(70) The assessment, using the METT approach, was carried out by WWF in 2007.
(71) Emerton L., U.A. Kyin, R. Tizard (2015). Sustainable financing of protected areas in Myanmar. Yangon: Wildlife Conservation Society. Available at http://goo.gl/cGip0X

Using a GPS to map illegal logging, Indonesia. The Spatial Monitoring and Reporting Tool (SMART) provides park staff with technology and capacity to collect field data, which is linked with other information to help target protection efforts. The SMART system is now applied at more than 500 sites worldwide, including in at least 11 of the countries covered in this study.

Ranger post, Tsagaan Shuvuut special protected area, Mongolia. Lack of funds for maintenance and operational costs affects protected areas across the region. In some Mongolian protected areas portable ger tents now offer a more flexible and effective solution for the limited ranger staff, who have to cover very large areas.

Rangers use fireworks to drive elephants out of crop fields and into the forest, Way Kambas National Park, Indonesia. Conflict between local people and wildlife causes economic losses and injury, leading to killing of wildlife and opposition to protected areas. Non-lethal methods to reduce the damage, including helping communities to better protect their livestock, are now being promoted.

In China, PA managers often pursue business opportunities to generate funding for PAs, sometimes to the detriment of the biodiversity values. An additional problem in many countries is that even where parks are able to attract significant income from tourist revenues, this income must be surrendered to central government, and is not available for managing the parks.

An EU-funded review of protected area financing in Myanmar[72] identifies a range of options for improving the funding of PAs, many of which are relevant across the region. The study proposes diversifying sources of funding for PAs, increasing retention and reinvestment of funds generated by the PA, and improving financial management. Diversifying sources of funds includes market-based instruments (user fees, payment for ecosystem services), enhanced allocations from national budgets (e.g. debt-for-nature swaps, allocations from a wider range of departmental sources), and private sector engagement (donations, cost-sharing, biodiversity offsets, concessions and leases).

In addition to increases in central government funding for park management, there have been attempts to diversify the types of funding available to PAs. The Vietnam Conservation Fund was a EUR 11.5 million sinking fund, set up to channel funds and technical advice to special-use forests (protected areas), with grants made on the basis of a competitive proposal process, and implementation supported by technical advisors[73]. A similar fund in Lao PDR combined an endowment and a sinking fund. The Bhutan Trust Fund for Environmental Conservation is an endowment fund, which provides grants for biodiversity conservation and local capacity building. Other possible strategies are investment in the tourism and ecosystem services potential of parks, including REDD+[74] (where relevant), and allowing parks to collect revenue and use it for protection.

Lack of resources often results in low staff morale, lack of accountability, little incentive for high performance, limited technical capacity, inadequate legal knowledge, poor relations with surrounding communities and tensions with local governments. At many sites, effective patrolling and other management only happens in the context of a donor programme or with the support of an international NGO. Lack of field staff is a widespread problem: examples include sites in Afghanistan (66 rangers for 11 000 km², 166 km² per ranger) or Iran (13 game guards for 15 170 km², 1 200 km² per guard).

There are numerous government and civil society initiatives to improve the effectiveness of PAs. Important approaches with regional applicability include:

- the implementation of the SMART (Spatial Monitoring and Reporting Tool)[75] approach to improve the management and implementation of law enforcement in protected areas, including the use of the SMART patrol database (see Box 3 on SMART, section 5.2.1);
- numerous capacity building initiatives, many site- and project-based, and some attempts to build institutions and a community of conservation professionals. The IUCN WCPA[76] and the ASEAN Centre for Biodiversity Conservation have developed competency standards for protected area managers[77], while the Royal University of Phnom Penh, Cambodia, runs a biodiversity conservation masters course which trains mid-level managers, and includes practical management skills (e.g. budgeting, planning) and a research placement in a PA;
- increased collaboration between PA authorities and neighbouring communities on management and resource sharing. These approaches can help to reduce any negative impacts of protected areas on local livelihoods, and allow the integration of protected area management into multi-stakeholder management of the wider landscape. In Vietnam, examples include paying local people for the planting and protection of natural forests in national parks, while in Lao PDR the National Protected Areas system aims to involve local stakeholders in the designation and management of sites. Over 50 communities were involved in CSOs which helped create Afghanistan's first two protected areas, Band-e-Amir National Park and Wakhan National Park, and both parks are now developing co-management systems;
- scaling-up work by communities and NGOs to address human-wildlife conflict, which is an increasing problem across the region. Developing and testing alternatives to killing 'problem' animals (including tigers, elephants, snow leopards), and training local people to use them, has reduced the damage to livelihoods, and thus reduced opposition to PAs. Emerging initiatives such as the Safe System Approach[78] ensure that all the six elements (prevention, mitigation, response, research, policy and monitoring) of conflict are addressed. A project in Kaeng Krachan National Park in Thailand has promoted elephant alarm fences and night patrol teams, resulting in a significant decrease in conflicts and in the losses experienced by farmers[79];
- integration of protected areas into larger scale land use and economic planning. Examples include buffer zones outside PA boundaries: legislation in Bangladesh prohibits detrimental activities within 'Ecologically Critical Areas' up to two kilometres from protected areas, while in India ecologically sensitive zones or areas (ESZ/ESAs) limit development up to 10 kilometres from the boundaries of protected areas. In PNG, the 2014 protected area policy aims to ensure that legislation for the mining and logging industries respects protected areas;
- standardising the monitoring of protected area management effectiveness. The Management Effectiveness Tracking Tool (METT)[80] approach has been widely applied by projects, but the results are not always independently verified. The Conservation Assured Tiger Standards sets out minimum management standards for the management of tiger reserves[81]. IUCN has also launched a 'green list' of well-managed PAs, where management standards have been independently assessed and certified. The green list approach is being piloted in China, Korea and Australia.[82]

(72) Emerton, L., Kyin, U. A., Tizard, R. (2015) ibid.
(73) Emerton, L., Kyin, U. A., Tizard, R. (2015) ibid.
(74) REDD+, as used by the UNFCCC, is '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 in developing countries'.
(75) A similar system, MIST, was implemented in the region from 2007-2012 but has been superseded by SMART.
(76) International Union for the Conservation of Nature and Natural Resources' World Commission on Protected Areas.
(77) https://www.iucn.org/content/global-register-competencies-protected-area-practitioners. Also Appleton M., G.I. Texon and M.T. Uriarte (2003). Competence Standards for Protected Area Jobs in Southeast Asia. ASEAN Regional Centre for Biodiversity Conservation.
(78) WWF TAI (2015). Human Wildlife Conflict: a SAFE Approach. WWF Tigers Alive Initiative.
(79) See http://www.wcsthailand.org/english/hec, accessed 25 May 2017.
(80) The Management Effectiveness Tracking Tool. See https://www.conservationgateway.org/ExternalLinks/Pages/mett-management-effective.aspx
(81) Conservation Assured (2016). CA/TS Manual Version 1.3. Conservation Assured, Petaling Jaya, Malaysia.
(82) https://www.iucn.org/theme/protected-areas/our-work/green-list

A community ranger burns an offering to show his respect to the mountains, Munkhkhairkhan National Park, Mongolia. Involving local people can bring traditional knowledge and values into park management, while community members receive training, an income and an understanding of the objectives of the park.

China accounts for some 70 % of global demand for ivory, with devastating impacts on African and Asian elephants. The trade is enabled by improving transport and communication links between the continents. Tighter regulation in China and international cooperation by government, companies and civil society is helping to address the problem, but has not yet stopped the trade.

3.1.3 Protected area governance

The Philippines and Papua New Guinea have relatively progressive PA governance arrangements. In PNG, a new PA act (2014) responded to the fact that 95 % of the land is owned by customary communities by laying the basis for collaborative creation and management of PAs. The Philippines has the most comprehensive regulations for PAs, including the creation of new areas, incorporation of indigenous rights, and the establishment of multi-stakeholder management boards.

Across South Asia, Mongolia, Island South-East Asia and the Greater Mekong, PA governance is relatively well established, with clear laws and institutional responsibility. However, in several countries – in particular Cambodia and Lao PDR – this official designation lacks political support and is ignored or amended to allow land-based investment to go ahead. The PA downgrading, downsizing and degazettement tracking database[83] has records of 153 instances of downgrading or downsizing of PAs, the majority in Cambodia. In some countries, corruption results in misuse of funds and undermines key decisions on, for example, staff appointments or granting of management rights.

PA governance faces some significant challenges in China, with seven different agencies involved in the creation and management of PAs. There is a lack of clarity over roles and mandates between government agencies, as well as overlaps between PAs and private land status and titles, resulting in overlapping jurisdictions, agencies and programmes. Use zones within PAs do not have adequate legal standing, and so diverse government agencies operate independently within protected areas, with protected area managers only able to exert effective control in the core zone, which is usually small.

One approach to increasing the public profile and political support for protected areas is to emphasise their economic and social value. A number of studies have valued the natural capital of protected areas (see for example Box 4, section 5.2.1 on valuation of Indian tiger reserves), but there are not yet any examples of the results of these studies being incorporated into national accounting or asset inventories. The Biofin project[84] offers an integrated approach to identifying biodiversity finance needs and opportunities.

3.1.4 Regional cooperation on protected areas and the environment

ASEAN provides an example of a regional grouping of countries that has integrated environmental concerns across its strategies, and that promotes collaboration on protected areas as well as other environmental issues. ASEAN promotes economic, political and security cooperation between its 10 members: Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.

ASEAN's overarching objectives and policies are detailed in three 'blueprint' documents: the ASEAN economic community blueprint 2025, the political-security blueprint 2025, and the socio-cultural community blueprint 2025[85]. The latter includes environmental cooperation for sustainable development and regional integration as a pillar of ASEAN, identifying several priority areas of regional importance[86]: regional cooperation to protect, restore and promote sustainable use of terrestrial, marine and coastal ecosystems and to halt biodiversity loss and land degradation[87]; sustainable forest management (embedded in the ASEAN Agreement on Transboundary Haze Pollution); addressing the impact of development projects on natural environments[88]; sustainable consumption and production, and the development of green economies.

The **ASEAN Centre for Biodiversity** (ACB)[89], established in 2005 through an EU-supported initiative, is an intergovernmental organisation that facilitates cooperation and coordination on conservation and sustainable use of biodiversity among the ASEAN member states and regional and international organisations. The centre's ongoing programme includes the ASEAN Heritage Parks programme[90] and the Biodiversity Conservation and Management of Protected Areas programme. The centre acts as a clearing house to facilitate access to biodiversity information in the ASEAN region in support of science-based decision-making.

The **ASEAN Working Group on Nature Conservation and Biodiversity** was established by ASEAN leaders and is a forum for cooperation on biodiversity conservation, including discussions of ASEAN member state positions in relation to the biodiversity conventions.

EU-ASEAN Cooperation is reviewed annually by a Joint Cooperation Committee. Funds of EUR 170 million have been exclusively earmarked for ASEAN for 2014-2020, covering three focal sectors:

- Connectivity through sustainable and inclusive economic integration and trade;
- Climate change, environment and disaster management;
- A Comprehensive Dialogue Facility.

Two recent programmes are part of EU Development Cooperation in the ASEAN region[91]: the Sustainable Use of Peatland and Haze Mitigation in ASEAN programme (EUR 20 million, 2016-2019), which aims to promote the sustainable management of peatlands in the ASEAN region and fight transboundary haze pollution, and the Biodiversity Conservation and Management of Protected Areas in ASEAN programme (2016-2021, EUR 10 million), which aims to enhance the conservation of biodiversity and the effective management of protected areas in the ASEAN region, targeting ASEAN Heritage Parks. It is implemented in close coordination with the ACB. The programme will include site-level actions to improve PA management effectiveness, national interventions to enhance knowledge and mainstream biodiversity conservation, and actions to strengthen the capacity of the ACB to support the regional biodiversity agenda and ASEAN member states.

(83) http://www.padddtracker.org/view-paddd
(84) Biofin is managed by UNDP and supported by the European Commission and several European governments. Further information: http://www.biodiversityfinance.net/
(85) ASEAN Socio Cultural Community (ASCC) Blueprint.
(86) http://environment.asean.org/action-plans/
(87) ASCC Blueprint, p. 110, Strategic Measures C1 (i) and C (iii).
(88) ASCC Blueprint, p. 111, Strategic Measures C1 (iv).
(89) http://aseanbiodiversity.org/
(90) ASEAN Heritage Parks (AHPs) are defined as 'protected areas of high conservation importance, preserving in total a complete spectrum of representative ecosystems of the ASEAN region'. See http://aseanbiodiversity.org/the-ahp-programme/
(91) https://eeas.europa.eu/delegations/association-southeast-asian-nations-asean/907/eu-projects-asean_en

Sign marking an elephant corridor, Karnataka, India. Government and NGOs have worked with local people to set aside land to form the corridor, maintaining the link between two important protected areas with a population of 2 000 Asian elephants, and reducing conflict between them and local farmers.

Gillnet is cut from the snout of a Ganges river dolphin. Species which inhabit heavily used ecosystems, such as Asia's rivers and lakes, depend on integration of sympathetic management practices into resource management by local people and industry.

3.2 Landscape and seascape-scale conservation

Landscape and seascape approaches 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.[92] Government, private sector and local resource users all have important roles to play.

Landscape and seascape approaches can alleviate pressure on PAs, addressing the drivers of threats, such as unsustainable land-use or poor land-use planning or zonation, rather than only trying to deal with the immediate problems through enforcement. These approaches also improve connectivity between PAs and help maintain important biodiversity values in the landscape or seascape, including those that may not be effectively protected within the boundary of a protected area. Rather than being limited to conventional PAs, landscape and seascape approaches offer the opportunity to work with private sector and community actors using financial incentives, safeguards and planning controls, certification, land tenure and resource management rights. These approaches need to be supported by national-level policies and programmes that encourage sustainability in key sectors, including industrial agriculture, extractive industries and infrastructure.

Landscapes and seascapes play an important role in the maintenance of ecosystem services, which include water for intensive irrigated agriculture, a wide range of plant and animal products, and services such as pollination and pest control. Landscapes and seascapes in the region also provide recreational opportunities for millions of people from urban centres, and for international tourists. Maintaining the quality of these services underpins economic and social development in the region.

A landscape or seascape approach is a basket of different actions by different stakeholders, not a single well-defined approach. Examples of relevant actions are described below for each main stakeholder group, but in many cases they are not carried out in the context of a deliberate landscape or seascape approach.

3.2.1 Government actions

Government actions in support of landscape and seascape approaches include establishing a supportive regulatory and policy framework, putting in place mechanisms to ensure security of tenure and rights to manage resources, and creating or allowing the development of financing mechanisms.

Regulatory and policy frameworks cover land-use zoning, assessment of environmental impacts and risks, and limits to the harvest or off-take of wild biodiversity or fisheries.

Land-use zoning: Across Asia, national governments typically retain ultimate control over land and natural resources, although PNG and the Solomon Islands recognise the pre-eminence of customary rights (Timor-Leste also recognises customary rights in its constitution), while in Malaysia and Pakistan control over natural resources is delegated to sub-national governments (states). All governments use their authority to put in place land-use zoning, which specifies, at a broad level, which areas are available for urbanisation, industrial development or agricultural development. Some have gone further and identified areas that are priorities for ecosystem functions. These include China's definition of ecological function conservation areas for soil and water conservation, erosion control, and biodiversity maintenance, part of the 'ecological red-lining' approach. Other examples are (i) the identification of 'conservation blueprint' zones in Mongolia, which are subject to higher levels of environmental safeguards for mining and other development; (ii) the designation of 'watershed protection forests' in Indonesia; (iii) the priority given to sustainable management in forest corridors in Bhutan; and (iv) the current review of land-use zoning in Lao PDR. Land-use zonation does not necessarily accord with local community management practices which are in operation on the ground, and this may be a source of conflict (see 3.2.2).

In some cases, governments have put in place agreements that recognise the transboundary nature of important ecosystems. These areas require international action to ensure their preservation. Examples include cooperation between Vietnam and China on the Sino-Vietnamese Limestone landscape; between China, India and Myanmar on the management of the Brahmaputra-Salween (also called the Thanlwin river) Landscape; and between Cambodia, Lao PDR and Thailand over the management of the Emerald Forest complex. The Heart of Borneo initiative of the governments of Indonesia, Malaysia and Brunei Darussalam aims to coordinate the creation of protected areas and sustainably managed forests across the centre of the island.

Zoning is equally important in marine environments, delineating commercial, artisanal fisheries and no-take zones. Indonesia has a specific set of regulations on the management of small islands and coastal environments, and large international collaborative actions. Large areas of marine habitats in the Coral Triangle have been defined as seascapes: the Verde Island Passage in the Philippines; the Banda Sea Seascape, Lesser Sunda Seascape and Bird's Head Seascape in Indonesia. The Bird's Head Seascape is a particularly good example of a multi-stakeholder approach, as it involves international and local NGOs, government, private sector and customary communities (see Box 5, section 5.2.2, on multi-stakeholder involvement in the Bird's Head Seascape). Transboundary seascapes are also being established, including the Sulu-Sulawesi Seascape, which involves Malaysia, the Philippines and Indonesia, and the Papua-Bismarck Solomon Sea, which involves Indonesia, Papua New Guinea and the Solomon Islands.

Safeguards and impact assessment: Environmental impact assessments (EIAs) of economic development projects and investments are required by all the countries across the region, although there are issues with the quality, timing and follow-up in many cases. EIA laws have been reviewed, strengthened and improved in recent years, including in Lao PDR, China and Mongolia. In Mongolia, revisions to environment laws in 2012 included (i) strengthening the requirements for public participation, (ii) for reporting on environmental management plans, (iii) stricter sanctions for non-compliance, (iv) holding financiers to account, and (v) requiring companies to evaluate impacts on areas identified in the 'conservation blueprint' approach.

Regulating exploitation and promoting non-consumptive use: Applying limits to the harvest or off-take of specific species or wild products can be an important driver of more sustainable resource management. Where there is an opportunity for significant economic benefit from the exploitation of a single species, licensing or the delegation of rights to communities for management may focus on the species, rather than the ecosystem per se. In Tajikistan, a project focuses on building community institutions to manage markhor goat and urial sheep, with the goal of sustainable financing through trophy hunting. In Iran, five private, sustainable hunting reserves have been established under a 2016 law allowing a private entity to manage land under a 5 to 10-year lease, including for conservation purposes. There are examples of non-consumptive use, such as nature-based tourism, from many areas, including India and Nepal (tiger, rhino tourism) and Indonesia (orang-utan, marine tourism).

Security of tenure and the right to access, manage and protect natural resources is an essential requirement before any community or private sector company can invest in sustainable management. Since national authorities have control over natural resources in all the countries of the region (except PNG and the Solomon Islands), mechanisms for the state to grant control to communities are important within the context of a landscape or seascape approach. They exist in most countries, though the degree to which they are used varies widely. Thailand has a strong tradition of community-based forest management, sometimes based around temples, with hundreds or perhaps thousands of community forests. The Forest Rights Act in India provides a mechanism for granting management rights to communities, and Conservation Reserves and Community Reserves are official protected area categories, managed by communities. Nepal has a well-established system of community forest user groups, and participatory governance of community and collaborative forests has improved livelihoods and contributed to forest conservation. Myanmar has over 250 community forest user groups, and has established targets for expansion of community-managed forests and community-based protected areas, although progress to date has been limited. There are growing numbers of community-managed forest areas in Cambodia, facilitated by the Community

(92) Sayer J., T. Sunderland, J. Ghazoulc, J.L. Pfund, D. Sheil, E. Meijaard, M. Venter, A.G. Boedhihartono, M. Day, C. Garcia, C. Van 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. http://www.cifor.org/publications/pdf_files/articles/ASunderland1302.pdf

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Working with government agencies and local community groups, the Royal Society for Protection of Nature, Bhutan, promotes the sustainable management of wetlands and forests in the Phobjikha valley, important for the threatened black-necked crane and critically endangered white-bellied heron.

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***REDD+ may offer an incentive to m**aintain forests, but rural communities generally lack the technical knowledge and funding to take part. Support from the private sector and CSOs can enable local groups to set up community carbon pools, where communities with small forest areas share the costs and risks of engaging with REDD+.*

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Timber from certified sustainable logging operations. Certification schemes enable buyers and consumers to make choices about the environmental and social footprint of the products they buy. To be successful they require consumer education as well as technical assistance to companies to help them meet the standards.

Protected Areas regulation. Mongolia has moved towards community-based natural resource management through the creation of community cooperatives that are given conditional user rights[93], mainly to forest and grazing lands.

In some countries, governments have gone beyond granting management concessions, and recognised community tenure rights over land and resources. In PNG this is based on recognition of the primacy of customary rights in the constitution, with regulations on protected areas and resource extraction rights developed within this framework. The Philippines recognises and supports communities to claim and develop their ancestral domain. A 2013 court decision in Indonesia also opened the possibility of the country's large number of indigenous communities having their rights to forestland recognised.

Systems for granting rights to the private sector for land use and resource extraction are generally well developed, in response to the needs of private capital investors. Frequently the granting of these rights by governments has been a source of conflict with local populations, and a cause of environmental degradation. In the context of a landscape approach, new models of licensing may be needed to encourage investment in long-term, sustainable business models, including REDD+ schemes. An example of a significant change in policy was the creation of a new category of commercial forest licence, for 'ecosystem restoration', by the Indonesian Ministry of Forestry in 2004. By 2016, 16 such licences had been granted covering 6 230 km² of forest[94].

Clear, defensible access to resources in marine ecosystems is equally important for sustainable management. The Government of PNG is legally obliged to recognise customary marine tenure, and has worked with communities through the creation of locally managed marine areas, aiming to ensure that the needs of coastal communities are respected and recognised by the commercial fisheries industry. In Indonesia, there are discussions about enabling local fishing groups to have management rights over areas of marine territory.

Financial incentives: Governments provide resources to support landscape or seascape-scale approaches to maintenance and restoration of ecosystem services, in some cases on a large scale. The Chinese Government has invested massively in incentivising sustainable land use, through eco-compensation payments, across a network of National Key Ecological Function Areas, and through six major forestry programmes, which pay people to plant and maintain tree cover on land vulnerable to erosion and desertification. The Vietnamese Government makes payments to forest owners who plant and maintain 'special use' forests through payments into community bank accounts, known as the 'savings book' approach. In Indonesia, the Green District Development Programme introduced an environmental component to village-level development planning, providing grants for community activities that improved local environmental management. In India, the government provides financial assistance through the Integrated Development of Wildlife Habitats scheme, which includes funding for protection of biodiversity outside PAs. Mongolia has also introduced a Pastures, Conservation and Climate Action pilot scheme, which uses a Payment for Environmental Services approach to support community-owned approaches to carbon sequestration, improved livelihoods and biodiversity conservation.

Governments have also put in place regulations permitting, or in some cases mandating, payments based on ecosystem services. Vietnam's Payment for Environmental Services programme obligates ecosystem service users (e. g. hydropower, water and tourism companies) to pay registered forest owners for the provision of ecosystem services, including water, biodiversity and landscape aesthetics for tourism, and forest carbon sequestration. The scheme is reported to have contributed to the management of over 35 000 km² of forest by over 300 000 households. In Bhutan, the Sustainable Hydropower Policy allows for 1 % of the royalty of hydropower sales to be redirected to the Ministry of Agriculture and Forests.

Regional cooperation: The **Mekong River Commission** is an example of international collaboration on the management of a specific resource. This intergovernmental body was established in 1995 by the Governments of Cambodia, Lao PDR, Thailand and Vietnam with the aim of jointly managing their shared water resources and developing the economic potential of the river. The two upstream countries, China and Myanmar, are 'dialogue partners' of the Mekong River Commission. Member countries are required to inform the commission of any plans for dams.

Started in 2007, the Mekong River Commission has addressed the threat of climate change in the region, and initiated the Climate Change and Adaptation Initiative in 2009. The initiative now has EU funding (see section 5.3) and technical support from the Global Climate Change Alliance[95] for strategic analysis and planning, including an assessment of climate change risks to wetlands and biodiversity in the region, capacity development, pilot project implementation in each of the Mekong River Commission countries and mechanisms for regional cooperation.

(93) Under the laws on 'Environmental Protection' and 'Forests'.
(94) Institute for Global Environmental Strategies, http://www.iges.or.jp/en/natural-resource/20170615.html, accessed 4 July 2017.

(95) The Global Climate Change Alliance was launched in 2007 by the European Commission to strengthen dialogue and cooperation on climate change between the EU and developing countries. See http://www.gcca.eu/technical-and-financial-support/regional-programmes/gcca-lower-mekong-basin-ccai

Acacia plantation for paper production, Indonesia. Under pressure from NGOs and buyers, two of South-East Asia's largest paper producers have made commitments to stop clearing natural forests and to address conflicts with communities. While the commitments are important steps forward, their implementation remains controversial.

Women constructing solar cookers at the Barefoot College, Rajasthan, India. Barefoot Colleges teach self-reliance and support communities to address their development needs in sustainable ways. Solar cookers reduce the amount of wood collected from dry forest ecosystems, and save the time of women who collect it.

3.2.2 Local populations

Local populations, especially resource users but also those who benefit from ecosystem services or who have a customary claim to the area, are key stakeholders in a landscape approach. They can contribute to the sustainable management of a landscape through maintaining and enhancing traditional resource management systems, developing new, sustainable economic activities that combine improved livelihoods and conservation, and by collaborating with government and private sector actors. **An indigenous peoples' and community-conserved area (ICCA)** is a place where (1) a people or a community has a link with a clearly defined territory, area or species, (2) the community is the major player in decision-making and in management implementation, and (3) decisions and actions lead to the conservation of the territory, area or species and associated cultural values.[96] ICCAs include a range of terrestrial, freshwater and marine sites that are protected by communities for a variety of cultural and practical reasons. Hundreds of sites have been registered on the ICCA registry. Many more are unregistered, and it is possible that the total area of indigenous peoples' and community-conserved areas exceeds the protected areas set aside by government, but this is difficult to confirm because data is scattered and inconsistent.

Traditional management systems and institutions offer strong customary systems of land and resource ownership and management, dominating natural resource use in PNG and the Solomon Islands (for marine and terrestrial resources); they are also an important component of management systems in Timor-Leste. In some cases, customary institutions are becoming more formalised, to enable them to run projects and engage with external organisations more effectively; an example is the YUS[97] Conservation Organisation, in PNG, an association of customary landowners promoting conservation and community development needs on behalf of the YUS communities.

In other countries, customary ownership and mechanisms to prevent over-harvest of wild resource (e.g. sasi in Indonesia) survive in more remote areas, but are not well aligned with official policy. Countries such as the Philippines have made progress in integrating these customary communities and practices with the state's governance of land and resources (see section 3.2.1); the UNDP-GEF (United Nations Development Programme – Global Environment Facility) New Conservation Areas in the Philippines Project[98] aims to support indigenous communities to map, inventory and plan the management of their territories, and at the same time help to plug gaps in the Philippines' protected areas network.

Local populations are finding **innovative new approaches** to enhance livelihoods and maintain their environment, often working with projects and CSOs. Examples include successful local ecotourism ventures in Sumatran National Parks, the creation of local associations to transfer funds to communities in Indonesia or the development of 'community carbon pools' that allow communities to combine forest assets with achieving commercially viable REDD+ payments in the Greater Mekong sub-region. In PNG there are examples of encouraging intensive, sustainable farming methods, including reforestation using native species; and setting up conservation agreements that provide economic development to villages as a reward for the declaration of logging-free forests. In Pakistan, 65 new community-level governance institutions have been formed with over 100 community rangers to protect 10 000 km² of mountain habitat as part of an initiative to protect markhor goats. There are examples of religious groups playing a role in conservation; for example, in Cambodia, Buddhist monks are involved in the green shade movement, and the Association of Buddhists for the Environment, works for conservation in the Cardamom Mountains. In Myanmar, there are monks working on public awareness-raising for Alaungdaw Kathapa National Park.

3.2.3 Civil society organisations

CSOs have a key role to play in facilitating dialogue and negotiation between stakeholders in a landscape, mobilising interest, and bringing knowledge and experience from other locations to inform local stakeholders. In many areas, CSOs have played an important role supporting the integration of protected area management into the landscapes around them, including addressing issues such as community development, human-wildlife conflict and land-use zonation.

CSOs may also contribute to creating a supportive environment for landscape approaches by campaigning to apply pressure on governments and private sector players to adopt and promote more sustainable practices. A particularly successful model in recent years has been collaboration between campaign NGOs based in markets that are sensitive to public opinion (e.g. North America, Europe, Australia) and local NGOs in the region, which can investigate and document environmental and social abuses by the companies producing goods – timber, palm oil, paper, coffee, etc. – for these markets.

CSOs have also been instrumental in working with government and private sector partners to establish long-term financing mechanisms in support of landscape approaches. Examples include the Mama Graun Conservation Trust Fund in PNG, and the trust fund for the conservation management of the Cardamom Mountains of Cambodia. The Satoyama initiative is a collaborative programme implemented by Conservation International Japan, United Nations University and Institute for Global Environmental Strategies which supports sustainable management in high-biodiversity agricultural landscapes in the Indo-Burma hotspot (and other hotspots globally), with field projects in India, Myanmar and Thailand[99].

(96) The ICCA consortium is an organisation initiated by IUCN and the World Commission on Protected Areas with 109 members worldwide, including in nine of the countries covered by this report. The consortium documents and promotes the creation and management of ICCAs, including maintaining a global registry of sites. http://www.iccaregistry.org/en/about/iccas, accessed 31 August 2017.

(97) YUS is an acronym from the names of three rivers that flow through the area, Yopno, Uruwa and Som.

(98) http://pbcfi.org.ph/newcap, accessed 4 May 2017.

(99) The Satoyama programme is funded by the GEF, see http://gef-satoyama.net/

Cement factory in the Hon Chong hills, Vietnam. This 400 ha area of limestone outcrops and caves has the greatest density of critically threatened species on the planet. Half of the area has been destroyed for cement production. Some companies have taken action to mitigate their impact on biodiversity, but it is not yet clear if extinctions can be avoided.

3.2.4 Private sector

Globally, the links between private sector and biodiversity conservation are the focus of mechanisms such as the CBD Business and Biodiversity Platform, which has recently focused on encouraging companies to go beyond corporate social responsibility (CSR)[100] to integrate conservation and sustainable use of natural capital in business planning and operations[101]. The Natural Capital Protocol[102] offers a mechanism for doing this. The role of the private sector in landscape and seascape approaches to sustainable natural resource management can be divided into three broad groups: investing in biodiversity as a business; mitigating the impact of business activities, including in the supply chain; and contributing to the activities of other groups (communities, CSOs, governments) working on environmental issues.

There is little **investment in non-exploitative use of biodiversity and ecosystems** in the region, although the eco-tourism industry has become a driver of conservation in some areas. As noted above, some governments have put in place frameworks allowing Payments for Ecosystem Services schemes, REDD+ schemes and other initiatives. There has been some uptake of these opportunities by the private sector: a review of 57 REDD+ projects across South-East Asia found that 39% were developed by private sector interests, although NGOs and government also played an important role[103]. A pilot approach which values biodiversity directly is the Malua Biobank in Malaysia, which sells 'biodiversity conservation certificates' to companies wishing to promote a more environmentally responsible image, investing the funds in forest protection in Malaysian Borneo.

Reducing the environmental impact of private sector activities: Several major industries are the subject of voluntary certification schemes, which set minimum social and environmental standards. These schemes include those of the Roundtable on Sustainable Palm Oil (RSPO), for oil palm, the Forestry Stewardship Council (FSC) and others for timber. Uptake of these schemes is variable: the large number of RSPO and FSC-certified companies in Malaysia and Indonesia reflects the enormous importance of oil palm production and timber plantation and processing in those countries, as well as the relatively high level of scrutiny and oversight. Membership elsewhere in South-East Asia is much lower, with no FSC-certified concessions in Myanmar and very few in PNG, although these two countries have some of the largest natural forest logging industries in the region. Other industry standards of relevance to the region are the sustainable rice platform, the cement sustainability initiative, the sustainable natural rubber initiative and the marine stewardship council standards.

Under pressure from markets in developed countries, some companies have committed themselves to standards that go beyond industry certification schemes. By 2015, 60% of the global palm oil trade was under sustainability commitments that included having no deforestation in the supply chain. Similar commitments have been made by two of the largest pulp-paper companies in South-East Asia, which were major consumers of fibre from natural forests and land for tree plantations. Voluntary commitments are also being put in place in the clothing industry.[104] Examples of other companies taking action to measure and mitigate their impacts include oil and gas companies, such as Exxon-Mobil in PNG, and the Holcim cement company, which developed an action plan to reduce the impact of its mining in the Hon Chong hills of southern Vietnam, taking into account the unique karst biodiversity of the region. For hydroelectric companies, investment in sustainable land management aims to maintain water supplies and reduce erosion, rather than mitigate impacts. As an example, the Nam Theun 2 power company in Lao PDR pays EUR 0.8 million a year to support the management of the Nakai-Nam Theun Biodiversity Conservation Area.

The Extractive Industries Transparency Initiative does not address environmental issues directly, but by establishing standards for transparency about financial transaction, it can help reduce the opportunities for rent seeking and corruption, which often undermine environmental standards in the sector.

In addition to action by companies that directly use resources, some private banks and finance companies that invest in them have started to put standards in place, which are usually linked to due diligence and concerns over risks to debt. The Equator Principles have been adopted by 89 financial institutions from 37 countries, and also by members of the cross-sector biodiversity initiative International Petroleum Industry Environmental Conservation Association (IPIECA)[105] and the International Council on Mining and Metals, to promote sustainability across their sectors.

Public finance institutions, particularly the World Bank, the Asian Development Bank, and the International Finance Corporation (IFC), play an important role in establishing and enforcing social and environmental standards in their work with the private sector, national governments and civil society. The IFC's Performance Standard 6 on Biodiversity Conservation and the Sustainable Management of Living Natural Resources is a well-accepted and relatively rigorous standard, which has now been incorporated into the World Bank's safeguard policies.

The role of **private sector support to sustainability and conservation initiatives** is growing, through CSR payments and other mechanisms. CSR is normally voluntary, but Indonesian law requires state-owned enterprises, companies investing in the exploitation of natural resources, and the mining, oil and gas industry to operate CSR programmes, while companies listed on the Malaysian Stock Exchange are required to publish information on their CSR and are scored on its quality through the Environment, Social and Governance Index. CSR programmes can represent a significant investment: BNI, an Indonesian bank, spent EUR 7 million on CSR in 2014.

As an extension of its commitments to sustainable business practice, pulp-paper giant APP has committed to protect high conservation-value forests within its concessions, while its competitor APRIL has supported the creation and management of a 1 500 km² ecosystem restoration concession and a national park, both protecting peat swamp forest in Indonesia.

Examples of collaboration between the private sector, NGOs and sometimes government agencies are also increasingly frequent, and include Project BLUEprint in Sri Lanka, a partnership between travel companies, eco-tourism providers and an NGO promoting responsible, community-based whale watching. In China, the Alxa SEE Ecological Association is a large environmental NGO initiated and sponsored by more than 500 entrepreneurs, which aims to 'promote the sustainable development of nature and humanity'.

Private protected areas are still rare in the region (in contrast to their prevalence in Africa, for example), but one example is the Tambling Wildlife Reserve in Indonesia, which combines the protection of ecosystems on private land and the management of a section of a national park.

Examples of companies contributing financially to conservation in the area where they work include three companies operating gas pipelines crossing the Tenasserim Range (from Myanmar to Thailand), which contribute to a biodiversity compensation fund, HSBC's support to a 'forest rehabilitation and peatland management' project in Danum Valley, Malaysia; support by Chevron for a national park in Indonesia; support for government tree-planting programmes by Japanese car manufacturers and Indonesian cigarette companies; support from Shell Philippines for ecological research on Malampaya Sound. Companies have also made direct payments to NGOs in support of specific conservation objectives: WWF in Vietnam has partnerships with the International Investment Bank (conservation of Asian elephant in Vietnam), HSBC bank (Saola and forest protection), Coca-Cola (Tram Chim National Park management), Giant Ibis transport (conservation of giant ibis in Western Siem Pang, Cambodia) and Microsoft (mangrove restoration).

(100) CSR refers to voluntary actions taken by companies, often in the form of donation of funds or staff time, outside of their normal business operations, to achieve positive social or environmental impacts.
(101) https://www.cbd.int/business/meetings-events/2016.shtml, accessed 4 May 2017.
(102) http://naturalcapitalcoalition.org/protocol/
(103) Graham V., S.G. Laurance, A. Grech, A. McGregor and O. Venter (2016). A comparative assessment of the financial costs and carbon benefits of REDD+ strategies in Southeast Asia. *Environ. Res. Lett.* 11(2016), 114022.

(104) Rayon, an important component of clothing, is produced from wood fibre.
(105) IPIECA is the global oil and gas industry association for environmental and social issues.

3.3 Tackling wildlife crime

Whilst wildlife crime has been recognised as serious transnational organised crime at the UN and CITES levels for almost two decades, implementation of adequate law enforcement and criminal justice responses at the national level has varied considerably between countries. In some countries, it is only recently that national decision-makers changed their perception that wildlife crime was mostly connected to local traditions, subsistence and food security, and therefore not a priority for national and international action, while others reacted a lot sooner. Investigations have demonstrated the scale of the illegal global trade, the links to other forms of trafficking, corruption and funding for insurgency and terrorism. They have also shown that the illegal trade can be linked to the spread of disease, loss of revenue from legal trade, and in some cases undermining of local livelihoods and regional security.

Governments, international organisations and NGOs have responded to the threat posed by wildlife crime with updated legislation and regulations, improved enforcement, mechanisms for collaboration over data-sharing and capacity-building, and campaigns to raise awareness and change consumer habits. Donors, including the EU, have supported these actions with significant amounts of funding. However, the consensus is that the response has not yet been adequate to tackle the scale of the trade. Engagement by law enforcement agencies has increased in some cases but remains inadequate, and most prosecution and judicial services still do not treat organised wildlife crime as a serious issue.

As noted in section 2.1.1, the wildlife crime issue is complicated by human-wildlife conflict and by the poorly regulated domestication and farming of wild species.

3.3.1 Government actions

Regulation

All countries in the region have legislation on biodiversity conservation, although laws vary between countries in terms of degree of protection and the species covered. In Pakistan and Malaysia, the federal system means that the countries' component states have authority in this area. In some countries, legislative loopholes that can be exploited by criminals and unscrupulous traders are a major concern, but in many there have been moves to update and improve weak legislation: Afghanistan, Kyrgyzstan and Kazakhstan have banned poaching and trade of snow leopard products, and increased penalties[106]. Indonesia banned manta ray hunting in 2015[107] (in response to the CITES CoP16[108] listing of manta rays on Appendix II). Many countries have also developed action plans to coordinate and increase support for action on species threatened by trade: Malaysia and Indonesia have national action plans for the conservation of tiger, Asian elephant and orang-utan, and both these countries and the Philippines have initiated national plans of action for shark protection[109]. Countries in Central Asia have developed National Snow Leopard Ecosystem Protection Programmes in the context of the Global Snow Leopard and Ecosystem Protection Programme. Nevertheless, national legislation and regulations are frequently weak in one or more of the following areas:

- full protection is given to species which are native to the country, but not to non-native species, even when these species are traded through the country[110]. This makes it more difficult to coordinate action against trafficking across international borders;
- hunting and sale of threatened species is prohibited, but possession or consumption is not;
- trade in products from threatened species which are captive-bred or farmed is allowed, creating opportunities to 'launder' illegal products as legal ones;
- the trade in synthetic or fake wildlife products is not controlled, complicating enforcement;
- sanctions allowed by legislation are limited to administrative sanctions and fines.

Political support is key to ensuring that resources are allocated and legislation enforced consistently. The recognition of wildlife crime as a high priority by heads of states has given more visibility to the issue. The heads of state of Vietnam, Laos PDR, Cambodia, Myanmar, India and China have all attended conferences and made statements on the issue, with the Vietnamese Prime Minister issuing a directive on wildlife crime in 2014[111].

In addition to tackling poaching and trafficking, legislation and regulations that limit or close the market for products from threatened wildlife in consumer countries are very important. China has committed to close its domestic ivory market by the end of 2017, and to address a loophole that allows smuggled ivory to be passed off as legitimate domestic trade, with action against domestic ivory retailers commencing in March 2017[112,113]. Efforts to reduce the demand for wildlife products

(106) Regional Enforcement Strategy to Combat Illegal Wildlife Trade in Central Asia 2015-2018.
(107) http://voices.nationalgeographic.com/2014/02/21/indonesia-announces-worlds-largest-sanctuary-for-manta-rays/, accessed 7 September 2016.
(108) Sixteenth session of the Conference of the Parties.
(109) See http://smartconservationtools.org/wp-content/uploads/2016/01/SMART-2015-Annual-Report.pdf
(110) For example, it was legal to trade African elephant ivory in Thailand until 2016, and Indonesian legislation protects the native sub-species of tiger, but not the other sub-species (S. Zain, TRAFFIC, personal communication, March 2017).
(111) https://cites.org/eng/news/sundry/2014/20140318_vn_pm.php, accessed 22 April 2016.
(112) The USA has made similar commitments, enacting a partial ban in July 2016.
(113) http://www.ifaw.org/international/news/ifaw-china-shuts-down-one-third-ivory-factories-and-shops

Manta rays butchered for sale. This iconic marine species attracts tourists, and awareness campaigns have promoted the fact that manta rays are more valuable alive than dead. Recent moves to strengthen their protection include listing on appendix 2 of CITES (2013) and banning of manta ray hunting in Indonesia (2014).

and/or close domestic markets have been implemented by governments and civil society organisations (see 3.3.3, and Box 7 on CSO campaigns to reduce consumer demand for ivory in China, section 5.2.3). China's revised Wildlife Protection Law, passed in 2016 and effective from January 2017, prohibits the use of online trading platforms to buy and sell illegal wildlife and wildlife products, and further regulates the farming of protected species for domestic trade and consumption[114].

Farming of wildlife species can pose particular challenges for conservation (see section 2.1.1) and has been the subject of campaigns for bans or tighter regulation, especially for endangered, CITES Appendix I-listed species. The CITES Conference of the Parties (CoP) has now called for a phase out of commercial tiger farms. At the 2016 CITES CoP and Standing Committee meetings, Lao PDR announced that it was 'looking for ways to phase out tiger farms'[115], but farming of other threatened species continues in the country, as it does in Cambodia, China, Thailand and Vietnam (with some of those farms in violation of national law, and concerns that they are a source of illegally exported animals and products).

Wildlife crime breaks laws on trade, tax, animal and plant health, imports and exports, and money laundering, organised crime, fraud, conspiracy, corruption and illegal immigration, and can be addressed using the laws and agencies dedicated to these crimes.

Enforcement

Every country in the region has an agency mandated to enforce existing laws on wildlife poaching and trafficking. Although enforcement action against wildlife crime has increased, it remains sporadic in most countries. Seizures are promoted as evidence of success (and are more widely reported than arrests and prosecutions), while the number of arrests, prosecutions and seizure of assets remains limited. Those arrested are most often low-level couriers, not the organisers and financiers of the trade, and governments rarely report on successful prosecutions. When there are prosecutions, the penalties imposed are often small. Lack of capacity for intelligence-led enforcement, corruption and involvement of political elites in the lucrative trade further undermines enforcement and prosecution in many countries.

At the supply end of the illegal wildlife trade, there are many initiatives and collaborative efforts with NGOs, international agencies and technical assistance projects, which combine enforcement with elements of community involvement.

(114) There are some concerns about how the law sustains the market for wildlife products by allowing parallel markets for captive bred products. See https://eia-international.org/wp-content/uploads/Chinas-revised-Wildlife-Protection-Law-EIA-concerns-and-opportunities.pdf
(115) Statement by H.E. Mr Sommad Pholsena, Laos Minister of Natural Resources and Environment at the 67th Meeting of the Standing Committee to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), ahead of the 17th Conference of the Parties (CoP17) to CITES in Johannesburg, South Africa, as reported on https://eia-international.org/groups-welcome-intention-laos-phase-tiger-farms, accessed 15 October 2016.

They include some that promote sustainable off-take (e.g. sustainable hunting of markhor goats in Pakistan and urial sheep in Tajikistan), and working with communities to address human-wildlife conflict and reduce poaching (e.g. community-based conservation of snow leopard, wolf, argali and ibex in Kyrgyzstan). Many of the projects focused on protected area management also include elements of targeted monitoring and prevention of poaching of high-value species such as elephants, rhinos and tiger (see section 3.1). Intelligence-led approaches have been used in India, where authorities have successfully dismantled tiger and pangolin poaching and trade networks[116], and in Nepal, where coordinated law enforcement and effective engagement of local communities have led to reduced poaching of rhinos, and established a successful model for the conservation of commercially valuable species[117,118].

Much of the effort against wildlife crime focuses on trafficking. To be effective, this requires coordination between agencies with mandates for biodiversity conservation, criminal prosecution, tax and revenue enforcement, and cross-border control. Initiatives to facilitate this coordination include India's Wildlife Crime Control Bureau, which brings together police, forest and customs officers; the Government of Nepal wildlife crime control committees, which allow coordination between the Department of National Parks and Wildlife Conservation, the Forest Department, customs, the army, the police, the National Investigation Department and the Crime Investigation Bureau; and Indonesia's Wildlife Crime Units, which bring together police, wildlife authorities and NGOs.

Where illegal hunting or illegal logging forms an important source of income or livelihoods for local and indigenous communities, top-down enforcement efforts may result in conflict with local stakeholders. Alternative mechanisms which combine enforcement with communication and delegation of management responsibility to communities may be more effective.[119]

Regional cooperation for enforcement

When wildlife crime is transboundary, enforcement across international borders requires data sharing and communication between agencies in multiple countries. Lack of resources and differences in software and systems can be obstacles to effective collaboration, but regional processes have been important in raising the profile of the issue and securing national commitments. The Wildlife Enforcement Networks for South Asia and the ASEAN countries exist to facilitate improved international coordination, which includes meetings, communication and information exchange. Member states of ASEAN have recognised the importance of action on wildlife crime, with ASEAN Ministers adding wildlife and timber trafficking to the list of priority transnational crimes, mandating follow-up through the ASEAN Senior Officials Meeting on Trans-National Crime.[120] Following this decision, the ASEAN National Police Network is also seeking to work more closely with the ASEAN-Wildlife Enforcement Network (ASEAN-WEN).[121]

In Central and East Asia, 12 countries signed the Bishkek Declaration on the conservation of the snow leopard, which led to the creation of a Regional Enforcement Strategy to Combat Illegal Wildlife Trade in Central Asia, and the Snow Leopard and Wildlife Enforcement Network. The WEN groups and the China National Inter-agencies CITES Enforcement Coordination Group[122] are supported by CITES. Another forum is the Asian Regional Partners Forum on Combating Environmental Crime[123], which operates under the auspices of UNEP, and brings together 25 governments, NGOs and international agencies. Some WENs have funding from donors or donor governments, but have not had the necessary political will and political support of Asian governments. Twenty-one of the countries covered in this report are signatories of one or more of the species' MoUs under the Convention on Migratory Species, which include species threatened by hunting and trade, such as sharks, marine turtles, saiga antelope and Bukhara deer (Annex 3).

The marine sector is also the subject of several regional initiatives or agreements, including the Coordinating Body on the Seas of East Asia, Partnerships in Environmental Management for the Seas of East Asia, Indian Ocean Tuna Commission, Western and Central Pacific Fisheries Commission and the Coral Triangle Initiative (CTI – See Box 2). Some of these agreements address the conservation and management of species subject to illegal or unsustainable trade. A donor programme, Bay of Bengal Large Marine Ecosystem Project, has also been active in promoting sustainable marine management in the Indian Ocean countries.

(116) Wildlife Protection Society of India (WPSI) in Maharashtra and Madhya Pradesh.
(117) Martin E., C. Martin and L. Vigne (2013). Successful reduction in Rhino Poaching in Nepal. *Pachyderm* 54, pp. 66-73.
(118) https://www.usaid.gov/sites/default/files/documents/1861/Page%2011.pdf
(119) Beyond enforcement: engaging communities in combatting the illegal wildlife trade. Regional workshop for Southeast Asia, with a focus on the Lower Mekong Basin. Hanoi, Vietnam, 15-16 November 2016. Workshop report available at: http://static1.1.sqspcdn.com/static/f/157301/27509043/1490964682887/Beyond-Enforcement-Viet-Nam.pdf?token=6J2BFdZ0jSXNZDd4jhx1zlKrvfM%3D
(120) https://www.unodc.org/southeastasiaandpacific/en/2015/10/asean-wildlife-timber/story.html, accessed 22 April 2016.
(121) http://www.freeland.org/blog-posts/senior-asean-officials-direct-wildlife-enforcement-network/, accessed 22 April 2016.
(122) https://cites.org/sites/default/files/eng/prog/iccwc/WENs/NICECG-info_sheet_Sept16.pdf, accessed 26 June 2017.
(123) http://www.unodc.org/southeastasiaandpacific/en/2010/02/arpec/story.html, accessed 22 April 2016.

Participants in a UNODC wildlife forensics training course, Vietnam. International collaboration, including through the International Consortium on Combating Wildlife Crime, has allowed skills, knowledge and information to be shared internationally in the fight against the illegal wildlife trade.

Box 2. THE CORAL TRIANGLE INITIATIVE ON CORAL REEFS, FISHERIES AND FOOD SECURITY (CTI-CFF)

CTI-CFF is one of the biggest conservation initiatives ever undertaken in the marine world, with financing of over EUR 500 million since 2009. The CTI-CFF was launched in December 2007. It is implemented through the regional plan of action developed by the Coral Triangle countries (Indonesia, Malaysia, Papua New Guinea, the Philippines, Solomon Islands, Timor Leste), which includes the preparation of implementation road maps for regional action on illegal, unreported and unregulated fishing and the live reef-fish trade, as well as community livelihoods and marine protected areas. In response, Malaysia, Indonesia and the Philippines have drafted National Plans of Action for the protection of sharks, sea turtles and other threatened species. Conservation NGOs and donor-funding agencies have played an important supporting role in the success of the partnership.

References:
http://www.coraltriangleinitiative.org/
Abraham A. (2015). Stock-take of CTI-CFF Programs and Projects: Strategic Review of Progress and Future Directions. Asian Development Bank
Asian Development Bank (2014). Regional state of the Coral Triangle – Coral Triangle marine resources: their status, economies, and management. Mandaluyong City, Philippines.

3.3.2 International organisations and collaborative mechanisms

Global organisations and networks play an important role in combating international wildlife crime, providing support to national governments and a platform for collaboration. The **International Consortium on Combating Wildlife Crime** (ICCWC)[124] is a platform for cooperation between CITES, Interpol, the UN Office on Drugs and Crime (UNODC), the World Bank and the World Customs Organisation, which works to increase capacity, strengthen criminal justice systems, raise awareness, promote the use of technology and promote cooperation between agencies. Key outputs of the ICCWC and its members include the Wildlife and Forest Crime Analytic Toolkit (see UNODC below), an Indicator Framework for Combating Wildlife and Forest Crime, Guidelines on Methods and Procedures for Ivory Sampling, Best Practice for Forensic Timber Identification, and training on anti-money laundering regimes. In early 2017, an ICCWC-coordinated project, Thunderbird, led by Interpol, resulted in 370 investigations, leading to 89 prosecutions, with participation from Bangladesh, Hong Kong, India, Indonesia, Mongolia, Sri Lanka and Thailand.

Interpol, the international police organisation, has projects addressing illegal international trade in waste, illegal logging and other forest crimes, the conservation of Asian big cats, illegal international fisheries trade and the ivory trade. All the countries covered by these reports are members of Interpol.

The **UN Office on Drugs and Crime** (UNODC) has a Global Programme for Combating Wildlife and Forest Crime, which aims to link existing regional efforts in a global system, enhancing capacity-building and wildlife law enforcement networks at regional and sub-regional levels. UNODC's Wildlife and Forest Crime Analytic Toolkit provides a basis for reviewing national frameworks and laws, capacity building, container profiling, data gathering, awareness and alternative livelihoods. The toolkit has been fully implemented in Bangladesh, Nepal and Vietnam[125]. The UNODC-CITES Asia Wildlife Enforcement and Demand Management Project (with funding of EUR 5 million from the EU, 2016-2020) aims to address international trade and demand for key African wildlife species in Asia, in particular African elephant, rhino and pangolin, and to reduce the illegal killing of elephant, rhino and tiger in Asia. The project is implemented by UNODC, and 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.[126]

The **World Bank** supports actions by ICCWC partners and the Global Tiger Initiative (GTI, see below). Its regional projects on wildlife crime included Strengthening Regional Cooperation for Wildlife Protection in Asia, working with the Governments of Bhutan, Bangladesh and Pakistan to build capacity and institutions to collaborate on combating the illegal wildlife trade.[127]

Other multilateral agreements and organisations with relevance to wildlife crime are the **UN Convention on Transnational Organised Crime, UN Convention Against Corruption**, and the **World Customs Organisation**.

The **Global Tiger Initiative** (GTI) addresses the conservation of tiger and snow leopard, and is led by the 13 tiger range countries (Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, Russia, Thailand and Vietnam[128]), in partnership with the World Bank, GEF, the Smithsonian Institute, Save the Tiger Fund and the International Tiger Coalition. It is coordinated by a secretariat in Washington DC and funded by the World Bank with multiple other donors[129]. While the majority of work under the initiative involves the protection of sites, the GTI also addresses the illegal trade in tiger products.

The GTI's secretariat provided advice and support for the establishment of the **Global Snow Leopard and Ecosystem Protection Programme**, launched with the signing of the Bishkek declaration in 2013. The 12 snow leopard range countries (Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan and Uzbekistan) have agreed to address the conservation of high mountain ecosystems, including combating poaching and wildlife crime.

The **Global Wildlife Programme** is a 7-year GEF-funded initiative[130], aiming to address the wildlife crime links between Africa and Asia. Initially focused on Africa, the programme has recently expanded to include Thailand and Vietnam[131]. It has recently published a report on funding for tackling the illegal international wildlife trade, showing that over USD 1.3 billion has been committed since 2010.[132]

(124) https://cites.org/prog/iccwc.php/Wildlife-Crime, accessed 29 March 2017.
(125) See https://cites.org/sites/default/files/eng/prog/iccwc/ICCWC_Toolkit_implementation_table_rev_1Sept16-web.pdf, accessed 26 April 2017.
(126) http://www.unodc.org/brussels/en/unodc-cites-asia-wildlife-enforcement-and-demand-management-project.html, accessed 17 June 2016.
(127) http://www.worldbank.org/en/news/feature/2014/10/14/regional-collaboration-for-combating-illegal-wildlife-trade-in-bangladesh
(128) North Korea is also a range state, although there are no recent records. The country has not signed CITES and is not part of the Global Tiger Initiative.
(129) http://globaltigerinitiative.org/, and http://www.worldbank.org/en/topic/environment/brief/the-global-tiger-initiative
(130) See http://www.worldbank.org/en/topic/environment/brief/global-wildlife-program. Initial GEF funding of EUR 100 million is expected to leverage an additional EUR 538 million.
(131) GEF added another EUR 30.7 million in June 2016, allowing expansion from 10 to 19 countries. Asian countries involved in the programme are now Afghanistan, India, Indonesia, Philippines, Thailand and Vietnam. See http://www.rona.unep.org/news/2016/gef-steps-efforts-combat-wildlife-crime-additional-40-million-expand-program
(132) http://www.worldbank.org/en/news/press-release/2016/11/17/new-analysis-shows-scale-of-international-commitment-to-tackle-illegal-wildlife-trade-over-13-billion-since-2010

The **United States Agency for International Development** (USAID) supports Asia's Regional Response to Endangered Species Trafficking programme, bringing together 10 countries (including China), NGOs and private sector organisations, working to reduce consumer demand and improve enforcement against the illegal wildlife trade[133]. USAID is also part of the Oceans and Fisheries Partnership, with the South-East Asian Fisheries Development Center and the CTI-CFF, which aims to support regional cooperation to combat illegal, unreported and unregulated fishing, promote sustainable fisheries and conserve marine biodiversity in the Asia-Pacific region.

The UK Government's **Illegal Wildlife Trade Challenge Fund** supports projects that address wildlife trafficking, and has funded NGO projects in China, Indonesia, Kyrgyzstan, Lao PDR, Mongolia, Myanmar and Vietnam[134].

The EU, recognising its role as both a destination market and transit point for the global illegal wildlife trade, has adopted the **EU Action Plan Against Wildlife Trafficking**[135] for 2016-2020. The Action Plan aims to (i) reduce the demand and supply of illegal wildlife products globally; (ii) address differences in the way that different EU Member States implement and enforce the shared rules of wildlife crime; and (iii) strengthen global partnerships between source, transit and consumer countries. In response to the Asian wildlife trafficking crisis, the EU is funding a joint project of CITES and UNODC, mentioned above (see under UNODC).

In Lao PDR, in a specific effort to facilitate collaboration on illegal wildlife trade issues, 11 national entities, the EU, the World Bank and the UNODC have formed the **Working Group 15.7**[136] to work with government, civil society and the private sector to apply emerging global approaches to tackling wildlife trafficking.

Wildlife crime in international conventions and agreements

The **Convention on International Trade in Endangered Species of Wild Fauna and Flora** (CITES) is an inter-governmental treaty and key instrument for international cooperation to help ensure that any international trade in protected species is sustainable, well managed and legal; it also provides a forum to address trade in CITES-listed species. All the countries covered by these reports (except Timor-Leste and Tajikistan) are parties to the convention. CITES is especially important in the region because the countries covered are simultaneously source, transit and consumer countries, so the regulation of trade in all CITES-listed species – not just those native to the country – is needed. The listing of all eight pangolin species in Appendix I of the convention at the September 2016 CITES CoP[137] is an ex-ample where international cooperation can contribute to commitments to reduce pressure on wild populations.

CITES (Article VIII) requires that parties put in place national legislation which, as a minimum, authorise:

- designation of CITES Management and Scientific authorities;
- regulation of legal trade and prohibition of trade in violation of the Convention;
- penalisation of such trade; and
- confiscation of illegally traded and/or possessed specimens.

CITES assessment of national legislation (September 2016)[138] concluded that only eight of the countries covered by this report have legislation that 'generally meets the requirements of CITES' (Cambodia, China, Indonesia, Iran, Malaysia, Papua New Guinea, Thailand, Vietnam), with another six countries in the process of review and likely to meet all requirements (India, Kazakhstan, Kyrgyzstan, Mongolia, Pakistan, the Philippines). Afghanistan, Bangladesh, Bhutan, Lao PDR, Myanmar, Nepal, Sri Lanka and Uzbekistan do not yet meet CITES requirements, although processes of improvement are under way in most countries.

CITES recognises the importance of addressing consumer behaviour, and adopted a resolution on demand reduction[139] which includes a commitment to 'actively develop and implement well-targeted, species-specific, evidence-based campaigns by engaging key consumer groups and targeting the motivations for the demand'.

(133) Further details available at https://www.usaid.gov/biodiversity/wildlife-trafficking
(134) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/515724/iwt-challenge-project-list.pdf
(135) European Commission (2016). EU Action Plan Against Wildlife Trafficking. European Commission, Brussels, COM(2016) 87 final. Further details at https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-87-EN-F1-1.PDF
(136) The name is a reference to target 15.7 of the Sustainable Development Goals, which is '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'. Members are Australia, France, Germany, Japan, Republic of Korea, Singapore, Switzerland, Thailand, United Kingdom, United States of America, Vietnam, EU, UNODC and the World Bank.
(137) https://cites.org/sites/default/files/notif/E-Notif-2016-063.pdf, accessed 2 April 2017.
(138) Status of Legislative progress for Implementing CITES, updated on 1 September 2016, available at https://cites.org/sites/default/files/eng/com/sc/66/Inf/E-SC66-Inf-19.pdf, accessed 30 March 2017.
(139) Conf. 17.4: Demand reduction strategies to combat illegal trade in CITES listed species. https://cites.org/sites/default/files/document/E-Res-17-04.pdf

Addressing trafficking of wildlife products between Africa and Asia

Asian markets play an important role in the intensification of illegal hunting of wildlife in Africa, especially elephant and rhino, but also big cats, pangolin and threatened tree species and others. Trans-continental initiatives include the MoU between South Africa and Vietnam to tackle rhino poaching and trade, and outreach programmes conducted by China highlighting wildlife trade issues to its citizens and businesses in a number of African countries. In December 2015, national leaders at the Forum on China-Africa Cooperation Summit endorsed the Johannesburg Action Plan (2016-2018) which includes commitments by China and 50 African Union Member States to work closely together on a variety of actions to combat illegal trade of fauna and flora products.

Trade governance and demand-side measures

Illegal logging and related trade is addressed by the EU Forest Law Enforcement, Governance and Trade (FLEGT) initiative, a package of measures launched in 2003 to address both the demand and supply sides of the problem. The initiative is delivered through the FLEGT Action Plan[140] and focuses on promoting trade in legal timber and supporting countries to improve their forest governance systems and strengthen capacity for law enforcement, particularly through a multi-stakeholder approach. Under the FLEGT Action Plan the EU has adopted the EU Timber Regulation, a law prohibiting the marketing of illegal timber in the EU and obliging EU operators to carry out due diligence. It developed the country legality framework and the FLEGT licensing scheme to work with producer countries towards establishing systems to verify the legality of timber exports. This has led to the signing of several bilateral FLEGT Voluntary Partnership Agreements (VPAs), with Indonesia becoming the first country in the world to issue FLEGT licences in November 2016. In the region, Lao PDR, Malaysia, Thailand and Vietnam are currently negotiating VPAs (as of June 2017), while there is related work underway in Cambodia, China and Myanmar[141]. There are FLEGT projects supporting improved forest governance in Cambodia, China, India, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, Papua New Guinea, Philippines, Thailand and Vietnam.

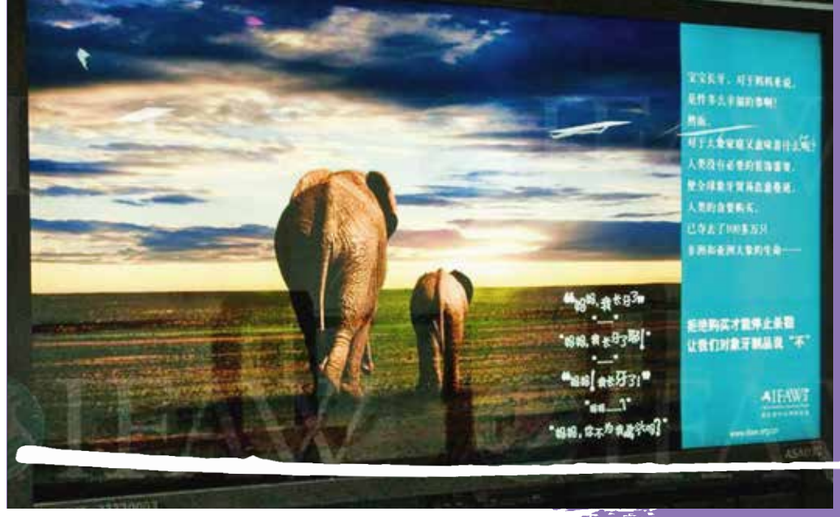
The Trans-Pacific Partnership, a proposed free trade agreement between 12 Pacific Rim countries[142] (including Malaysia and Vietnam among the countries covered by this study) contains strong safeguards against illegal wildlife and timber trafficking in the current drafts. These include agreements to 'effectively enforce environmental laws', 'fulfil obligations under CITES', and 'take measures to combat and cooperate to prevent trade in wild fauna and flora that has been taken illegally'[143]. Australia and Japan also have legislation to combat illegal logging.

Other consumer countries with laws limiting the import of illegally produced timber and wildlife include the USA (through the Lacey Act), Japan and Australia.

3.3.3 Civil society actions

Several international NGOs are working on the illegal wildlife trade in Asia, including the Environmental Investigation Agency, Fauna & Flora International, Freeland, TRAFFIC (a partnership of WWF and IUCN), the International Fund for Animal Welfare, WildAid, WCS and WWF. Some of these NGOs only focus on illegal wildlife trade, while others have broader remits; some have science-based field programmes while others are campaign-focused. As a result, they have developed expertise in different aspects of action against wildlife crime, and many of them work as partners to governments and international agencies. Local NGOs play an increasingly important role in action against wildlife crime, although the freedom they have to operate, and their capacity to act, vary greatly between countries. India, Indonesia and the Philippines have large and diverse civil society communities, with national NGOs and networks that have developed expertise in work on wildlife crime.

The roles played by NGOs include field-based science and monitoring of wildlife populations, investigating and monitoring of trade, maintenance of databases (such as the Elephant Trade Information System, managed by TRAFFIC for CITES) and facilitation of information sharing, campaigning or otherwise communicating in source and market countries[144]. They also collaborate with governments, providing figures and analysis to guide policy-making and decisions in international forums, working to improve or update regulations and legislation, capacity building of officials and decision-makers[145], and assisting investigations, case management and prosecutions. NGOs have played a leading role in the development of campaigns to influence the demand and market side of the illegal wildlife trade chain (see also section 4.3, and Box 7, section 5.2.3, on campaigns to reduce consumer demand for ivory in China). A sub-set of more animal welfare-oriented CSOs operate facilities to receive, treat and where possible release live animals confiscated during law enforcement, and campaign on issues such as the exploitation of the Asiatic black bear and the sun bear in bile extraction for traditional medicine in Lao PDR, Vietnam and China.



Airport awareness poster, Beijing. A 2007 survey found that 70 % of Chinese consumers believed that ivory was obtained without having to kill elephants. Campaigns have changed attitudes to purchasing ivory, shark fin, rhino horn and tiger parts. They need to be complemented by law enforcement to acheive sustained change in consumer behaviour.

3.3.4 Private sector actions

Private sector organisations are key players in illegal wildlife trade, sometimes involved in the direct exploitation and marketing of wildlife products, but also by providing services that are used to facilitate trade (often unwittingly), such as shipping, freight forwarding, financial services, Internet marketplaces and communication.

The 2016 Buckingham Palace Declaration, signed by 63 companies, transport industry bodies, international organisations and NGOs, includes commitments to share information on suspected illegal cargoes to facilitate action by authorities.[146] Implementation is supported by the USAID-funded Reducing Opportunities for Unlawful Transport of Endangered Species programme. Airlines are one key transport industry that is used by wildlife traffickers, and the International Air Transport Association has launched a campaign to increase awareness among airline staff and encourage collaboration with authorities[147]. Other examples include web-based trading platforms banning advertisements for illegal wildlife products, including China's Baidu search engine and online market Taobao, which remove advertisements for ivory, tiger bone and rhino horn[148].

The private sector can also play an important role in promoting sustainable use of wildlife products, and so reducing the incentive for local people to become involved in illegal trade. In the Solomon Islands, the Ministry of Fisheries and Marine Resources and Solomon Islands Telecom have created a mobile inshore fisheries data platform (Hapi Fis, Hapi Pipol) that collects fishery data to support sustainable management [149]. The Coral Triangle Initiative has created a Regional Business Forum to encourage a greater engagement of the private sector in marine biodiversity conservation[150]. The forum leverages public-private partnerships to address unsustainable consumption patterns, including the live reef-fish trade, shark fin products and unsustainable tourism operations. It also works to create new markets that incentivise sustainable business operations and demand sustainable products and processes[151].

(140) Information on the Action Plan is at http://www.euflegt.efi.int/flegt-action-plan
(141) http://www.euflegt.efi.int/vpa-countries, accessed 29 March 2017.
(142) The USA pulled out of the agreement on 23 January 2017, and the future of the agreement was unclear as of mid-2017.
(143) See https://ustr.gov/about-us/policy-offices/press-office/press-releases/2015/october/summary-trans-pacific-partnership and http://www.state.gov/documents/organization/254013.pdf, accessed 22 April 2016.
(144) See for example, IFAW's campaigns on ivory using prominent Chinese spokespeople, http://www.ifaw.org/united-kingdom/news/chinese-cultural-icons-plead-lives-elephants-media-blitz, and WildAid's campaigns on tiger, pangolin, rhino and elephant at http://wildaid.org/programs, accessed 22 April 2016.
(145) See for example Freeland's work on capacity strengthening for PA rangers and managers, based on the ASEAN Centre for Biodiversity's competence standards for PAs at http://www.freeland.org/programs/protect/, accessed 22 April 2016.
(146) A further 12 airlines signed the declaration in June 2017. https://www.unitedforwildlife.org/#!/2016/03/the-buckingham-palace-declaration
(147) http://www.iata.org/policy/environment/Pages/wildlife-trafficking.aspx
(148) http://www.ifaw.org/united-kingdom/our-work/wildlife-trade/reducing-markets-wildlife-products-china
(149) Initial GEF funding of EUR 100 million is expected to leverage an additional EUR 538 million. See http://www.worldbank.org/en/topic/environment/brief/global-wildlife-program
(150) Abraham A. (2014). Stock-take of CTI-CFF Programs and Projects: Strategic Review of Progress and Future Directions. CTI-CFF Interim Regional Secretariat, Jakarta, Indonesia.
(151) An example is the concept of 'wildlife banks' pioneered by the YUS conservation areas project, Papua New Guinea, which builds on the customary use of taboos as a mechanism for limited hunting.

#4

Lessons learned

Asia's coral reefs support extraordinary biodiversity and millions of people, but are threatened by destructive fishing practices, sedimentation and climate change. In places where communities and authorities have worked together, local marine protected areas have been able to halt, and in some cases reverse, the decline in coral cover.

#4 _ Lessons learned

4.1 Protected areas

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

Key lessons on protected areas

- Overall, PA effectiveness (defined as 'the extent to which management is protecting values and achieving goals and objectives') is low, but there are models of successful patrolling and enforcement. These models need to be scaled up and institutionalised, and accompanied by improved monitoring against higher standards for management. The SMART[152] system of monitoring enforcement effort and responding to threats has been piloted in several PAs and adopted in a small group of countries, but should now be adopted across national PA networks (see Box 3, section 5.2.1). Existing standards for measuring the effectiveness of PA management should be applied more widely, including as a basis for management decision-making.
- There is a need to create new official PAs, but there are also opportunities to expand the use of community-managed reserves, private land holdings or biodiversity-friendly 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.
- Although there is substantial government spending on PAs in some countries, the situation overall is characterised by underfunded and inadequately staffed PAs. 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.[153] Assigning international status to protected areas (e.g. World Heritage Sites, biosphere reserves, Ramsar sites, ASEAN Heritage Sites) may help to increase political will (through the prestige and international attention associated with the designation) and funding (through promotional value leading to greater donor support and increased tourism revenue)[154].
- Many local populations and local governments perceive PAs as an obstacle to livelihoods and economic development. Some of the issues (e.g. human-wildlife conflict) can be mitigated directly, while in other cases local interests can be accommodated without compromising biodiversity values if top-down, bureaucratic approaches to PA management can be adapted to better accommodate the concerns of other stakeholders. Explicit articulation of biodiversity conservation objectives would make it clearer where there are opportunities to negotiate collaborative arrangements without compromising critical biodiversity values. There are many examples of collaborative approaches to government-run protected areas, both marine PAs and terrestrial parks, involving communities, local governments and local businesses in their protection and management. These models provide lessons and approaches that could be scaled-up and integrated into policies and programmes. On the other hand, fully devolving PAs to local government can make them vulnerable to local political pressures, in some cases leading to the downsizing or reduction in an area's protected status. Consequently, the mechanism to involve local stakeholders in PA decision-making needs to be evaluated carefully before changes are made.
- Where local populations and economies do experience unavoidable costs as a result of protected areas, these may be compensated through projects (e.g. ecosystem services, small-enterprise development, tourism opportunities) or other schemes (e.g. through targeted revenue or other assistance from central government), often within the context of a wider landscape-level approach. Such schemes need attention to equity and efficiency, and the link between the scheme and the persistence of biodiversity must remain explicit.

(152) See http://smartconservationtools.org/wp-content/uploads/2016/01/SMART-2015-Annual-Report.pdf

(153) Debt for nature swaps involve debtor countries and institutions writing off a portion of a country's debt in return for the borrower Government making payments in support of environmental programmes.

(154) Conradin K., M. Engesser and U. Wiesmann (2015). Four decades of world natural heritage – how changing protected area values influences the UNESCO label. *Journal of the Geographical Society of Berlin*, 146(1).

The future of much of Asia's most iconic biodiversity, including the tiger, depends on effectively managed protected areas. Since 2007, sustained efforts in Thailand's Western Forest Complex using the SMART approach have resulted in increases in tiger prey densities, reduced poaching and more tigers.

4.2 Landscape and seascape conservation approaches

Landscape and seascape-level approaches are important because their scale allows multiple stakeholders across a mosaic of land uses and jurisdictions to work towards integrated conservation and economic development objectives. For biodiversity conservation, landscape and seascape approaches are especially relevant where they:

- retain connectivity between species' populations in protected areas, allowing genetic mixing of populations and re-stocking after local extinctions (for example after a natural disaster or as a result of over-exploitation);
- allow the survival of wide-ranging or low-density species, which cannot be protected within protected areas, or species that use migration and geographic dispersal as a key part of their life-cycle (e.g. Tibetan antelope, marine reef-building corals);
- allow survival of the full range of diversity, including those not covered by protected areas, and maximise the chance of protecting undiscovered species. This is particularly relevant for marine biodiversity conservation.

Key lessons from experience with landscape and seascape approaches in the region

- The basis for landscape and seascape-level management is (i) integrated land-use and development planning, including for example integrated coastal zone management, and (ii) a platform or mechanism to allow for multi-stakeholder engagement. The mechanisms allow different interests and priorities to be accommodated. It may be necessary for the platform to be formalised or legalised to give participants a mandate to consider broader aspects beyond their individual sectoral and institutional agendas.
- High-level political support and an enabling national policy and fiscal environment assist in achieving coordination and joint decision-making. This allows government departments responsible for different activities within the landscape or seascape (for example, conservation, forestry, agriculture, water management, marine resources and fisheries, energy, infrastructure) to collaborate. 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 or seascapes requires good data on biological features, ecological processes, land-use and land suitability, social values and rights, and legal constraints (such as zoning and licensing).
- Individual companies and industry groups have made significant commitments to the social and environmental sustainability of their operations and trade chains. Achieving real change involves independent monitoring, sanctions from buyers if the companies fail to meet their commitments, technical assistance to companies, and continued market pressure, as well as addressing legal constraints on the adoption of more sustainable approaches, at both the demand and supply side. These roles require cooperation between NGOs, government and companies.
- Industrial land use (e.g. agriculture) and extractive industry projects can be 'greened' through improved safeguards and environmental impact assessments, financial incentives and disincentives for environmental performance, and enhanced market access (for example for certified

products). Early engagement in the planning of investments increases the chance of harmonising development with landscape or seascape objectives. Proactive approaches seeking shared objectives may have greater traction with industry and decision-makers than simply opposing development that is incompatible. Concrete examples of the success of 'green economy' initiatives can serve as a model for other landscapes, seascapes or countries.

- Landscapes or seascapes that retain high wild diversity are often also the centre of crop, livestock or fish genetic diversity. Maintaining these species and varieties reinforces cultural links between people and the landscape or seascape, and encourages the maintenance of mosaics that are rich in wild and domesticated species. Documenting and maintaining the diversity of domesticated species and varieties in a landscape can be a useful entry point for the maintenance of landscape diversity as a whole. Participatory approaches to a biodiversity inventory[155] allow local and indigenous knowledge, beliefs and resource management practices to be documented in a way that is accessible to outsiders and at the same time raises awareness of issues among community members.
- Landscape or seascape approaches require long-term donor and government commitment, as well as flexibility in planning and implementation, with inception phases important to allow for plans and details to be worked out. Donors and governments need to accept that landscape or seascape approaches are complex, and impacts are uncertain and difficult to measure. REDD+ shows some promise as a source of funding for sustainable land use at a project or landscape level (through the voluntary market).

4.3 Wildlife crime

Wildlife crime is one of the most serious threats to biodiversity in Asia. The networks of people engaged in wildlife crime have shown that they can adapt quickly to pressure by finding new sources of supply, bringing new species and products into the trade chain, shifting international trafficking routes to avoid enforcement and taking advantage of weak points along the transport chain, and creating new products and markets to take advantage of developments in social media and market preferences (section 2.1.1). A large number of governments, international organisations and NGOs have responded with the creation of forums and programmes designed to address the problem through data sharing and capacity building, and to channel resources to where they are needed for enforcement (section 3.3), but the consensus is that the response has not yet been effective in reducing the trade, despite sporadic enforcement successes. Wildlife crime extends beyond biodiversity, and impacts the overall security and governance of particular parts of the world. Therefore, it has been classified as a priority transnational crime by the UN General Assembly[156].

Key lessons and promising approaches

- In the long term, a combination of demand reduction and supply control will be the solution to wildlife crime, but in the short term, work on enforcement and legal aspects is urgent to stop the expansion of illegal trade and to provide an opportunity for work on market demand to make a difference.
- Demand reduction campaigns and education can work, especially when combined with legal restrictions (including regulations and bans on domestic trade, markets and the consumption of illegal products), but there is a requirement for long-term commitment and multi-pronged approaches that are rooted in a deep understanding of culturally specific consumer behaviour. Demand reduction work needs to move beyond awareness-raising to ensure behaviour change, and this requires rigorous testing, evaluation and adaptive management of campaigns, and a tighter focus on important target groups within the consumer market – for example businessmen or traditional health practitioners. Sustainable, long-term funding commitments for this work are essential to allow campaigners to focus on long-term planning. Demonstrating the impact from these campaigns is difficult, however, and requires more attention to establishing baselines, monitoring behaviour change and learning from experience, focusing on market availability, rather than general awareness, as an indicator.
- Enforcement effort and prosecutions (not just seizures) need to be massively scaled up. This is most effective when good intelligence is backed up with collaborative action by law enforcement agencies, including environmental agencies (e.g. forestry or fisheries authorities), police, prosecutors and other enforcement agencies such as those responsible for customs, tax, money-laundering or corruption. The role of convening these agencies has often been taken by international organisations, projects or NGOs, but scaling-up enforcement requires that mechanisms for collaboration between agencies are institutionalised. Effective enforcement includes prosecutions with meaningful deterrent penalties, and successful prosecutions should be communicated to and by the media to serve as a deterrent.
- Top-down, government-driven enforcement against illegal hunting can have negative consequences for local and indigenous communities, leading to impoverishment and opposition to law enforcement efforts. Law enforcement needs to go beyond targeting the hunters themselves to focus on actors that drive the illegal trade (middlemen, traders, kingpins, importers), and be combined with other approaches to address issues such as unsustainable hunting for subsistence purposes.
- Good enforcement needs good information. Intelligence gathering, information sharing, and the use of technology for detecting wildlife crime are all expanding, but there is potential and tremendous need for a much broader integration of efforts, and much greater implementation of intelligence-based law enforcement.
- Successful enforcement operations too rarely lead to anything more than the confiscation of goods and the prosecution of low-level traffickers/mules. Pressure on the people who organise, finance, protect and profit from the trade is needed, through increased risk of detection combined with greater penalties including sentences consistent with the severity of the crime. This often requires a revision of the penal code, revision of sentencing guidelines, and strengthening enforcement capacity as well as greater awareness and expertise among police, prosecutors, judiciary, revenue and customs authorities, including greater accountability and action against corruption.
- Political support is critical to ensure that adequate laws and their necessary enforcement are in place. International commitments and funding, and arguments based on economic impacts (loss of charismatic species important to tourism, tax and non-tax revenue losses), governance (links to organised crime and other forms of trafficking, corruption, disease transmission) and social/cultural impacts (loss of culturally significant species, livelihoods) are all important arguments to secure the attention and support of political decision-makers. Collation and communication of data on the economic, cultural and social costs of wildlife crime, and the role of corruption in perpetuating it, is part of the efforts required to convince policy-makers of the need to act.
- The capacity to identify products in trade remains a challenge. Promising approaches include mobile apps, such as Wildlife Alert and Wildlife Guardian (in Chinese), which have been created for enforcement personnel to help them identify illegal wildlife trade products straightaway.[157]
- The international dimension of wildlife crime underpins all of the points above, and makes international communication and collaboration essential. Key issues are harmonisation of domestic laws in compliance with international standards, data and intelligence sharing, mutual legal assistance and collaboration on demand reduction and anti-corruption campaigns. International treaties and platforms for cooperation exist but need to be used and strengthened.
- In source areas where human-wildlife conflict and local subsistence hunting activities provide an excuse or an additional motive for wildlife crime, these issues need to be addressed together with the communities involved;
- 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, for example 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 timing of hunting[158], with sanctions imposed by traditional leaders and decision-makers. In other cases, the support of official agencies and regulations will be needed to enforce bans or limits on hunting. Monitoring catch rates and wildlife populations is necessary to support decision-making[159].

Honey gathering, West Timor, Indonesia. Biodiversity-rich landscapes support millions of livelihoods throughout the region. Securing these landscape values requires recognition of the rights of local communities, and careful integration of economic development with preservation of species and ecosystem services.

(155) For example, the multidisciplinary landscape assessment approach pioneered by CIFOR. See http://www.cifor.org/mla
(156) http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/69/314, accessed 29 June 2017.
(157) See https://apps.wcswildlifetrade.org
(158) An example is the concept of 'wildlife banks' pioneered by the YUS conservation areas project, Papua New Guinea, which builds on the customary use of taboos as a mechanism for limited hunting.
(159) 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.

Monitoring fishing practices, Gam river basin, Vietnam. The CSO Center for Water Resource Conservation and Development has initiated co-management of fisheries with government and communities.

Oil palm outside the Gunung Leuser National Park, Indonesia. Voluntary certification schemes, social and environmental safeguards for loans, and corporate social responsibility funding are all helping to reduce the negative impact of oil palm, rubber, coffee, timber, cement and other commodities. Regulations and stronger market incentives are required to support this positive shift.

4.4 Civil society organisations (CSOs)

The CSO community in the region is diverse and growing, especially in India, the Philippines and Indonesia, and includes NGOs, religious and social organisations and others. However, they face obstacles of limited capacity, resources and restrictions on their activity.

Key lessons on the role of CSOs

- 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.
- The climate for CSO activity is not improving in all countries. Some governments have passed laws restricting the financing and activities of CSOs, and illegal action against CSOs remains a threat[160], with cases of killing of environmental activists in Cambodia, India, Indonesia, Myanmar, Thailand, Pakistan and Philippines in 2015.[161]
- 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 reflections and the 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 languages and specific needs of the region. Projects such as the ASEAN Heritage Parks small grants programme[162] and the CEPF[163] offer useful lessons on combining multi-stakeholder planning, grants and technical assistance for grant implementation.
- Donor support to CSOs should not only include finance and capacity building, but also networking and helping CSOs to get their message communicated, especially in countries where the political situation is not supportive.
- Pilot initiatives have shown the effectiveness of engaging media professionals, CSOs and government in increasing access to biodiversity information for citizens and policy-makers.[164] Compilation and communication of very local data on issues of immediate concern to people encourages them to engage with the issue, and complements the national level data consolidated in global processes.

(160) For example, civil rights monitor civicus classifies Iran, Lao PDR, Turkmenistan, Uzbekistan and Vietnam as 'closed' in respect of the freedom given to civil society; while in the other countries covered by this study civil society is either 'repressed' (eight countries) or 'obstructed' (11 countries). Only PNG is classified as 'narrowed' recognising the wide, but still sometimes constrained, position of civil society in the country. https://monitor.civicus.org/country/list/?country_or_region=&status_category=all&submit=Search, accessed 26 April 2017.

(161) As documented by Global Witness, https://www.globalwitness.org/en/campaigns/environmental-activists/dangerous-ground/

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

(163) CEPF has active CSO small grants programmes in the Greater Mekong and Wallacea hotspots, and has in the past funded CSOs in Sumatra. Lessons are available in report at http://www.cepf.net/Pages/default.aspx

(164) The Media for Improved Reporting on the Environment and Natural Resources in Central Asia project funded by the European Union and implemented by Internews, https://ec.europa.eu/europeaid/case-studies/media-improved-reporting-environment-and-natural-resources-central-asia_en. Products of this project include highly localised datasets.

4.5 The private sector

The private sector has a key role to play in supporting more sustainable and inclusive development pathways. It 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 and employment opportunities. They thus have a strong influence over local decision-making, including land-use licensing and resource management. Progressive companies can work with governments to promote green or sustainability agendas, but others may delay and undermine these agendas.

Key lessons on the role of the private sector

The voluntary commitments made by some sectors and companies are primarily from those selling into markets that are sensitive to environmental and social messages, such as the EU. Companies selling into less selective markets have little incentive to adopt such commitments, and can undermine sustainability commitments. To prevent this, governments in producer and consumer countries need to incorporate key elements of voluntary sustainability commitments into legislation. Companies have a role to play with site, national and international-level lobbying decision-makers and regulators in order to adopt the initiatives that they have pioneered.[165]

- Despite significant CSR spending by some companies, little effort is currently invested in understanding or addressing (avoiding, rehabilitating or offsetting) the impacts of the companies' activities[166]. There is potential for CSR funding to be re-aligned to address conservation priorities more effectively. Leading companies are now putting increasing efforts into understanding impacts and dependencies on biodiversity and ecosystem services, implementing the 'mitigation hierarchy'[167] and enabling sustainable supply chains.
- There are an increasing number of platforms and mechanisms, globally, regionally or for particular commodities, which aim to encourage and assist private sector companies to adopt and implement concepts such as sustainability, mitigating impacts and promoting no net loss or zero deforestation, and natural capital accounting. General examples include the CBD Business and Biodiversity Platform, the Natural Capital Initiative or the International Finance Corporation Performance Standards, while commodity-specific initiatives include voluntary standards for timber (e. g. Forest Stewardship Council), oil palm (e. g. Roundtable on Sustainable Oil Palm) and oil and gas (e. g. the work of IPIECA). The CBD is working with the private sector to move towards improved, standardised reporting of biodiversity impacts through its Business Reporting on Biodiversity initiative.

(165) A good example was the Indonesian Palm Oil Pledge. However, the initiative was dissolved 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, see https://news.mongabay.com/2016/07/under-government-pressure-palm-oil-giants-disband-green-pledge/

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

(167) The mitigation hierarchy of actions by companies to mitigate biodiversity impacts is, in order of priority, avoid, minimise, restore/rehabilitate, offset. See http://cmsdata.iucn.org/downloads/iucn_biodiversity_offsets_policy_jan_29_2016.pdf, accessed 21 June 2017.

#5

Strategic approaches

Malabar torrent toad is endemic to the Western Ghats, India, where it has only been reported from a few sites. The toad is presumed to be dependent on tropical evergreen forest and to be threatened by continuing habitat loss. Further information is urgently needed to support conservation action for the species.

#5 _ Strategic approaches

5.1 Priority geographies

Geographic priorities for conservation of biodiversity and ecosystem services are presented to provide indicative guidance on the most important regions and landscapes. These are areas that need priority attention for biodiversity funding from governments and donors. They are also areas where rigorous scrutiny and impact assessment for projects likely to impact negatively on biodiversity, including infrastructure, energy and agricultural development, are extremely important.

5.1.1 Global terrestrial priorities: priority regions for conservation

As noted in section 1.2.1, the main global analyses of priority areas for terrestrial biodiversity have identified large areas of global significance for biodiversity in the countries covered by this report. The most widely used are:

- biodiversity hotspots and high biodiversity global wilderness areas (Conservation International),
- Global 200 ecoregions (WWF),
- endemic bird areas (BirdLife International).

These global analyses use different approaches to setting priorities, and so there are some differences in the areas which they highlight. To capture the overall picture of priorities for terrestrial biodiversity conservation, this study defines **'priority regions for conservation' as any area which is identified by at least one of these three global datasets**. Table 5.1 and Figures 5.1-5.3 show that very large areas of Asia – 15.7 million km², around 58 % of the entire land area of the countries included in the study – are of global significance for biodiversity conservation.

Table 5.1 Priority regions for conservation in the study area

Sub-region	Total area of priority regions for conservation in the sub-region (km²)	Priority regions for conservation as % of total land area in the sub-region
Central Asia	2 212 594	31
East Asia	6 352 902	57
South Asia	1 780 673	48
Greater Mekong	2 365 175	100
Island South-East Asia and New Guinea	3 023 096	100
TOTAL	15 734 440	58

Figure 5.1 Priority regions for conservation and biodiversity hotspots[168] in the study area

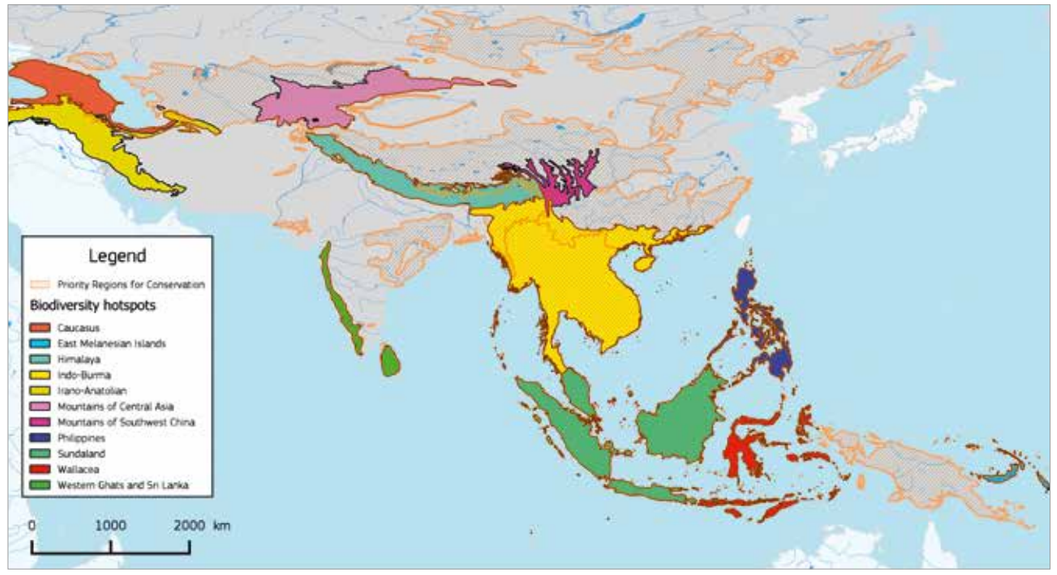
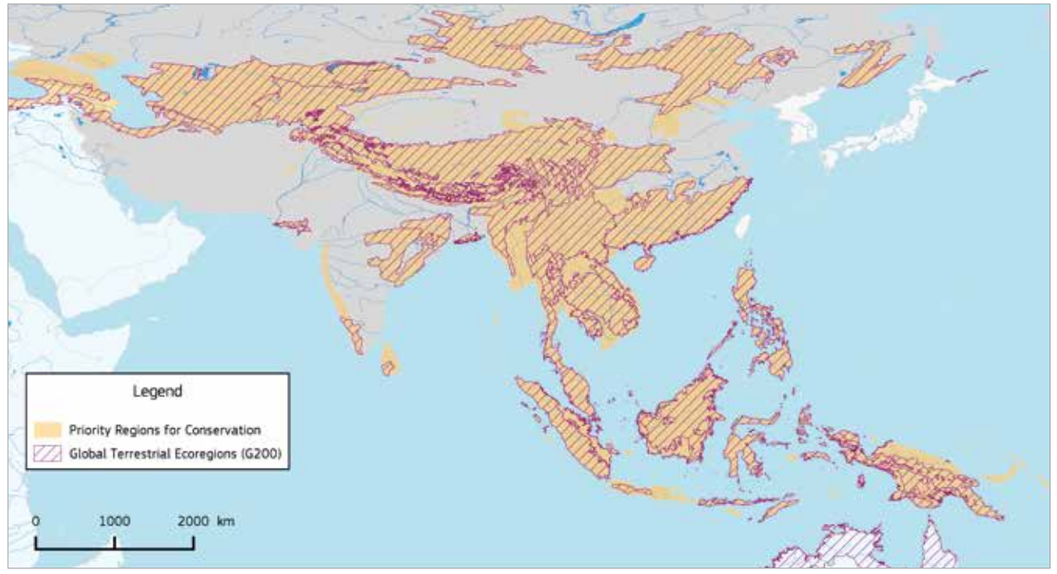


Figure 5.2 Priority regions for conservation and global 200 ecoregions[169] in the study area



([168]) 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: Earth's Biologically Richest and Most Endangered Ecoregions. CEMEX, Mexico City, Mexico, 390 pp.

([169]) 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, pp. 933–938.

Figure 5.3 Priority regions for conservation and endemic bird areas[170] in the study area

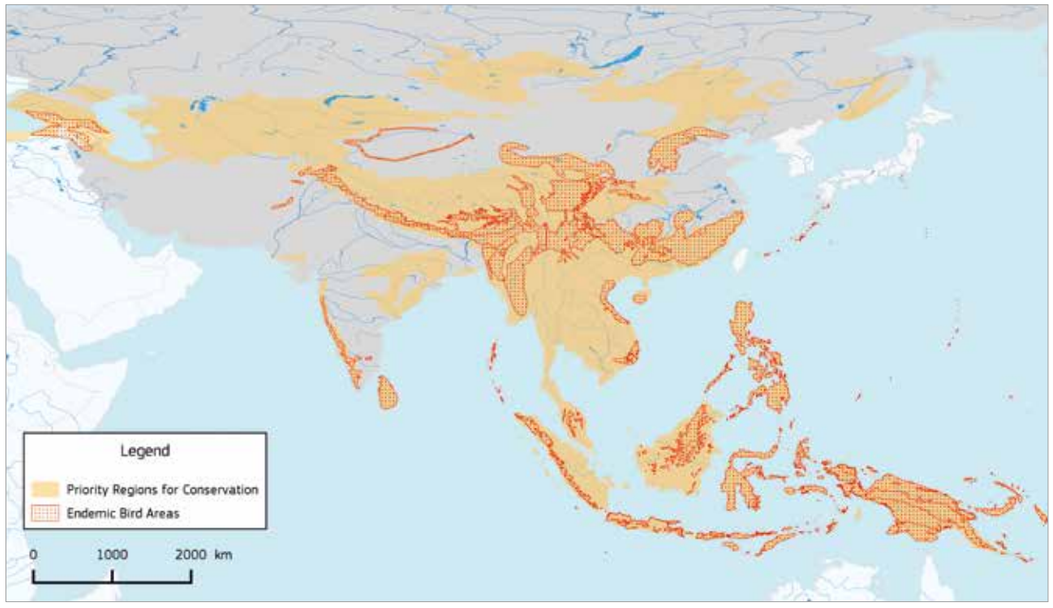
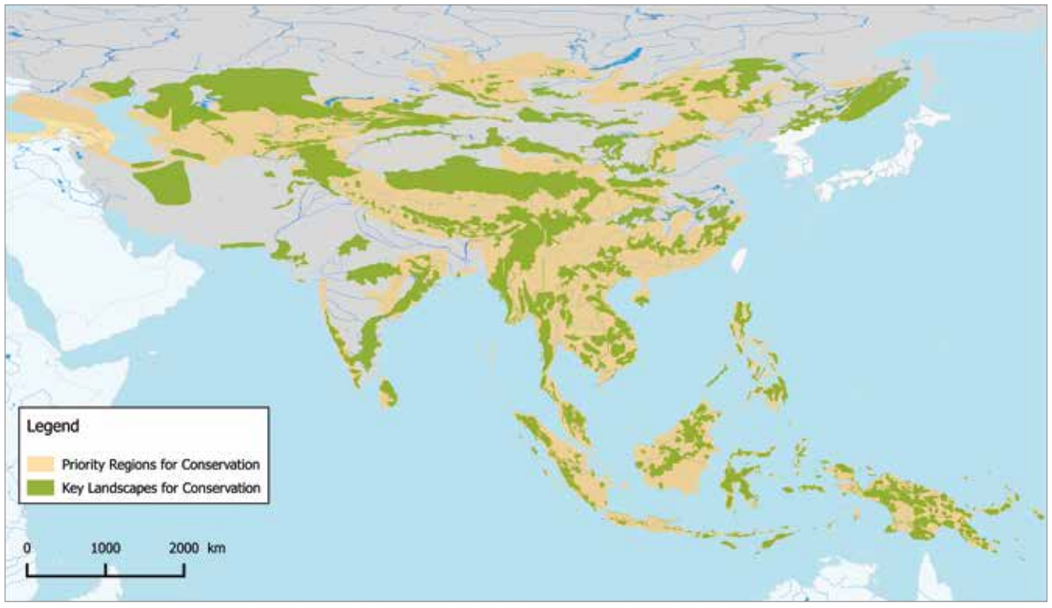


Figure 5.4 Priority regions for conservation and key landscapes for conservation in the study area



Note: Data sources are listed under the sub-regional maps, figures 5.5-5.9, and detailed in the regional analysis.

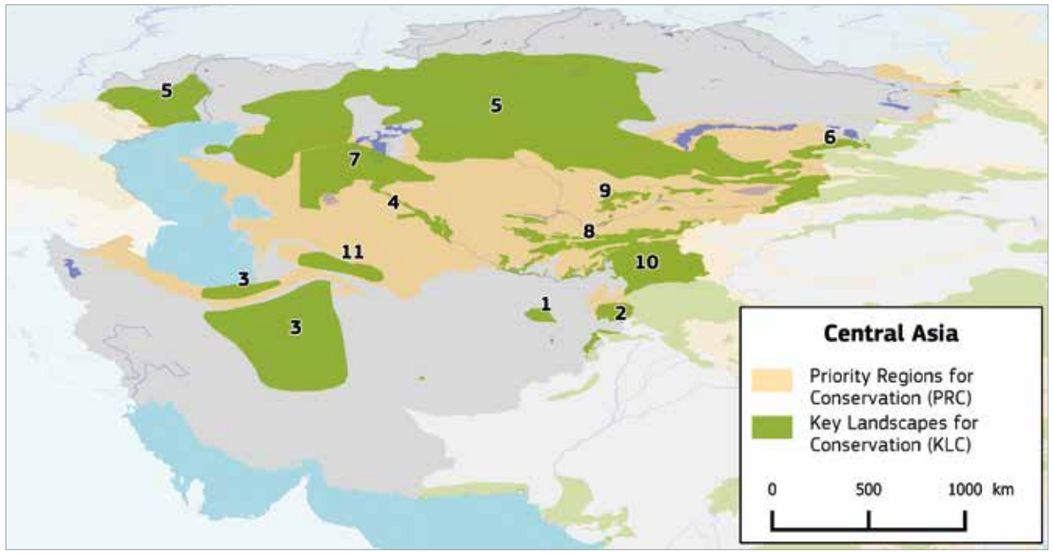
5.1.2 Landscape-level terrestrial priorities: key landscapes for conservation (KLCs)

The priority regions for conservation described above give a broad indication of priorities, but are too extensive to be the basis for national or sub-national identification of priorities for action. **Key landscapes for conservation (KLCs) are defined to provide a finer-grained identification of priority geographies**. As there is no single methodology to identify landscape-level priorities that has been applied across the whole region, relevant, published, landscape-level approaches are combined to cover the entire area (detailed methodologies for identifying KLCs are in the relevant sub-regional chapters). Key landscapes for conservation total 6.1 million km² in area, around 23 % of the study area. Most KLCs are within the larger priority regions for conservation described above (section 5.1.1), but differences in the methodology used by the reference studies mean that there are also KLCs outside the priority regions for conservation. These KLCs should still be considered as being of global significance for conservation.

Figure 5.4 provides an overview of the priority regions for conservation and KLCs across the entire study region, while figures 5.5-5.9 provide detail at a sub-regional level. Further information is in the sub-regional chapters, and the Annexes.

([170]) 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 7. BirdLife International, Cambridge.

Figure 5.5 Priority regions for conservation and key landscapes for conservation in Central Asia

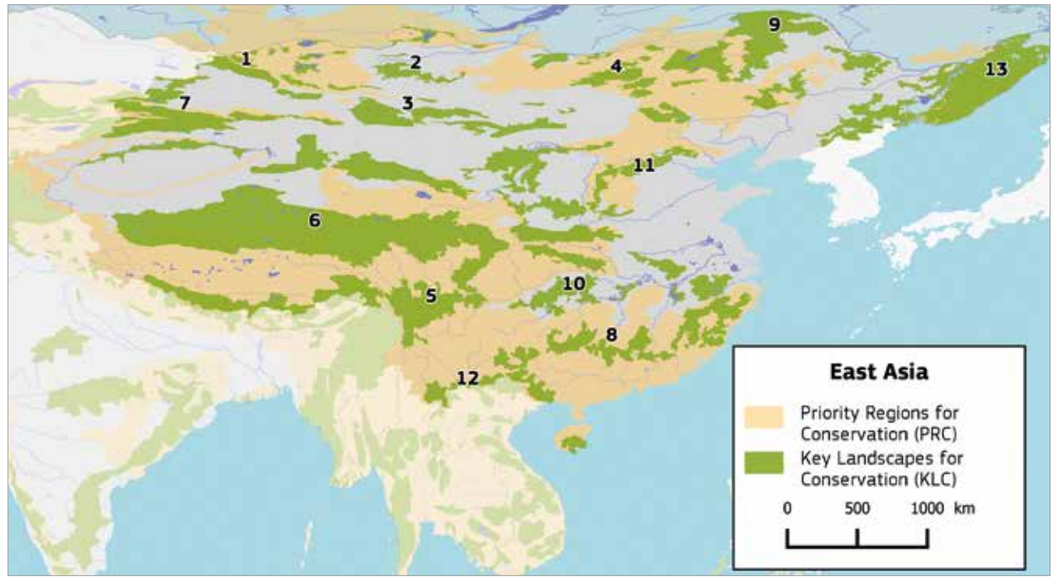


Data sources for Central Asia map: BirdLife International, CEPF, GSLEP, SLCUs, WWF. Full details of source data are in the Central Asia chapter of the regional analysis.

Table 5.2 Key to KLC groups in Central Asia

#	KLC group	#	KLC group	#	KLC group
1	Afghanistan Pamir and Hindu Kush	5	Kazakhstan steppe and semi-desert	9	Kyrgyzstan foothills and mountains
2	Afghanistan eastern forest complex	6	Kazakhstan mountains	10	Tajikistan foothills and mountains
3	Iran mountains and desert	7	Uzbekistan steppe, semi-desert and desert	11	Turkmenistan mountains, desert and steppe
4	Bukhara-Tugai woodland	8	Uzbekistan foothills and mountains		

Figure 5.6 Priority regions for conservation and key landscapes for conservation in East Asia

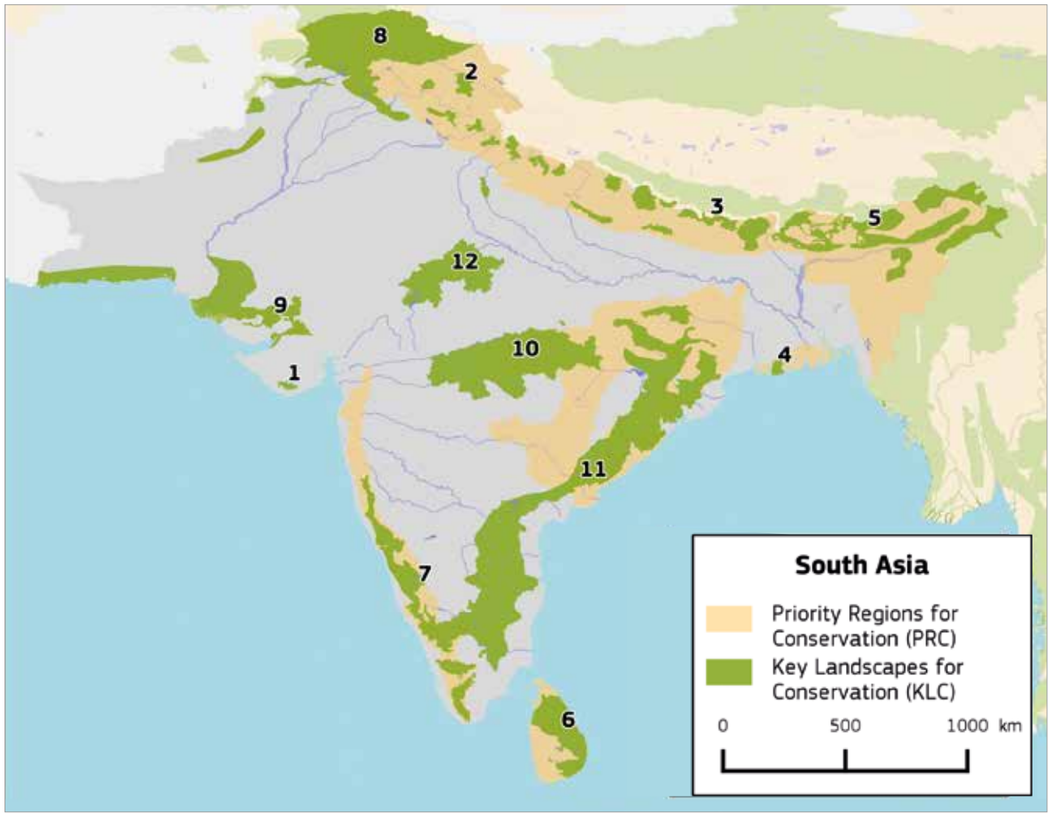


Data sources for East Asia map: China NBSAP, TNC, WWF. Full details of source data are in the East Asia chapter of the regional analysis.

Table 5.3 Key to KLC groups in East Asia

#	KLC group	#	KLC group	#	KLC group
1	Altai-Sayan	6	Alpine region of Qinghai-Tibetan plateau	11	Loess plateau region and north China plain
2	Hangay	7	Desert region of Inner Mongolia-Xinjiang plateau	12	Lower hilly region of south China
3	Central Asian Gobi desert	8	Hilly plain region of east and central China	13	Russian Far East
4	Daurian steppe	9	Hilly plain region of north-east China		
5	Alpine canyon region of Southwest China	10	Hilly regions of central, south and west China		

Figure 5.7 Priority regions for conservation and key landscapes for conservation in South Asia

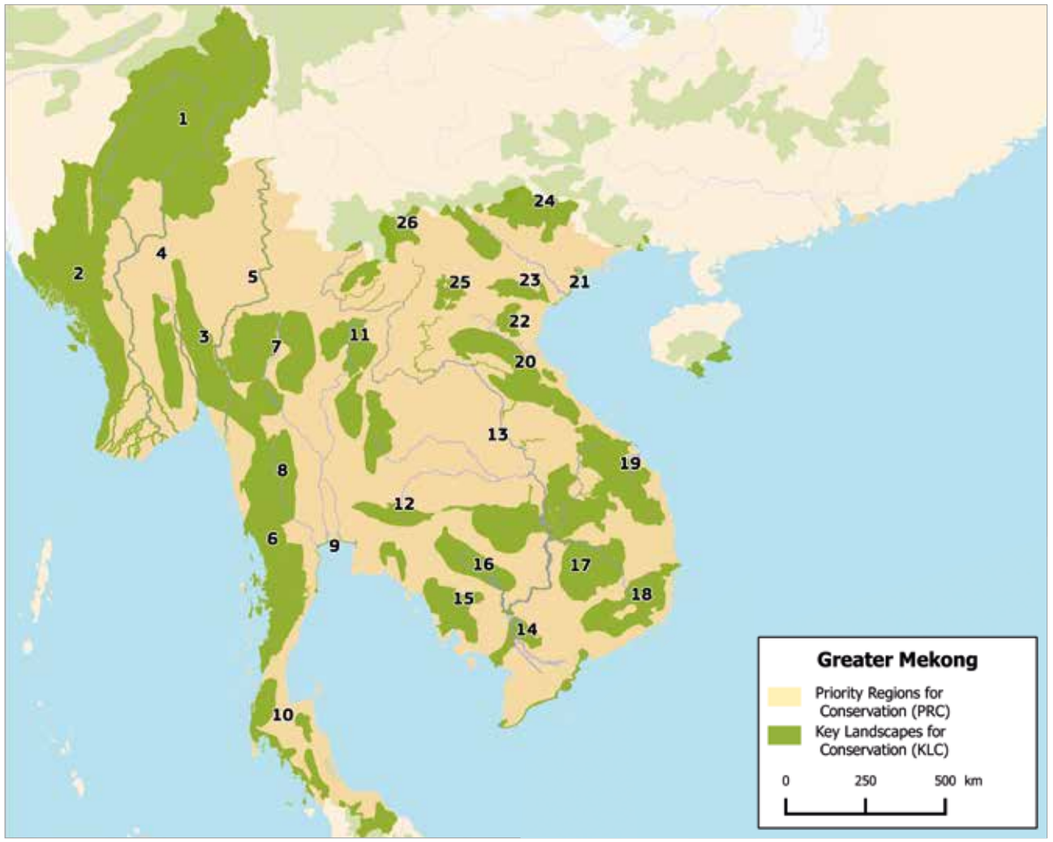


Data sources for South Asia map: Bird Conservation Nepal, BirdLife International, CEPF, GSLEP, WCS, WWF. Full details of source data are in the South Asia chapter of the regional analysis report.

Table 5.4 Key to KLC groups in South Asia

#	KLC group	#	KLC group	#	KLC group
1	Gir forest	5	Northeast India and Bhutan	9	Rann of Kutch
2	Northwest India	6	Sri Lanka	10	Satpura Maikal
3	Nepal	7	Western Ghats	11	Eastern Ghats
4	Sunderbans	8	Pakistan	12	Ranthambhore

Figure 5.8 Priority regions for conservation and key landscapes for conservation in the Greater Mekong

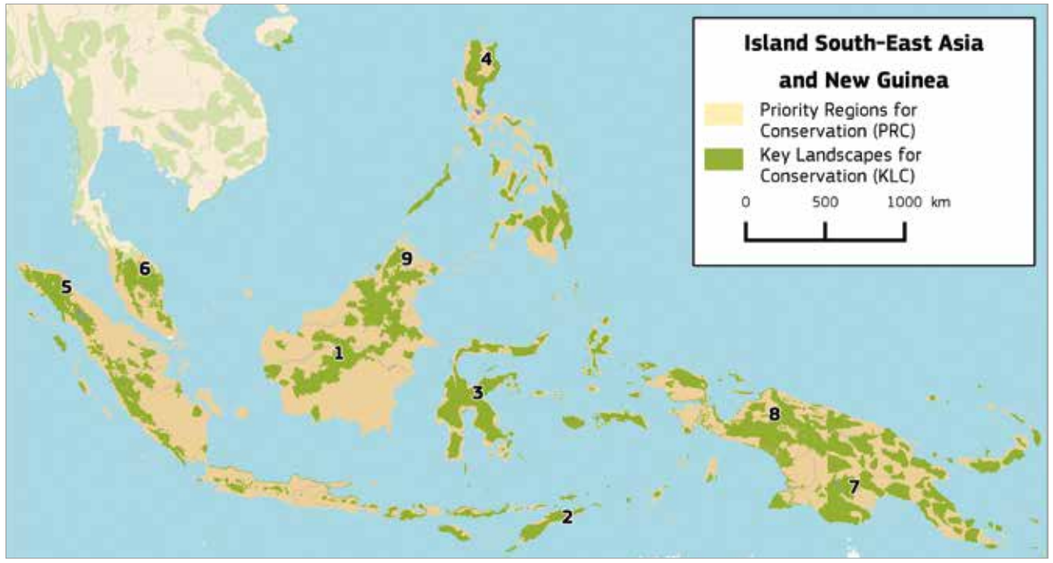


Data sources for Greater Mekong map: CEPF, KBA corridors. Full details of source data are in the Greater Mekong chapter of the regional analysis.

Table 5.5 Key to KLC groups in the Greater Mekong

#	KLC group	#	KLC group	#	KLC group
1	Upper Chindwin-Ayeyarwady	10	Southern Thailand	19	Central Annamites
2	Chin Hills – Rakhine Yoma	11	North East Thailand	20	Northern Annamites
3	Bago-Yoma-Sittaung	12	Eastern forests	21	Red river coast
4	Ayeyarwady – Chindwin	13	Mekong river	22	Chu river
5	Thanlwin	14	Mekong delta	23	Northern Indochina Limestone
6	Taninthayi	15	Cardamom	24	Sino-Vietnamese limestone
7	West Thailand	16	Tonle Sap	25	Nam Et – Phou Louey
8	Greater western forest complex	17	Central plains forests and grasslands	26	Nam Ha
9	Inner gulf	18	Southern Annamites		

Figure 5.9 Priority regions for conservation and key landscapes for conservation in Island South-East Asia and New Guinea



Data sources for Island South-East Asia map: BirdLife International, CEPF, CI-CSIRO[171], Wich et al (Sumatran Orang-utan)[172], Wildlife Conservation Society, Struebig et al (Borneo mammal distribution)[173], Alcorn and Beehler[174]. Full details osource data are in the Island South-East Asia chapter of the regional analysis.

Table 5.6 Key to KLC groups in Island South-East Asia and New Guinea

#	KLC group	#	KLC group	#	KLC group
1	Indonesian Borneo	4	Philippines	7	Papua New Guinea
2	Timor-Leste	5	Indonesian Sundaland	8	Indonesian Papua
3	Indonesian Wallacea	6	Peninsula Malaysia	9	Malaysian Borneo

(171) 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.

(172) 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.

(173) 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

(174) 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

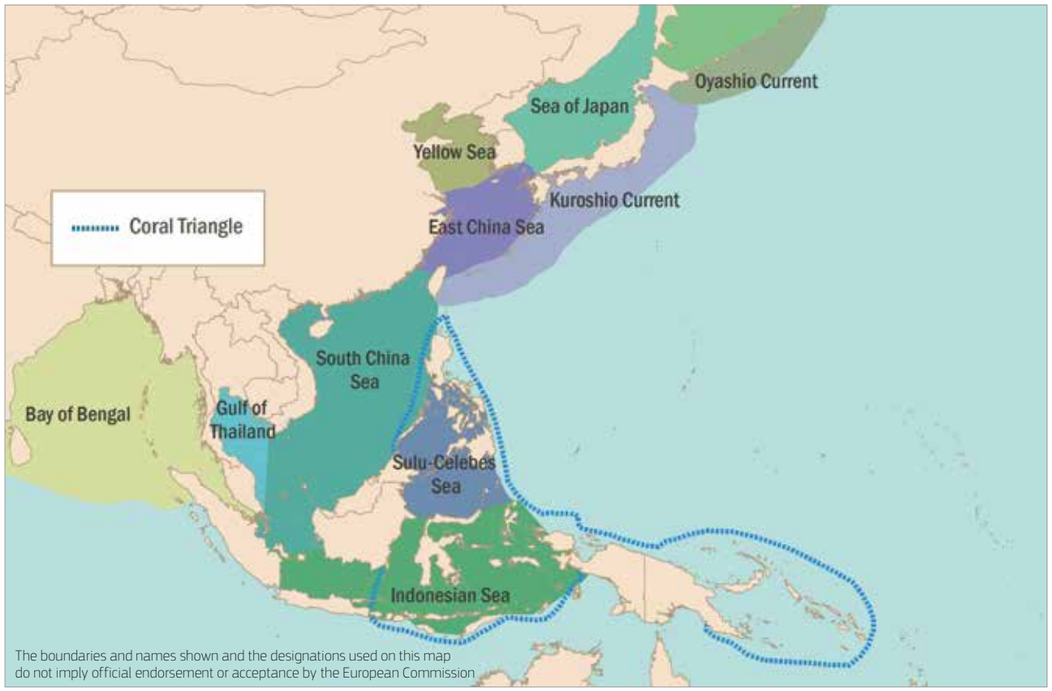
5.1.3 Marine priority areas

Eleven large marine ecosystems (LMEs) have been defined for Asia's oceans: The Sea of Okhotsk, Sea of Japan, Yellow Sea, East China Sea, Oyashio Current, Kuroshio Current, South China Sea, Sulu-Celebes Sea, Indonesian Sea, Gulf of Thailand and Bay of Bengal (Figure 5.10). LMEs are extensive areas that have been designated for the purpose of applying ecosystem-based management and assessments.[175] Four criteria are used to determine, define and establish LMEs: (i) bathymetry, (ii) hydrography, (iii) productivity, and (iv) trophic interactions. These criteria are demonstrative of the structure, function and dynamics of ecosystems.

Two LMEs, Sulu-Celebes and Indonesian Sea, make up the bulk of the Coral Triangle (see section 5.1.4), a global centre for reef diversity. Of the LMEs outside the Coral Triangle, the Bay of Bengal stands out as of exceptional global importance. It is an ecological region containing coastal watersheds, islands, reefs and coastal and marine waters, which span the political boundaries of eight countries: the Maldives, Sri Lanka, India, Bangladesh, Myanmar, Thailand, Malaysia and Indonesia.[176] The Bay of Bengal LME is of critical importance as it supports a number of inland and coastal fisheries, with an estimated 3.7 million people directly dependent on the bay and its resources for their livelihood and employment. Aquaculture generates an estimated EUR 7.2 billion for the region's economy, and fisheries an estimated EUR 25 billion. Combined with tourism, these marine and coastal services contribute an annual total of EUR 55.2 billion to the economy.

Twenty-nine ecologically or biologically significant marine areas (EBSAs) have been defined in the study region by the parties to the CBD. They include the Sri Lankan side of the Gulf of Mannar (Sri Lanka), the Central Indian Ocean Basin, South of Java Island (Indonesia), the Remetau Group: South-West Caroline Islands and Northern New Guinea (partially PNG), and the New Britain Trench Region (partially PNG).

Figure 5.10 Large marine ecosystems in Asia



(175) NOAA Regional Ecosystems Delineation Workgroup (2004). Report on the Delineation of Regional Ecosystems. Regional Ecosystems Delineation Workshop, Charleston, SC.

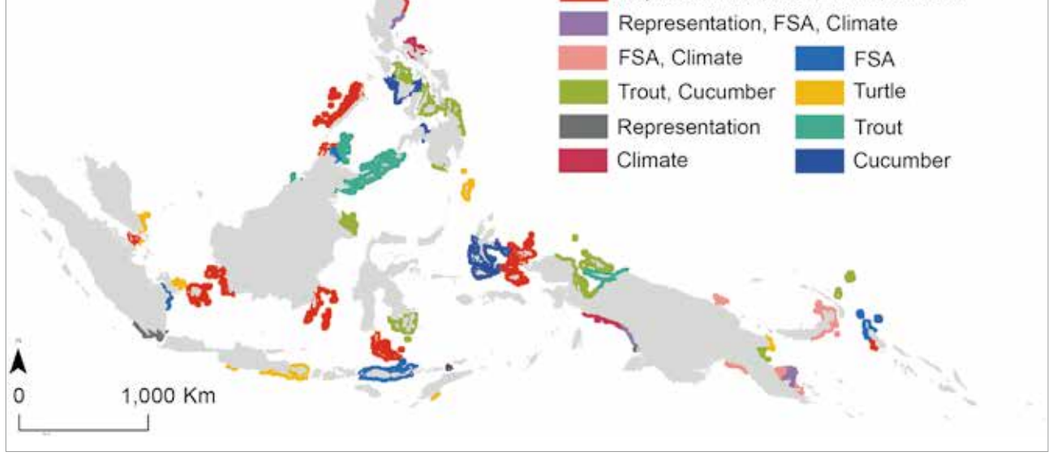
(176) FAO and GEF (2006). BAY OF BENGAL: Sustainable Management of the Bay of Bengal Large Marine Ecosystem Project Document, available on http://www.boblme.org/

5.1.4 Priority areas in the Coral Triangle

Extensive analysis has been carried out in the Coral Triangle region to identify priorities and opportunities for conservation. This study identified key seascapes for conservation (the marine equivalent of the priority landscapes, KLCs, identified for terrestrial regions) in the Coral Triangle, adopting an existing analysis[177], which prioritises areas on the basis of:

- representation of marine habitats;
- grouper spawning aggregation;
- sea turtle habitat;
- larval dispersal between reefs for coral trout and sea cucumbers;
- reefs with lower vulnerability to climate change.

Figure 5.11 Marine priorities in the Coral Triangle



Source: M. Beger et al.[178]

Areas are selected as priorities because they contain important representative marine ecosystems ('representation'), contain significant fish spawning aggregations (FSA), contain important sea turtle habitats ('turtle'), are important for larval dispersal between reefs for coral trout and sea cucumbers ('trout' and 'cucumber'), and possess coral reefs with lower vulnerability to climate change ('climate').

(177) Beger M., J. McGowan, E.A. Treml, A.L. Green, A.L. White, N.H. Wolff, C.J. Klein, P.J. Mumby and H. P. Possingham (2015). Integrating regional conservation priorities for multiple objectives into national policy. *Nature communications*. DOI: 10.1038/ncomms9208.

(178) Beger et al. (2015). Ibid.

The giant panda lives only in bamboo forests in western China. Protection of key reserves and restoration of habitat corridors has allowed the wild population to grow to at least 1 800 (2011-2014 survey), a 17 % increase from a decade previously. Panda reserves protect a wide range of other threatened and endemic species.

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

The links between biodiversity, the environment and human peace and prosperity are close, complex and reciprocal. Natural ecosystems with a full complement of species support human livelihoods and economies through the provisioning, regulating, supporting and cultural services that they provide (see section 1.2.3). However, human livelihoods and economies are also the drivers of the destruction of ecosystems, both through poverty and lack of alternatives, and wealth and unsustainable consumption. Healthy natural environments contribute to peace and security at the level of households, communities and states. Conversely, environmental degradation and catastrophes are drivers and consequences of impoverishment, migration, conflict and corruption.

Section 2.1 noted that there are multiple pressures leading to the degradation and loss of biodiversity and ecosystem services throughout the region. Despite the fact that this is undermining human peace and prosperity, section 2.2 makes it clear that the mechanisms to govern the environment are, in most cases, failing to deliver anything close to sustainable use. The reasons include failures of governance, insecurity of tenure and access, lack of capacity and information, and changing patterns of demand from a growing population with an ever-larger requirement for energy, food and other materials.

Efforts to address environmental degradation and biodiversity loss need to take these links into account in their analysis of causes and in the development of strategies. While urgent action is needed to address immediate threats and prevent imminent extinctions, biodiversity conservation is ultimately inseparable from the move towards more sustainable livelihoods and greener economies.

As sections 3 and 4 show, governments, civil society and the private sector are increasingly taking action, including through innovations in the funding and management of protected areas, initiatives to plan and manage entire landscapes and seascapes more sustainably, to give greater value to ecosystem services through ecosystem services payments, tourism and other non-extractive use, and to mitigate the impacts of land-use change, extractive industries and energy production. There are also efforts to better understand the true costs and benefits of environmental impacts, to factor them into decision-making, and to make more funding available for biodiversity and ecosystem conservation through approaches such as blending[179] and public-private partnerships.

This final section of the report presents strategic approaches to address the threats identified and to build on the actions already initiated. Where relevant, the approaches are divided into short, medium and longer-term, indicating their urgency and feasibility. The pressures, key actors and opportunities for action will vary from place to place and over time, and so translating these strategic approaches into action will need to take account of national and local circumstances.

(179) The European Commission uses the term 'blending' to refer to 'the combination of EU grants with loans or equity from public and private financiers', with the EU grant element used in a strategic way to attract additional financing. European Commission (2014). Blending European Union aid to catalyse investments. Available at https://ec.europa.eu/clima/sites/clima/files/docs/blending_en.pdf, accessed 4 July 2017.

Local villagers take part in an awareness programme, Tonle Sap Lake, Cambodia. Engaging local people in the management of protected areas involves communicating the importance and unique features of the PA as well as its importance for livelihoods and the economy.

Bornean orang-utan. Protected area networks need to be expanded to ensure that the full diversity of ecosystems and species is represented, and to anticipate the impacts of climate change.

5.2.1 Protected areas

Protected areas contribute to the delivery of SDG 14 (conserve and sustainably use the oceans) and SDG 15 (protect, restore and promote sustainable use of terrestrial ecosystems), and to strategic goal C of the Aichi biodiversity targets[180], specifically target 11 (protected areas) and 12 (threatened species).

Key issues

Protected areas are the last hope of survival in the wild for many threatened species and intact ecosystems in Asia, and remain the most important approach for the conservation of biodiversity. However, almost all protected areas face very significant challenges in fulfilling their mandate for biodiversity protection, from illegal habitat loss to over-exploitation, as well as, in some countries, officially sanctioned projects for the construction of infrastructure or the development of extractive industries and industrial agriculture. For example, a quarter of the land inside South Asia's protected areas is classified as 'human modified'. The inability of many existing protected areas to deal with these pressures is due to a lack of management effectiveness and funding, but many species and ecosystems are poorly represented in protected areas, necessitating expanding and rationalising national protected area networks.

The management effectiveness of protected areas is discussed in terms of legal and policy issues; institutional arrangements and relationships; management capacity and processes; and funding. These core issues of management effectiveness are relevant to protected areas throughout the study region, although they take on different forms and require different solutions, depending on local circumstances.

Legal and policy issues: All the countries in the study have a legal basis for the creation of protected areas, although there is a need to update and strengthen the legislation in many cases, and to harmonise protected area laws with those on land-use planning and economic development. Examples of best practice in protected area legislation can be found in the Philippines (where the law mandates the establishment of multi-stakeholder boards and recognises indigenous rights) and Papua New Guinea (where the law recognises the need to develop multi-use protected areas with the participation of local landowners).

Institutional arrangements and relationships: Across the region it is common for protected area legislation to be sectoral in nature (i. e. falling under the jurisdiction of a specific institution within the government), and for the creation of protected areas to be driven by central government, sometimes with minimal consultation with local stakeholders. This creates difficulties in coordination across institutions and between levels of government, as well as conflicts with other stakeholders, and fuels the perception that protected areas are in competition with alternative land uses. Where political support for conservation is weak, the result may be confused mandates for management, issuance of permits for conflicting land uses, or the degazettement (removal of legal protection) of protected areas[181]. The numerous examples of co-management with local communities and other stakeholders, in terrestrial and marine PAs, provide models which could be further mainstreamed into policy and practice.

Management capacity and processes: Many protected areas do not have a dedicated management authority, with responsibility commonly delegated to a local unit of a central government ministry, or to a local government department. Burdened with responsibility for the management of multiple protected areas, other conservation duties, and often based far from the sites, these agencies are frequently unable to provide adequate levels of monitoring or protection. Even in countries which have funded specific management units for some protected areas (e. g. the Philippines, India, Indonesia), resources are extremely inadequate or poorly allocated, and management planning and implementation fail to make optimal use of available resources. Other obstacles to effective management are policies and practices that mean staff spend little time in the field or engaged with local stakeholders, weak legal protection and difficult institutional relationships. As a result, illegal land and resource use (including over-exploitation of biodiversity) are very widespread problems in protected areas throughout the region.

Funding: Almost no countries in Asia provide sufficient government financing to support PA networks, despite admirable progress in meeting the CBD area commitments for PAs under the Aichi Targets (17 % of land area and 10 % of coastal and marine areas). Without sufficient financial support, or staffing, the vast majority of protected areas are 'paper parks' – paper designations, without the resources to appropriately implement management interventions.

Important approaches to address these shortcomings are the introduction of SMART patrol systems (see Box 3), which support optimisation of limited resources to address the most significant threats; professionalisation of protected area management staff; increased government funding for PA networks; and development of innovative financing mechanisms. A significant gap

([180]) See footnote under section 3.1 for more information on the Aichi targets The Aichi Biodiversity Targets are part of the Strategic Plan for Biodiversity 2011-2020 adopted by the parties to the Convention on Biological Diversity in 2010. At global level they consist of 5 strategic goals and 20 targets, which provide a framework for the development of national targets and National Biodiversity Strategies and Action Plans. The 5 strategic goals address mainstreaming biodiversity; reducing pressure and promoting sustainable use; safeguarding ecosystems and species; enhancing the benefits from biodiversity and ecosystem services; and enhancing implementation. Further information: https://www.cbd.int/sp/targets/default.shtml

([181]) The Protected Areas downgrading, downsizing and degazettement tracker records a large number of these events in protected areas in the region, with the largest number in Vietnam. See http://www.padddtracker.org/

remains, however, in delivering effective protection of biodiversity and ecosystem services within the protected area estate. Ultimately, massive increases in PA budgets, staffing and staff capacity are necessary in order to improve management effectiveness.

PA networks and coverage. The 25 countries covered by this study have declared nearly 7 000 terrestrial protected areas covering over 3 million km², or 11 % of the land surface of the region.[182] The proportions of each country defined as PAs vary between 51 % (Bhutan) and 0.4 % (Afghanistan), though the figures for several Central Asian countries are likely to be incomplete. Only Bhutan, Cambodia, Lao PDR, Malaysia, Mongolia, Nepal, Sri Lanka, Tajikistan and Thailand have declared 17 % or more of their land surface as PAs, which is the CBD Aichi target.

In the marine realm, the six countries of the Coral Triangle region (Indonesia, Malaysia, Papua New Guinea, the Philippines, Solomon Islands, Timor-Leste), have established almost 2 000 marine protected areas covering over 200 000 km². In the Bay of Bengal large marine ecosystem, there are important MPAs in Bangladesh, India and Myanmar, but management effectiveness remains low, and many places are unprotected.

For national protected area systems to be effective it is important that the full diversity of ecosystems and species is represented within the system. One way to check this representativeness is to compare the location of PAs with the distribution of threatened and endemic species. This can be done using key biodiversity areas[183] (KBAs). KBAs have been defined for large parts of South Asia, all of South-East Asia, and are currently being defined for Central Asia. The available data shows that:

- the Greater Mekong countries have between 33 % and 83 % of their KBAs within protected areas;
- other South-East Asian countries have between 13 % and 40 % of their KBAs within protected areas, reflecting the difficulty of adequately covering the highly diverse areas scattered across thousands of islands.

While there is no necessity for KBAs to become government protected areas, these figures suggest serious under-representation of some species and habitats within the protected area networks.

An independent analysis of the representation of land-cover types and threatened vertebrates[184] in the Indo-Burma hotspot (i. e. Greater Mekong) concluded that the protected area coverage should be increased to 21 % of the region's land area, requiring an additional 102 000 km², primarily in Myanmar (36 900 km²) and Cambodia (14 500 km²). Similar studies have identified the need for expansion of PA networks in Mongolia and China.

In the marine realm, an assessment of the Coral Triangle marine protected area system showed adequate coverage of the coral and seagrass ecosystems overall, but great variation between countries, with coverage of mangroves ranging from 0.01 % (Malaysia) to 9 % (Indonesia), and many challenges around management effectiveness.

Protected areas: strategic approaches

In response to the challenges outlined above, the following strategic approaches are proposed. The division into short, medium and long term is indicative of how immediately these approaches might be expected to have an impact. In fact, the relevance and impact of different approaches will vary depending on the opportunities and constraints in each country. Further details are in the regional analysis.

Short-term approaches

- Expand and intensify efforts to optimise the use of existing funding and management resources, through the expanded use of the Spatial Monitoring and Reporting Tool (SMART) approach (see Box 3), exploiting the increasing opportunities for sharing experience and expertise between protected areas within the region. Focus on high-priority protected areas, identifying ongoing and imminent large-scale drivers of species and habitat loss. Expand the use of SMART or similar approaches for the management of marine protected areas.
- Immediate improvements in funding and support for protected area management, through enhanced donor support or increased funding and staffing from government agencies, focusing on priority sites which require safeguarding until longer-term sources of financing are available.
- Provide support to local stakeholders and PA management agencies where there are major conflicts over resources and land. Potential approaches include managing human-wildlife conflict, collaborative management and resource-sharing, and linking improved protection of biodiversity with the development of alternative livelihood strategies.
- Review national terrestrial and marine PA networks with reference to their integrity and coverage of biodiversity. Reviews should take account of models which predict changes in the distribution and populations of key species as a result of climate change. Undertake the work needed to support proposals for extensions and additions to protected areas, including the need to identify and protect key biodiversity areas.
- Raise the profile of protected areas, emphasising that they are the primary, and often only, approach for biodiversity protection. Underline the need to safeguard them against degradation caused by competing land uses.

Medium-term approaches

- Regional, national or site initiatives to increase investment in protected areas, in particular substantial increases in PA budgets, staffing and staff capacity. This should include greater government financing, continued donor support, trust funds, re-investment of park revenues into management, and scaling-up diversified sources of revenue from ecosystem services, tourism fees, corporate relationships and, where possible, sustainable use of biodiversity. In some countries there may be opportunities to adapt environment funding (e. g. for land and forest rehabilitation in China, Vietnam) to align them with protected area management goals.
- Identify and support innovative efforts to improve the quality of strategic and management planning for protected areas, including those which successfully involve local stakeholders, local governments and private sector interests, and which foster increased engagement by civil society organisations in the management of PAs.
- Address key obstacles to the effective performance of protected area staff, through the sharing of good practice, matching sites and issues across the region and identifying opportunities for mentoring and exchange, and the wider adoption of competency standards for PA staff. Address weaknesses in the systems regarding incentives and accountability for PA staff. Invest in improvement of training facilities and training programmes for PA staff in existing institutions. Establish mechanisms to allow civil society and other stakeholders to alert authorities to mismanagement, misuse of resources for PA management, illegal or negligent actions by PA management.
- Encourage the use of existing (or create new) mechanisms for the involvement of local stakeholders in the management of PAs, and support alternative protected areas, e. g. those managed by customary communities or private sector organisations. Support the use of mechanisms to clarify community land and resource rights within protected areas. Support the further development of rights-based management of marine protected areas, for example individual quotas, community rights, or state-controlled licensing systems.
- Improve KBA and other biodiversity inventories (such as the Coral Triangle atlas for marine regions) to identify gaps in the coverage of ecosystems and species by national protected area systems, and support the analysis and communications work needed to propose the creation of priority additional protected areas.

Long-term approaches

- Replicate and scale-up initiatives on the valuation of PAs in terms of natural capital. Use social marketing and other methods to build a greater understanding of the economic, social and cultural values of PAs amongst the public and decision-makers (see Box 4).
- Put in place mechanisms to address inequalities in the distribution of benefits and costs of PAs, in particular to compensate local communities and other local stakeholders who experience opportunity costs as a result of restrictions on access and use. Put in place mechanisms for revenue sharing between PAs and local stakeholders.
- Support reviews of legal and policy instruments leading to the revision of conservation and resource sector laws and regulations to ensure alignment with the principles of effective management. Strengthen the legal and policy basis of protected areas in order to prioritise biodiversity conservation as their primary mandate..
- Support national and local authorities to address weaknesses in planning laws and regulations in other sectors (e. g. energy, agriculture, fisheries, extractive industries) that create opportunities to degazette protected areas or issue concessions for exploitation within them.
- Support the reform of institutional relationships and mandates for the protection of protected areas: this is especially important in China, where the lack of a clear division of mandates between the Ministry of Environmental Protection and the State Forest Administrations, in particular, is a significant problem for PA management.

(182) Note that data for PA numbers and areas are partly reliant on the UNEP-WCMC World Database of Protected Areas, https://www.protectedplanet.net/, which is a global standard reference and presents data submitted by national governments, but is known to be incomplete in some cases.
(183) KBAs are defined on the basis of the confirmed presence of a globally threatened or endemic species, using criteria and procedures developed by the KBA partnership, including IUCN, WWF, WCS and BirdLife International, and are registered on the global KBA database. See http://www.keybiodiversityareas.org/home
(184) Tantipisanuh N., T. Savini, P. Cutter and G.A. Gale (2016). Biodiversity Gap Analysis of the protected areas system of the Indo-Burma Hotspot and priorities for increasing biodiversity representation. *Biological Conservation* 195, pp. 203-213.

Lowland swamp forest. The fate of Asia's ecosystems and biodiversity is not only influenced by national governments and local people, but by global markets and the decisions of companies and consumers worldwide.

Box 3. Making protected areas management SMART

One of the most important advances in the management of protected areas in Asia has been the introduction of the Spatial Monitoring and Reporting Tool (SMART)[185], an approach that combines a site-based management tool with capacity building and standards for protected area management. The tool links spatial data collected on patrols with other information (for example, the location of fires and clearance detected by satellite), to enable park managers and rangers to target their efforts towards the highest priority areas and issues.

SMART has been adopted nationally by Bhutan, Thailand and the Philippines, while the governments of Bangladesh, Cambodia, India, Indonesia, Lao PDR, Myanmar, Nepal and Vietnam endorse its use in some of their protected areas. It is also in use in Africa and South America, at over 500 sites worldwide. The tool's implementation, further development and wider use is supported by a group of international NGOs as well as numerous national protected area authorities, donors and governments. As knowledge and experience of the approach has developed in the region, opportunities for exchanges and learning between sites have increased. SMART approaches have resulted in measurable improvements:

- in the core reserves of the Western Forest Complex of Thailand, where use of SMART since 2007 has resulted in increases in tiger prey numbers, reduced poaching, and an increase in tiger density from 1.74 to 2.39 tigers per 100 km².
- in the Nam Et-Phou Louey National Protected Area in Lao PDR, where the use of SMART has lowered hunting pressure over the 200 000 ha core zone.

References:

SMART partnership (2016). Annual Report 2015. Available at http://smartconservationtools.org/wp-content/uploads/2016/01/SMART-2015-Annual-Report.pdf

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.

([185]) A similar system, MIST, was implemented in the region from 2003 to 2012 but has been superseded by SMART.

Box 4. Valuing the natural capital of India's tiger reserves

The tiger is a flagship for conservation in India. Forty-seven tiger reserves cover 68 000 km², 2 % of the land surface of the country. In addition to their critical role in conservation, these areas provide important economic, social, cultural and spiritual benefits, and since 2006, tiger reserves have been required to have 'core' and 'buffer' areas, with the buffers intended to ensure the flow of ecosystem services to neighbouring communities.

A study of six of the reserves (Corbett, Kanha, Kaziranga, Periyar, Ranthambore and Sundarbans), chosen to represent the variety of environmental and economic situations found throughout the network, used a selection of approaches to value the tangible and intangible ecosystem services. The main services valued were gene-pool protection, provisioning of water and water purification services, employment for local communities, provision of habitat and refugia for wildlife, sequestration of carbon, provisioning of fodder in buffer areas, recreation value, biological control, cycling of nutrients, and, in the Sundarbans, fish nursery and provisioning, waste assimilation and moderation of cyclonic storms.

The study valued the flow of benefits from the individual tiger reserves from EUR 114 million to EUR 243 million (rupee figures converted at EUR 1: INR 72) per year, or between EUR 690 to EUR 2 620 per hectare per year. The study also valued stock – land, timber and carbon – and concluded that the reserves protect and conserve stock valued from EUR 0.3 billion to EUR 9 billion. These values can be expected to increase as a result of increasing demand, greater scarcity and technological advances, which allow the exploitation of a wider range of biological materials and services.

Key conclusions of the study are:

- a large proportion of flow and stock benefits are intangible, and hence often unaccounted for in market transactions. Economic valuation makes them 'visible' to decision-makers;
- the ecosystem services provided by tiger reserves are important. However, an understanding of who experiences the costs and benefits is needed to address conflicts and establish effective policies and mechanisms for payments.

Reference

Verma, M., D. Negandhi, C. Khanna, A. Edgaonkar, A. David, G. Kadekodi, R. Costanza and R. Singh (2015). Economic Valuation of Tiger Reserves in India: A Value+ Approach. Indian Institute of Forest Management. Bhopal, India.

5.2.2 Landscape and seascape approaches

Sustainable management of landscapes and seascapes contributes to the delivery of SDG 14 (conserve and sustainably use the oceans) and SDG 15 (protect, restore and promote sustainable use of terrestrial ecosystems), as well as SDG 12 (sustainable production and consumption) and SDGs 1 and 2 (ending poverty and hunger). It also addresses strategic goal B of the Aichi biodiversity targets (reduce direct pressures on biodiversity and promote sustainable use) and goal D (enhance the benefits to all from biodiversity and ecosystem services).

Key issues

Landscape and seascape approaches 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[186]. Rather than being limited to conventional PAs, landscape and seascape approaches offer the opportunity to work with private sector and community actors using financial incentives, safeguards and planning controls, certification, land tenure and resource management rights. Landscape and seascape approaches are supported by national-level policies and programmes that encourage sustainability in key sectors, including industrial agriculture, extractive industries and infrastructure.

Integrated, landscape- and seascape-scale approaches are central to conservation outside formal protected area systems. These approaches embody the crucial, dynamic interface between conservation and development agendas in the fast-developing economies of the region. In fisheries, the value of a mosaic of no-take zones and fishing zones combined with the protection of key elements of the ecosystem is well established. In terrestrial systems, secondary forests, once- and twice-logged forests, and semi-natural landscapes dominated by productive activities such as agriculture and forestry may still have considerable biodiversity value, and they can continue to provide important ecosystem services. However, these values and services are frequently eroded by over-exploitation of resources, intensification of land use, use of destructive exploitation methods, pollution and land-use change such as dams, industrial agricultural concessions, unsustainable smallholder agriculture, onshore and seabed mining, coastal land-claiming and urban development. Linear infrastructure (roads, railways, pipelines, power lines) developments demand less land but have a disproportionate impact by forming a barrier to wildlife movements, providing a conduit for access by hunters or farmers, and thereby exacerbating habitat loss and fragmentation.

When landscapes form corridors or buffers connecting and surrounding terrestrial PAs, they allow larger populations of species to move and inter-breed. This reduces the chance of over-exploitation, disease or disasters such as fires causing local extinction.

Connectivity within and between seascapes is vital to allow ecologically and economically important species to complete their full life cycle, and to allow seasonal movements of populations of fish and marine mammals. Connectivity can be broken when reefs, seagrass beds and mangroves are destroyed or where pollution and sedimentation cause deterioration in the quality of the habitat. As in terrestrial systems, marine protected areas that are isolated experience a greater risk of local extinctions, and greater vulnerability to disasters such as storms, over-fishing and other disturbance. Isolated sites are slower to recover their species diversity and economic value than those which are part of larger, intact seascapes.

Resource management at landscape and seascape scale involves many stakeholders with multiple agendas, and so landscape and seascape approaches necessarily require negotiation with trade-offs between conservation priorities, local resource management and private sector interests. While these approaches 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.

Landscape and seascape approaches are an important complementary approach to protected areas in all the countries covered by this study. These approaches are gaining momentum in Central and East Asia as large tracts of relatively intact landscapes still exist, while in PNG they are the main approach to conservation, as 90 % of land is under customary ownership, making conventional government-controlled protected areas less relevant.

There is a high degree of inter-connectivity between marine and terrestrial systems, and integrated approaches are especially relevant at the interface between the marine and terrestrial realms. A significant proportion of the damage to marine biodiversity and ecosystems is from the land, with land-based sedimentation and pollution damaging reefs and seagrass beds, while at the same time marine ecosystems such as reefs and mangroves play a crucial role in protecting coastlines from wave action and flooding.

([186]) 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. Available at: http://www.cifor.org/publications/pdf_files/articles/ASunderland1302.pdf

Baliem valley, Indonesian New Guinea. Communities divide the landscape into zones for habitation, farming, collection of forest products, and hunting. Much of the area's unique biodiversity can survive in this diverse landscape. However land-use patterns are changing as a result of population movements, social change and increasing demand for timber.

Box 5. Multi-stakeholder conservation in the Bird's Head Seascape, Raja Ampat, Indonesia

The Bird's Head Seascape, at the western end of Indonesian New Guinea, is the heart of the Coral Triangle and epicentre of coral reef diversity on the planet. The islands of the region have their own threatened species, including two endemic birds-of-paradise. In the 1990s the region was under severe pressure from over-fishing and destructive fishing practices, and the reefs dying under a blanket of sediment resulting from uncontrolled (sometimes illegal) logging and mining activity.

The Bird's Head Seascape initiative, a partnership of local communities, local government, tourism operators, industry and civil society organisations, and with the involvement of the Coral Triangle initiative, was started in 2004.

The local government was the first in Indonesia to declare local marine protected areas (MPAs), in 2006, and followed this with the creation of a 46 000 km² shark and manta ray sanctuary, in 2010. In 2014, the national government issued a regulation banning the hunting of manta rays. Customary marine and land tenure is strong in the region, and the involvement of customary leaders has been key to ensuring that the regulations accommodate local interests, and are accepted and supported. A floating environmental education centre tours villages in the archipelago, delivering lessons and training to local schools and fishermen. Initiatives by communities and the district have been reinforced by the province, which declared itself as a 'conservation province' in 2015.

The programme has harnessed the tourist appeal for the region, introducing an entry permit system which creates revenue for local government and pays for marine protection, and providing training and advice to families to enable them to build simple beach-side 'homestays' to house tourists, as well as to provide transport and guiding services. The district government has also provided support to fishermen who abandon shark finning in favour of fish farming, while the MPAs employ people to survey and protect the reefs.

The impact on biodiversity and livelihoods has been measurable. Poaching has declined dramatically, fish populations and tourist sightings of sharks and manta rays have increased, and coral reef health has improved. Challenges remain, including pressure to open up the region's mineral resources for mining, and the difficulty of policing the area against external poachers.

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Rice fields and planted forest, Guizhou Province, China. Integrated management of the landscape provides food and timber and secures water supplies for an ancient agricultural irrigation system.

Landscapes and seascapes: strategic approaches

Strategic approaches for biodiversity conservation at a landscape and seascape level are required to address legal and policy issues, institutional arrangements and capacity, planning, and implementation challenges. While more examples of these integrated approaches are needed, the greatest challenges lie in the medium and long-term efforts required to mainstream them into policies and regulatory frameworks.

Short-term approaches

- Identify and prioritise landscapes and seascapes, based on (i) biological importance, (ii) opportunities for biodiversity conservation (e.g. maintaining connectivity between protected areas, or protecting migration routes), (iii) level of engagement of local resource users and managers, (iv) support from local governments, and (v) opportunities for constructive private sector engagement. Section 5.1 presents a preliminary prioritisation of landscapes across the region in the form of key landscapes for conservation and key marine areas in the Coral Triangle. Further details are in the relevant chapters of the regional analysis.
- In selected high-priority areas, support the implementation of integrated landscape and seascape conservation programmes that negotiate more sustainable outcomes between conservation and development. Promote and communicate results and lessons to policy-makers and decision-makers.
- Support the implementation of existing legal and policy frameworks, using mechanisms such as community conservation areas, ecologically sensitive/critical areas, protected and watershed forests, special conservation sites and locally managed marine areas, to conserve high priority, unprotected sites and threatened species. Collaborative and aligned approaches involving local authorities, civil society and the private sector will be key to implementing these mechanisms.
- Support platforms and mechanisms for interaction between local resource users, government and the private sector in priority landscapes and seascapes (see for example the YUS Conservation Area Management Committee, PNG[187] and in Raja Ampat, Box 5), to allow for the building of a shared understanding of issues and negotiation on agreed objectives. Catalyse and strengthen donor coordination in landscapes and seascapes where there are major donor projects, by supporting mechanisms for sharing experience and planning.
- Support systems for effective public-private partnerships in priority landscapes and seascapes. These could include development of concession systems that allow the private sector to provide services and infrastructure to facilitate tourism within protected areas, contributing to park operating costs through the payment of fees, or a role for the private sector in the development of ecosystem services and mitigation of key threats such as deforestation or over-fishing.

Medium-term approaches (landscape or seascape level)

- Use multilateral environmental agreements and facilitate bilateral engagement for more effective transboundary and international cooperation to protect shared resources (e.g. water, marine areas) and ecosystems (e.g. transnational priority sites, migration pathways), and to remove threats including hunting, overfishing, habitat fragmentation and habitat conversion.
- Support studies for the valuation of natural capital and environmental assets as a basis for decision-making, using methods developed by existing international initiatives on natural capital and ecosystem services. Ensure that this data is used to improve environmental planning and decision-making, and to provide a baseline against which the actual impacts of policies and programmes can be evaluated.
- Build on the information from valuation studies to develop policies that create incentives for a green economy. This will include (i) establishment of regulations to avoid and reduce impacts on natural systems; (ii) investments in clean energy; (iii) sustainable production and consumption, including recycling and waste management; and (iv) planning policies that identify priority areas for conservation and where development activities should take place.
- Ensure that consideration of climate change impacts and related fields such as disaster risk reduction are integrated into landscape-scale economic and environmental planning.
- Scale-up successful pilots of human-wildlife conflict mitigation mechanisms (establishment of early warning systems, effective compensation policies, enforcement of strict buffer zones in densely populated landscapes), to help address sources of conflict between conservation and livelihoods.
- Engage private sector players in the landscapes and seascapes through voluntary mechanisms, such as sustainability certification, corporate social responsibility, payments for ecosystem services and industry standards (e.g. those promoted by the Roundtable on Sustainable Palm Oil, extractive industries' sustainability initiative, marine stewardship council and FLEGT[188]), to promote more sustainable practices into their own operations and throughout their supply chains, as well as supporting initiatives by communities and local authorities in their area of operation. Encourage leading companies to advocate the strengthening of these mechanisms, and to work with local producers to develop incentives that reward sustainable or biodiversity-friendly products and production methods.
- Support adoption of 'no net loss' policies that require all companies to comply with a mitigation hierarchy to avoid and minimise impacts on biodiversity and ecosystem services and to pay to offset for the residual impacts arising from development. Build the mitigation process into project planning and design and incorporate it into the EIA process.

Long-term approaches (strengthening the legal and policy framework)

- Support reviews of the frameworks for strategic environmental assessment (SEA) and environmental impact assessment (EIA), to ensure (i) that these procedures are used at an early stage in the development of policies and plans, and (ii) that the best available data on important sites, species and ecosystem services are used as a basis for evaluation. Ensure that mechanisms are in place to allow civil society and other stakeholders to comment and to report abuse of the EIA/SEA system. The bundling of infrastructure and economic development into 'corridors' for development in many countries of the region gives an opportunity for efficiencies in SEA and EIA implementation, and for the introduction of environmental safeguards. Where the independence and rigour of EIAs is in doubt, support mechanisms for rigorous independent review and improved transparency.
- Encourage governments to give environmental strategies a stronger legal basis (e.g. National Biodiversity Strategy and Action Plan for the CBD, National Determined Contributions under the UNFCCC, environmental aspects of the SDGs) and to further integrate these strategies into economic planning and sectoral policies.
- Support analysis and sharing of best practice on the creation of policies and financial incentives to overcome barriers to the adoption of sustainable economic initiatives, such as green infrastructure, renewable energy, and the sustainable management of forest, fisheries and agriculture.
- Support clarification, strengthening and expansion of local resource rights, to provide improved security of access to resources for local people and encourage greater investment in long-term sustainable management of their land or marine resources. Provide financial and technical support for the greater use of existing mechanisms for granting local resource rights, such as community forestry licences and locally managed marine areas.

(187) Further information in the Island South-east Asia report, and in 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.

(188) Forest Law Enforcement, Government and Trade Voluntary Partnership Agreements.

Peat-swamp forest and village. Landscapes used and managed by local people support much natural biodiversity as well as providing numerous products and services for local livelihoods. Landscape approaches aim to maintain the diversity and sustainability of these landscapes while taking advantage of the opportunities of economic development.

Five tonnes of dead pangolins, seized from traffickers, before being destroyed by police. Pangolins are now believed to be the world's most traded animal.

Some male Asian elephants grow exceptionally long tusks. While Asian elephant populations have fallen overall, the number of these extraordinary 'tuskers' has declined even more severely, as result of poaching and capture. Maintaining genetic diversity within species' populations is important for health and long-term survival.

5.2.3 Wildlife crime

Countering wildlife crime contributes to the delivery of SDG 12 (sustainable production and consumption) and SDGs 14 and 15 (sustainable use of marine and terrestrial resources). It also contributes to Aichi biodiversity target 6 (sustainable management of marine species), target 12 (avoiding species extinction) and goal D (enhance the benefits to all from biodiversity and ecosystem services).

Key issues

Despite significant efforts, the growth in wildlife crime outpaces efforts to counter it, species are being driven closer to extinction and market demand continues to grow. The obstacles to effective control include corruption at all levels, lack of sustained political commitment, problems with enforcement (capacity, inter-agency and cross-border collaboration, inadequate legal frameworks), the complex, long-term nature of demand-reduction campaigns, and the complications caused by the growth of wildlife farming.

Wildlife crime is being addressed at the level of international conventions, in commitments by national leaders, through cooperation between law enforcement and wildlife conservation agencies, and through dedicated projects and NGOs collaborating with and assisting governments, working on investigations, data gathering and consumer/market/legislation/policy campaigns. Donor support is available for action, though far more is needed.

Key actions should be in alignment with the EU Action Plan Against Wildlife Trafficking[189], which outlines clear steps toward three broad objectives: (i) preventing wildlife trafficking and addressing its root causes; (ii) implementing and enforcing existing rules and combating organised wildlife crime more effectively; and (iii) strengthening the global partnership of source, consumer and transit countries against wildlife trafficking. Implementation of the Action Plan has begun, including provision of funding for a number of projects on the issue globally.

Unsustainable but not illegal harvests (for example, because the species concerned have not been included in national legislation or regulations, international agreements on wildlife protection or trade regulation, or because quotas or other limits on exploitation have not been set) are also widespread. In some countries this includes fishing techniques that damage the marine environment, such as the use of bombs and poison, as well as unregulated fisheries and unregulated off-takes of non-CITES terrestrial species. Addressing the legal but unsustainable trade requires amendments to legislation or regulations and action to change the behaviour of collectors/traders, and efforts to study, understand and monitor wildlife populations.

([189]) EU Action Plan Against Wildlife Trafficking: http://ec.europa.eu/environment/cites/pdf/WAP_EN_WEB.PDF

Box 6. The erosion of genetic diversity: the loss of big tuskers in Asia

In contrast to African elephants, only bull Asian elephants grow tusks, while cow elephants have small incisor teeth called tushes. Within a viable, wild population of elephants a sub-set of dominant bulls grow exceptionally long tusks – the longest recorded tusks of an Asian elephant were around 3 metres, while the heaviest weighed around 73 kg each. Although on average not as large in body size and tusk size as the bull African elephants, these 'tuskers' (bulls with tusks to the ground) are a spectacular part of the natural wealth of Asian jungles and have been recognised as part of human heritage.

While Asian elephant populations have declined precipitously across the continent, the decline of big tuskers has been even more marked, to the point where only a handful (around a dozen) are now known to survive, almost all of them in captivity. Historically, trophy hunting, capture for local rulers and temples, zoos, circuses and the logging industry all demanded large, big-tusked male elephants in preference to females or smaller males. Although these pressures have now been reduced, poaching for ivory continues to target males with larger tusks. In captivity, isolation from females, over-work, poor or improper nourishment and lack of exercise limit the opportunities for large tusked males to pass on their genes as they might have done in the wild. The result is that, over a few generations, elephants with large tusks have been virtually eliminated from the populations. The majority of the bulls in most of the Asian elephant populations are now tuskless (called maknas) or have very small tusks – in Sri Lanka, for example, 93 % of the elephant bulls are maknas. While the fate of wild elephant populations rests on the success of conservation efforts in the wild, the preservation of big tuskers would require active intervention to protect the remaining individuals (including possibly armed guards 24/7), and to encourage breeding (including targeted artificial insemination).

Wildlife crime: strategic approaches

Short-term approaches

- Support and expand current efforts on the investigation and action against wildlife trafficking, providing additional resources and capacity for immediate action.
- Strengthen existing mechanisms for inter-agency and transboundary cooperation, and encourage greater cooperation between specialist wildlife protection staff and other relevant agencies, such as police, customs, financial investigation and revenue authorities, prosecutors and judiciary, and greater engagement of specialist NGOs and civil society in support of enforcement at all levels.
- Enhance the impact of prosecution under existing national regulations on illegal wildlife trade, increasing sanctions for organising and financing the wildlife trade as well as for consuming the products. Raise the awareness of police, prosecutors and judges of the serious, transnational nature of wildlife crime and the role of corruption in perpetuating it. Encourage the application of other laws including criminal codes, anti-corruption and anti-money laundering legislation.
- Strengthen the political priority given to work on wildlife crime, including through international multilateral and bilateral fora, and feedback to governments at the national level, to secure or reinforce commitments to action on wildlife crime from national leaders and other influential figures. Encourage the stronger implementation of existing commitments, such as the CITES National Ivory Action Plans in China, Malaysia, Singapore and Vietnam, and the Johannesburg Action Plan which includes commitments by China and 50 African Union Member States to cooperate on illegal wildlife trade issues.

Medium-term approaches

- Expand and strengthen programmes to support capacity building for decision-makers, official agencies and CSOs involved in action on wildlife crime and unsustainable exploitation.
- Support public information campaigns aimed at closing markets and changing purchasing behaviour. Build on this to minimise the demand for unsustainable and illegal wildlife products, combining consumer education and market measures, supported by initiatives to supply alternative products, where these are available and do not threaten other species.
- Take action against illegal commercial 'farming' of threatened animals (e.g. tiger), and tighten the scrutiny of licensed farms/captive breeding operations to ensure that they do not act as a cover for trafficking or further processing of illegal wildlife products. Ensure compliance with international decisions and recommendations, for example the CITES CoP14 decision that tigers should not be bred for their parts and derivatives. Encourage pre-emptive actions to ban commercial farming of endangered animals in countries where it is not yet established.
- Review existing wildlife legislation and update protected species lists, ensuring that they cover threatened non-native species which are trafficked through the country, and that they are harmonised with legislation in neighbouring countries. Review quotas and documents showing non-detrimental findings for CITES listed species, ensuring that they incorporate international designations such as IUCN Red List status, and that they are aligned with CITES requirements. Support development of appropriate regulations and capacity to ensure effective collaboration between national CITES Management and Scientific Authorities.
- Introduce and promote inspection and 'wildlife trafficking free' certification of key private sector players (e.g. airlines, shipping lines, freight forwarders, port authorities, social media platforms) that play a key role in trade chains.
- Support work to demonstrate the links between wildlife trafficking and corruption, money laundering, tax avoidance and transnational crime, using this evidence to encourage action by agencies tasked with addressing these issues.
- Work to maximise the effectiveness of international intelligence and data sharing and coordination through the enhancement of existing platforms when applicable (e.g. the Wildlife Enforcement Networks, Convention on International Trade in Endangered Species, International Consortium on Combating Wildlife Crime).
- Promote new sources of funding for action against wildlife crime, including the collection of 'restitution funds' from offenders, and the establishment of mechanisms to reclaim revenues lost through money laundering, tax evasion and lost permit fees.

Long-term approaches

- Take action to reduce and eventually ban commercial farming of threatened species, as well as farming of species where there is inadequate proof of no adverse impact, sustainability and legality of supply.
- Promote studies and campaigns to create and maintain political support for action against wildlife crime. Build on this awareness with mechanisms that allow the public to report crimes as well as to monitor the implementation of government commitments to action on wildlife crime.

Carved ivory for sale. The illegal ivory trade has decimated elephant populations (see Box 7).

Box 7. CSO action to change consumer perceptions reduces demand for ivory in China

While demand from western countries fuelled the trade in ivory during the 19th and most of the 20th centuries, China now accounts for an estimated 70 % of global demand. Meanwhile, African elephant populations have fallen to 500 000, and continue to decline.

The international trade in ivory has been illegal since 1989, banned under CITES, but China continued to allow its domestic market to operate, ostensibly using CITES-authorised stockpiles. In fact, the continued domestic trade, carried out by government-authorised factories and shops, has been a cover for illegal ivory, and has sent a message to consumers that buying ivory is not harmful.

At the end of December 2016, China announced it would shut down the domestic ivory industry by the end of 2017, and in March 2017 12 of 35 ivory carving facilities and 55 of 130 ivory shops in the country were closed. While there are some concerns about possible loopholes, such as the transfer of ivory carving facilities to African countries, this action is an important step towards reducing the demand in China.

Changes in public perceptions and buying habits are needed to reinforce the impact of regulatory change. In 2007, a survey found that 70 % of Chinese consumers believed that ivory (literally translated from Chinese as 'elephant teeth') was obtained without having to kill elephants, and 83 % claimed that they would not have bought ivory if they had known. Since then, civil society organisations have carried out public education campaigns to address this misperception, using poster advertisements, short films and videos with messages from opinion-leaders from business, culture and the arts. Evaluations suggest that these were effective in reducing the number of people willing to buy ivory, and brought about an increase in people who believe elephant poaching is a problem, from 46 % in 2012 to 70 % in 2014, matched with a decline in the number of people who believed ivory only comes from natural elephant mortality. Surveys found that 95 % of respondents supported an ivory ban. Another key aspect of the change was reducing the accessibility of ivory – work with search-engine providers and on-line sales sites resulted in several of them banning sales of ivory (and other threatened wildlife products). Although difficult to prove, it is likely that the changes in public perceptions contributed to the willingness of law-makers to ban the trade.

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Youth groups campaign for action to preserve the Mekong river, Thailand. The Mekong Community Institute Association works with youth networks to monitor environmental problems and communicate them to the public. CSOs are playing an increasingly important role in mobilising public support for conservation across the region.

A Cambodian herpetologist observes a Cardamom Mountains bent-toed gecko. Monitoring key species and ecosystems enables scientists to understand the impact of development and land-use change, and the effectiveness of protected areas. Translating data into improved policies and management practices requires effective communication of the results.

Ripe coffee beans. Adoption of voluntary certification standards enables private sector players to contribute to sustainable landscapes. Where production is by smallholders, the support of intermediary companies and retailers is important to ensure that farmers can meet the requirements of the standard.

5.2.4 Enhancing the role of civil society

Enhancing the role of civil society contributes to the delivery of SDG 16 (peaceful and inclusive societies) and SDG 17 (strengthening the means of implementation). It also contributes to goal A of the Aichi biodiversity targets (mainstreaming biodiversity across society), and supports implementation of the other goals and their targets.

Key issues

The diversity, capacity and level of engagement of civil society in environmental issues varies greatly across the region, but in most countries the scale and impact is increasing. Both international and domestic NGOs are active in biodiversity-related research, monitoring, public education and awareness raising, and advocating for change in policy and practice. In many countries, NGOs and local community groups work in partnership with conservation authorities on the protection of key sites and actions against wildlife trafficking. In some, such as Papua New Guinea, locally based organisations in partnership with national and international NGOs play a leading role in the management of forests and marine resources.

While each country is different, a common theme across the region is the need to further engage local communities and wider civil society in environmental issues at the level of planning, decision-making and management. To do this, CSOs require improved access to information, the ability to use and share it more effectively, improved organisational capacity and greater capacity to take action, including sustained sources of funding. In some cases, policy changes and clarity over the role and rights of civil society groups are required.

Strategic approaches to enhance the role of civil society

Sections 5.2.1, 5.2.2 and 5.2.3 noted the important role that civil society plays in protected areas, integrated landscape and seascape approaches and tackling wildlife crime. In addition, civil society engagement may be fostered through the cross-cutting approaches listed below.

- Continue support to existing programmes that strengthen CSOs, such as the role played by the Critical Ecosystem Partnership Fund, to which the EU is a major donor.
- Integrate capacity development into programmatic frameworks, and ensure that it delivers immediately applicable skills and knowledge, and encourages synergy and collaboration between CSOs, private sector and government. Establish a long-term objective of 'graduating' CSOs that have the skills to plan, organise, locate resources and implement actions. Invest in sustainable funding mechanisms and support-institutions that can provide capacity-building services to CSO communities beyond the life of individual programmes.
- Expand the mandate and opportunities for CSOs to contribute, which may involve strengthening land and resource rights, or clarifying rights and responsibilities when CSOs work with government partners on, for example, environmental rehabilitation programmes or the co-management of protected areas.
- Provide CSOs with access to data and knowledge, and the skills to use it strategically. Further involve them in efforts to increase public awareness on issues such as protected areas, ecosystem services and wildlife crime.
- Encourage the establishment of whistle-blower schemes to provide civil society with a secure mechanism to report corruption associated with wildlife crime.
- Pursue opportunities for strengthening sustainable financing mechanisms for CSOs, emphasising the need for collaboration between CSOs, government and the private sector while maintaining the ability of CSOs to act independently.
- Support more effective collaboration between civil society and the media, to improve public awareness of biodiversity values and threats, and provide opportunities for local voices to be heard in regional and global fora. Support capacity development for CSOs and media in communicating environmental issues.

5.2.5 Increasing private sector engagement

Private sector engagement contributes to the delivery of several SDGs, especially SDG 12 (sustainable production and consumption) as well as SDG 8 (decent work and sustainable economic growth) and SDG 9 (sustainable industry). It also contributes to Aichi biodiversity targets, especially Goal A target 4 (sustainable production and consumption), Goal B target 8 (pollution) and Goal D target 16 (equitable sharing of benefits from genetic resources).

Key issues

The region includes some of the world's fastest growing economies and a large proportion of global economic activity. Private sector actors are key stakeholders in many of the processes driving the loss and degradation of ecosystems across the region, including extraction of minerals, generation of power, expansion of industrial agriculture, urbanisation and development of infrastructure. The diversity of economic and governance systems across the region means that the extent to which the private sector is required to avoid or mitigate impacts varies greatly, as do opportunities for the private sector to contribute to conservation.

Strategic approaches to private sector engagement

In addition to specific actions related to protected areas, integrated landscape or seascape approaches and wildlife crime, the following cross-cutting approaches will contribute to greater private sector engagement.

- Support the strengthening and more effective implementation of voluntary international standards for key sectors (e.g. extractives, oil palm, fibre, infrastructure, marine fish) and their wider adoption across the region, including improved independent monitoring in the field and along the trade chain.
- Work with governments to identify and remove policy obstacles to the implementation of corporate sustainability commitments, and to force laggard companies to adopt similar standards, including through trade agreements.
- Work with governments to develop effective regulations on 'no net loss of biodiversity', requiring investors to avoid or reduce impacts as part of their overall project planning processes, and to comply with the results of Strategic Environmental Assessments and other land-use planning processes. Ensure that companies mitigate any residual impacts (e.g. after operations finish) and avoid long-term loss of biodiversity or ecosystem services.
- Strengthen the use of EU strategies and processes to create incentives for legal and sustainable production and trade in specific sectors, including through the FLEGT

process for timber, as well as for fisheries and other commodities.

- Leverage financing and provide guarantees to stimulate investment in clean energy, and in improved land-use management, through payments for ecosystem services, conservation contracts, and other incentives that lead to adoption of green economy practices that protect natural capital.
- Create opportunities for public-private partnerships through effective concession policies that stimulate investment in services and infrastructure and in the management of protected areas.
- Explore opportunities with European investors around green economy investment opportunities (e.g. green bonds, conservation investments), which will directly contribute to green economy objectives.
- Work with governments to strengthen and update regulations and safeguards affecting the environmental performance of key sectors, including attention to the impact of investment and business activity along trade chains and in other countries (e.g. sustainable procurement policies for buying from overseas suppliers, environmental standards for work overseas).
- Support the development and implementation of improved regulatory frameworks and industry standards for businesses that have the potential to contribute positively to ecosystem and biodiversity conservation (e.g. nature tourism, sport hunting and fishing, sustainable harvesting of common wild species).

5.2.6 Improved data and information management

Improved data and information management underpins the delivery of many of the SDGs and the Aichi targets.

Key issues

Data on biodiversity, ecosystem services, the threats to them and the impacts of conservation measures are a fundamental requirement for policy development and implementation. Current data on all of these aspects of conservation is patchy, project-specific and often inadequate. 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 that need this information in the planning and evaluation of their activities do not necessarily have the expertise to use it effectively.

There are many initiatives to collate biodiversity information, often at site or local level, sometimes national and international. However, these are often not updated, and so quickly become obsolete and unreliable.

Strategic approaches to data and information management

In addition to the role of research and knowledge management in relation to the previous sections, the following general strategic approaches are relevant across the region.

- Support development of capacity and programmes to carry out key applied research and monitoring. This should include addressing gaps in the knowledge on threatened species, ecosystems, threats and impacts of management, as well as key issues such as ecosystem valuation, application of sustainability criteria or land-use change impacts. Include the updating and expansion of global standard priority setting analyses, as well as the identification of key biodiversity areas.
- Support the development of capacity among planners and decision-makers to use environmental information and analysis in planning.
- Integrate ecosystem and biodiversity concerns into ongoing and new work on climate change monitoring and modelling, and disease monitoring.
- Support the further development and use of standard protocols for biodiversity data management, with reference to international standards and the requirements of international conventions. Enhance mechanisms for sharing of data between key agencies in-country, and for allowing access to information by other agencies and civil society organisations. Work with policy-makers and data custodians to address practical and regulatory obstacles to sharing datasets, including linking them with global platforms and initiatives such as the Eye on Biodiversity initiative[190].
- Support the wider awareness of the values of biodiversity and ecosystems through providing access to biodiversity data (especially, for example, on a local scale) in a form that is appropriate for schools and universities, and within the relevant professional development courses.
- Encourage the creation of national and regional platforms for sharing data on specific groups of species and issues, leading to collaborative planning and joint action for critically threatened species and ecosystems, especially those inadequately covered by protected areas and existing species action planning initiatives.

([190]) The Eye on Biodiversity Special Initiative focuses on the incentives required to further motivate people, governments, agencies and organisations to share their information and data on issues related to biodiversity, particularly with regard to Principle 10 of the 1992 Rio Declaration. http://www.eoesummit.org/blog/initiative/eye-on-biodiversity/

The EU is a major importer of timber products, including from the forests of Asia. It works with exporting countries to improve forest governance and ensure that timber entering the EU is legal and, as far as possible, sustainable. Similar work is being undertaken for tuna, palm oil and other commodities.

Box 8. Asian Species Action Partnership: Connecting data and conservation action to save species on the brink of extinction in South-East Asia

South-East Asia has by far the highest concentration of species on the brink of extinction of any region in the world. The Asian Species Action Partnership (ASAP) is an IUCN Species Survival Commission initiative, working to catalyse conservation action for the critically endangered (as defined by IUCN) land and freshwater vertebrates of the region. There are currently 174 species on ASAP's target list, many of which have had no conservation attention.

ASAP brings together over 50 NGOs, academic organisations, expert groups and zoos. By mobilising support where it is urgently needed, drawing on the collaborative expertise of conservation practitioners, pooling resources and raising the profile of the lesser-known species, ASAP hopes to maximise efficiency and minimise the risk of extinction.

ASAP has been able to direct conservation effort and support to some of the species most in need, playing a key role in catalysing action for the white-bellied heron, the world's most endangered heron, and working with partners to develop conservation action plans for the helmeted hornbill and Sunda pangolin. ASAP has helped organisations such as Wildlife Reserves Singapore to enhance their conservation strategy and strengthen their efforts using ASAP as a guide for their conservation support within the South-East Asia region. It is well placed to work with ASEAN member states to help meet their obligations under the Convention on Biological Diversity and the UN Sustainable Development Goals (SDGs).

Reference

http://www.speciesonthebrink.org/

5.3 The European Union and biodiversity conservation in Asia

This section addresses the links between EU policies and the issues discussed in this report, including lessons and proposals for policy dialogues with EU partner countries to further a shared agenda on livelihoods and environmental sustainability. It summarises the EU's efforts to ensure that its own global ecological footprint is minimised and that its trading relationships with the rest of the world are a driver for sustainability. It also provides examples for partners, such as international organisations, financial institutions and governments of the region.

5.3.1 Links with the main EU policy agendas

The **European Consensus on Development**, Our World, Our Dignity, Our Future[191], released in June 2017, lays out the principles that underpin the EU's external development work and partnerships, and aims to ensure that EU development policy is closely aligned with the internationally agreed Sustainable Development Goals. As such, it endorses and adopts the structure of the United Nations 2030 Agenda for Sustainable Development, summarised as 'the 5Ps: people, planet, prosperity, peace, partnership' (see Annex 4).

The **EU Biodiversity Strategy**[192] (target 6) addresses the need for the EU to contribute to biodiversity conservation globally, notably by (i) reducing the negative impacts of EU consumption patterns (Action 17a), (ii) enhancing the contribution of trade policy (Action 17b), (iii) mobilising funds for biodiversity conservation in line with the targets agreed in Hyderabad (Action 18) and (iv) minimising any negative impact from development cooperation programmes (Action 19).

Europe has the world's highest net imports of resources per person, and its open economy relies heavily on imported raw materials and energy. The issue is addressed by the EU through the flagship initiative '**A Resource Efficient Europe**'[193] and associated 'Roadmap to a Resource Efficient Europe'[194] which, in addition to laying out a roadmap for the EU economy to shift towards de-coupling growth from resource exploitation, refers to the need to monitor and reduce the EU's environmental impact globally.

The EU's impact on deforestation globally is significant: between 1990 and 2008, the EU is estimated to have imported about one-third of the globally traded products whose production is associated with deforestation in the countries of origin[195]. In Asia, the main countries involved are Indonesia (deforestation associated with palm oil, rubber, coffee and cocoa) and Malaysia (deforestation associated with palm oil), as well as Laos, Thailand and Vietnam (rubber, coffee, and palm oil). In response to that, the EU has implemented the **EU Timber Regulation**[196], which was developed as part of the **EU FLEGT Action Plan** and came into force in March 2013. Its aim is to reduce illegal logging by ensuring that no illegal timber or timber products can be sold in the EU. To do so, it prohibits operators in Europe from placing illegally harvested timber and products derived from illegal timber on the EU market. By improving governance, clarifying the frameworks for the tenure rights and leveraging trade measures, the FLEGT AP contributes to addressing deforestation and forest degradation.

The EU and its Member States are the largest contributor to biodiversity-related official development assistance and have more than doubled funding between 2006 and 2013. However, significant efforts are still needed to maintain the investments at the height of the CBD Hyderabad target, i.e. doubling biodiversity funding by 2015 (using as a reference the average level from 2006 to 2010[197]) and maintaining it until 2020. EU support for the environment – including climate change, sustainable energy and water – represented 5.7 % (EUR 2.71 billion) of total funding for development managed by the Directorate-General for International Cooperation and Development (EUR 49.67 billion) in the period 2007-2013[198]. The mid-term review of implementation of the EU biodiversity strategy concludes that 'reaching the CBD Hyderabad target, as well as increasing the effectiveness of funding, will require continued commitment, better prioritisation and coordination with other donors'[199].

(191) European Commission (2017). The New European Consensus on Development 'Our World, Our Dignity, Our Future', available at https://ec.europa.eu/europeaid/new-european-consensus-development-our-world-our-dignity-our-future_en
(192) European Commission (2011). Our life insurance, our natural capital: an EU biodiversity strategy to 2020. COM(2011) 244 final. Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0244:FIN:EN:pdf
(193) European Commission (2011). A Resource Efficient Europe. COM(2011) 21.
(194) http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52011DC0571
(195) European Commission (2013). The impact of EU consumption on deforestation: Comprehensive analysis of the impact of EU consumption on deforestation. Technical report 2013-063.
(196) http://ec.europa.eu/environment/forests/timber_regulation.htm
(197) European Commission (2015). EU Assessment of Progress in Implementing the EU Biodiversity Strategy to 2020: Accompanying Document: report of the Commission to the European Parliament and the Council. COM(2015) 478.
(198) https://ec.europa.eu/europeaid/sectors/environment_en, accessed 22 March 2017.
(199) European Commission (2015). The Mid-Term Review of the EU Biodiversity Strategy to 2020. COM(2015) 478, p.18. See http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015DC0478&from=EN

Attention to **mainstreaming biodiversity** and environment across the remaining 94.3 % of the budget is crucial to ensuring that the EU's development assistance impacts positively on these issues. This is consistent with the European consensus' emphasis on the importance of policy coherence and the need to mainstream sustainable development in all EU policies, with particular reference to finance, environment and climate change, food security, migration and security.

The wider impacts of environmental degradation, and its links to other forms of organised crime, are also recognised in the **EU Agenda on Security**[200]. In February 2016, the European Commission adopted the **EU Action Plan against Wildlife Trafficking**[201], whose priorities are: (i) preventing wildlife trafficking and addressing its root causes; (ii) implementing and enforcing existing rules and combating organised wildlife crime more effectively; and (iii) strengthening the global partnership of source, consumer and transit countries against wildlife trafficking. Each measure, which were taken based on these priorities, has been assigned to and is implemented by an EU actor (Commision services, EEAS, Europol, Eurojust) and/or Member States[202].

5.3.2 Engaging with development partners

The EU works with development partners (regional organisations, governments, civil society and the private sector) through a combination of dialogue, trade and cooperation agreements, and several bilateral and multilateral development funding mechanisms, focused on priority needs in each country. Biodiversity and ecosystem services underpin development, are inseparable from it, and therefore need to be mainstreamed into all aspects of the EU's relationship with development partners. There are obstacles to doing this, however, including the large number of issues on the dialogue agenda, the problem that environment and biodiversity issues are often treated as low priority or niche issues, and, especially in the larger economies, the fact that the relationship with the EU is only one of many bilateral relationships which the government is engaged in. This section describes some of the examples and lessons on how these challenges have been addressed.

Making the arguments for biodiversity and ecosystems based on best available data

Compelling politically and culturally relevant arguments for the importance of biodiversity and ecosystems need to be made based on adequate knowledge and a combination of data and examples. A great deal of information is available, and could be collated, summarised and, where necessary, translated, to make it relevant and accessible to policy-makers. EU delegations and partners need to allocate resources for focused, additional data collection to address specific needs in preparing an analysis of environmental issues.

Some of the most useful sources of information are described below.

General overviews of priority issues: *Larger than Tigers* provides a regional overview of priority areas for biodiversity, but a more detailed national or sub-national analysis will often be necessary. Sources include EU Country Environment Profiles[203] and the environmental profiles development by the World Bank and the Asian Development Bank.

Detailed information on biodiversity: Many sources are available. The Critical Ecosystem Partnership Fund[204] provides ecosystem profiles on threatened species and key biodiversity sites. Data is available from the ASEAN Centre for Biodiversity and the IUCN.

Information on wildlife trafficking: A wealth of information is available from publications of international organisations such as the World Customs Organisation, Interpol, CITES Secretariat and UNODC. Government reports and submissions to CITES are also a useful source of information, and a number of national and international non-governmental organisations (see section 3.3.3) have published material on wildlife trafficking.

Demonstrating the livelihood impacts and wider economic benefits: Studies conducted by TEEB[205], the World Bank-led WAVES partnership[206] and UNEP, cover approaches such as total economic valuation[207], mapping essential natural capital[208]

(200) European Commission (2015). The European Agenda on Security. COM(2015) 185 Final of 28.4.2015, available at https://ec.europa.eu/home-affairs/sites/homeaffairs/files/e-library/documents/basic-documents/docs/eu_agenda_on_security_en.pdf
(201) EU Action Plan against Wildlife Trafficking. COM(2016) 87 final; available at http://ec.europa.eu/environment/cites/pdf/WAP_EN_WEB.PDF
(202) http://ec.europa.eu/environment/cites/trafficking_en.htm
(203) Profiles for Afghanistan, Bangladesh, Cambodia, China, India, Indonesia, Lao PDR, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea, Thailand, Vietnam and the Philippines are available at http://capacity4dev.ec.europa.eu/public-environment-climate/documents. Note: not all are current.
(204) Ecosystem profiles are available hotspots identified by Conservation International. Dates of writing varied. Section 5 lists the hotspots in the region.
(205) TEEB studies and TEEB-inspired studies are available for ASEAN, the Philippines, Thailand and India. See http://www.teebweb.org/resources/ecosystem-services/
(206) 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 overseen by a steering committee. See https://www.wavespartnership.org/, accessed 9 September 2016.
(207) Pascual U. and R. Muradian (2010). The Economics of valuing ecosystem services and biodiversity. Chap. 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
(208) 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 (2014). Towards a global map of natural capital: key ecosystem assets. UNEP, Nairobi, Kenya.

and natural capital accounting.[209] They offer data and models for incorporating the value of ecosystem services into economic decision-making. Numerous site- and locality-specific studies describe the importance of wild resources for livelihoods.

Linking with international agendas

Countries in the region are party to most of the key international conventions, and with these come a series of obligations and a degree of international exposure. The EU is often well-placed to offer assistance to development partners in understanding the implications of these agreements for their own countries, preparing to attend international meetings, and translating the results of international commitments into national policies and plans. Important examples include the commitments to expand the area of land and sea under well-managed protection (CBD's Aichi targets), the relevant environmental targets under the SDGs, and commitments to take action against illegal trade under CITES and the United Nations Convention against Transnational Organised Crime. Other important commitments include agreements under the Convention on Migratory Species (CMS), such as the Memorandum of Understanding concerning the Restoration, Conservation and Sustainable Use of the Saiga Antelope (*Saiga* spp.), the Central Asia Mammals Initiative and the East Asian-Australasian Flyway Partnership. Commitments made under the UN Commission on Crime Prevention and Criminal Justice and the United Nations Convention against Corruption are also relevant, especially to wildlife trafficking.

Cases where countries come under specific scrutiny or criticism (for example, sanctions under CITES because of failure to adequately monitor or report trade) may actually offer opportunities to raise the political profile of the issue and assist those within the host country government who are trying to act on the issue. EU support might be direct (e.g. providing experts, funding studies, hosting meetings and dialogues) or indirect (e.g. funding experts from private sector or civil society organisation to provide technical assistance to government).

Wildlife trafficking should also be addressed in forums dealing with money laundering and financial crimes, such as the Financial Action Task Force on Money Laundering. The Task Force conducts peer reviews of its national members to assess implementation of its recommendations, providing an in-depth description and analysis of each country's system for preventing criminal abuse of the financial system.

Working through policy dialogue

Some countries in the region (China, Vietnam and Indonesia are notable examples) have suffered severe environmental problems (e.g. air pollution, water pollution), which have caused public health crises and economic losses. As a consequence, some aspects of environmental management have become major policy concerns, presenting an opportunity for the EU to support monitoring and action by the government and non-state actors. Environmental issues may be less politically sensitive than economic cooperation, trade or security, and so may provide an entry-point for cooperative relationships between governments. To engage in policy dialogue, access to the best, most up-to-date information on biodiversity and the issues under discussion is essential, both to establish the credibility of the EU and to ensure that the resulting dialogue is as well-informed as possible.

Policy dialogue needs to be grounded in a good understanding of the interests of different stakeholders and groups, and of national priorities, including plans such as the national tiger and elephant action plans in the relevant range states. Non-environment sector policies may also be highly relevant – anti-corruption, money-laundering and tax revenue policies and regulations may be key to creating effective cooperation for addressing the unsustainable and illegal use of resources.

Strengthened dialogue with source, transit and market countries is a priority (Objective 3.2) of the EU Action Plan on Wildlife Trafficking, with priority actions that include the identification of priority countries, the establishment of mechanisms for dialogue, and the introduction of the topic into high-level meetings with Ministers and other government officials responsible for police, customs and other law enforcement agencies. The need for a network of focal points in embassies and delegations is recognised, as is the relevance of existing structures, such as the green diplomacy network. The promotion of issues through dialogue with regional organisations such as ASEAN[210] and the Asia-Europe Meeting is also important.

Working through trade relationships

The EU represents an important market for many countries in the region. Imports from 20 countries benefit from reduced tariffs under the General Scheme of Preferences (GSP). Among these are eight least-developed countries which come under the 'Everything But Arms' arrangement, and five countries which benefit from tariff-free trade under the GSP+, as a result of their commitments to good governance and sustainable development.

Illegal logging has been an important driver of deforestation and forest degradation across South-East Asia in particular, with the timber usually processed in other countries in the region (such as China, Vietnam), and the finished products exported to markets in Europe and the USA. The FLEGT process supports some of the main countries to put in place mechanisms to verify the legality of timber: Indonesia has signed a voluntary partnership agreement with the EU, while Lao PDR, Malaysia, Thailand and Vietnam are at different stages in the process. Other examples of support for legality and sustainability through trading relationships include the EU regulation that bans the import of untraceable tuna (2010), which catalysed Philippine tuna fishers to organise and secure approval for a tracing system[211], and the European Parliament's decision in April 2017 on palm oil and the deforestation of rainforests[212].

EU bilateral trade agreements include a chapter on sustainability, including social and environmental safeguards which offer an opportunity to reflect the importance of biodiversity and wildlife crime. The 2016 EU-Vietnam agreement, for example, already includes consideration of biodiversity, sustainable forest management and the sustainable management of marine resources.[213] Wildlife crime, in particular, is a relevant topic for discussions about the governance of trade, and an area for potential support from the EU for the monitoring and enforcement of standards. Wildlife crime could be highlighted more strongly within the agendas of bilateral summits or trade negotiations, with key strategic partner countries and regional blocs such as ASEAN, South Asian Association for Regional Cooperation, G7 and G20.

The pressure for adoption of standards within trading mechanisms may also come from leaders within the industry, with important progress in adoption of voluntary standards for palm oil, timber, pulp-paper, rubber, coffee and other commodities. The practices of EU companies operating and sourcing in the country are important as an example of best practice and should adhere to EU standards.

Working through funding and capacity building relationships

Nineteen[214] of the 25 countries covered in this report have EU-funded bilateral development aid programmes. While none of these programmes focus on environmental issues specifically, they represent important opportunities to mainstream environmental conservation into EU programmes. However, all countries covered by this report are eligible for regional funding, and can also benefit from programmes under the thematic budget lines, such as the Global Public Goods and Challenges (GPGC) programme. Examples of EU-funded biodiversity projects are (i) the 'Sustainable Use of Peatland and Haze Mitigation in ASEAN' (EUR 20 million, designed to support the implementation of the ASEAN Programme on Sustainable Management of Peatland Ecosystems 2014-2020 (APSMPE) and aimed at conserving the region's biodiversity-rich peat forests and thereby reducing greenhouse gas emissions, and (ii) the 'Biodiversity Conservation and Management of Protected Areas in ASEAN' (EUR 10 million) focused on enhancing conservation of biodiversity and effective management of key protected areas within the ASEAN Heritage Parks Network. Furthermore, the EU biodiversity strategy (Target 6, Action 19) commits the EU to ensuring its external aid is biodiversity-proofed, for example through EIAs and SEAs. Using the leverage its funding provides, the EU can assist with addressing environmental problems by involving more actors, convening partnerships, introducing novel approaches and examples, and supporting improved frameworks and institutional measures.

An important sub-set of regional and global (and sometimes bilateral) funding is available for civil society. In providing support to local CSOs, the EU can also assist them to get their views heard within policy-making forums, and promote their efforts as examples of good practice. This may be especially important in countries where CSO communities are poorly developed or have limited freedom to operate. Improved environmental governance benefits indirectly from civil society action on corruption, transparency and public awareness, and is not limited to CSOs that address a specifically environmental agenda.

In addition to funding, there are areas where EU experience could be mobilised in support of development partners. Delegations and EU Member States could support strengthening the criminal justice response to wildlife trafficking, for example by (i) sharing expertise and best practice between wildlife crime enforcement officers and the authorities in priority source, transit and destination countries, (ii) arranging roundtables for enforcement officials, and (iii) identifying areas for technical and financial support.

All of the approaches outlined above are likely to be more effective when they involve coordination between a group of partners, such as donors, diplomatic missions, national agencies or civil society organisations who support a similar agenda and can offer expertise and resources for engagement[215]. The EU's convening power, and its role as a long-term development partner in many of the countries, allows it to act as an effective catalyst for this kind of cooperation.

(209) http://www.worldbank.org/en/topic/environment/brief/environmental-economics-natural-capital-accounting, accessed 9 September 2016.
(210) Wildlife trafficking is already on the list of areas for EU-ASEAN cooperation. See European Commission (2016). Analysis and Evidence in support of the EU Action Plan against wildlife trafficking. COM(2016)87 final.

(211) http://wwf.panda.org/wwf_news/?188441/Europe-accepts-responsibly-caught-Coral-Triangle-tuna
(212) See http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P8-TA-2017-0098+0+DOC+XML+V0//EN
(213) See http://trade.ec.europa.eu/doclib/docs/2016/february/tradoc_154229.pdf
(214) The countries without bilateral aid programmes are China, India, Indonesia, Malaysia, the Russian Federation and Thailand. Discussions on bilateral relations with Iran are under way.
(215) Examples include the 15.7 group in Lao PDR. Similar joint approaches have been used in Thailand, Vietnam and China.

#6

Conclusion

The long-term future of species such as this Asian elephant depends on effective protected areas, the sympathetic management of wider landscapes and efforts to change consumer behaviour and stem the illegal wildlife trade.

#6 _ Conclusion

Elephants in a tea estate. The survival of Asia's biodiversity depends on the decisions of local people, governments, business and consumers about how to balance short-term economic needs with longer-term considerations of sustainability.

Grassland and wetland in the Western Ghats, India. The mountains are a hotspot for biodiversity and a source of water for the lowlands to the east.

Asia's biodiversity represents an extraordinary treasure of terrestrial, freshwater and marine species and ecosystems, many of them unique. Although in some cases depleted, and almost everywhere under pressure, this biological richness still provides services and products of enormous economic and cultural value, many of them irreplaceable. The analysis of threats and needs in this report provides a critical tool for prioritising action and allocating resources, to support biological diversity and to address the conservation and the sustainable development challenges.

Knowledge, applied to understanding and addressing threats and optimising sustainable benefits, is the foundation of successful biodiversity conservation. While important gaps remain, work to understand the status and needs of species, to map ecosystem functioning, and to learn from innovative solutions to problems is on-going throughout the region. Applying the results of scientific research to policy-making, planning and field management decisions can be done more effectively as technology facilitates interaction between people across geographic and language barriers.

The establishment of an extensive network of protected areas indicates that biodiversity is increasingly viewed as an asset that should be protected and managed wisely. Networks of protected areas are still expanding, as research highlights additional gaps and needs. The continuing challenges of protection and sustainable management are being addressed through hundreds of initiatives that will (i) make law enforcement more effective, (ii) engage with stakeholders, (iii) maximise benefits while maintaining ecological integrity, and (iv) find innovative ways to ensure sustainable financing. Important work is being conducted to assess and recognise how local and indigenous communities have been able, through their own rules and norms, to effectively maintain the diversity of their lands. Supporting and learning from these communities can make a vital contribution to biodiversity conservation as well as to social development. The role of private reserves, although not yet well developed, is likely to grow as private sector corporations are encouraged to invest in ecosystem services, conservation and the greening of their own business processes.

Although the protected areas of the region are huge, they represent only a fraction of the land and sea surface. The wider landscapes support economic activity, provide ecosystem services, and contain important reservoirs of wild as well as domesticated biodiversity. In decision-making, the importance of taking environmental considerations fully into account is increasingly recognised, with many examples of improvements in the robustness and enforceability of measures to anticipate and mitigate negative impacts. Although truly integrated 'landscape management' remains a rarity, there are numerous elements of such an approach which are being used, and could be scaled-up and combined – including strategic environmental assessment, natural capital accounting, multi-stakeholder platforms for decision making, multiple-use zoning of landscapes and environmental services payment schemes.

This study shows the intense pressure on species and ecosystems caused by the rapid growth in the illegal and unsustainable exploitation of biodiversity for traditional medicinal products, culinary delicacies, ornaments, fashion accessories and exotic pets. The markets for these products are global, but several Asian countries play a key role in this trade, as transit countries or end-markets. The growing realisation of the scale and impacts of the illegal wildlife trade has prompted action by governments, the private sector and civil society organisations. In many countries, national legislation has been reviewed, sanctions increased, international cooperation scaled up, and technology employed to support the detection and prosecution of wildlife crime and trafficking. Civil society campaigns are changing the perceptions and behaviour of consumers and policy-makers, and private sector organisations are increasingly clamping down on the use of their services by traffickers of wildlife products.

Biodiversity and sustainably managed ecosystems are key components of green economies and societies. Certain Asian countries are world leaders in the adoption of renewable energy, advanced technology related to the environment and innovations to move towards a circular economy. Major industries are putting in place safeguards and reviewing the sustainability and impacts of their operations.

As a result of action by governments, civil society, business and ordinary citizens, there are thousands of positive initiatives across the region, and many opportunities to support and invest in the promotion of greener, more sustainable economies and societies. Donor organisations, financial institutions and investors are increasingly supportive of initiatives which recognise that economic activity should be based on, and contribute to, more equitable and sustainable social and environmental practices. The perceived dichotomy between development and environment is becoming blurred, as improved understanding of ecosystems and of new ways to account for their values reinforces the idea that conservation is an essential foundation of economic development, and not a separate policy or an alternative to it.

The European Union is one of the largest contributors to biodiversity-related development assistance and stands ready to play a leading role. The preparation of this study contributes to promoting a new approach which emphasises the vital importance of the environment-development nexus. The *Larger than Tigers* reports provide a tool that will strengthen the cooperation among key national and international players working towards the common goal of ensuring the preservation of our planet's irreplaceable natural resource base.

Annexes

Veitch's pitcher plant, endemic to Borneo. Pitcher plants are highly sought-after by collectors because of their extraordinary shape, which allows them to trap and digest insects. All pitcher plants are now listed on Appendix I or II of CITES in an effort to control the international trade.

Annex 1 Global biodiversity priority regions in the study countries

Country	Biodiversity hotspot	Terrestrial and freshwater Global 200 ecoregions within the study area
Afghanistan	Mountains of Central Asia	Middle Asian montane steppe and woodland, Tibetan Plateau steppe, Western Himalayan temperate forests
Bangladesh	Indo-Burma	Naga-Manipuri-Chin Hills moist forests, Sundarbans mangroves, Terai-Duar savannas and grasslands
Bhutan	Himalayas	Eastern Himalayan alpine meadows, Eastern Himalayan broadleaf and conifer forests, Terai-Duar savannas and grasslands
Cambodia	Indo-Burma	Annamite Range moist forests, Cardamom Mountains moist forests, Indochina dry forests, Mekong river
China	Himalayas, Indo-Burma, South-West China, mountains of Central Asia	Altai-sayan montane forests, Daurian steppe, Eastern Himalayan alpine meadows, Eastern Himalayan broadleaf and conifer forests, Hengduan Shan coniferous forests, Indochina dry forests, Mekong River, Middle Asian montane steppe and woodland, Russian Far East rivers and wetlands, Salween river, Xi Jiang rivers and streams, Yangtze rivers and streams, Yunnan lakes and streams, Northern Indo-china subtropical moist forest, Southeast China Hainan moist forest, Southwest China temperate forests, Tibetan Plateau steppe
India	Himalayas, Indo-Burma, Western Ghats and Sri Lanka	Chhota-Nagpur dry forests, Eastern Deccan Plateau moist forest, Eastern Himalayan alpine meadows, Eastern Himalayan broadleaf and conifer forests, Indus river delta, Naga-Manipuri-Chin Hills moist forests, Western Ghats rivers and streams, Rann of Kutch flooded grasslands, Southwestern Ghats moist forest, Sundarbans mangrove, Terai-Duar savannas and grassland, Tibetan Plateau steppe, Western Himalayan temperate forests
Indonesia	Sundaland, Wallacea	Borneo lowland and montane forests, Central Range subalpine grasslands, Central Sulawesi lakes, Greater Sundas mangroves, Lakes Kutubu and Sentani, Moluccas moist forest, New Guinea rivers and streams, Sundaland rivers and swamps, New Guinea mangrove, New Guinea montane forest, North Australia and trans-fly savannas, Nusa Tenggara dry forests, Peninsular Malaysian lowland and montane forests, Southern New Guinea lowland forests, Sulawesi moist forests, Sumatran islands lowland and montane forests, western Java mountain forests
Iran	Irano-Anatolian, Caucasus	Caucasus-Anatolian-Hyrcanian temperate forests
Kazakhstan	Mountains of Central Asia	Altai-sayan montane forests, Middle Asian montane steppe and woodland, Volga river delta, central Asian deserts
Kyrgyzstan	Mountains of Central Asia	Middle Asian montane steppe and woodland, central Asian deserts
Lao PDR	Indo-Burma	Annamite Range moist forests, Indochina dry forests, Mekong river, Northern Indochina subtropical moist forest
Malaysia	Indo-Burma, Sundaland	Borneo lowland and montane Forests, Greater Sundas mangroves, Kayah-Karen/Tenaserrim moist forest, Kinabalu montane scrub, Sundaland rivers and swamps, Peninsular Malaysian lowland and montane forests
Mongolia		Altai-sayan montane forests, Daurian steppe, Russian Far East rivers and wetlands
Myanmar	Himalayas, Indo-Burma, South-West China mountains	Eastern Himalayan Alpine Meadows, Eastern Himalayan Broadleaf and Conifer Forests, Kayah – Karen/Tenaserrim Moist Forest, Lake Inle, Mekong River, Naga-Manipuri-Chin Hills Moist Forests, Salween river, Northern Indochina subtropical moist forest
Nepal	Himalayas	Eastern Himalayan alpine meadows, Eastern Himalayan broadleaf and conifer forests, Terai-Duar savannas and grasslands, Western Himalayan temperate forests
Pakistan	Himalayas	Indus river delta, Western Himalayan temperate forests, Tibetan Plateau steppe, Rann of Kutch flooded grasslands
Philippines	Philippines	Philippines freshwater, Philippines moist forests, Palawan moist forest
Papua New Guinea	East Melanesia	Central Range subalpine grasslands, Southern New Guinea lowland forests, New Guinea mangroves, New Guinea montane forests, New Guinea rivers and streams, Northern Australia and trans-fly savannas, Lakes Kutubu and Sentani
Russian Far East		Altai-sayan montane forests, Daurian steppe, Volga river delta, Russian Far East rivers and wetlands, Russian Far East temperate forests (= broadleaf and mixed forests)
Sri Lanka	Western Ghats and Sri Lanka	South-Western Sri Lanka rivers and streams, Sri Lankan moist forests
Tajikistan	Mountains of Central Asia	Middle Asian montane steppe and woodland, Tibetan Plateau steppe
Thailand	Indo-Burma, Sundaland	Cardamom Mountains moist forests, Indochina dry forests, Kayah-Karen/Tenaserrim moist forest, Mekong river, Peninsular Malaysian lowland and montane Forests, Northern Indochina, Salween river
Timor-Leste	Wallacea	Nusa Tenggara dry forests
Turkmenistan	Mountains of Central Asia, Irano-Anatolian	Middle Asian montane steppe and woodland, Central Asian deserts, Caucasus-Anatolian-Hyrcanian temperate forests
Uzbekistan	Mountains of Central Asia	Middle Asian montane steppe and woodland, Central Asian deserts
Vietnam	Indo-Burma	Annamite Range moist forests, Indochina dry forests, Mekong river, Northern Indochina subtropical moist forest, Xi Jiang rivers and streams, Southeast China Hainan moist forest

Annex 2 Total number of globally threatened species, by country

	Critically endangered	Endangered	Vulnerable	Total
Malaysia	261	227	792	1 280
Indonesia	207	295	776	1 278
China	187	390	535	1 112
India	155	382	526	1 063
Philippines	110	148	529	787
Thailand	83	149	386	618
Vietnam	95	162	336	593
Sri Lanka	140	169	275	584
Papua New Guinea	41	67	384	492
Myanmar	43	94	185	322
Cambodia	31	68	160	259
Lao PDR	35	69	116	220
Bangladesh	23	45	80	148
Iran	23	26	94	143
Pakistan	14	34	94	142
Nepal	15	35	62	112
Bhutan	14	30	52	96
Kazakhstan	18	20	43	81
Turkey	13	10	38	61
Uzbekistan	12	17	30	59
Kyrgyzstan	7	14	27	48
Mongolia	4	15	29	48
Tajikistan	8	11	27	46
Afghanistan	5	12	27	44
Timor-Leste	4	11	8	23

Source: IUCN Red List of threatened species, http://www.iucnredlist.org/, compiled June 2016.

Annex 3 Signatories of species-level MoUs under the Convention on Migratory Species, and related agreements and initiatives

	MoUs								Agree-ments	Others*	
Country	Migratory birds of prey	Bukhara deer	Dugong	Indian Ocean – SE Asia marine turtles	Saiga antelope	Siberian crane	Slender-billed curlew	Migratory sharks	Africa-Eurasian Migratory Waterbird Agreement (AEWA)	East Asian – Australasian Flyway Partnership	Central Asian Mammals Initiative
Afghanistan						yes					yes
Bangladesh			yes	yes						yes	
Bhutan											yes
Cambodia				yes						yes	
China						yes				yes	yes
India	yes		yes	yes		yes					yes
Indonesia				yes						yes	
Iran	yes			yes		yes	yes				yes
Kazakhstan		yes			yes	yes	yes				yes
Kyrgyzstan											yes
Lao PDR											
Malaysia				yes						yes	
Mongolia	yes				yes	yes				yes	yes
Myanmar			yes	yes						yes	
Nepal	yes										yes
Pakistan	yes			yes		yes					yes
PNG			yes	yes							
Philippines			yes	yes				yes		yes	
Russian Fed.					yes	yes				yes	yes
Sri Lanka			yes	yes				yes			
Tajikistan		yes									yes
Thailand			yes	yes						yes	
Timor-Leste											
Turkmenistan		yes			yes	yes					yes
Uzbekistan		yes			yes	yes	yes		yes		yes
Vietnam				yes						yes	

** EAAFP is a partnership affiliated with the CMS, with national governments and other organisations joining as partners. Central Asian Mammals Initiative is a non-legally binding framework initiative with a programme of work adopted by the parties to the CMS, and has range states but not signatories.*

Annex 4 Links between the European Consensus on Development, 'Our World, Our Dignity, Our Future', and the five pillars of Agenda 2030

The **European Consensus on Development**, Our World, Our Dignity, Our Future[216], released in June 2017, lays out the principles that underpin the EU's external development work and partnerships, and aims to ensure that EU development policy is closely aligned with the internationally agreed Sustainable Development Goals. As such it endorses and adopts the structure of the United Nations 2030 Agenda for Sustainable Development, summarised as 'the 5Ps: people, planet, prosperity, peace, partnership'. As noted in section 1, Asia is a region where the nexus between environment and development is particularly important, due to the speed of economic growth and the exceptional diversity of wild species and ecosystems. This annex is not an exhaustive analysis, but offers an overview of the links between the Consensus on Development and the '5Ps' in the context of biodiversity and the environment.

People

The lives of individuals and households in Asia's poorest countries and regions are directly affected by biodiversity and ecosystem services. This is captured by the idea of resilience, 'the ability of an individual, a household, a community, a country or a region to withstand, to adapt, and to quickly recover from stresses and shocks'. It includes the ways in which biodiversity and ecosystem services underpin livelihoods and social development, by providing a safety net in times of crisis, fulfilling household needs without the need for cash payments, and providing a basis for sustainable economic development. Forests, for example, provide an important proportion of nutrition for many households in rural communities that have access to these resources[217], making an irreplaceable contribution to food security. The subsistence and resilience value of wild biodiversity is undermined, however, when harvesting is unsustainable, which is particularly likely when products are being collected for large, high-value markets in urban centres. The expanding international illegal wildlife trade, representing one of the main threats to biodiversity in Asia, is also making local livelihoods less secure, and thereby contributing to impoverishment and migration.

The negative effects of biodiversity loss and environmental degradation on livelihoods have strongly gendered impacts, with women and girls bearing the greatest impact and having fewer options for dealing with them. In rural areas, where women are typically responsible for the household, family health and fulfilling subsistence needs, they often suffer the direct consequences of environmental degradation first, as it impacts their ability to (for example) access clean water, collect non-timber forest products and manage home gardens. Conversely, the opportunities to develop new sources of income, or to migrate to find work, are often more easily seized by men. Migration may have especially severe effects on women, leaving them to deal with increasingly difficult environmental and economic circumstances, while caring for the youngest and oldest members of the family who cannot migrate. In other situations, it is women who migrate, often ending up with low-paid jobs in cities or in foreign countries, presenting them with opportunities for economic freedom, but also exposing them to risks of exploitation and trafficking.

Planet

The consensus[218] sums up the importance of the environment as follows: 'human well-being and resilient societies depend on a healthy environment and functioning ecosystems. Environmental degradation, climate change, extreme weather, and natural or man-made disasters can off-set development gains and economic progress, especially for the poor. This can increase vulnerabilities and needs, jeopardise peace and stability and cause large-scale migration.'

Parts of the region have experienced widespread deforestation, and this remains a threat to the highly biodiverse forests which remain. Diverse and productive wetlands and marine habitats are also under threat. The present unsustainable development pathway being pursued across the region is testing the limits of natural systems and resources, including freshwater, fertile land and raw materials, as shown in section 2. The poorest and most vulnerable households are least able to cope with shortages. There is an urgent need to shift towards a greener, more sustainable economic model, with the ideas of product longevity and recycling encapsulated by the 'circular economy' concept.

The low-lying coastal communities and cities in the region are highly vulnerable to the impacts of climate change, but the region's larger economies are also major emitters of greenhouse gases (although the per capita emissions vary widely). Some of the countries of the region have played a leading role in global efforts to tackle climate change, and this needs to continue with a general shift to low-carbon, sustainable growth strategies including through the implementation of national determined commitments under the Paris Climate Change Agreement. REDD+ and other schemes, which incentivise the sustainable management of high carbon stock landscapes, may have a key role to play in linking adaptation, mitigation and livelihoods if they can be rolled out at sufficient scale, something which depends in part on the creation of an effective global market for carbon credits.

Prosperity

There are a variety of opportunities to stimulate greater investments in a green economy that will result in generating economic returns for conservation actions. Through improved regulations, such as no net loss, governments can create regulated markets that will increase the flow of resources into specific conservation actions. Payments for these direct actions and other ecosystem service payments are often directed to landowners and communities who deliver the service through habitat restoration, reforestation and protection. Greater focus on policies that stimulate public-private partnerships will increase investments in protected areas and lead to greater cash flow that will help reduce the threats to conservation. The region also offers opportunities for attracting investors looking for both a conservation impact and economic returns. The result would be a shift from deriving economic benefit from the exploitation of resources to one of recuperation and sustainable use of the natural resource base.

The shift to a circular economy, emphasising production of durable goods, minimum waste and maximum recycling, is especially important in this region, and is at the heart of the EU-supported SWITCH to Green Flagship Initiative and its regional initiative, SWITCH ASIA, which aim to generate growth, create jobs and reduce poverty while investing in natural capital, cleaner technologies, energy and resource efficiency, and low-carbon development.

The value of biodiversity and ecosystem services is frequently acknowledged but inadequately factored into economic and development decision-making. The EU's support to natural capital accounting approaches (e.g. through TEEB, WAVES programmes), aims to provide additional evidence on which to base improved policies and decisions.

Energy is critical for human development, but, as highlighted in these reports, the race to increase energy production may be at the expense of natural assets (forests, agricultural land and rivers) that are of enormous long-term value. The increased use of renewable energy is welcome, but needs to be better combined with appropriate safeguards and assessments, to deliver development without undermining the natural resource base.

At local levels, the equitable distribution of the costs and benefits to livelihoods from conservation is important. Land tenure reform and access to credit and technical assistance may be essential to enable smallholders to take advantage of schemes to promote better, more sustainable livelihoods, for example. Across the region, human-wildlife conflict is increasing, and can result in opposition to conservation efforts where there is no effective mechanism for mitigation or compensation.

Peace

The contribution of biodiversity to peace and livelihood security, and thus to reducing the 'push factors' of migration has become one of the key justifications for a specific focus on biodiversity conservation within EU development policy. Voluntary and involuntary migration are widespread problems, with an important driver in Asia being the nexus (mutually reinforcing impacts) of environmental degradation, economic marginalisation and insecurity. Land degradation, deforestation, soil erosion, disease, invasive pest species, and water and air pollution undermine livelihoods and directly drive emigration, at the same time contributing to greater economic and political instability. As communities become less cohesive and more vulnerable, public authority and rule of law may have less influence, making it easier for militias, terrorist networks and traffickers to operate with impunity. Refugees fleeing insecurity and poverty often have little alternative but to engage in unsustainable land and resource use, creating new environmental problems in the areas they move to.

The long-term role of biodiversity loss and ecosystem degradation in this process is often unseen, and so the value of maintaining these services as part of preventative measures is inadequately factored into decision-making. Climate change adds to the problems, driving migration through sea-level rise, changing rainfall patterns, and more frequent and intense natural disasters.

The challenges of migration and insecurity (including poor access to justice and threats to human rights and property rights) are exacerbated by corruption. Exploitation of biodiversity can also be a cause of corruption, with the illegal transnational trade in high-value wildlife products becoming (along with arms and human trafficking) an important driver of corruption among officials responsible for issuing permits or controlling borders. Corruption also allows the laundering of proceeds from wildlife crime and facilitates avoidance of tax, customs and bio-protection regulations.

Development policies can contribute to reducing migration by supporting protection of natural resources and ecosystem services, ensuring more equitable distribution of the benefits they deliver; by protecting land rights and mitigating conflicts; by pooling remittances and encouraging convergence with development funding, and in urban areas, by addressing slum development planning and pollution issues. Trade and security policies should also be cognisant of the influence of environmental problems, and the potential impact of the policies.

216 European Commission (2017). The New European Consensus on Development 'Our World, Our Dignity, Our Future', available at https://ec.europa.eu/europeaid/new-european-consensus-development-our-world-our-dignity-our-future_en

217 Rowland D., A. Ickowitz, B. Powell, R. Nasi and T. Sunderland (2016). Forest foods and healthy diets: quantifying the contributions. *Environmental Conservation*. DOI:10.1017/S0376892916000151.

218 EU Consensus on Development, section 2.2, para 43.

Annex 5 List of KLCs

Central Asia

# on map	KLC group	KLC name	Country	Size (km²)	Important protected areas	Special significance
CA 1	Afghanistan Wakhan Pamir and Hindu Kush watersheds	Wakhan	AF	10 950	Wakhan National Park, Band-e-Amir National Park	Key landscape for snow leopard and Marco Polo sheep (argali ssp.) as well as ibex, urial, wolf, brown bear. Headwaters of Amu Darya and other major rivers for the region.
		Central Highlands	AF	8 575		
		Dashte-Nawar	AF	375		
		Northern Hindu Kush	AF	13 293		
CA 2	Afghanistan Eastern Forest Complex and wetlands	Eastern Forest Complex	AF	20 936		Important montane conifer forest with deodar cedar, pine, spruce, fir. Unusual boreal/ Himalayan/ Asiatic mix of species includes snow leopard, common leopard, markhor, musk deer, Asiatic black bear, yellow-throated marten, leopard cat, palm civet. Wetlands and riparian areas host numerous threatened bird species and large numbers of migratory birds.
		Imam-Sahib-Darqad	AF	1 210		
		Hamun-i-Puzak	AF	438		
CA 3	Iran mountains and desert	Dashte-Kavir	IR	270 572	Touran Biosphere Reserve, Miandasht Wildlife Refuge, Naybandan Wildlife Reserve, Bafgh National Park, Miankaleh Wildlife Refuge, Kavir National Park, Golestan National Park, Central Alburz Protected Area	Desert region home to last remaining Asiatic cheetah as well as gazelle spp., wild ass, houbara bustard, Pleske's ground jay. Montane regions hold urial, Persian ibex, common (Persian) leopard, brown bear, Persian fallow deer. Hyrcanian region has rare subtropical beech/oak forests with high biodiversity.
		Caspian Hyrcanian Forest	IR	23 382		
			IR	15 214		
CA 4	Bukhara-Tugai woodland	Bukhara-Tugai Forest	KG	203		Critical habitat for Bukhara deer; waterways are key regional habitat for otter, jungle cat, waterfowl, migratory birds, sturgeon spp. and other fish species.
		Bukhara-Tugai Forest	TJ	7 096		
		Bukhara-Tugai Forest	TK	10 378		
		Bukhara-Tugai Forest	UZ	20 890		
CA 5	Kazakhstan steppe and semi-desert	Ural Steppe	KZ	87 284	Naurzum Nature Reserve, Ustyurt Nature Reserve, Altyn Dala Nature	Contains the majority of world population of saiga antelope and major populations for threatened great bustard and sociable lapwing, as well as at least six species of eagle. Wetlands of critical importance to breeding and migratory waders and waterfowl (e.g. white-headed duck).
		Ustiurt/Betpak-Dala	KZ	1 010 430		
CA 6	Kazakhstan mountains	Zhungar Alatau	KZ	16 624	Almaty Nature Reserve, Ile-Alatau National Park, Aksu-Jabagly Nature Reserve	Over 2 500 plant species; mid-elevations dominated by extensive spruce forests. Home to important populations of snow leopard and threatened argali subspecies. Lakes important to threatened endemic fish and bird species such as Dalmatian pelican and relict gull.
		Northern Tien Shan	KZ	26 380		
		South Altai	KZ	1 652		
		Ugam-Chatkal/West Tien Shan	KZ	927		
		Boroldaу	KZ	333		
		Kyzylkol	KZ	42		
		Chokpak	KZ	102		
		Karatau	KZ	428		
		Tolebi	KZ	151		
		Merke-West Tien Shan	KZ	709		
		Altyn-Emel	KZ	5 296		
		Charyn Park-Toraygyr	KZ	2 577		

# on map	KLC group	KLC name	Country	Size (km²)	Important protected areas	Special significance
CA 7	Uzbekistan Steppe, semi-desert and desert	Ustyurt Uzbekistan	UZ	122 107	Saigachy Nature Reserve	Key landscape for saiga antelope; deserts important for saxaul woodland, sand cat, houbara bustard and reptiles (tortoise, agamids, lacertids, etc.).
CA 8	Uzbekistan foothills and mountains	Hissar-Allay-Gisar	UZ	5 633	Ugam-Chatkal National Park, Zaamin National Park, Chatkal Nature Reserve, Kitab Nature Reserve, Kyzylkum Nature, Nurata Nature Reserve, Surkhan Nature Reserve	Relict walnut forests, pistachio and juniper; westernmost population of snow leopard, Menzbier's marmot, markhor, ibex, argali (Severtzov's); urial and perhaps leopard found in other ranges.
		Alaykuu-Allay-Gisar	UZ	1 473		
		Talimarjan Reservoir	UZ	859		
		Northern Nuratau	UZ	2 952		
		Nuratau	UZ	1 048		
		Western Zeravshan	UZ	1 276		
		Dalverzin	UZ	40		
		Pskem Basin	UZ	2 834		
		Akbulak Basin	UZ	717		
		Bashkyzylsay Basin	UZ	174		
		Karabau Dukentsay	UZ	348		
		Kugitang Baysuntay	UZ	2 000		
		Angren Plateau	UZ	775		
CA 9	Kyrgyzstan foothills and mountains	Northern Tien-Shan	KG	17 101	Sary-Chelek Nature Reserve, Ala Archa National Park, Sarychat-Ertash Nature Reserve, Besh Tash National Park, Issyk Kul Nature Reserve, Naryn Nature Reserve, Chong-Kemin National Park	Foothills are important sites for walnut and ancestral fruit tree woodlands. High mountains hold fir forests and important populations of snow leopard, argali, ibex, brown bear; rivers and lakes contain unique assemblages of fish species.
		Besh-Aral	KG	975		
		Kassan-Sai	KG	831		
		Leilek	KG	65		
		Son-Kul Lake	KG	350		
		Chatyr-Kul Lake	KG	247		
		Alai valley	KG	1 266		
		Shekaftr	KG	1 271		
		Chatkal valley	KG	746		
		Aflatun	KG	657		
		Besh-Tash	KG	542		
		Chychkan	KG	348		
		Nyldy	KG	164		
		Ugam-Chatkal/West-Tien-Shan Kyrgyzstan	KG	7 887		
			KG	17 369		
CA10	Tajikistan foothills and mountains	Tajik-Pamir	TJ	69 227	Pamir National Park, Zorkul Nature Reserve, Ramit Nature Reserve, Tigrovaya Balka Nature Reserve	Globally important markhor range; also home to snow leopard, argali, ibex, urial, brown bear. Foothill forests still contain remnant woodlands of walnut, apple, pear, and other native fruit and nut trees.
		Alaykuu-Allay-Gisar	TJ	15 130		
		Tavildara	TJ	2 228		
		Asht	TJ	335		
		Kayrakum	TJ	647		
		Romit	TJ	734		
		Kushvoristan	TJ	915		
CA11	Turkmenistan mountain, desert and steppe	Tallymerjen	TK	1 675	Repetek Nature Reserve, Hazar Nature Reserve, Bathyz Nature Reserve, Köpetdag Nature Reserve, Sünt-Hasardag Nature Reserve, Gaplaňgyr Nature Reserve	Deserts host gazelles, wild ass, urial, wild goat, a complex community of small mammals including jerboa, jird, ground squirrel, piebald shrew, etc. and high reptile diversity (lizard, snake, tortoise). Important bird species include houbara bustard and Pander's ground jay.
		Koytendag	TK	730		
		Kopet Dag	TK	16 765		

Annex 5 List of KLCs

East Asia

# on map	KLC group	KLC name	Country	Size (km²)	Important protected areas	Special significance
EA 1	Altai-Sayan	Altai Tavan Bogd	MN	6589	Sharga, Uvs Lake, Khar Us Lake	Global centre of temperate plant diversity; important populations of saiga antelope, snow leopard, argali sheep, reindeer; important wetlands. Transboundary with China and Russia.
		Khar Us Lake	MN	8530		
		Khovsgol Lake	MN	8446		
		Khyargas Lake	MN	3412		
		Munkhkhairkhan	MN	4934		
		Sharga	MN	3136		
		Siilkhem A	MN	699		
		Turgen	MN	1204		
		Ulaantaiga	MN	4812		
		Uvs Lake	MN	4421		
		unamed proposed new PA	MN	(3 KLCs, no area data)		
EA 2	Hangay	Khan Khokhii	MN	2215		Diverse conifer forest and steppe species communities, red deer, wild boar, musk deer, brown bear, argali sheep, Siberian marmot.
		Tarvagatai-Khangain	MN	5476		
		unamed proposed new PA	MN	(no area data)		
EA 3	Central Asian Gobi Desert	Small Gobi A	MN	11490	Small Gobi A and B, Great Gobi A and B, Zagiin Us	Key habitat for Central Asian migratory or nomadic species such as Asiatic wild ass, goitered gazelle, wild Bactrian camel, Gobi bear, Przewalski horse, snow leopard, argali sheep. Trans-boundary with China.
		Small Gobi B	MN	6812		
		Great Gobi A	MN	46330		
		Great Gobi B	MN	9251		
		Ikh Bogd Uul	MN	2621		
		Suikhent uul	MN	48		
		Zagiin Us	MN	2735		
EA 4	Daurian Steppe	Mongol Daguur A	MN	902	Mongol Daguur A and B, Dornod Mongol, Dariganga, Nomrog, Toson Khulstai, Onon Balj A and B	Temperate grasslands, mixed forest, endangered bird (saker falcon, great bustard) and mammalian species such as Mongo-lian gazelle, Mongolian marmot, grey wolf, brown bear, Eastern moose. Important wetlands hold white-naped crane, red-crowned crane, Siberian crane, relict gull. Transboundary with China and Russia.
		Mongol Daguur B	MN	152		
		Dariganga	MN	330		
		Dornod Mongol	MN	5885		
		Khan Khentii	MN	12301		
		Buir Lake and wetlands Ramsar site	MN	1040		
		Lakes in the Khurkh-Khuiten river valley, Ramsar site	MN	429		
		Nomrog	MN	3208		
		Onon Balj A	MN	2919		
		Onon Balj B	MN	1063		
		Toson Khulstal	MN	4585		
		Yakhi Lake	MN	2512		
		unamed proposed new PA	MN	(2 KLCs, no area data)		
EA 5	Alpine canyon region of Southwest China	Northern Minshan Mountain and Hengduan Mountain	CN	61792	Changtang National Protected Area, Sanjiangyuan National Park	Alpine and canyon ecosystems in Minshan and Hengduan mountains, giant panda, golden monkey, Bengal tiger, Indo-china tiger, rare and endemic plants.
		Southern Hengduan Mountain	CN			
EA 6	Alpine region of Qinghai-Tibetan Plateau	Sanjiangyuan-Kekexili -Changtang Area	CN	716174		Parts of the Himalayas as well as the world's largest and highest plateau, source of several major Asian rivers. Tibetan antelope, wild yak, Przewalski's Gazelle, Alpine musk deer, Tibetan wild ass, Himalayan musk deer, black-necked crane, snow leopard.
		Southeast of Himalaya Mountain	CN	34685		
EA 7	Desert region of Inner Mongolia-Xin-jiang Plateau	Altay Mountain Areas	CN	49707	Qilianshan National Park	Transboundary with the Altai-sayan region in Mongolia. Bactrian camel, snow leopard, argali, relict gull, rare and endemic fresh-water fish.
		Kumtag Area	CN			
		Qilian Mountain Area	CN	130989		
		Southwestern section of Tianshan-Jungar Basin	CN	175607		
		Tarim River Basin Area	CN	40439		
		Western Erdos-Helan Mountains-Yinshan Mountains	CN	32706		
		Xilingguole Pasture Area	CN			
EA 8	Hilly plain region of East and Central China	Dabieshan Mountains	CN	34261	Chinese Alligator National Protected Area	Broad-leaved evergreen forests, Chinese alligator, Chinese sturgeon, river dolphins, Siberian crane.
		Dongting Lake	CN			
		Huangshan-Huaiyushan Mountain Area	CN	59747		
		Nanling Mountains	CN	97758		
		Poyang Lake	CN	10175		
		Wuyishan	CN	81542		

# on map	KLC group	KLC name	Country	Size (km²)	Important protected areas	Special significance
EA 9	Hilly plain region of Northeast China	Changbaishan Mountain Area	CN	186 900	Amur Tiger and Amur Leopard National Park	Amur tiger, Amur leopard, wetlands, threatened freshwater fish.
		Daxing'anling Mountain	CN	291 538		
		Hulunbeir	CN	40 646		
		Songnen Plain	CN	38 228		
		Three rivers plain	CN	27 684		
		Xiaoxing'anling Mountain Area	CN	59 282		
EA 10	Hilly regions of Central, South and West China	Daba Mountain Area	CN	(with Qinling)	Giant Panda National Park	12 000 of the 31 000 vascular plant species that occur in China, 3 500 of them endemic to China; karst species and ecosystems, giant panda, crested ibis, black-necked crane, Sichuan dormouse, two species of snub-nosed monkey, giant salamander, endemic fish in Yangtse River.
		Limestone Area of West Guangxi and South Guizhou	CN	23 000		
		Qinling Mountain	CN	179 816		
		Wuling Mountain	CN	186 053		
EA 11	Loess Plateau region and North China Plain	Liupan Mountain and Ziwuling Mountain	CN	108 421	Xiaowutaishan National Protected Area	Wetlands, forest birds, North China leopard.
		Taihang Mountains	CN	46 843		
EA 12	Lower hilly region of South China	Central and South Hainan Island Area	CN	11 206		Tropical rainforest and tropical monsoon forest, mangrove. Forests on Hainan island: 4 200 plants, 630 endemic to the island; Hainan Eld's Deer, Hainan gibbon, Hainan gymnure, Asian elephant.
		Mountain Area of Southwest Guangxi	CN			
		Xishuangbanna Area	CN	34 775		
EA 13	Russian Far East	Amur and Ussuri River Lowlands	RU		Land of the Leopard National Park, Lazovskii Reserve, Sikhote-Alin Reserve, Ussuriskii Reserve, Bikin National Park, Bastak Reserve, Khinganskii Reserve, Khanka Reserve	Red-crowned crane, Oriental white stork, scaly-sided merganser, Baer's pochard, mandarin duck, Blakiston's fish-owl, Amur tiger, far eastern leopard, Himalayan black bear, kaluga sturgeon, chum, Pink Masu salmon species.
		Lake Khanka Lowlands	RU			
		Sikhote-Alin Mountains and Rivers	RU			
		Southwest Primorsky Krai	RU			

Annex 5 List of KLCs

South Asia

# on map	KLC group	KLC name	Country	Size (km²)	Important protected areas	Special significance
SA 1	Gir Forest	Gir Forest	IN	1 716	Gir National Park, Gir Wildlife Sanctuary	Only remaining population of Asiatic lion persists in and around Gir forest. The Gir Wildlife Sanctuary is the most important protected area for the species.
SA 2	Northwest India	Northwest India	IN	22 835	Nanda Devi National Park, Great Himalaya National Park, Pin Valley National Park, Govind Pashu Vihar National Park, Hemis National Park	Upper catchments of several important rivers; important areas for snow leopards, tragopans, tigers, Himalayan tahr. High levels of plant and animal endemism.
SA 3	Nepal	Nepal	NP	31 230	Chitwan National Park, Shuklaphanta Wildlife Reserve, Bardiya National Park, Api Nampa Conservation Area, Shey Phoksundo National Park, Annapurna Conservation Area, Manaslu Conservation Area, Langtang National Park, Sagarmatha National Park, Kanchenjunga Conservation Area	Globally threatened birds and mammals including vulture, migratory birds. Important areas for snow leopard, tiger, greater one-horned rhinoceros.
SA 4	Sundarbans	Sundarbans	IN, BD	2 516	Sundarbans West Wildlife Sanctuary, Sundarbans South Wildlife Sanctuary, Sundarbans East Wildlife Sanctuary, Chandpai Dolphin Sanctuary, Dhangmari Dolphin Sanctuary, Dudhmukhi Dolphin Sanctuary, Sundarbans National Park	The world's largest mangrove ecosystem; important source site for tiger, habitat for other species such as river shark and humpback dolphin; global stronghold for several critically endangered turtle and bird species.
SA 5	Northeast India and Bhutan	Northeast India and Bhutan	IN, BT	109 086	Kaziranga National Park, Manas Tiger Reserve, Pakke Tiger Reserve, Namdapha National Park, Eaglenest Wildlife Sanctuary, Dibang Wildlife Sanctuary, Jigme Dorgi National Park, Royal Manas National Park, Jigme Singye Wangchuck National Park, Sakteng Wildlife Sanctuary, Bundeling Wildlife Sanctuary	Eleven KBA corridors including tiger source sites Manas Tiger Reserve and Kaziranga National Park in Assam have been declared World Heritage sites. Globally important populations of Asian elephant and greater one-horned rhinoceros. High levels of endemism.
SA 6	Sri Lanka	Sri Lanka	LK	37 313	Yala National Park, Udawalawe National Park, Galoya National Park, Wasgamuwa National Park, Wilpattu National Park, Horton Plains National Park, Peak Wilderness Sanctuary, Knuckles Forest Reserve, Victoria Randenigala Rantembe Sanctuary	Asian elephant, and large numbers of endemic plants and birds.

# on map	KLC group	KLC name	Country	Size (km²)	Important protected areas	Special significance
SA 7	Western Ghats	Western Ghats	IN	69 201	Kali Tiger Reserve, Bhadra Tiger Reserve, Kudremukh National Park, Nagarahole Tiger Reserve, Bandipur Tiger Reserve, Wayanaad Tiger Reserve, Mudumalai Tiger Reserve, Sathyamangalam Tiger Reserve, Biligiri Rangaswamy Tiger Reserve, Cauvery Wildlife Sanctuary, Periyar National Park, Anamalai Tiger Reserve, Parambikulam Tiger Reserve	High levels of plant and amphibian, reptile and fish endemism; 10 tiger source sites and 5 KBA corridors; largest Asian elephant population in the world; amongst the greatest densities of tiger in the world.
SA 8	Pakistan	Pakistan	PK	225 781	Karakouram National Park, Khunjerab National Park, Nanga Parbat Conservancy, Tangir Conservancy, Keti Bundar South Wildlife Sanctuary, Hingol National Park	The giant woolly flying-squirrel is only found in the dry pine forests of northern Pakistan; snow leopard, markhor, large extensions of Rann of Kutch saltwater marsh habitat, globally important populations of many threatened wild ungulate species.
SA 9	Rann of Kutch	Rann of Kutch	IN	23 842	Kutch Desert Wildlife Sanctuary, Wild Ass Sanctuary, Narayan Sarovar Sanctuary, Kutch Bustard Sanctuary	The seasonal salt marsh provides refuge for the Indian sub-species of Asiatic wild ass and supports one of the world's largest breeding colonies of the greater and lesser flamingo.
SA 10	Satpura Maikal	Satpura Maikal	IN	117 913	Bandavgarh Tiger Reserve, Kanha Tiger Reserve, Melghat Tiger Reserve, Pench Madhya Pradesh Tiger Reserve, Pench Maharashtra Tiger Reserve	Five important protected areas are all tiger source sites: Bandhavgarh, Kanha, Pench and Melghat.
SA 11	Eastern Ghats	Eastern Ghats	IN	266 671	Nagarjuna Srisailam Tiger Reserve, Amrabad Tiger Reserve, Gundla Brahmeshwara Wildlife Sanctuary, Simlipal Tiger Reserve, Kanger Ghati National Park, Karlapat Wildlife Sanctuary, Kotgarh Elephant Reserve, Dasapalla Elephant Reserve, Debrigarh Sanctuary, Chandil Dalma Elephant Reserve	Unique plant taxa and high levels of plant endemism. Tiger source site and important elephant range habitats.
SA 12	Ranthambhore	Ranthambhore	IN	55 651	Ranthambore Tiger Reserve, National Chambal Wildlife Sanctuary, Palpur-Kuno Wildlife Sanctuary, Keoladeo National Park	An important source site for tigers and habitat for the critically endangered great Indian bustard, gharial, Asiatic lion, Gangetic river dolphin, red-crowned roofed turtle.

Annex 5 List of KLCs

Greater Mekong

# on map	KLC group	KLC name	Country	Size (km²)	Important protected areas	Special significance
GM 1	Upper Chindwin-Ayeyarwady	Lower Chindwin Forest	MM	40 087	Hkakaborazi National Park, Htamanthi Wildlife Sanctuary, Indawgyi Wetland Wildlife Sanctuary, Alaungdaw Kathapa National Park	Montane, evergreen and semi-evergreen hill forest, with alpine Himalayan habitats in the far north; large number of threatened species, including birds, primates, banteng, Asian elephant, Eld's deer, freshwater turtles.
		Upper Ayeyarwady Catchment	MM	101 394		
		Upper Chindwin Catchment	MM	50 156		
GM 2	Chin Hills – Rakhine Yoma	Chin Hills Complex	MM	36 272	Khaw Nu M'Zung (formerly Natmataung) National Park, Rakhine Yoma Elephant Range	Evergreen and semi-evergreen hill forest, threatened vultures, primates, Asian elephant, reptiles, turtles, shorebird migration, fish recruitment.
		Rakhine Yoma Range	MM	47 914		
GM 3	Bago-Yoma-Sittaung	Bago Yoma Range	MM	16 143	North Zamari Wildlife Sanctuary, Moeyungyi Wetland Wildlife Sanctuary	Evergreen and semi-evergreen hill forest, Asian elephant, banteng, threatened primates, threatened tortoise and fresh-water turtle, river, floodplain, wetlands, fish and shorebird migration, spoon-billed sandpiper.
		Sittaung River	MM	3 048		
		Western Shan Yoma Range	MM	27 742		
GM 4	Ayeyarwady-Chindwin	Ayeyarwady River	MM	19 798	Ayeyarwady Dolphin Protected Area, Meinmahla Kyun Wildlife Sanctuary	Large river, floodplain, wetlands, Asian elephant, white-winged wood duck, threatened primates, threatened freshwater turtles, tortoises.
		Chindwin River	MM	5 299		
GM 5	Thanlwin	Thanlwin River	MM	7 692		Large free-flowing river, floodplain, wetlands, fish migration.
GM 6	Taninthayi	Taninthayi Range	MM	42 880	Taninthayi Nature Reserve Taninthayi National Park (proposed), Lenya National Park (proposed)	Deciduous, dipterocarp, and evergreen forest types, tiger, Asian elephant, threatened freshwater turtles, birds.
GM 7	North-West Thailand	Lum Nam Pai-Salawin	TH	24 333	Omkoi Wildlife Sanctuary	Mixed, deciduous and semi-evergreen forest, threatened freshwater turtle, Asian elephant, banteng.
		Mae Ping-Om Koi	TH	8 666		
		Sri Lanna-Khun Tan	TH	20 164		
GM 8	Greater Western forest complex	Chumphon	TH	1 740	Kaeng Krachan National Park, Huai Kha Khaeng Wildlife Sanctuary, Thung Yai Wildlife Sanctuary	Deciduous, dipterocarp, semi-evergreen and evergreen forest, Asian elephant, hornbills, banteng, tiger, Malay tapir.
		Kaeng Krachan	TH	5 479		
		Western Forest Complex	TH	24 112		
GM 9	Inner Gulf	Inner Gulf of Thailand	TH	1 408		Tidal mudflats, shorebird migration, threatened birds including spoon-billed sandpiper.
GM 10	Southern Thailand	Hala-Bala	TH	7 423	Hala Bala Wildlife Sanctuary Bang Lang National Park Klong Saeng Wildlife Sanctuary Similan Islands National Park Tarutao National Park	Lowland evergreen and semi-evergreen forest, tiger, threatened primates, Asian elephant, freshwater turtles, tortoises, Malay tapir, hornbills.
		Khao Banthad	TH	4 064		
		Khao Luang	TH	2 439		
		Khlong Saeng-Khao Sok	TH	8 132		
		Mu Ko Similan-Phi Phi-Andaman	TH	26 317		

# on map	KLC group	KLC name	Country	Size (km²)	Important protected areas	Special significance
GM 11	North-East Thailand	Doi Phuka-Mae Yom	LA, TH	17 053	Thailand: Phu Kheio Wildlife Sanctuary	Mixed deciduous, semi-evergreen forest, tiger, Asian wild dog, Asian elephant, threatened primates.
		Phu Khieo-Nam Nao	TH	13 395		
		Phu Miang-Phu Thong	TH	9 944		Semi-evergreen forest.
GM 12	Eastern forests	Lower Eastern Forest Complex	TH	4 139	Khao Yai National Park Thap Lan National Park Pang Srida National Park	Sub-tropical moist, dry, deciduous and semi-evergreen forest, banteng, Asian elephant, tiger, threatened primates.
		Phanom Dongrak-Pha Tam	TH	3 510		
		Upper Eastern Forest Complex	TH	9 685		
GM 13	Mekong River	Mekong River and major tributaries	KH, LA, TH	16 475		Large river, floodplain, wetlands, Irrawady dolphin, migration of freshwater fish, threatened fish, birds, Siamese crocodile.
GM 14	Mekong Delta	North-western Mekong Delta Wetlands	KH, VN	7 854	Vietnam: Phu Quoc National Park Con Dao National Park U Minh Ha & U Minh Thuong National Park Ca Mau National Park Tram Chim National Park Can Gio Mangrove Biosphere Reserve	Large river, floodplain, wetlands, migration of large waterbirds, mangrove, flooding cycle, sea mammals, primates (Indochina silvered langur) and birds (Sarus crane), marine turtles.
		Mekong Delta Coastal Zone	VN	3 933		
GM 15	Cardamom Mountains	Cardamom and Elephant Mountains	KH	17 660	Sre Ambel Proposed Protected Area Peam Krasop Wildlife Sanctuary Central Cardamoms National Park Phnom Aural Wildlife Sanctuary Phnom Samkos Wildlife Sanctuary Southern Cardamoms National Park	Tropical moist broadleaf forest and mangroves, Siamese crocodile, Asian elephant, threatened primates, endangered freshwater fish.
GM 16	Tonle Sap	Tonle Sap Lake and Inundation Zone	KH	17 547	Prek Toal Core Area Northern Tonle Sap Protected Landscape Ang Trapeang Thmor Protected Landscape	Large river, floodplain, wetlands, very important fishery, fish migration, migration of large waterbirds.
GM 17	Central plains forests and grasslands	Sekong Plains	KH	3 845	Cambodia: Keo Seima Wildlife Sanctuary, Chhep Wildlife Sanctuary, Kulen Promtep Wildlife Sanctuary, Prey Preah Rokha Wildlife Sanctuary, Phnom Prich Wildlife Sanctuary, Srepok Wildlife Sanctuary, Lomphat Wildlife Sanctuary, Mondulkiri Wildlife Sanctuary, Virachey National Park, Phnom Tbeng National Heritage Park, Prey Lang Wildlife Sanctuary, Veunsai Siem Pang Wildlife Sanctuary, Western Siem Pang Wildlife Sanctuary Vietnam: Chu Mom Ray National Park	Semi-evergreen and deciduous dipterocarp forests, large river, floodplain, wetlands, banteng, Asian elephant, Asian wild dog, threatened primates, threatened vultures, giant ibis, white-shouldered ibis, Eld's deer, Siamese crocodile.
		Northern Plains Dry Forests	KH, LA	19 322		
		Eastern Plains Dry Forests	KH, VN	21 160		
		Cambodia-Lao PDR-Vietnam Tri-border forests	KH, LA, VN	10 617		
		Bolaven Plateau	LA	4 411		
		Xe Khampho-Xe Pian	LA	4 723		

# on map	KLC group	KLC name	Country	Size (km²)	Important protected areas	Special significance
GM 18	Southern Annamites	Southern Annamites Western Slopes	KH, VN	3 945	Vietnam: Cat Tien National Park, Bu Gia Map National Park, Yok Don National Park, Lo Go Xa Mat National Park, Bidoup-Nui Ba Mountain National Park, Chu Yang Sin National Park	Semi-evergreen forest, threatened primates, saola, threatened birds, tortoises, freshwater fish.
		Di Linh	VN	5 166		
		Lowland Dong Nai Watershed	VN	8 293		
		Southern Annamites Main Montane Block	VN	11 976		
GM 19	Central Annamites	Central Annamites	LA, VN	32 873	Lao PDR: Hin Namno National Protected Area, Laving Lavern Protected Area, Xe Sap National Protected Area Vietnam: Kon Ka Kinh National Park, Chu Mon Ray National Park, Son Tra Nature Reserve, Sao La Protected Area, Bach Ma National Park, Song Thanh National Park	Semi-evergreen forest, large-antlered muntjac, endangered reptiles, birds, primates (e. g. grey-shanked douc langur).
GM 20	Northern Annamites	Central Indochina Limestone	LA, VN	7 990	Lao PDR: Nam Kading National Protected Area, Naki Nam Theun National Protected Area, Phou Sithone Protected Area Vietnam: Ke Go Nature Reserve, Khe Net Nature Reserve, Giang Man Nature Reserve, Phong Nha Ke Bang National Park, Pu Mat National Park, Vu Quang National Park	Evergreen and semi-evergreen forest, saola, large-antlered muntjac, Asian elephant, threatened turtles, Laotian rock-rat, Edward's pheasant, threatened primates (e. g. red-shanked douc langur, Hatinh langur).
		Northern Annamites	LA, VN	21 112		
		Quang Binh-Quang Tri-Xe Bangfai Lowlands	LA, VN	3 819		
		Ke Go and Khe Net Lowlands	VN	1 011		
GM 21	Red River coast	Red River Delta Coastal Zone	VN	2 255	Ba Vi National Park Xuan Thuy National Park	Large river, floodplain, wetlands, shorebird migration, including spoon-billed sandpiper, black-faced spoonbill.
GM 22	Chu River	Upper Chu River Watershed	VN	4 505	Pu Huong Nature Reserve Xuan Lien Nature Reserve	Threatened primates.
GM 23	Northern Indochina Limestone	Northern Indochina Limestone	VN	6 793	Van Long Nature Reserve Cuc Phuong National Park Cat Ba National Park Pu Luong Nature Reserve	Semi-evergreen forest, Delacour's langur, Cat Ba langur.
GM 24	Sino-Vietnamese Limestone	Ailao/Hoang Lien Mountains	VN, CH	28 076	Vietnam: Hoang Lien National Park Trung Khanh Species and Habitat Conservation Area Ba Be National Park	Semi-evergreen forest, black-crested gibbon, Cao-vit gibbon, threatened amphibians.
		Sino-Vietnamese Limestone	VN, CH	58 502		
GM 25	Nam Et-Phou Louey	Nam Et-Phou Louey	LA	4 391	Nam Et-Phou Louey National Protected Area	Semi-evergreen forest, tiger, Asian golden cat, clouded leopard, dhole, northern white-cheeked gibbon, sambar deer, muntjac, serow, gaur.
GM 26	Nam Ha	Nam Ha-Xishuangbanna-Phou Dendin	LA, CH	21 523	Lao PDR: Nam Ha National Protected Area	Semi-evergreen forest, Asian elephant, threatened freshwater turtle.

Annex 5 List of KLCs

Island South-East Asia and New Guinea

# on map	KLC group	KLC name	Country	Size (km²)	Important protected areas	Special significance
ISEA 1	Indonesian Borneo	Borneo, Indonesia	ID	153 715	Gunung Palung National Park, Tanjung Puting National Park, Danau Sentarum National Park, Kutai National Park, Kayan Mentarang National Park	High diversity of endemic species, including Bornean orang-utan, as well as Siamese crocodile and proboscis monkey.
ISEA 2	Timor-Leste	Timor-Leste	TP	10 970	Nino Konis Santana National Park	Endemic species.
ISEA 3	Indonesian Wallacea	Indonesian Wallacea	ID	218 939	Bogani Nani Wartabone National Park, Lore Lindu National Park, Gandang Dewata National Park, Aketajawe-Lolobata National Park, Komodo National Park	High number of endemic species, including babirusa, anoa, maleo and Komodo dragon.
ISEA 4	Philippines	Sierra Madre Corridor	PH	136 385 (in total)	Northern Sierra Madre Natural Park	Largest remaining forest cover in Philippines, endemic bio-diversity and indigenous communities.
		Palawan Corridor	PH		Coron Islands, El Nido-Taytay Managed resource protected area, Malampaya sound, St Paul's subterranean river national park	High plant endemicity, including an endemic genus, large numbers of endemic and threatened species from other taxa.
		Eastern Mindanao	PH		Agusan Marsh, Mt Hamiguitan Range Wildlife Sanctuary	Last dipterocarp forests in the Philippines, high diversity of endemic plants, birds, mammals.
		Other Philippine corridors	PH		Mounts Iglit-Baco National Park, Mt. Guiting-Guiting Natural Park	Island endemic species.
ISEA 5	Indonesian Sunda-land	Sumatra-Java-Bali	ID	168 301	Bukit Barisan Selatan National Park, Gunung Leuser National Park, Kerinci Seblat National Park, Siberut National Park, Ujung Kulon National Park, Way Kambas National Park	Sumatran rhinoceros, Sumatran tiger, Sumatran orang-utan, Javan rhinoceros, and a high diversity of threatened and endemic mammals.
ISEA 6	Peninsula Malaysia	Peninsula Malaysia	MY	57 185	Belum-Temenggor Landscape, Taman Negara National Park, Endau-Rompin Landscape	Sundaland forest birds, Sumatran rhino (but now likely extinct in Peninsula Malaysia[1]), tiger populations have increased in Endau-Rompin.
ISEA 7	Papua New Guinea	Papua New Guinea	PG	267 521	Tonda Wildlife Management Area, Crater Mountain, Hunstein Range	Marsupial mammals, endemic birds including birds of paradise, high diversity of forest species with many endemics.
ISEA 8	Indonesian Papua	Indonesian Papua	ID	193 707	Lorentz National Park, Cyclops Mountain Nature Reserve, Mamberamo Wildlife Re-serve, Wasur National Park (Ramsar site)	Marsupial mammals, endemic birds including birds of paradise, high diversity of forest species with many endemics.
ISEA 9	Malaysian Borneo	Borneo, Malaysia	MY	66 669	Batang Ai National Park, Lanjak-Entimau Wildlife Sanctuary Pulong Tau National Park, Usun Apau National Parks	High diversity of endemic species, including Bornean orang-utan and Hose's civet.

[1] Zafir A.W.A., J. Payne, A. Mohamed, C.F. Lau, D.S.K. Sharma, R. Alfred, A.C. Williams, S. Nathan, W.S. Ramono and G.R. Clements (2011). Now or never? What will it take to save the Sumatran Rhinoceros Dicerorhinus sumatrensis from extinction. *Oryx* 45(2), pp. 225-233. Available at https://www.researchgate.net/publication/215781840_Now_or_never_what_will_take_to_save_the_Sumatran_rhinoceros_Dicerorhinus_sumatrensis_from_extinction. New European Consensus on Development 'Our World, Our Dignity, Our Future', available at https://ec.europa.eu/europeaid/new-european-consensus-development-our-world-our-dignity-our-future_en

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