PRESERVING BIODIVERSITY IN SOUTHEAST ASIA: IMPROVING MANAGEMENT OF NATURAL RESOURCES

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(To Mr. Roberto V. Oliva, Executive Director of the ASEAN Centre for Biodiversity)

Policy guidelines to decrease the pressure on biodiversity caused by the high dependence of populations in Southeast Asia on natural resources and forests. Many decisions have been taken to address biodiversity loss including grants and subventions to biodiverse protected areas. This is only the first step towards better management of resources and the preservation of biodiversity which should be continued by engaging communities on local issues.

EXECUTIVE SUMMARY

Climate change and biodiversity are the core planetary boundaries due to the huge number of interactions with other boundaries and the impact on other boundaries' resilience to change (Rockström et al. 2009). Although it is less mediatized, biodiversity could cause as much damage as climate change (Villamor and Lasco 2008).

South East Asia is going through major demographic and economic growth (UN 2015). Deforestation used for the development of emerging countries is an increasing threat to one of the most biodiverse areas of the planet (McDonald, Kareiva and Forman 2008) along with climate change and other exploitative land use.

Governments' interventions have improved the situation through better managed swidden agriculture and logging for example, but actions and policy guidelines are not yet sufficient, usually because they are too broad. Therefore, the conclusion advises more local and specific action to improve communities' livelihoods and behaviour. Social change creates a change in labour and consumption benefitting biodiverse areas (Campbell et al. 2005).

Scientists, governments, organisations and communities should collaborate to target specific issues threatening biodiversity, through the creation of protected areas, subventions, community induced sustainable management of resources supported by bottom-to-top government policies. Eventually, biodiversity protection will require a paradigm's shift regarding the relationship between human beings and nature.

EMPIRICAL ANALYSIS

WHY SHOULD WE PRESERVE BIODIVERSITY?

Biodiversity loss has major impact on the Earth System and ecosystem stability, functions (ESA 2005) and services (Cardinale et al. 2012). It also impacts the vulnerability of aquatic and terrestrial ecosystems to Climate Change because the rate of speciation is lower than the rate of extinction (Steffen et al. 2005).

Ecosystems with many functions and services are better able to respond (be resilient or adapt) to changes among species (Walker et al. 2004). Human activity could shift irreversibly and destroy three quarters of all biodiversity, particularly species which are slow to adapt to **non-linear change** (Folke et al. 2010). Human activity has already crossed the biodiversity planetary boundary (Rockström et al. 2009). If it continues, the Earth would need several million years to replace the stock of 9 million species facing the sixth great extinction event (Myers et al. 2000) (Cardinale et al. 2012) (Chapin et al. 2000).

Biodiversity accounts for **community diversity, species diversity and genetic diversity**, key to medical research and the most at risk. Biodiversity provides human beings with food and medical security (COHAB Initiative Secretariat 2010).

Non-linear change: consequences that are not proportional to the cause and cannot be anticipated

Biological diversity: the variety of life found on Earth can be categorised in three categories regarding its scale (community, species and genetic)

WHY IS SOUTHEAST ASIA A KEY AREA TO PRESERVE BIODIVERSITY?

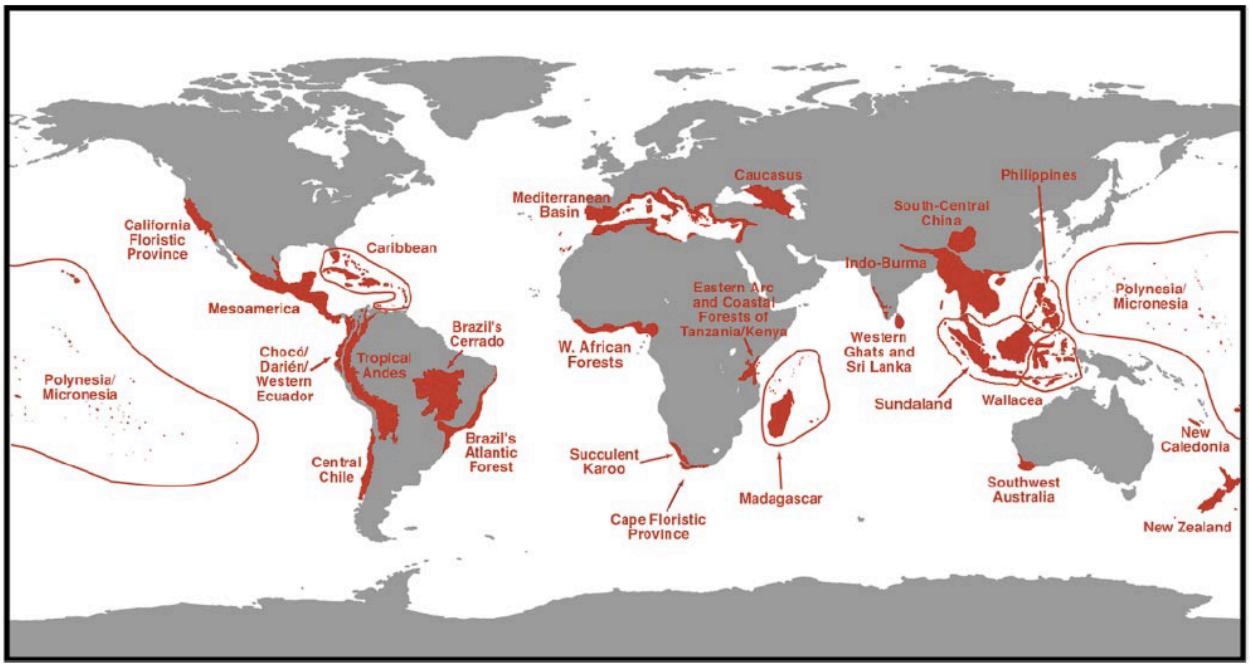

Figure 1 The 25 hotspots. The hotspot expanses comprise 30–3% of the red areas.

Southeast Asia concentrates biodiversity due to favourable **environmental conditions**: high insolation, multiple abiotic factors, smaller impact of glaciation events and higher productivity create a high rate of species richness. The map (figure 1) shows the 25 hotspots in the world among which 6 are situated in Southeast Asia (Myers et al. 2000).

2,216 new species were discovered in the Greater Mekong (from Myanmar to Vietnam) between 1997 and 2014 (WWF 2014*), which makes it one of the most prolific regions of the world. However, South East Asia also has some of the world's highest rate of habitat loss and over-exploitation of species (Hughes 2017).

WHAT ARE THE THREATS TO BIODIVERSITY IN SOUTHEAST ASIA?

Biodiversity loss is mainly due to deforestation, climate change and exploitative land use including dams, mines, and hunting.

Deforestation is the main cause of loss biodiversity, functions and services of ecosystems and regulatory capacities of the Earth system (MEA 2005a). South East Asia has known massive deforestation in biodiversity hotspots (respectively in pink and blue in figure 2), partly due to rubber and palm oil production, impacting ecosystems vital for rural forest-dependent communities. For example, Indonesia has lost 2 281 000 ha between 2000 and 2005, about 1.92% of its forest cover every year (FAO 2009) and it continues today (Graham et al. 2017).

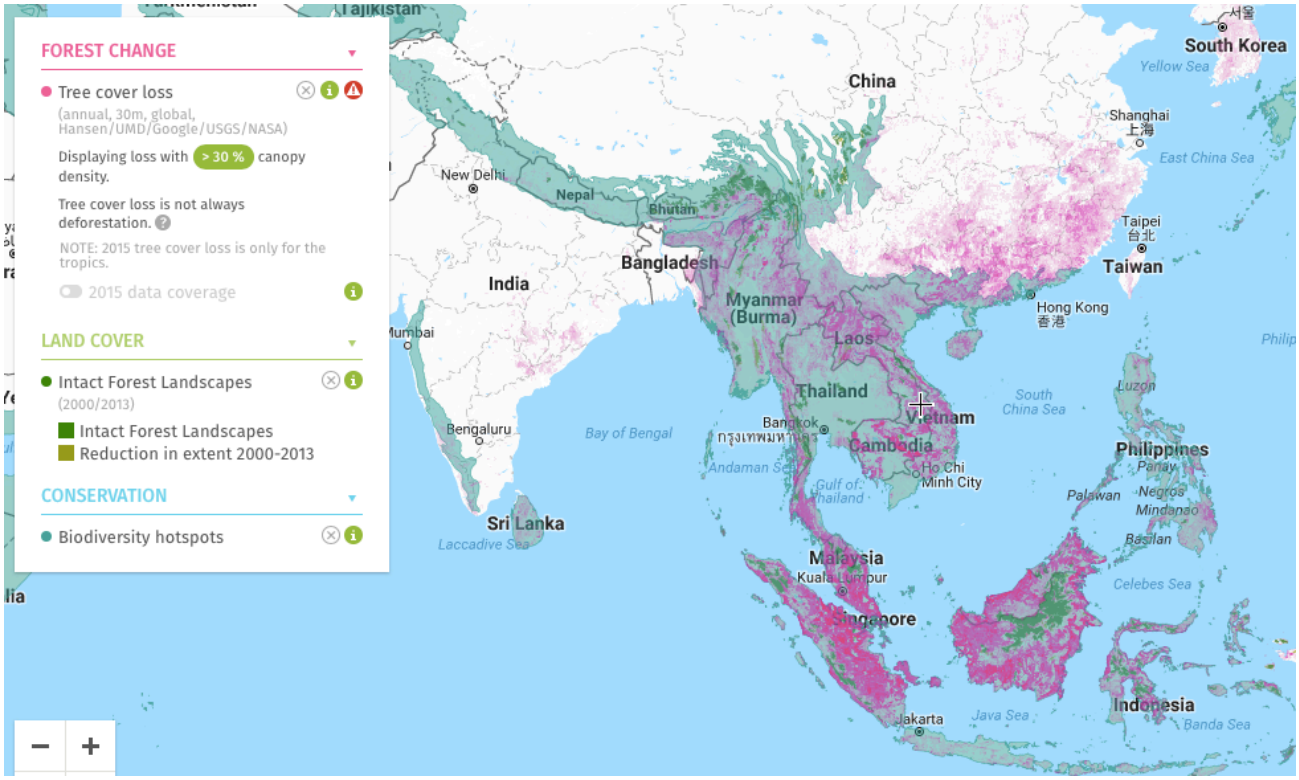

Figure 2 Tree cover loss, land cover and biodiversity hotspots in Southeast Asia in 2015 (Global Forest Watch 2015)

Climate change is also one of the principal direct and long-term drivers affecting ecosystems, as it now happens too fast for organisms to disperse or adapt (MEa 2005). It affects distributions, extinction rates, reproduction and growing seasons (CBD 2007).

Hunting in Southeast Asia created the fourth-biggest illegal trade in the world making $20 billion every year for cartels, medicine, food or sport; and mostly targeting endangered species like elephants or pangolins.

Southeast Asia also has the highest rate of dams planned to be constructed (Zarfl et al. 2015) reducing by 20% to 70% the number of migratory fish (Ziv et al. 2012). Fisheries also damage the unique freshwater biodiversity to feed more than 65 million people. Furthermore, drainage of habitats and conversion to agricultural land threaten 80% of the 50 million migratory wading birds depending on wetlands for migration and breeding (WWF 2014).

ASSESSMENT OF EVIDENCE – EXAMPLES OF GOVERNMENT INTERVENTIONS

Study cases (OWG8 2014) ; (Cramb et al. 2009) show that a shift towards better management of resources requires strict protection of biodiversity rich areas, but also regulation of current practices. The first type of intervention is more effective to protect biodiversity, but threatens poor local communities as it is sometimes their only source of income. The second type integrates local land use strategies that provide the basic needs of communities (World Resources Institute 2000).

Deforestation and land use are key issues for biodiversity in Southeast Asia and they need to be targeted together (OWG8 2014), therefore national and international legislation is starting to regulate the impact of forestry production to protect biodiversity. The Convention on Biological Diversity is one of the biggest institutions, it was created in 1992 at the Earth Summit in Rio de Janeiro, and is now leading research, publishing policy briefs and promoting government interventions worldwide (Carrizosa 2004).

LOGGING

Southeast Asian biodiversity is promoted by the UN-REDD program by implementing more sustainable forest management (SFM) including responsible logging (Meijaard et al 2005). Reduced-impact logging (RIL) contributes to a shift in forestry methods toward promoting SFM. Other measures have been taken like nomenclatures (eg. high conservation value forests and biodiversity hotspots) or certifications, either international like the Forest Stewardship Council's in 1993 or national like the Indonesian one (Dennis et al. 2008).

However, RIL doesn't try to recover from the loss in species biodiversity and is therefore limited. SFM are not sufficient as they don't target the larger underlying causes of deforestation like the demand for wood and food due to waste (OWG8 2014).

SWIDDEN AGRICULTURE

Swidden agriculture is central to livelihood in South East Asia and to social relations and cultural identity (Cramb et al. 2009). Farmers have proactively responded to political and economic change and benefit from the insertion of cash crops, the redeployment of household labour and better livelihoods. Institutions for the management of land have started to emerge in communities. Community induced management of resources with legislative support has shown to be more effective than large-scale top-to-bottom decisions.

However complete specialisation in a domain has increased vulnerability to the market, and swidden is still an important safety net to face market fluctuations. Swidden agriculture transformation has left some communities marginalised, and heavy-handed state interventions have increased the processes of differentiation (Cramb et al. 2009).

Protection of biodiversity can come either from market based regulations creating incentives for farmers (e.g. decrease the price of wood in an area), or from government regulations through laws which are coercive (e.g. prevent negative activities) (UNPD 1999).

Governments are limited by their ability to enact the law. Market-based regulations are limited as biodiversity is a public good, and therefore you cannot prevent someone from using it. Protecting biodiversity requires interventions from both origins.

CRITICISM OF GUIDELINES AND RECOMMENDATIONS

1. So many guidelines have been published by independent organisms that it has become complicated to find the most relevant. (Dennis et al. 2008)
2. Most guidelines are phrased in general terms and lack recommendations targeting local conditions (Dennis et al. 2008).
3. Governments, firms, and non-governmental organisations should coordinate their efforts more often (Gunningham 2009).

CONCLUSION

It is urgent to diminish drastically biodiversity loss rates (Diaz et al. 2005) and expand the scale of the Aichi biodiversity targets established by the Convention on Biological Diversity. Ecological niches and populations need appropriate local solutions taking species, habits and norms, and economic activity into account, and thus local case studies and researches are key.

Biodiversity protection requires a focus on poor communities, that are both the cause and threatened by biodiversity change, as they try to escape poverty with small additional income but

suffer from biodiversity loss. Communities who bear most of the costs of biodiversity change are usually the poorest (Sanderson 2005) and should be compensated. Access to biodiversity benefits and ecosystems services is a key human right and should be equally distributed including to poor and isolated communities. Some of them are indigenous, and their territories should be recognised as such by locals and global governance (Liang 2011).

Global-scale drivers of biodiversity loss should be tackled by the cooperation of multiple agents: global governance, governments, (non-profit) organisations, the private sector and communities. Local involvement must be met by positive market incentives and supportive bottom-to-top government policies (IGBP 2012).

Biological corridors between protected areas where human activity is allowed to some extent is an example like carbon credits and ecotourism of incentives and 'soft' interventions of the government viable for farmers (Villamor and Lasco 2008).

Already existing forms of legislation require more research, active protection and expansion. RIL would benefit from the marking, recording and mapping of protected species of trees (OWG8 2014) and classification of sensitive sites like wetlands (Klassen 2006) to regulate and legislate. Biodiversity hotspots would need a 'hotspot rescue fund' (Myers et al. 2000) to safeguard the large areas and habitats and establish checkpoints, patrol, and control borders. While to expand SFM, governments will need working capital, capacity to build and funds from private and public sources, to reduce technical management issues and conflict (Dennis et al 2008).

New forms of legislation should also be created:

- Nitrogen-saturated wetlands require protected areas to preserve ecosystems storing carbon and the fragile balance with climate change (Van Roon 2012).
- Fisheries should respect by 2020 a "maximum sustainable yield" respecting the precautionary principle (OWG8 2014).

On a global scale, ecosystem services should be included in global governance and inclusive intergenerational wealth to create a green economy (IGBP 2012). Planning water and land-use must include biodiversity to create long-term sustainable projects. Waste and excessive natural resource consumption should be reduced by education and government interventions (IGBP 2012).

For example, some myths must be corrected: off-setting forests by 'industrial forest' to decrease the 'net forest loss' is not equivalent to preserving original habitats (Gradus and Smulders 1993). Although it is better for the environment than no action at all, off-setting does not completely recover biodiversity loss as it only considers some levels of biodiversity like the community or the species one, not genetic diversity.

Market failure leading to overconsumption of natural resources is only one of the many reasons causing biodiversity loss. Improving the economic system asks to redefine nature's importance, it has monetary value and social value when interactions with human beings are included (ZEF 2009). Protecting biodiversity is barely a value today while it should be the norm to be effective, so it requires a paradigm's shift.

LIST OF CITED REFERENCES

Campbell et al. (2005) *Multiple Methods in the Study of Driving Forces of Land Use and Land Cover Change: A Case Study of SE Kajiado District, Kenya*. Human Ecology 33: 763.

Cardinale et al. (2012) *Biodiversity Loss and Its Impact On Humanity.* Nature 486.7401: 59-67

Carrizosa (2004) *Accessing Biodiversity and Sharing The Benefits: Lessons from Implementing the Convention on Biological Diversity*. 1st ed. Cambridge: IUCN.

Convention on Biological Diversity (CBD) (2007) *Biodiversity and climate change.* Secretariat of the Convention of Biological Diversity: 44

Center for Development Research (ZEF) (2009) *Biodiversity conservation: Accounting for the diversity of values in nature and society.* Germany: University of Bonn

Chapin et al. (2000) *Consequences of changing biotic diversity* Nature 405:234–242

COHAB Initiative Secretariat (2010) *The importance of biodiversity to human health.* Ireland

Cramb et al. (2009) *Swidden Transformations and Rural Livelihoods in Southeast Asia.* Hum Ecol 37(323): 346

Dennis et al. (2008) *Biodiversity conservation in Southeast Asian Timber Concessions: a Critical Evaluation of Policy Mechanisms and Guidelines*. Ecology and Society 13(1): 25

Diaz et al. 2005 "Biodiversity regulation of ecosystem services" Pages 297–329 in *Ecosystems and human well-being: current state and trends*. Island Press, Washington, D.C., USA.

Ecological Society of America (ESA) (2005) *Effects of biodiversity on ecosystem functioning: a consensus of current knowledge.* Ecological monographs, 75 (1): 3-35

FAO (2009) *State of the World's Forests*. Available at: <http://www.fao.org/waicent/faoinfo/forestry/publclst.htm>

Folke et al. (2010) *Resilience thinking: integrating resilience, adaptability and transformability.* Ecology and Society 15(4): 20.

Global Forest Watch (2015) "Forest change, land cover and biodiversity hotspots in Southeast Asia" Available at:

<http://www.globalforestwatch.org/map/4/12.34/106.82/ALL/grayscale/loss/607,592?tab=analysis-tab&begin=2001-01-01&end=2016-01-01&threshold=30&dont_analyze=true>

Graham et al. (2017) *Spatially explicit estimates of forest carbon emissions, mitigation costs and REDD+ opportunities in Indonesia.* Environmental Research Letters 12(4): 1-11

Gradus & Smulders (1993) *The trade-off between environmental care and long-term growth—Pollution in three prototype growth models*, Journal of Economics 58: 25. doi:10.1007/BF01234800

Gunningham (2009) *The New Collaborative Environmental Governance: The Localization Of Regulation*. Journal of Law and Society 36.1: 145-166.

Hirsch (2011) *China and the Cascading Geopolitics of Lower Mekong Dams.* The Asia-Pacific Journal Vol 9, Issue 20 No 2

Hughes (2017) 'Southeast Asia is in the grip of a biodiversity crisis' *Asia Times,* 6th of January, 2017

International Geosphere-Biosphere Programme (IGBP) (2012) *Biodiversity and ecosystems for a planet under pressure*. UK: Green Ink

Liang (2011) *Global Governance: Promoting Biodiversity And Protecting Indigenous Communities Against Biopiracy*. Journal of Commercial Biotechnology 17(3): 248-253

Mcdonald, Kareiva, and Forman. (2008) *The Implications of Current And Future Urbanization For Global Protected Areas And Biodiversity Conservation.* Biological Conservation 141.6 (2008): 1701

Meijaard et al. (2005) *Life after logging: reconciling wildlife conservation and production forestry in Indonesian Borneo.* Jakarta: Indonesia Printer

Millenium Ecosystem Assesment (MEA). 2005a. *Ecosystems and human well-being: synthesis.* Island Press, Washington, DC, USA

Myers et al. (2000) *Biodiversity Hotspots And Major Tropical Wilderness Areas: Approaches To Setting Conservation Priorities*. Macmillan Magazines Ltd 403: 853-858

Rockström et al (2009) *Planetary Boundaries: Exploring the Safe Operating Space for Humanity.* Ecology and Society: a journal of integrative science for resilience and sustainability, 14(2), 32

Sanderson (2005) *Poverty and Conservation: The New Century's ''Peasant Question?''.* World Development 33(2): 323–332

Steffen et al. (2015). Sustainability. *Planetary Boundaries: guiding human development on a changing planet.* Science 347(6223)

United Nations Development Programme (UNPD) (1999) *Global Public Goods: International Cooperation in the 21st Century*. New York: Oxford University Press, Inc.

UN Open Working Group on the Sustainable Development Goals 8 (OWG8) (2014) *Forests and Biodiversity*. New York: UNHQ

Van Roon (2012) W*etlands in the Netherlands and New Zealand: Optimising biodiversity and carbon sequestration during urbanisation.* Journal of Environmental Management 101: 143-150

Villamor and Lasco (2008) *Biodiversity and Climate Change: restoring the connectivity for globally threatened species requiring landscape level conservation.* Laguna, Philippines: World Agroforestry Centre 4p.

Walker et al. (2004) *Resilience, Adaptability and Transformability In Social-Ecological Systems.* Ecology and Society 9(2): 5

World Bank *GDP Growth (Annual %)*. Data.un.org. N.p., 2015. Web. 10 Apr. 2017. Available at: <http://data.un.org/Data.aspx?q=growth&d=WDI&f=Indicator_Code%3aNY.GDP.MKTP.KD.ZG>

World Resources Institute (2000) *Forest problems and law enforcement in Southeast Asia: the role of local communities*. Washington, DC

World Wide Fund for Nature (WWF) (2014*) *New Species discoveries in the Greater Mekong.* Available at: < http://wwf.panda.org/?222513/New-species-discoveries-in-the-Greater-Mekong>

World Wide Fund for Nature (WWF) (2014) *Prioritizing Migratory Shorebirds for Conservation: Action on the East Asian-Australasian Flyway*. Hong Kong

Zarfl et al. (2015) *A global boom in hydropower dam construction* Aquat Sci 77: 161.

Ziv et al. (2012) *Trading-off fish biodiversity, food security, and hydropower in the Mekong River Basin.* PNAS 109(15): 5609–5614