Annex 22:

Threats to Biodiversity, Underlying Factors and Baseline Analysis

Threats to Biodiversity

Threats to biodiversity have been systematically reviewed at the national level in 2005[1] and later in 2012[2]. These remain largely relevant and those of greatest impact on the Tanintharyi landscapes and seascapes covered by the project are summarized below. Further details can be found in the baseline reports (**Annexes 16 & 17**) and, in the case of site-specific threats, landscape profiles (**Annex 12)** developed for this project.

Plantation development: The outstanding biodiversity of the Tanintharyi region is under increasingly severe threat. Lowland forests in the Tanintharyi Range Corridor that support significant populations of globally threatened species, such as tiger, elephant and the endemic Gurney's pitta, are under immediate threat from land conversion to oil palm and rubber plantations. Already, some 50 plantation licences have been issued in the region amidst a trend of increasing interest in the development of this sector. According to a 2015 Forest Trends report[3], forest clearing for the expansion of commercial agriculture is now the leading cause of degradation. While this process has been occurring for decades, the current rate of forest conversion for plantations is unprecedented. Concessions were issued for 16 km^2 of oil palm and rubber plantations within the Permanent Forest Estate (PFE) in 2013-2014. The laws, regulations, and procedures by which these concessions are allocated, especially those involving degazetting of forest reserves or those located within forest reserves, are spread across numerous uncoordinated jurisdictions through use of legal loopholes, specific permits and exemptions. In addition, the vast majority of existing oil palm estates are not certified by the Round Table on Sustainable Palm Oil (RSPO), pay little or no attention to RSPO environmental and social guidelines and consequently have major impacts on biodiversity and environmental quality. An underlying cause for the palm oil concession development is the past Government policy aiming at rapid expansion of the evolving oil palm industry in the Tanintharyi region. It also imposed upon the industry, not only social, environmental and implications, but also the basis for an unsustainable and enduring poor performance of the industry.

Data from the Department of Industrial Crop Development (DICD) for 2014 provided indicates that a total of almost 1,000,000 acres (almost 405,000 ha) have been allocated by the Government of Myanmar to 44 Oil Palm Plantation companies to develop plantations in the Kawthoung, Myeik and Dawei Districts of the Tanintharyi region. Of that land area, almost 350,000 acres (±142,000 ha) have been planted, with some 283,000 acres (±115,000 ha) in Kawthoung, 46,000 acres (±19,000 ha) in Myeik, and 17,000 acres (±7,000 ha) in Dawei District. Of the 44 companies concerned, apparently 43 are Myanmar owned (three foreign companies have Joint Venture Agreements (JVA) with local companies), and one is the result of FDI. Deforestation from the rubber and oil palm sector (assumed to be areas >50 acres to exclude smallholdings) is a major contributor to forest loss in Myeik (43%) and the dominant contributor in Kawthoung District (76%). Annual deforestation rates are very high in Tanintharyi and the highest deforestation rates are in areas with many oil palm concessions. The concessions may also be displacing communities inland to forested areas.

Over-exploitation of forest resources*:* Unsustainable and/or illegal logging and illegal wildlife trade also pose major threats to biodiversity. Forest products are over exploited particularly through resource extraction quotas sold to local businesses that often overlap with PA boundaries and can be politically sensitive to enforce. In the forestry sector, promising new reforms are underway, but so far have focused only on FD-managed timber estates. The remaining natural forests in the country's resource-rich, ethnic minority areas remain outside any effective forest management and are vulnerable to extensive logging and conversion[4]. Much of the deforestation in Tanintharyi is, however, linked to land conversion for plantations – for example, Yuzana Company and Htoo Trading, the latter of which is one of the country's most dominant private timber companies, are the two biggest companies operating in the palm oil sector based in Tanintharyi Region, both

[1] Tordoff, A. W., Eames, J. C., Eberhardt, K., Baltzer, M. C., Davidson, P., Leimgruber, P., Uga & Aung Than 2005. *Myanmar Investment Opportunities in BiodiversityConservation,* Birdlife International, Yangon, Myanmar.

[2] Wildlife Conservation Society 2013. Myanmar Biodiversity Conservation Investment Vision, Wildlife Conservation Society, Yangon, Myanmar

[3] Woods, K. 2015. Agro-Timber Conversion in Myanmar: The next driver of deforestation. Forest Trends, Washington D.C.

[4] Woods, K. 2013. Timber Trade Flows and Actors in Myanmar: The Political Economy of Myanmar's Timber Trade. Forest Trends, Washington D.C.

of which were granted associated rights over timber extraction in their project areas[5]. According to Springate-Baginski et al. 2015[6], in Dawei District, many forest reserves are partly or entirely degraded. Further, around town areas, along the coast, along the main road to Thailand, and in the extreme south of Kawthoung District, large plantations are replacing degraded as well as intact forest -within and outside forest reserves. Field observations confirmed such large-scale conversion of forest to other land-uses, but careful and selective harvesting was observed in intact forest.

In mangrove areas, cutting of mangrove trees for charcoal making is the main threat to the forests at present, the charcoal being sold to Yangon and Thailand. Domestic charcoal consumption is around 130,000 cu.ton for Myeik District and 75,000 cu.ton for Kawthoung District annually. In response, the Tanintharyi regional government has banned charcoal production across the whole region, although it is unclear whether this includes charcoal for domestic consumption, and the Forest Department plans to supply fuelwood and charcoal sustainably from natural forests, village fuelwood plantations, home-gardens and community forestry[7].

Urban and industrial development: The Dawei Development Corridor Project is a major strategic initiative, connecting countries of the Greater Mekong Subregion (GMS) Southern Corridor via shipping routes from Dawei to India. It includes associated infrastructure development such as Dawei Deep Sea Port and Industrial Estate covering an area of 250 km², a steel mill, petrochemical complex, coal-fired power plant, fertiliser plant, refinery and gas complex, pulp and paper and many other industries. These will be linked to Thailand by a 160 km 4-lane to 8-lane toll highway across the biodiversity-rich Tenasserim Mountain Range. The corridor from the coast of Myanmar to the border town of Thailand will consist of roads, railways, transmission lines, and oil and gas pipelines. Two government and ITD (Italian-Thai Development PCL) companies have signed for first-phase contract for the 10-year project which is worth an estimated USD 8 billion. There is substantial concern over social and environmental impacts in Dawei expressed by local CSOs such as Dawei Development Association.[8] [9] No EIA or SEA have yet been made available. Concerns over the road corridor include the fragmentation of the contiguous forest of the Tanintharyi Range Corridor, soil erosion in the mountainous interior, and impacts on water quality. Development of the deep sea port is also likely to impact coastal habitats and coastal water quality.

Soil erosion, sedimentation and pollution*:* Erosion resulting from land clearance, logging and plantation operations in the watershed increases sediment loading of rivers draining the respective catchment areas. However, at present there is almost no published information on such environmental impacts in Tanintharyi, and the water quality of the Myeik Archipelago showed no indications of related pollution during assessments under the BOBLME Programme.[10] [11] Terrestrial and marine pollution threats are on a sharp increase from extractive industries (e.g. offshore oil and gas production, and onshore copper, gold, tin, zinc and coal mining, etc.), aquaculture (e.g. shrimp farming) and construction in coastal areas such as seaport development. More than 50 mining companies have applied for a government license to explore for tin, tungsten, lead, coal and gold reserves in the Tanintharyi while currently, ten firms are licensed to carrying out mining and prospecting operations in the area.[12]

Over-exploitation of fisheries*:* Fishing rights are sold by auction, often resulting in commercial over-harvesting while at the same time impacting the subsistence needs of local communities. The decline of fishery resources is a major concern for the government, as local fishermen are reporting drastic reductions in their catches. This has led to a recent decision by the government to halve the off-shore fishing season from 90 to 45 days. Continued widespread illegal fishing by foreign vessels with modern equipment has seriously depleted fishery

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[5] Woods, K. 2013. Timber Trade Flows and Actors in Myanmar: The Political Economy of Myanmar's Timber Trade. Forest Trends, Washington D.C.

[6] Springate-Baginski O, Treue T, Kyaw Htun. 2015. Beyond over-logging? From military-era timber exploitation towards democratic and sustainable forest Governance. University of East Anglia, UK; University of Copenhagen; EcoDev.

[7] See Annex 16 for details

[8] https://www.facebook.com/DaweiDevelopmentAssociation/

[9] http://www.burmalibrary.org/show.php?cat=3266

[10] http://www.boblme.org/documentRepository/Nat_Myanmar.pdf

[11] http://www.boblme.org/documentRepository/Theme_%20Land%20Based%20Pollution%20-%20%20Urusla%20Kaly.pdf

[12] http://www.irrawaddy.com/news/burma/dawei-village-sue-thai-mining-firm-environmental-impacts.html

resources and represents massive leakage of national revenue. The critically weak capacity of the Department of Fisheries for monitoring and enforcing marine fisheries laws and its weak coordination and influence with other enforcement agencies are key contributing factors.

***Climate Change and Vulnerability*:** According to the IPCC's Fifth Assessment Report (AR5)[13], across South East Asia, temperature has been increasing at a rate of 0.14°C to 0.20°C per decade since the 1960s, coupled with a rising number of hot days and warm nights, and a decline in cooler weather. Annual total wet-day rainfall has increased by 22 mm per decade, while rainfall from extreme rain days has increased by 10 mm per decade, but climate variability and trends differ vastly across the region and between seasons. Future increases in precipitation extremes related to the monsoon are *very likely* in Southeast Asia. The ocean in subtropical and tropical regions will warm in all IPCC AR5 scenarios and will show the strongest warming signal at the surface.

The AR5 states with high confidence that coastal and marine systems in Asia are under increasing stress from both climatic and non-climatic drivers. It is likely that mean sea-level rise will contribute to upward trends in extreme coastal high water levels. Mangroves, salt marshes and seagrass beds may decline unless they can move inland, while coastal freshwater swamps and marshes will be vulnerable to saltwater intrusion with rising sea-levels. Widespread damage to coral reefs correlated with episodes of high sea-surface temperature has been reported in recent decades and there is high confidence that damage to reefs will increase during the 21st century because of both warming and ocean acidification. Marine biodiversity may decrease in the tropics if thermal tolerance limits are exceeded.

There is another dimension to what has been described above and that is changes will 'yoyo' in at least some cases. For example, mean annual rainfall in the Tanintharyi region is predicted to decline by up to 15% of the 1980s baseline by the 2030s and, thereafter, increase by up to 25% by the 2060s and 50% by the 2090s (**Figure 3**) (Southeast Asia START Regional Center - SEA START). The clear message is that climate changes will not necessarily always be in one direction, they may swing like a pendulum and less predictably than a pendulum. Therefore, long term survival of biodiversity and ecosystem services that are the product of such diversity is about maintaining the natural resource base (natural capital) and its diversity.

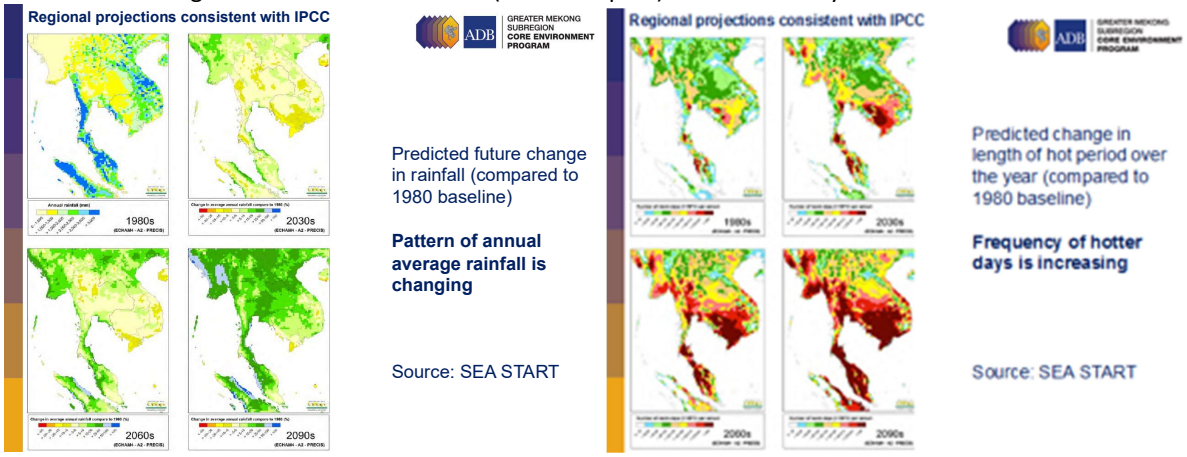

Figure 3. Predicted future change in rainfall for SE Asia (left), and change in length of hot period over the year (right). Source: SEA START / ADB GMS.

The implications of climate change for biodiversity conservation planning in Myanmar have been reviewed by Rao et al (2013)[14], with key points as follows[15]. High temperatures and droughts are expected to be the norm,

[13] IPCC, 2014: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 688.

[14]Rao M, Saw H, Platt SG, Tizard R, Poole C, Than Myint, Watson JEM. 2013. Biodiversity Conservation in a Changing Climate: A Review of Threats and Implications for Conservation Planning in Myanmar. AMBIO 2013, 42:789–804. DOI 10.1007/s13280-013-0423-5.

and are likely to be associated with more frequent forest fires in certain regions. Given experiences elsewhere in SE Asia (e.g. in Sumatra), it can be considered likely that forest fire frequency will increase in Tanintharyi region associated with increasing pressures for land clearance for plantations, exacerbated by dry periods linked to periodic El Nino conditions. Conversely, an increase in rainfall during the monsoon season is likely to cause flooding events that could affect livelihoods, transport, and homes. Prevailing and anticipated climatological changes have both direct impacts on biodiversity (see below) or exacerbate the impacts of current threats such as deforestation on biodiversity. Low-lying coastal areas in Tanintharyi region are expected to be vulnerable to intense rainfall. High impacts of sea level rise, cyclones, high winds and storm surges in coastal areas will affect mangroves and other coastal habitats and communities.

The review indicates that climate change poses major new challenges to biodiversity conservation as species will be exposed to changes at a rate and magnitude seldom previously experienced, with direct consequences for ecosystem assemblage and the services they provide to humanity[16,17]. However, there is still much to learn before the impacts of climate change on species diversity in Myanmar can be accurately assessed, with a few exceptions.

Overall, ecoregions in Myanmar will be variably affected by climatic impacts and sound interpretation of analyses will be critically important for effective adaptation planning for both species and human communities. The ecoregions in Tanintharyi can be expected to experience climatic change impacts. Temperature and rainfall changes in the Tenasserim Semi-Evergreen Tropical Forests in Tanintharyi can be expected to alter the bioclimatic envelope for many tropical species. Remaining examples of freshwater swamp forest, in permanently or seasonally inundated lowlands are expected to be climatically more unstable than dryland rainforest types.

In the case of Tanintharyi's outstanding coastal ecosystems: the mangroves, coral reefs, seagrass beds and the diverse shorelines of the Myeik Archipelago, in the nearer term, sea level rise and increased water temperatures will accelerate beach and coastal erosion and cause degradation of estuarine communities, mangroves and coral reefs with ultimate impacts on water supply and fisheries productivity[18]. IPCC AR5[19] states with high confidence that continuation of current trends in sea-surface temperatures and ocean acidification would result in large declines in coral-dominated reefs by mid-21st century.

Future rates of sea-level rise are expected to exceed those of recent decades, increasing coastal flooding, erosion, and saltwater intrusion into surface and groundwater. In the absence of other impacts, coral reefs may grow fast enough to keep up with rising sea-levels, but beaches may erode and mangroves, salt marshes, and seagrass beds will decline, unless they receive sufficient fresh sediment to keep pace or they can move inland[20]. Sea level rise is expected to impact globally threatened species of migratory shorebirds through the loss of intertidal mud flats[21,22]. Breeding colonies of seabirds and turtles may be particularly vulnerable to sea level rise[23]. Ocean acidification leads to reduction in coral calcification and affects coral reefs which provide

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[15] While this pre-dates the IPCC's Fifth Assessment Report, the conclusions and strategic recommendations for conservation remain relevant.

[16] Foden, W.B., G.M. Mace, J.-C. Vie´, A. Angulo, S.H.M. Butchart, L.DeVantier, H.T. Dublin, A. Gutsche, et al. 2009. Species susceptibility to climate change impacts. In Wildlife in a changing world: An analysis of the 2008 IUCN Red List of Threatened Species, ed. J.C. Vie´, C.H. Taylor, and S.N. Stuart.Gland, Switzerland: IUCN.

[17] Watson, J.E.M., M. Cross, E. Rowland, L.N. Joseph, M. Rao, and A.Seimon. 2011a. Planning for species conservation in a time of climate change. Climate Change: Research and technology for climate change adaptation and mitigation 3: 379–402. http://www.intechopen.com/articles/show/title/planning-for-speciesconservation-in-a-time-of-climate-change.

[18] Grantham, H.S., E. McLeod, A. Brooks, S.D. Jupiter, J. Hardcastle, A.J. Richardson, E.S. Poloczanska, T. Hills, N. Mieszkowska, C.J. Klein, and J.E.M. Watson. 2011. Ecosystem-based adaptation in marine ecosystems of tropical Oceania in response to climate change. Pacific Conservation Biology 17: 241–258.

[19] IPCC AR5 - ibid

[20] IPCC AR5 - ibid

[21] Buckton, S.T., and R.J. Safford. 2004. The avifauna of the Vietnamese Mekong Delta. Bird Conservation International 14: 279–322.

[22] Tordoff, A.W., J.C. Eames, K. Eberhardt, M.C. Baltzer, P. Davidson, P. Leimgruber, Uga, and Aung Than. 2005. Myanmar investment opportunities in biodiversity conservation. Yangon, Myanmar: Birdlife International.

[23] Duffy, D.C. 2011. No room in the Ark? Climate change and biodiversity in the Pacific Islands of Oceania. Pacific Conservation Biology 17: 192–200.

habitat for about a quarter of all marine species and are the most diverse among marine ecosystems[24]. Acidification is also expected to have negative impacts on other calcified marine organisms (algae, molluscs, larval echinoderms)[25].

Observations, experiments, and simulation models show that climate change would result in changes in primary productivity, shifts in distribution and changes in the potential yield of exploited marine species, resulting in impacts on food security and the economics of fisheries[26]. Similarly, climate change impacts on coastal ecosystems will have implications for human populations as they provide many functions, services and goods in terms of coastal protection and sediment retention, nurseries and habitats for aquatic organisms and feeding grounds for economically important species of fish. For biodiversity conservation within a changing climate, adaptation planning will be key to ensuring minimum impacts on species and ecosystem services.

Similarly, climate change impacts on coastal ecosystems will have implications for human populations as they provide many functions, services and goods in terms of coastal protection and sediment retention, nurseries and habitats for aquatic organisms and feeding grounds for economically important species of fish. The response of human populations to climate change will almost certainly place greater pressures on Myanmar's biodiversity. Upland crop production, practiced close to the margins of viable production and often dependent on rain-fed agriculture, can be highly sensitive to climatic variability. In coastal areas, sea-level rise, increased storm frequency and severity, and declining fish catches will increase pressures on communities to seek alternative protein sources and livelihood options[27].

Indirect Pressures on Biodiversity (Root Causes)

The root causes of these threats include unplanned fast economic growth, population increase, poverty, poor govenance, and lack of awareness of biodiversity values and related policies. Refugees returning from Thailand and internally displaced persons will bring additional pressures, especially if resettled in environmentally sensitive areas without guidance and support for sustainable livelihood practices.[28]

Economic growth: Myanmar is ranked 148 out of 188 countries on the Human Development Index (in the low human development category), but this has increased by 60.3% between 1980 and 2014 and Myanmar's GNI per capita increased by about 481.8 percent over the same period[29]. Economic growth has averaged 5 percent in recent years, with an annual per capita income of USD$702. Myanmar is undergoing a rapid political and economic transition that presents both opportunities and threats to biodiversity. The ADB[30] concluded that "Myanmar's current growth pattern is placing huge pressure on its environment and, if continued, will certainly be unsustainable given the country's continued population increase, expected rapid industrialization, increased consumption of and demand for natural resources for food production and trade, and increased energy consumption". In the Tanintharyi Region, major strategic economic developments, such as the Dawei Development Corridor, the rapid expansion of commercial rubber and oil palm plantations at the expense of natural forest habitats and increase in coastal development, exemplify this concern. These trends are set to continue and if not governed by strengthened policy, planning and regulatory frameworks embodying sustainability criteria supported by increased regional capacity for sustainable development, will result in the rapid loss of natural capital, ecosystem services, ecological and, ultimately, political security.

Population increase: While population increase is not identified as a top priority driver of threats to biodiversity in the Myanmar Biodiversity Investment Vision (WCS 2013), it is relevant in the Tanintharyi

[24] Roberts, C.M., C.J. McClean, J.E.N. Veron, J.P. Hawkins, G.R. Allen, D.E. McAllister, C.G. Mittermeier, F.W. Schueler, M. Spalding, and F. Wells. 2002. Marine biodiversity hotspots and conservation priorities for tropical reefs. Science 295: 1280–1284.

[25] IPCC AR5 - ibid

[26] Sumaila, U.R., W.W.L. Cheung, V.W.Y. Lam, D. Pauly, and S. Herrick. 2011. Climate change impacts on the biophysics and economics of world fisheries. Nature Climate Change 1: 449–456.

[27] Rao et al. 2013. ibid

[28] UNHCR estimates a total of about 400,000 individuals were still internally displaced in the rural areas of 36 townships in South-East Myanmar in Kayin, Kayah, South and East Shan and Mon States, and Bago and Tanintharyi Regions. (2008-2012, South East Myanmar: A Report on Village Profiles 2008-2012)

[29] http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/MMR.pdf

[30] ADB 2012. Myanmar: Interim Country Partnership Strategy 2012-2014. Country Planning Documents.

context, as growth in the regional population can be expected to be significant with greater social liberation and accompanying the prospect of rapid economic growth. Inevitably such population growth will exert increasing pressures on the region's natural resource base, especially where it involves the settlement of returning refugees and IDPs in new areas. The project land and seascapes encompass parts of Kyunsu, Tanintharyi and Bokpyin townships. The total population in the project area of 1,452,658 ha is estimated to be 145,230 (10.3% of population in Tanintharyi Region), based on spatial analysis of 2014 village tract census data. PPG survey results of 9 villages indicate 94 males: 100 females; average family size is 5.1; average size of village population is 490 persons. See **Annex 15** for more details on local population characteristics.

***Poverty**:* Poverty levels are at an estimated 26% of the population. Poverty is twice as high in rural areas where 70% of the population lives. The remote border areas, mainly populated by Myanmar's minority ethnic groups, and areas emerging from conflict are particularly poor. Access to electricity is limited to only 26 percent of the population and firewood (including mangrove charcoal) is a major source of energy for the population[31]. This situation is exacerbated in Tanintharyi by returning refugees from camps along the Thai border and the need to find land for resettlement of IDPs.

***Lack of awareness and integration of biodiversity values into regional planning*:** The lack of understanding of the economic, social and political (in terms of national security) values of the Natural Capital and the ecosystem services it provides to society is a major factor in its erosion for short-term gains in regionall and national economic planning. This lack of understanding is a weakness of both the public and within the government. For example, one recent study[32] estimated that the value of Myanmar's overall forest ecosystem services is over $7 billion USD. Of this, income earned from forest utilisation accounts for less than 15% of the value estimated in this study. By far the largest share – 85%, or around $6 billion USD − comes from forest ecosystem services such as forest carbon sequestration, watershed protection services, insect pollination, tourism, and mangrove protection of coastlines and fish nurseries. Thus, investment in forest conservation is expected to deliver significant net returns, estimated at around $39 billion USD over the next twenty years, or a net present value of $10 billion USD. A wider lack of awareness of environmental issues and understanding of government policies on the environment was seen as the most frequent root cause of biodiversity loss during the national analysis in 2012[33].

Failure or absence of good governance mechanisms: While the forest management system is well established and has the capacity to operate effectively in Myanmar, it has been abused in the recent past with massive profits from this national asset benefiting small elites, while negatively impacting the forestry and timber sectors. The result has included: systematic 'revenue-target' driven over-extraction of timber resulting in forest degradation and loss; expansion of agriculture and 'land grab' agri-business concessions destroying forests (including areas within reserved forests); and insecure land and tree tenure for local people, marginalising civil society and undermining incentives to conserve, protect and plant trees, and to collaborate with the Forest Department[34].

Baseline Activities

In the country's democratization process, the government has been striving to achieve both a green economy and green growth in the country – a growth pattern that learns from mistakes made by other countries in the region when faced with similar conditions of rapid growth and transition, generally characterized by economic growth that results in wealth disparity among populations at the expense of ecosystem degradation and biodiversity loss. Since 2011, the Myanmar government with the support of the **Green Economy Green Growth (GEGG) Association of Myanmar**, has been engaged in high level discussions with eminent thinkers and practitioners from both public and private sectors around the world, to explore ways and mechanisms to achieve a sustainable path for Myanmar's development. The Green Economy Green Growth Forum will continue to be held with an annual budget of approximately $ 100,000, with over $ 300,000 of in-kind

[31] http://www.mm.undp.org/content/myanmar/en/home/countryinfo.html

[32] Emerton, L. and Yan Ming Aung. (2013) The Economic Value of Forest Ecosystem Services in Myanmar and Options for Sustainable Financing. International Management Group, Yangon.

[33] Wildlife Conservation Society 2013. Myanmar Biodiversity Conservation Investment Vision, Wildlife Conservation Society, Yangon, Myanmar

[34] *Oliver Springate-Baginski, Thorsten Treue, Kyaw Htun. September 2015. Beyond over-logging?* From military-era timber exploitation towards democratic and sustainable forest governance.

contributions from international and national speakers providing a major platform that influences the course of the nation's development.

In the specific field of biodiversity and ecosystem services management, in order to protect the country's outstanding biodiversity, the Myanmar government has designed a network of 43 PAs. Thirty-six of these have been officially gazetted under the Protection of Wildlife and Protected Areas Law, while seven remain proposed. The 36 PAs cover 5.6% of the total land area of the country, and the addition of the seven proposed PAs would increase this to 6.7%.

In 2001, the Government of Myanmar approved a 30-year Forest Master Plan to increase the Permanent Forest Estate (constituted by reserved forests and public protected forests) to 30% PAs to 10% of the total country area. Furthermore, the Forest Master Plan encourages the registration of unclassified forests into community or private forests. The government invests approximately US$ 750,000 in PA management annually. Myanmar is a partner of the Global Tiger Initiative and was represented at the Global Tiger Summit in St. Petersburg in September 2010 by the then Minister of Forestry. It submitted a National Tiger Recovery Plan (NTRP), as part of the Global Tiger Recovery Plan in June 2010. To support the goal of the Tiger Range Countries, the German government made a commitment of EUR 20 million. With these funds KfW, the German Development Bank, has launched the Integrated Tiger Habitat Conservation Programme Asia - together with IUCN in January 2014[35]. Under this programme, a new Tanintharyi Tiger Project was launched at a workshop in May 2016 in Myeik[36] and will run for an initial three years with a budget of 1-1.5 million Euros, aiming to establish and support tiger and prey monitoring, community patrolling, improved law enforcement, support for village forest management, ecotourism pilots, and improved cooperation with Thailand. This new initiative will be implemented by FFI and FD with support from other partners and is funded by the German KfW Development Bank, through the Integrated Tiger Habitat Conservation Project that is managed globally by IUCN.

Myanmar is in the process of devolving power from the national government to regional and local governments. In 2013, the Region or State Parliament Law was promulgated. It is envisaged that an increasing level of authority and responsibility will be decentralized to the regional and state governments, including natural resource management. The government is also in the process of developing the National Land Use Policy. Related to this, MoNREC[37] (formerly MOECAF), started an initiative called One Map Myanmar Programme to harmonize the spatial planning data required for land use planning at the national and regional levels with technical assistance from the University of Bern and financed by Swiss Agency for Development and Cooperation (SDC) (CHF 1795203 for the first two years of 8 year initiative). Tanintharyi has been selected as a pilot region under the programme.

The Government of Myanmar invests approximately US$ 750,000 in PA management annually. In the Tanintharyi Range Corridor, there are 3 existing PAs covering 195,402 ha and two proposed PAs covering 523,159 ha. In 2014, two new marine PAs in the biodiversity-rich Myeik Archipelago (in Tanintharyi Marine Corridor) were proposed based on scientific surveys conducted with support from FFI and SI. However, a large proportion of the area of identified KBAs and Priority Corridors in Tanintharyi Region remain unprotected. With US$ 3 million support from the **International Tropical Timber Organisation (ITTO),** MoNREC is working on the 4-year "Capacity Building for Strengthening Transboundary Biodiversity Conservation of the Tanintharyi Range in Myanmar" (2013-2016)[38]. The project provides targeted capacity building support for improving transboundary biodiversity conservation between Myanmar and Thailand, with particular focus on the Tanintharyi Range. The project aims to establish institutional mechanisms for trans-boundary biodiversity conservation between the two countries, and supports trans-boundary research and joint actions. It also supports targeted research and work to engage community participation and livelihood support in the area of the proposed Tanintharyi National Park.

[35] https://www.kfw-entwicklungsbank.de/PDF/Entwicklungsfinanzierung/L%C3%A4nder-und-Programme/Asien/Myanmar_Tiger_2016_EN.pdf ; https://www.iucn.org/theme/species/our-work/action-ground/integrated-tiger-habitat-conservation-programme

[36] http://www.fauna-flora.org/news/last-roar-for-tanintharyi-tigers/

[37] During the process of Union Government restructuring in early 2016, the Ministry of Environmental Conservation and Forestry (MOECAF) was renamed as the Ministry of Natural Resources and Environmental Conservation (MoNREC).

[38] http://www.itto.int/council_committees/projects/

In the country's effort to safeguard biodiversity and ecosystem services, one of the most pressing issues is the highly limited availability of information and human resources and capacity to generate and apply such information. In response, Project partner agencies have been working closely with the MoNREC in support of a 10-year Strategic Framework for "**Building the Foundation for Natural Resource Stewardship, for Sustainable, Inclusive and Equitable Development" for 2015-2025**. The 10-Year Strategy aims to accelerate capacity development for better stewardship of natural resources, directly implementing the capacity development needs identified under the National Biodiversity Strategy and Action Plan (NBSAP). It also aims to promote sustainable, inclusive and equitable economic development, reduce poverty and conserve the rich natural heritage of the county for present and future generations. The Framework, presented to the Minister of (then) MOECAF in November 2013, will initially focus on building the necessary scientific foundation and trialing the application of scientific knowledge for biodiversity stewardship in close collaboration with the SI, FFI, GEGG, UNDP and other partners. The necessary financial resources for implementation of the Strategic Framework are estimated to be $128,500,000, including plans for establishing a $100 million trust fund. This proposed Ridge to Reef project is anchored on the Framework.

A number of other governmental and civil society organisations have also provided capacity development support to the country. Scientists from the **Smithsonian Institution** have been studying the biodiversity and ecology of Myanmar over the last 20 years and, since 1993, the SI has trained more than 300 MoNREC staff, completed 50 research projects, 150 science publications, aided in the discovery of over 70 species new to science, and located and identified hundreds of critical species. **Fauna and Flora International (FFI)** supports a range of biodiversity conservation programmes in Myanmar, including community forest programmes and collaborative PA management initiatives in Kachin, which led to the discovery of the snub-nosed monkey. In addition, the **Wildlife Conservation Society (WCS)** supports strengthening the country's capacity for conducting biological surveys, monitoring populations of key wildlife species, supporting establishment of protected area and management actions. WCS supported the Tanintharyi Forest Department in development of the regional forestry plan, and has supported Tanintharyi Nature Reserve development and management by developing the park management plan and introducing the SMART patrol system. WCS is also the CSO implementing partner for the GEF-5 PA strengthening project which will start implementation in late 2014, with focus on the northern tiger landscape. Furthermore, **World Wildlife Fund (WWF)** established its Myanmar Office in 2014 with a new Myanmar country programme. The programme includes support for Tanintharyi region, in particular, integration of green economy principles and development of a capital strategy with focus on the Dawei Development Corridor in northern Tanintharyi.

Mangroves for the Future (MFF) is a partnership-based initiative promoting investment in coastal ecosystems for sustainable development, working towards achieving the vision of a healthier, more prosperous and secure future for all coastal communities. Published in 2015, the National Strategy and Action plan (NSAP) is the product of a long collaborative process by the National Coordinating Body (NCB), including governmental organizations, UN agencies, INGOs, NGOs, academic institutions, and private organizations. It prioritizes five collective actions: environmental profiling, capacity development, integrated coastal management (ICM) policies and frameworks development, civil society engagement and management of marine protected areas (MPAs). Parallel to these frameworks, five cross-cutting issues are also considered: knowledge management and communications, responding to climate change, community resilience, gender equality and private sector partnership. The current project will contribute towards many of the strategic actions in the NSAP. MFF Phase 3 2014-2018 has received initial funding of $4 million from the Government of Norway.

Through its 2013-2015 programme, **UNDP** support extends to three areas: (i) Effective local governance for sustainable, inclusive community development; (ii) Climate change, environment and disaster risk reduction; and (iii) Democratic governance. UNDP supported initiatives include community-based reforestation and sustainable forest management, watershed management, development of community-based resource- and land-use planning systems, sustainable agricultural and livelihood development programmes and local conservation programmes. In addition, in November 2011, Myanmar became a **UN-REDD** Programme partner country and has developed the Myanmar REDD+ Readiness Roadmap. Based on the roadmap, with US$4,788,250 funding, UN-REDD programme is providing targeted support for 4 years from 2015 to engage stakeholders and develop capacity to implement a participatory governance arrangement for REDD+. **UNDP/UNEP joint programme Poverty and Environment Initiative (PEI)** support the government in improving the quality of foreign direct investment in natural resource sectors by managing the social and environmental

impacts. The current programme budget is US$700,000 for 2014-2017. See **Annexes 15 and 16** (baseline reports on marine resources and seascapes, and terrestrial resources and landscapes respectively) for further information on baseline activities.

Although the baseline activities are significant, the threats to the globally significant biodiversity of Tanintharyi Region are on the increase and biodiversity is in decline. Key gaps in the baseline include the failure to deal with illegal and unsustainable inshore and offshore fishing practices, limited support towards the development of new protected areas embracing under-represented marine, coastal and terrestrial forest habitats, the need for capacity development of the regional government for assessing the environmental impacts of development policies, programmes and projects, and integrated natural resource management that takes account of economic valuation of ecosystem services and biodiversity. Overall, the support provided in the fields of biodiversity conservation and ecosystem management has generally been small scale and rather fragmented, focusing on addressing specific threats and issues. A more comprehensive approach that combines work to improve response to systemic issues at the national, provincial levels, and interventions on the ground level to apply systemic improvement is warranted in this recently opened country.