



Myanmar
Climate
Change
Alliance



LOCAL CLIMATE RESILIENCE PLANNING (A Handbook for Practitioners)

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I. Introduction

1. About this handbook

This handbook is intended to guide national and local government officials on how to build resilience to climate change and hazards at the local level. Section 2 of the book introduces key issues related to climate change in Myanmar. Section 3 provides a methodological guidance on how to develop local climate resilience action plans. The annex part contains a long list of climate change adaptation (CCA) options applicable at a local level in Myanmar.

2. Which basic terms and concepts should you know?

Adaptation	Undertaking actions to adjust to already observed or expected climate and its effects with the objectives to: <ul style="list-style-type: none">▪ protect natural and human systems against the actual and anticipated harmful effects of climate change;▪ exploit any opportunities they may generate;▪ ensure the sustainability of investment and development interventions despite current climate risks and potentially increasingly difficult climatic conditions.¹
Climate	The average characteristics of meteorological conditions, calculated over a long period (typically 30 years or more).
Climate change	A shift in average climate parameters and/or in the magnitude of climate variability observed and persisting over long periods (typically decades or longer) ² . To simplify, climate change suggests long-term continuous change of: (i) the average (typical) climate, e.g. average (typical) seasonal temperatures in the coastal zone of Myanmar are getting higher; (ii) variability of temperatures, precipitation, and other climate parameters, e.g. more frequent and severe rainfall and stronger winds are observed in some regions of Myanmar.
Climate change impacts	The effects of climate change (e.g. increasing temperatures and change in seasonal patterns) and extremes (e.g. heat waves, heavy rainfall, severe storms) on human systems and environment. The impacts of climate change include: <ul style="list-style-type: none">▪ Physical impacts – floods, droughts and sea level rise;

¹ MCCA Dictionary (<http://myanmarccalliance.org/en/dictionary/>)

² UN-Habitat, Standardization of DRR Terminology, 2013, Norwegian Ministry of Foreign Affairs, Department of Rural Development

	<ul style="list-style-type: none"> Environmental – impacts on ecosystems such as loss of biodiversity, water scarcity, and land degradation; Impacts on human systems – socio-economic effects (e.g. loss of life and livelihood, food insecurity), and infrastructural consequences.
Climate hazard	Any climate-related physical event (e.g. cyclone), trend (e.g. increasing temperatures in dry season) or impact (e.g. flood, sea level rise), which has the potential to cause loss of, and damage to, people, physical assets, provision of services, and ecosystems. Hazards (as well as climate change impacts) can be divided into slow onset (like drought and insect infestations), and rapid onset (like floods) events.
Climate variability	The variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate, attributed either to natural internal processes within the climate system, or to variations in natural or anthropogenic variables. In other words, climate variability refers to the annual fluctuation of the climate, above or below the long-term average.
Climate risk	The probability of experiencing negative impacts of climate change.
Ecosystem	A system of living organisms, their environment (e.g. land, water) and the interactions within and between them.
Ecosystem services	<p>Ecosystems provide people with numerous benefits called ecosystem services, which could be categorized as follows:</p> <ul style="list-style-type: none"> Provisioning services are all products obtained from ecosystems such as food, fresh water and raw materials. For instance, people depend on lakes and rivers for water and fish, while forests are vital source of wood and food for many communities. Nature also provides people with traditional and commercial medicinal plants/raw materials (e.g. <i>‘Thanaka’</i> in Myanmar). Regulating services are related to the ability of ecosystems to regulate natural processes such as water, air and soil quality control, erosion prevention and moderation of extreme events. For example, trees in urban areas provide shade in hot days and improve the air quality, while mangroves can protect communities from hazards by reducing wind speed, flooding and coastal erosion. Forests remove carbon dioxide, prevent soil erosion and landslides, and reduce the flow of water during floods. Wetlands can filter waste water (e.g. human and animal waste) and absorb floodwaters. Cultural services refer to non-material benefits such as using the nature for tourism, ecotourism and sports, and cultural and spiritual activities. Supporting services are those benefits related to natural processes that support and maintain all other services (e.g. soil formation, providing nutrition and habitat for species).
Gender	Socially ascribed roles, responsibilities, rights and opportunities associated with being a man or a woman, and the social relations between women and men. These are dynamic, change over time and are context-specific. Gender

	roles in society shape the gender division of labour, which is the allocation of the tasks and responsibilities of women and men at home, at work and in society. For example, often a division is made between: (a) productive tasks (e.g. agriculture, fisheries/aquaculture, self-employment, workers in enterprises); (b) reproductive tasks such as child care and household tasks; and (c) community tasks ³ .
Mitigation of climate change	Human interventions aimed at reducing greenhouse gas emissions and/or enhancing the capacity of 'sinks' for GHGs, for the ultimate purpose of stabilising their concentration in the atmosphere; aims to reduce global exposure to the effects of climate change. Mitigation encompasses a wide range of activities, from reducing deforestation while also planting trees, to switching to renewable energy sources and climate-smart agricultural practices. It is important to highlight that while through mitigation we can limit the global warming, the temperatures will continue to rise.
Resilience	Resilience, in the context of climate change, is the ability of a system to: (i) absorb stress and cope with climate change and hazards, including maintaining its basic structure, functions and adaptive capacity, and (ii) recover, adapt and transform in ways that improve its sustainability, leaving it better prepared for future climate change impacts. In this context, climate-resilient development of townships of Myanmar suggests development that ensures townships' ability to cope with current climate and its impact and to adapt to future climate change, by preserving development gains and minimising damages.
Vulnerability	The degree to which a system is susceptible to, or unable to cope with, the adverse effects of climate change, including climate variability and extremes. This notion is used to describe socio-economic, physical and environmental factors, which determine the sensitivity/susceptibility of a country, town, community or individual to the impact of climate change (e.g. change in seasonal patterns) and/or hazard (e.g. flood). For example, socio-economic factors of vulnerability are poverty, low level of awareness on climate change, and dependence on climate-sensitive agricultural production. Land degradation and unsustainable natural resources management are environmental factors of vulnerability. Physical vulnerability relates to the state of infrastructure and human settlements.
Weather	A condition of the atmosphere at a certain time and location described by meteorological variables such as temperature, precipitation, wind, humidity, atmospheric pressure, cloudiness.

³ UN Women (2014). UN Women Master Class Training Manual: Rights Based Approach to Gender and Climate Change: the situation in Bangladesh. UN Women Bangladesh. Available at: <http://asiapacific.unwomen.org/en/digital-library/publications/2015/04/un-women-master-class-training-manual>

II. Climate change in Myanmar

1. How is the Earth's climate changing?

Warming of the Earth's climate system is evident from the observed increases in the average global air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level. Weather events of all kinds are getting more extreme. In arid areas, droughts and wildfires intensify. Number of cold days and nights decreases, while winter temperatures and precipitation become more extreme. Cities experience more frequent and extreme heat waves.

Temperatures will continue to rise in future. Most scientists agree on the "threshold" of a 2°C increase in global average temperature on the pre-industrial levels, above which humans and nature will not be able to cope with the negative effects of climate change. Myanmar is already experiencing significant losses due to climate change, and without adaptation, country's future development will be impeded.

2. What you should know about climate change in Myanmar?

Present climate in Myanmar⁴

There are eight major physiographic regions in Myanmar: the Ayeyarwady Delta, Central Dry Zone, Northern Hilly Region, Rakhine Coastal Region, Eastern Hilly Region, Southern Coastal Region, Yangon Deltaic Region, and Southern Interior Region. These regions form three main agroecological zones: i) Central Dry Zone; ii) Coastal Zone; and iii) Hilly Zone (Figure 1). The latter are used to describe climate variability and change at the sub-national level.

The country's climate is tropical to subtropical monsoon with three seasons: (i) hot, dry inter-monsoonal (mid-February to mid-May); (ii) rainy southwest monsoon (mid-May to late October); and (iii) cool, relatively dry northeast monsoon (late October to mid-February). Annual climate patterns, as well as seasonal temperatures and precipitation vary across the country, as summarized below.

⁴ Summarized from: (i) Ministry of Natural Resources and Environmental Conservation (2012). Myanmar's National Adaptation Programme of Action (NAPA) to Climate Change; (ii) Horton, R., De Mel, M., Peters, D., Lesk, C., Bartlett, R., Helsing, H., Bader, D., Capizzi, P., Martin, S. and Rosenzweig, C. (2016). Assessing Climate Risk in Myanmar. New York, NY, USA: Center for Climate Systems Research at Columbia University, WWF-US and WWF-Myanmar.

- *Coastal Zone.* The Yangon Deltaic Region has the highest mean annual temperature. The regions in the Coastal Zone receive the highest mean annual rainfall (2,500 – 5,500 mm) and are prone to flooding. Furthermore, the west coast experiences frequent tropical storms and cyclones during October-December and April-May periods.
- *Central Dry Zone.* Mean annual rainfall is the lowest in the Central Dry Zone (500-1000 mm per year) that is prone to extreme heat events and drought. Temperatures in this zone could reach 40-43°C during the hot dry season.
- *Hilly Zone.* The Northern Hilly Region has the lowest mean and maximum annual temperatures. The Eastern and Northern Hilly areas receive the lowest wet season precipitation, and both regions are exposed to heat waves, droughts and floods, as well as landslides.

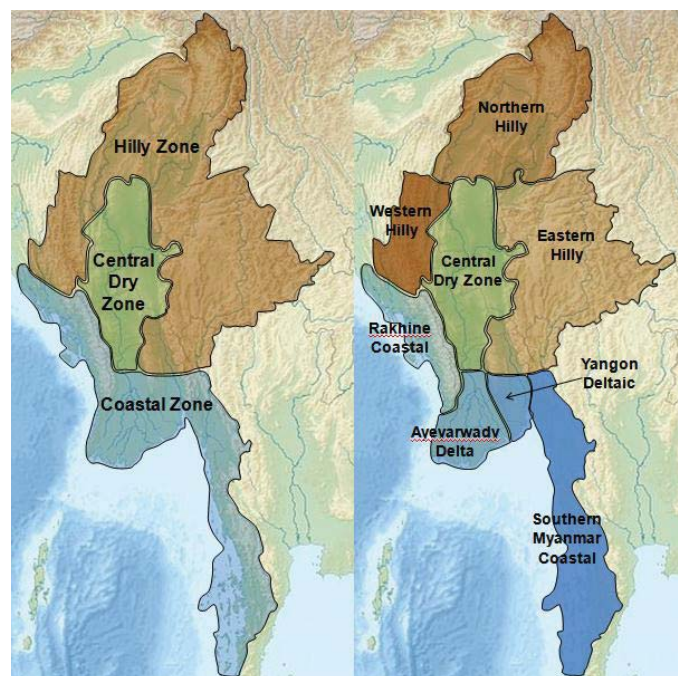


Figure 1 Agroecological zones in Myanmar (left) and physiographic regions (right)⁵

Observed climate changes

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_18226

