



# Climate Factsheet Cambodia (KHM)

## People, Geography, and Climate

- » Cambodia is a tropical nation in southeast Asia lying from 10° N to 15° N of latitude and 102° E to 108° E of longitude.<sup>1</sup>
- » Cambodia's mainland area covers an area of 181,035 km<sup>2</sup> with an east-to-west expanse of 580 km and north-to-south extent of 450 km, and a coastal area in the southeast region covering a length of approximately 435 km.<sup>1</sup>
- » The country is divided into central alluvial plains of the Mekong and Tonle Sap river basins, mountains, and highland areas.<sup>1</sup>
- » In the southwest, the Cardamom mountain range separates the coastal area and the central plains. In the northwest (Cambodian-Thai border), the Dangrek mountains are a continuation of the Korat Plateau and in the northeast, lie continuations of Kontum massif, separating Cambodia from Vietnam.<sup>1</sup>
- » The highest point in Cambodia is Phnom Aural, at 1813m above mean sea level.<sup>1</sup>
- » The 435km long coastal zone (part of the Gulf of Thailand) is important for fishing, tourism, and marine transportation.<sup>1</sup>
- » The Royal Government of Cambodia (RGC) consists of 1 capital city, 24 provinces, and 162 districts.<sup>2</sup>
- » The capital city is Phnom Penh and it lies in the south-central region, at the confluence of the Mekong, Tonle Sap, and Bassac rivers.<sup>3</sup>



**Population of the Cambodia is<sup>3</sup>  
14.7 million**

- » Cambodia has the highest annual population growth rate in southeast Asia, at 1.46% in 2013 (population of 14.7 million)<sup>3</sup>

### The population of Cambodia is young (in 2005)<sup>3</sup>



- » This feature may be attributed to the genocide of ~1.7 million Cambodians between 1975-1979 under the Khmer Rouge.<sup>3</sup>
- » Cambodia has a tropical monsoon climate with dry and wet seasons; the wet season occurs from May to October, receiving 90% of annual precipitation, and the dry season occurs from November to April.<sup>3</sup>
- » The mean annual precipitation (between 1994 to 2004) varied from 1400mm to 1970mm.<sup>3</sup>



The **maximum average temperature** is around **28 °C**  
The **minimum average temperature** is around **22 °C**

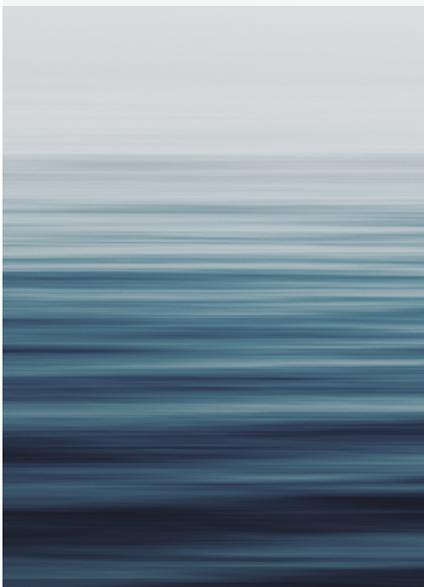
with maximum temperatures (which may be over 38 °C) occurring just before the onset of monsoon.<sup>3</sup>

# Global Climate Change



## Temperature

- » Global CO<sub>2</sub> levels in the atmosphere reached a record high of  $407.8 \pm 0.1$  parts per million (ppm) in 2018, which is 147% of pre-industrial levels.<sup>4</sup>
  - » Concentrations of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), both potent Green Houses Gases (GHGs) also reached record levels in 2018 at  $1869 \pm 2$  parts per billion (ppb) and  $331.1 \pm 0.1$  ppb, respectively.<sup>4</sup>
  - » The average rate of increase in global annual temperature is  $0.07$  °C ( $0.13$  °F) per decade since 1880, and about  $+0.18$  °C ( $+0.32$  °F) since 1981.<sup>4</sup>
  - » The 2010-19 decade is the warmest decade on record, with the past five years being the warmest five years between 1880-2019.<sup>4</sup>
- » From January to October 2019, the global mean temperature was  $1.1 \pm 0.1$  °C above the pre-industrial levels (1850-1900).<sup>4</sup>
- » In the 140-year record (up to 2019), 2019 is the second warmest year with global land and ocean surface temperature increasing by  $0.95$  °C ( $1.71$  °F) above the 20th-century average.<sup>4</sup>
- » As of 2019, the warmest year on record is 2016 with an increased value of  $+0.99$  °C ( $+1.78$  °F) and the third is 2015 with  $+0.93$  °C ( $+1.67$  °F).<sup>4</sup>



## Sea Level Rise

- » The excess energy accumulated in the atmosphere, because of increasing GHG concentrations, is taken up by the ocean which is measured as Ocean Heat Content (OHC).<sup>5</sup>
- » OHC is associated with rising sea levels due to the thermal expansion of ocean water.<sup>5</sup>
- » In 2019, OHC in the upper 700 m (since the 1950s) and upper 2000 m (since 2005) were found to exceed the previous record highs set in 2018.<sup>5</sup>
- » The global mean sea level reached its highest value ( $96.7 \pm 0.4$  mm) in September 2019, compared to January 1993 levels.<sup>6</sup>
- » The mean rate of increase in sea-level between 1993 and 2019 is approximately  $3.24 \pm 0.3$  mm/yr.<sup>4</sup>

## Ocean Acidification

- » Around 22% of annual CO<sub>2</sub> emissions in the past decade (2009-2018) are subject to the phenomenon of ocean acidification, caused by the absorbance of atmospheric CO<sub>2</sub> by the ocean to lower pH of water due to the formation of carbonic acid.<sup>4</sup>
- » Since the late 1980s, the pH of the global surface ocean has been declining at  $0.017$ - $0.027$  pH unit per decade; affecting marine lives, their life cycles, and reproduction, from crustaceans to corals.<sup>4</sup>

## Regional Climate Change

- » As of 2019, the same year Asia experienced the third-warmest year in the record with a recorded temperature of 1.68°C above the 1910–2000 average.<sup>5</sup>
- » Asia and the Pacific remain as the region that is most prone to disaster displacement due to both sudden and slow-onset disasters.<sup>4</sup>
- » The strong positive phase of Indian Ocean Dipole (IOD) in 2019 was associated with drought conditions in southeast Asia.<sup>4</sup>

### Coral reefs

 **Decline to 10-30%**

Coral reefs are projected to decline to 10%-30% of former cover at 1.5 °C of warming, and less than 1% at 2 °C of warming.<sup>4</sup>

- » Regional drought events in the lower Mekong river basin have occurred in 2004-2005, 2009-2010, and 2015-2016, with an atypically low flow of water in the Mekong, debilitating the agricultural systems in Thailand, Cambodia, and Vietnam.<sup>7</sup>

- » Historical climate trends for Cambodia (since 1960) are as follows:<sup>8</sup>

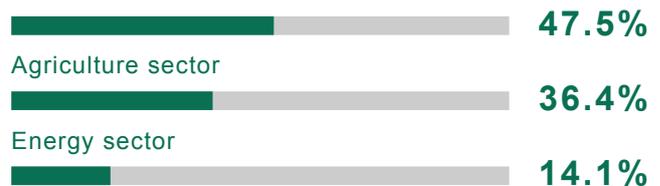
- › Increase in temperatures at about 0.18 °C per decade (0.20-0.23 °C in the dry season and 0.13-0.16 °C in the wet season)
- › The frequency of 'hot days' increased by 46 days per year.

- » In 2013, national GHG emission of Cambodia was 51.67 MtCO<sub>2eq</sub> with per capita emission of 3.43 tCO<sub>2eq</sub>.<sup>9</sup>

- » The Land Use Change and Forestry (LUCF) sector made up 47.6% of the country's total emissions (of which, change in forest area accounted for 93% of emissions).<sup>9</sup>

### The highest emission sector<sup>8</sup>

Industrial processes and waste accounting for the rest of total emissions



- » Agricultural emissions are caused by increased rice production and enteric fermentation from livestock.<sup>9</sup>

## Future Climate Projections

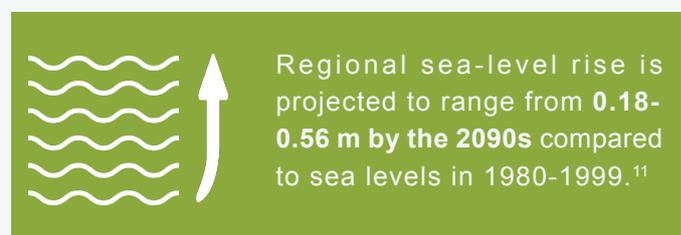
- » It is projected that the mean annual temperatures in Cambodia will increase by 0.8-1.6 °C by 2030, and 1.0-2.6 °C by 2050.<sup>8</sup>

- » It is projected that in eastern parts of Cambodia, including the Prey Lang landscape, temperatures could increase by 4-6 °C by 2050, resulting in potential adverse impacts on rainforests and pest outbreaks.<sup>8</sup>

- » As per the low rate of emission scenarios (SRESB1), the monsoon will probably continue to rise until 2050, then decrease, but in the high emission scenarios (SRESA2), the change in monsoon will reverse.<sup>10</sup>

- » The frequency and intensity of heavy storm events are projected to rise by 1-15 % by 2050, while the monsoon may potentially be shorter and shift to wetter conditions in October-November by 2085.<sup>8</sup>

- » The length of the drought period is likely to increase with drier conditions extending up to April-May, by 2085.<sup>8</sup>



- » The International Rice Research Institute predicts that for every degree increase in minimum night temperatures, the rice yield declines by 10% during the growing period in the dry season.<sup>10</sup>

# Cambodia – National Context

- » The Gross Domestic Product (GDP) growth in Cambodia from 1994 to 2015 averaged 7.5% annually.<sup>8</sup>
- » Revenue has increased between 15%-20% per annum during 2014-2018, and the current national revenue increased from about 15.06% of GDP in 2013 to 19.64% in 2017, nearly double or approximately 4.58% of GDP.<sup>2</sup>
- » The poverty rate declined from 48% in 2007 to 14% in 2014.<sup>8</sup>
- » The average life expectancy of Cambodians of both sexes has increased from 61.9 years in 2000 to 68.7 years in 2015 (66.7 years for males and 70.7 years for females).<sup>2</sup>
- » According to the Cambodian Demographic and Health Survey 2014, the proportion of women aged 20-24 who were married or living together before the age 18 years was 1.9%.<sup>2</sup>

## The forest cover in Cambodia

**73.04% → 49.48%**

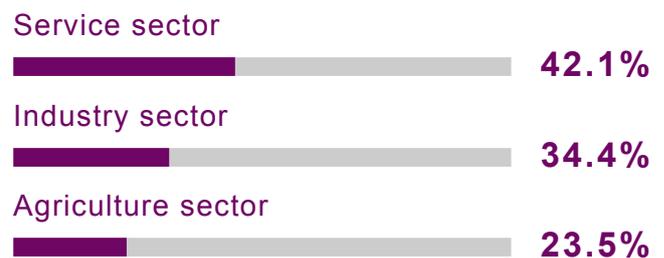


From 1965 to 2014 the forest cover in Cambodia declined from 73.04 % to 49.48 % of the total land area.<sup>12</sup>

- » Evaluated national forest cover resources in 2016 with results showing that Cambodia has a total of 8,742,401 ha, equal to 48.14%, with an average annual change rate of 0.67%.<sup>2</sup>
- » About 23% of Cambodian forests, nearly 2 million hectares, have been lost due to industrial agriculture, mining activities, and other drivers like fuelwood collection, charcoal making, and illegal logging activities.<sup>8</sup>
- » The protected area system of Cambodia covers 41% of the nation's total area.<sup>12</sup>
- » Rural areas comprise 98% of the country's total land and are home to 77% of the population, of which 90% are engaged in agricultural activities and 80% rely on crop production for subsistence.<sup>8</sup>
- » In 2013 around 3.3 million hectares of land was used for agricultural activity in Cambodia under household agricultural holdings. Under Juridical agricultural holdings (entities managed by private or state enterprises), around 806.6 thousand hectares of land was used as a cultivating area.<sup>18</sup>

- » Rice is the staple crop of the population. In the country, according to the agricultural census data in 2013, non-aromatic rice was planted in 2.03 million hectares of land, aromatic-rice in 280 thousand hectares, and sticky rice in 18 thousand hectares.<sup>18</sup>
- » Milled rice, cassava products (cassava slice, fresh cassava, and cassava powder), cashew, red corn, mangoes, and bananas were the major agricultural products exported in 2013.<sup>18</sup>

## The contributions to the GDP



The contributions to the GDP by the service, industry, and agriculture sectors in 2018 were 42.1%, 34.4%, and 23.5% respectively.<sup>2</sup>

- » There has been a steady growth in agri-industrial plantations like cassava and rubber, with a growth rate of rubber at 10% in 2011.<sup>10</sup>
- » The total area of rubber in Cambodia increased from 357.8 thousand ha in 2014 to 436.7 thousand ha in 2018, in which the agro-industry rubber land accounted for 64.22% and the family rubber accounted for 35.78%.<sup>2</sup>
- » The agricultural workforce sector of the Cambodian economy is at a steady decline from 54% of the total national workforce in 2010 to 37% in 2017, citing increases in rural-urban and cross-border migration.<sup>2</sup>
- » Agricultural production is dependent on the annual flooding and recession of the Tonle Sap lake and the Mekong river, which brings fertile alluviums to the central plains.<sup>8</sup>
- » The Mekong river basin system along with the Tonle Sap system covers around 86% of Cambodia's area during the wet seasons.<sup>8</sup>
- » The vulnerability of Cambodia is accountable to the geography and hydrology of the country, dominated by the Mekong basin and Tonle Sap basin.<sup>8</sup>
- » The dynamics of these basins are characterized by flood-pulse hydrology with extreme fluctuations in water level between dry and wet seasons; with the

surface area of Tonle Sap increasing from 2500 km<sup>2</sup> to 12,500 sq km<sup>8</sup>.

» The basins support a diversity of flooded forests, wetlands, and freshwater fisheries that are essential for the sustenance of livelihoods.<sup>8</sup>

» Water supply and sanitation systems in Cambodia are in dire conditions due to the deterioration of safe drinking water.<sup>8</sup>

» The urban and rural water supply in 2015 were 88% and 50%, respectively, with 89% sanitation facility in the urban area.<sup>2</sup>

» Inland fisheries account for about 80% of animal protein consumption by Cambodian people.<sup>8</sup>

» Cambodia's shallow, protected coastal waters are important habitats for seagrasses that are nurseries for various species of fishes, crustaceans, and other invertebrate species.<sup>11</sup>

» The annual loss of the 85,100 ha mangroves in Cambodia increased from 1.6% between 1990-2000 to 1.9% between 2000-2010.<sup>11</sup>

» The fossil fuel industry supplies 35% of the power, with hydropower and other imports supplying 49% and 15%, respectively, with 33 sub-terminals covering 20 capital and provinces.<sup>2</sup>

## Cambodia's Involvement and Progress within the UNFCCC

» Cambodia ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1995 and acceded to the Kyoto Protocol in 2002.<sup>3</sup>

» Cambodia submitted its Initial National Communication (INC) in 2002.<sup>1</sup>

» The RGC submitted the National Adaptation Programme of Action to Climate Change (NAPA) in 2006.<sup>16</sup>

» In its Intended Nationally Determined Contribution (INDC) submitted to UNFCCC (2014), Cambodia conditionally pledges to reduce its GHG emissions by 27% by 2030, relative to its 2010 GHG emissions.<sup>9</sup>

» Cambodia then submitted the Second National Communication (SNC) to the UNFCCC in 2015.<sup>3</sup>

» Cambodia's National REDD+ (Reducing Emission from Deforestation and Forest Degradation) Strategy for 2017-2026 was published in 2017.<sup>12</sup>

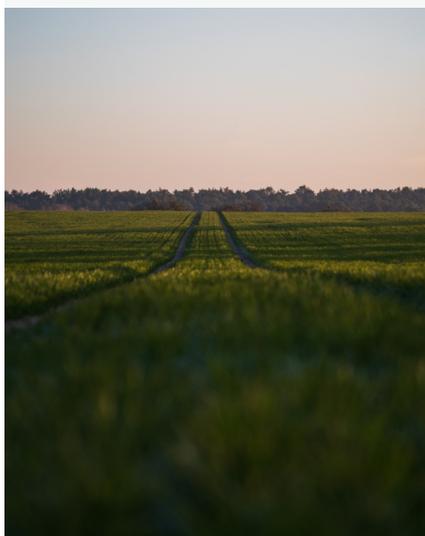
» The National Forest Monitoring System (NFMS) of Cambodia was submitted in 2015.<sup>12</sup>

» The first summary of the Safeguards Information System (SIS) was submitted in 2019.<sup>15</sup>

» Cambodia's Forest Reference Level (FRL) was submitted to the UNFCCC in 2017, at 78,953,951 tCO<sub>2</sub> year-1 (historical average net emission levels from 2006-2014).<sup>13</sup>

## Impacts of Climate Change

### Important Sector-Wise Climate Impacts in Cambodia:<sup>8</sup>



#### » Agriculture and Food Security

Reduced crop yields; Reduced agricultural land; Decreased food security. Projected impacts to rice yields are uncertain, though shifts in the timing of the rainy season could have substantial adverse impact without adaptation measures. One study suggests that a failure to ensure optimal timing, cultivar, and fertilizer use in the face of shifting climatic conditions could result in as much as 9.9 percent losses in wet season yields and 7.7 percent loss in dry season yields by 2050, respectively. Because most of Cambodia's rice fields are rain-fed, with only 20 percent irrigated, the poorest farmers (typically without irrigation) are particularly vulnerable to shifts in the timing, frequency, and/or intensity of rainfall. Prolonged droughts in 2004 and 2005 affected nearly 30 percent of agricultural land in Cambodia and caused a 14 percent decrease in rice yields.<sup>8</sup>

- › **Water Resources:** Decreased water quality for drinking; Limited freshwater availability; Unpredictable changes in water flow. The reduced availability of surface water has increased groundwater extraction, which poses a potential risk to human health given the prevalence of elevated arsenic levels in Cambodia; this potentially exposes more than 2 million people to high levels of arsenic.<sup>8</sup>
- › **Human Health:** Increased heat stress; Reduced water and food supply; Increased water- and vector-borne diseases. Increased temperatures are projected to increase heat-related conditions for at-risk groups, such as the elderly, pregnant or expecting women, young children, and infants, and deforestation is likely to lead to higher temperatures in cleared areas. Health infrastructure, such as hospitals, clinics, and cold chain storage facilities, may also be impacted by the increasing temperatures, heavy rains, and subsequent flooding, thus impacting overall patient care.<sup>8</sup>
- › **Fisheries and Food Security:** Reduced fish production; Decreased food security; Loss of livelihoods. The climate variability could amplify an emerging boom-and-bust cycle of fish catches, with years of large catch followed by shortages. Increased seasonal variability in rainfall, with wetter wet seasons that may boost inland fish production and drier dry seasons, which may threaten fish stocks, make it increasingly difficult for fishing communities to effectively adapt.<sup>8</sup>
- › **Ecosystems:** Loss of livelihoods; Decreased food security; Habitat and biodiversity loss. Increased temperatures and changes in precipitation patterns have the potential to influence and degrade the composition of the forest and reduce overall forest productivity.<sup>8</sup>

- ›› The climate-induced adverse impacts in 2015 resulted in the loss of \$1.5 billion or 10% of the country's annual GDP.<sup>8</sup>
- ›› Whereas only 20% of rice fields are irrigated, the rest are rainfed and rely on the Tonle Sap and Mekong river basins, and the monsoon season.<sup>8</sup>
- ›› The rainfed fields are highly vulnerable to extended drought periods and higher flash flood incidents.<sup>8</sup>
- ›› The drought in 2004-2005 impacted 30% of agricultural lands in Cambodia and decreased rice yields by 14%.<sup>8</sup>

The rice yields, subject to changing climatic conditions and failure to provide optimum growing conditions, may face about



- ›› The hydrology is affected by the intermixture of climatic stressors (extended droughts, changing rainfall patterns, storms) and non-climatic stressors (overfishing, deforestation, and construction of dams) in the Tonle Sap and Mekong river basin, which could cause agricultural losses of around \$100-\$170 million annually.<sup>8</sup>
- ›› The flash flood events of 2013 affected 20 provinces out of 24, destroying 267,000 ha rice fields and impacting 350,000 households.<sup>8</sup>

- ›› The record-breaking El Niño event of 2016 caused aggravated drought, heatwaves, decreased water levels, and wildfires affecting a third (640,000 ha) of flooded forest area.<sup>8</sup>
- ›› The 2016 drought in the Mekong River basin broke the 100-year historical record of water scarcity, high-temperature levels, and saline intrusion in the Mekong delta, which caused water shortages in 18 of Cambodia's 25 provinces and put 2.5 million people under stress.<sup>7</sup>

The six most drought-prone areas in Cambodia are in the provinces	
1.	Battambang
2.	Banteay Meanchey
3.	Kampong Cham
4.	Kampong Chhnang
5.	Prey Veng
6.	Svai Rieng

based on records from the national agricultural census, historical drought events, and understanding of food and water security, and irrigation systems in the nation.<sup>7</sup>

- ›› High water levels during wet seasons and extended drought periods can have both positive and negative impacts on livelihoods dependent on fisheries, specifically in the inability of these people to adapt to fluctuating levels of fish catches, seawater intrusion, and destruction of fishing infrastructure.<sup>8</sup>

- » It is projected that sediment runoff in the Tonle Sap lake, which alone accounts for 7% of national GDP, will increase by 21% in 2050.<sup>8</sup>
- » Along with flash floods, Cambodia also experiences tropical storms, such as typhoon Ketsana in 2009, which caused 43 deaths and impacts on 180,000 households.<sup>8</sup>
- » Climate change impacts on the health sector include devastating damages due to flash-flood events to health infrastructures, displacement of people, and increased risks of water- and vector-borne diseases like malaria and dengue.<sup>8</sup>

- » Cambodia is subjected to high arsenic concentration in groundwater and high diarrheal disease rates, the latter causing around 10,000 deaths annually, which could worsen due to various climatic and anthropogenic activities.<sup>8</sup>
- » Sea level rise and flooding adversely affect the mangrove ecosystem in southern Cambodia, increasing sedimentation and resulting in the killing of Mangrove forests.<sup>8</sup>
- » The rate of loss of Mangrove increased from 1.6% between 1990-2000 to 1.9% between 2000-2010.<sup>11</sup>

**The overall loss of Mangrove forests from 1989 to 2017 was (1415 ha per year).<sup>17</sup>**  **42%**

## Plans, Policies, Laws, and Strategies Addressing Climate Change Issues in Cambodia

### **Rectangular Strategy for Growth, Employment, Equity and Efficiency**

(Phase I: National Strategic Development Plan (NSDP 2006-2010), Phase II: NSDP 2009-2013, Phase III: NSDP 2014-2018, and Phase IV: NSDP 2019-2023)

### **Cambodia Climate Change Strategic Plan (CCCSP) 2014-2023**

### **National Forest Programme (NFP) 2010-2029**

### **National Strategic Plan on Green Growth and Development 2013-2030**

### **The Strategic Planning Framework for Fisheries: 2010-2019**

### **Land Law 2001**

### **Forestry Law 2002**

### **Law on Fisheries 2006**

### **Protected Areas Law 2008**

### **National Biodiversity Strategy and Action Plan 2016-2020**

### **Gender and Climate Change Action Plan 201-2018**

### **Cambodia's National REDD+ Strategy 2017-2026**

### **Climate Change Priorities Action Plan for Agriculture, Forestry and Fisheries 2014-2018**

### **National Strategic Plan for the Management of the Protected Areas 2017-2031**

# Mitigation and Adaptation to Climate Change

National Strategic Development Plan (NSDP) 2019-2023 aims to implement RGC's "**Rectangular Strategy**", focusing on four policy rectangles<sup>2</sup>

i.	<b>Human resources development</b>
ii.	<b>Economic diversification</b>
iii.	<b>Private sector development and employment</b>
iv.	<b>Inclusive and sustainable development</b>

» Actions in response to climate change at the national planning level include expenditure on climate change compared with GDP (1.18% in 2018), mainstreaming climate change into national and sub-national plans (14 in 2018), reducing the number of communes vulnerable to climate change, and obtain carbon credits from Clean Development Mechanism (CDM) and other voluntary mechanisms (REDD+) and markets.<sup>2</sup>

» The NSDP 2019-2023 also prioritizes stopping corruption through the strengthening of the education system of the nation.<sup>2</sup>

» The National Council for Sustainable Development (NCSA) and its Secretariat's Department of Climate Change (DCC) have developed the National Climate Change Monitoring and Evaluation (M&E) Framework.<sup>14</sup>

» The RGC's overall strategy for climate change response is embedded in the Cambodia Climate Change Strategic Plan (CCCSP) 2014 – 2023.<sup>10</sup>

» The CCCSP identifies **8 strategic objectives**; to promote climate resilience by improving food, water, and energy security; to reduce vulnerability and risks to climate change; to ensure the resilience of critical ecosystems; to promote low-carbon technologies supporting sustainable development; to improve climate change responses, strengthen institutions and framework; and to collaborate and participate actively in international climate change processes.<sup>10</sup>

» The specific strategies to achieve the objectives are listed in the CCCSP 2014-2023.<sup>10</sup>

» The implementation of the CCCSP has been planned in 3 phases as:<sup>10</sup>

› The immediate (2013-2014) action plan was to put institutional and financial arrangements, develop M&E framework and indicators, and develop climate change action plans by line ministries.

› The medium (2014-2018) action plan involved accreditation of Adaptation Fund and Green Climate Fund, operation of M&E and data management systems, and prioritizing adaptation activities, followed by GHG mitigation activities.

› The long-term (2019-2023) action plan is to scale up successful cases and increased budgets in national programs, funding climate change responses.

The Ministry of Environment has a leading role in achieving environmental sustainability, progressing in areas such as<sup>2</sup>

1. **Information and environmental awareness**
2. **Protected area management**
3. **Environmental protection**
4. **Sustainable development/ climate change**

» The RGC has paid attention to promoting gender equality and empowering women in all sectors and at all levels by in-depth mainstreaming into the NSDPs.<sup>2</sup>

» Economic opportunities for women are provided through the Women Development Center in 14 provinces, Cambodia Women Entrepreneurs Association, and Cambodian Businesswomen Federation; all working to develop a career, seek markets to sell products and strengthen the voices of women in the economy.<sup>2</sup>

# Agriculture and Water Resource Management

» The RGC focuses on strengthening commercialization for small-scale farmers and enhancing linkage between industrial plantations and smallholders through relevant policies like 'Promotion of Paddy Rice Production and Milled Rice Export' and 'National Rubber Development Strategy 2011-2020'.<sup>2,13</sup>

» RGC has developed the 'Climate Change Priorities Action Plan for Agriculture, Forestry and Fisheries 2014-2018' identifying adaptation and mitigation actions and promoting climate-smart agriculture.<sup>9</sup>

» Measures taken by RGC to mitigate agriculture-related problems faced by farmers include increasing market competitiveness, improvement of roads, water supply systems, power supply systems, provision of technical assistance and agricultural inputs, land reforms, and investment financing.<sup>2</sup>

» April 9 is designated as the national day of Khmer product consumption under the One Village One Product movement.<sup>2</sup>

» NSDP 2014-2018 achieved increasing the ability and potential of irrigation in addition to the existing irrigation capacity to increase agricultural production, flood and drought mitigation, and seawater intrusion prevention:

- › Irrigation of 316,689 ha rice plantation and 4,413 ha of minor crop
- › Maintenance of sustainable irrigation of rice of 485,698 ha and 1,556 ha minor crops through regular/ periodic repair-maintenance.

» The Ministry of Agriculture, Forestry, and Fisheries (MAFF) prioritizes five programs:<sup>2</sup>

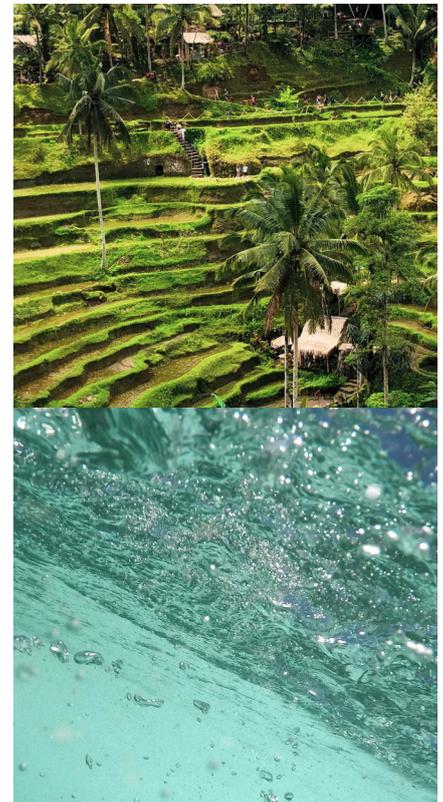
- › Increase the productivity of all crops with ~5% growth per year, and increase export of agricultural products by 7%
- › Achieve animal production growth rate of 3% annually through management and development of livestock and focus on animal health
- › Increasing aquaculture yields by 20% per year sustainably and strengthening enforcement of the Law of fisheries
- › Sustainably manage forest resource & wildlife by promoting forest replantation, increased research and development, and capacity building of forest communities
- › Optimizing the effectiveness of supporting services & human resource development

» Ministry of Water Resources and Management (MOWRAM) identifies the following activities for water resources management:<sup>2</sup>

- › Rehabilitate & construct existing irrigation schemes
- › Prioritize drainage systems in high poverty areas
- › Encourage maintenance and expansion of reservoirs, lakes to ensure adequate water supply
- › Disseminate water management technology in rain-fed areas
- › Establish and support Farmer Water Users Community (FWUC)
- › Research and prepare river basin development plans
- › Encourage farmers' participation, especially women in all stages of irrigation and drainage system development projects
- › Encourage investments from donors and the private sector to support the management of irrigation schemes
- › Ensure income is generated through irrigated agriculture and continue investments in the water sector to boost agricultural productivity

» The Cambodia National Mekong Committee has continued implementing the Mekong River Commission's procedures for sharing of data and information, water usage monitoring, notification, prior consultation and agreement, maintenance of water on the main river, and water quality.<sup>2</sup>

» Promoting the development and implementation of the “Master Plan for Agriculture Sector Development towards 2030” and the “Agriculture Sector Strategic Development Plan 2019-2023”.<sup>2</sup>



» Fostering livestock and aquaculture through continued implementation of the “Law on Animal Health and Production”, the “Strategic Planning Framework for Livestock Development 2016-2025”, and the “National Aquaculture Development Strategy 2016-2030”.<sup>2</sup>

## Forest Protection and Sustainable Forest Management



- » Cambodia aims to increase the national forest cover by 60% of its total area by 2030.<sup>2</sup>
- » The management of forests is overseen by the National Forest Programme (NFP) 2010-2029.<sup>13</sup>
- » The National Protected Area Strategic Management Plan (NPASMP) under the Ministry of Environment will implement the REDD+ strategy.<sup>2</sup>
- » Six major programs of community forestry establishment and support to rural communities are planned for forest management.<sup>12</sup>
- » The RGC has created 499 community forests and 516 fishing communities in 2015.<sup>2</sup>
- » The number of protected areas in Cambodia has increased from 23 to 53, covering an area of 7.4Mha that is 41% of the total area.<sup>2</sup>

» Three REDD+ projects at the national level, undergoing technical procedures are the Keo Seima Wildlife Sanctuary, Prey Lang Wildlife Sanctuary, Tatai Wildlife Sanctuary, and the Southern Cardamom Mountains National Park.<sup>2</sup>

## Disaster Management Sector

» The National Committee for Disaster Management (NCDM) has:<sup>2</sup>

- › Developed law on disaster management
- › Established and implemented the rapid onset disaster Early Warning System “EWS 1294” in 11 provinces across Cambodia
- › Established Cambodia disaster loss and damage database (CamDi)

» The Drought Management Strategy 2019-2023 for lower Mekong basin involves 4 activities:<sup>7</sup>

- › **Indicator monitoring** – evaluate and monitor meteorological, hydrological, and agricultural indicators in selected locations, perform periodic assessments and develop future trend analyses.
- › **Early warning** – monitoring of indices through standard tools and development of data sharing portal, forecasting and early warning system development using customized parameters for the lower Mekong region.
- › **Capacity building** – a collaboration with concerned parties for technical and experience exchange, planning, and application of technologies through pilot projects.
- › **Mitigation action** – collaboration, information dissemination, a guideline for drought adaptation, pilot activities for adaptation measures.



» Ministry of Water Resources and Management (MOWRAM) identifies the following activities for flood and drought management:<sup>2</sup>

- › The study and construction of flood controls and water drainage systems
  - › Mitigate flood by educating communities and disseminating public information
  - › Urgent response to areas severely affected by drought, water, or other water caused destruction
  - › Encourage people and institutions to participate in flood mitigation actions such as preparation of safety hills
  - › Setting up of water pump and repair stations
  - › Mapping and geospatial analysis of flood-prone/ affected areas
  - › Restoration of sediments to reduce flood
- » The MOWRAM also plans on strengthening and expanding the meteorological and hydrological systems:<sup>2</sup>
- › Data collection and broadcasting of information on water resources management and meteorology
  - › Regular forecasting and alerts for droughts, flood, storms
  - › Improvement and installation of meteorological and hydrological stations
  - › Prepare inventory of information on irrigation systems, flood control systems, river basins, and other water resource management related data

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