Thailand

Thailand, a country located in the southeastern region of mainland Asia, is bordered to the north by Myanmar and Lao, to the east by Lao and Cambodia, to the south by Malaysia and the Gulf of Thailand, and to the west by the Andaman Sea. The total land area of the country is approximately 198,070 sq. mi. (513,000 sq. km). The country is divided into five regions: north, northeast, central, east, and south. The northern region is generally mountainous, while the northeast is on a high plateau. The central region is generally flat and fertile, while the southern region, a peninsula, constitutes most of the country’s coastline.

Thailand’s latest population estimate stands at 65 million, with the majority dwelling in rural, agricultural areas. Agriculture is the primary sector, employing 49 percent of the population and contributing to 10 percent of the gross domestic product (GDP). Thailand’s 1,988-mi.- (3,200-km-) long coastline brings its tourism and fishery sector alive, providing 6 percent of GDP and a livelihood to 10 percent of its population.

Thailand has recognized the significance of climate change by becoming a member of the United Nations Framework Convention on Climate Change (UNFCCC) on December 28, 1994, and later ratifying the Kyoto Protocol on August 28, 2002. In comparison to other industrialized countries, Thailand was able to cut down the level of greenhouse gas (GHG) by 0.6 percent, while contributing less per-capita emission than the world’s average. Thailand’s contribution to GHG emissions is only 0.8 percent of the world’s total. However, emissions doubled between 1991 and 2002.

The effects of climate change on Thailand include floods, droughts, higher surface temperature, severe storms, and sea-level rise. Weather patterns during the past decade have fluctuated from severe droughts to severe floods. Crops are therefore threatened, along with coastal tourism. Precipitation has also been in decline, causing water shortages. Intense rainfalls and more out-of-season storms have led to worse flooding over the past 10 years.

Thailand’s primary export and major grain is rice, which is an essential component of the country’s culture and economic system. With climate change, the impact on the rice industry would be high, especially since decreasing grain yields are directly proportional to increasing temperatures.

Bangkok, the country’s capital, is home to 15 percent of the total population and serves as the social, political, and economic center of Thailand. The city has been sinking at the rate of about 4 in. (10 cm) per year. Coupled with rising sea levels, this situation puts the city at risk. Construction

See Also: BP; Drought; Hurricanes and Typhoons; Land Use; Monsoons; Oil, Production of; Renewable Energy, Wind.

Further Readings
of a flood prevention wall around the capital has therefore been a paramount adaptation effort.

Bangkok’s per-capita carbon emissions (7.1 tons) is much higher than London, which is 5.9 tons per capita. The majority of these emissions—around 84 percent—are from energy use and transportation. To mitigate its emissions, the city adopted a target to source 8 percent of its energy requirement from renewable sources by 2011 and increase it to 35 percent by 2020. In addition, public and private organizations have signed the Bangkok Declaration on Mitigation of Climate Change aimed at reducing the city’s contribution to climate change through energy consumption reduction, GHG emissions reduction, lifestyle changes, and raising public awareness. Through this declaration, Bangkok seeks to achieve a 15 percent reduction in its GHG emissions below currently projected 2012 levels. In order to meet this target, Bangkok has been encouraging commuters to use public transportation. It also began to improve mass transit systems, construct bike lanes, promote the use of efficient lighting and appliances, encourage recycling and reusing, and implement surcharges on gasoline.

On the national front, Thailand’s National Committee on Climate Change has been playing an important role in drawing up a national strat-
Thermocline

The thermocline is the region of the ocean where temperature decreases most rapidly with increasing depth. It separates the warm, well-mixed upper layer from the colder, deep water below. A thermocline is present throughout the year in the tropics and middle latitudes. It is more difficult to discern in high latitudes, where temperature is more uniform with depth. The presence of a very shallow thermocline in the eastern equatorial Pacific Ocean has important implications for global climate.

The thermocline exists because the ocean absorbs most of the sun’s heat in a shallow layer near the surface. The heat absorbed from the sun increases the temperature of the surface relative to that of the deep ocean, maintaining the thermocline. This is in contrast to the atmosphere, where a much larger portion of incident solar radiation passes through to the Earth’s surface.

Two important properties of the thermocline are its depth and its strength, or how rapidly temperature decreases with increasing depth. The thermocline’s depth is influenced by the winds at the surface of the ocean. In the Atlantic and Pacific oceans, surface winds push warm surface water away from the equator toward the poles, bringing the thermocline close to the surface at the equator.

Water that diverges at the equator accumulates in the subtropics, increasing the depth of the thermocline there. The thermocline is generally 82 to 656 ft. (25 to 200 m) deep in the equatorial regions and up to 3,281 ft. (1,000 m) deep in the subtropics.

The thermocline is strongest in the tropics and weakest in high latitudes. This reflects the fact that the surface temperature of the ocean generally decreases from the tropics to the poles, whereas the temperature of the deep ocean is nearly the same at all latitudes. As a result, the temperature contrast between the upper ocean and the deep ocean is greatest in the tropics. The temperature can drop by as much as 18 degrees F (10 degrees C) in less than 164 ft. (50 m) in the tropical thermocline.

In the extratropical oceans, the strength and depth of the thermocline vary from season to season. There is a main thermocline throughout the year, between 656 and 3,281 ft. (200 and 1,000 m). During summer, the sun heats the ocean’s surface more strongly than in winter. Most of the additional heat is absorbed in a very shallow surface layer, generating a sharper “seasonal” thermocline above the main thermocline. The seasonal thermocline is similar to the tropical thermocline in terms of its strength and depth. It erodes in the winter as the surface cools relative to the temperature in the main thermocline.

Tropical Oceans
The existence of a strong and shallow thermocline in the tropical oceans has important implications for climate. In the equatorial Pacific Ocean,