

15. Thailand

The Kingdom of Thailand's population is estimated to be around 63 million inhabitants, and its surface area is approximately 513,000 km², with elevations ranging from sea level in the south to high mountains in the northwest. The country's centre is dominated by the predominantly flat Chao Phraya River valley, which was studied in the case study chapter of WWDR1 (see WWDR1 case study). Thailand has a tropical monsoonal climate with a distinct wet season and a long hot dry season. The monsoon season is from mid-May to early September, during which time most parts of the country receive over four-fifths of their annual rainfall. Thailand possesses abundant water resources; total internal renewable water resources are estimated to be approximately 210 km³ (FAO, 2000), 20 percent of which is used for agriculture.

Water and ecosystems

Thailand has over 40,000 wetlands, which are important at the local, national and international levels. As a contracting party of the RAMSAR convention (see **Chapters 5 and 12**), Thailand has twelve designated sites. Nonetheless, investment in agriculture has caused the overexploitation of forests. Between 1960 and 1990, the area devoted to agriculture doubled, while forest area was reduced by more than half, consequently producing widespread watershed degradation. Industry has recently become Thailand's main source of GDP. Though this has, in part, helped to decrease rural agricultural production and its related deforestation pressure, industrial areas have polluted wetlands with toxic chemicals. In an effort to lessen these negative trends, environmental concerns have been included in national socio-economic development plans.

Thailand's diverse coastal and marine areas and tropical and subtropical mountain ranges have made tourism a major part of the Thai economy. Unfortunately, tourism has also contributed to the clearance of coastal mangrove forests, the pollution of near-shore marine environments and the destruction of coral reefs. These environments are vital to sustained tourism revenues as well as the nation's important commercial fisheries (ICEM, 2003).

Natural resources management

The National, Economic and Social Development Plan (NESDP), prepared every five years, is the main mechanism for policy development and planning for the improved utilization of natural resources and environmental protection. Since the eighth NESDP (1997 to 2001), a participatory approach has been adapted to include important civil society organizations in its preparation. This was followed by an institutional reform and a restructuring of agencies responsible for the conservation and management of protected areas, which resulted in the establishment of the Ministry of Natural Resources and Environment in 2002.



Map 14.16: Overview of the river basins in Thailand

Source: Prepared for the World Water Assessment Programme by AFDEC, 2006.

A framework for environmental conservation has been established under the Policy and Prospective Plan for National Environmental Quality Enhancement and Protection (1997-2016) in addition to an Environmental Management Plan (2002-2006). However, despite of the reforms and changes in the institutional system, the management of natural resources has not been fully integrated into sectoral planning. Different ministries have varying responsibilities, objectives and priorities for managing water resources and the environment. The efforts of individual ministries responsible for different sectors are isolated and not well-coordinated. This lack of coordination renders IWRM implementation

difficult, in addition to impeding the Government in reaching its objectives in water management (ICEM, 2003).

Poverty and progress towards MDGs

Thailand's economy has undergone rapid development in the last three decades, and the level of poverty has greatly reduced. The number of people living in poverty dropped from 3.4 million in 1975 to fewer than 500,000 in 1995 (Ahuja et al., 1997). During the same period, however, income inequities between urban and rural areas increased. The proportion of poor living in rural areas rose to 92 percent in 1992, and the Asian economic crisis of 1997 and 1998 exacerbated the situation. Nevertheless, under 10 percent of the overall population currently lives below the poverty level. Thailand has made good progress towards achieving several of the MDGs, including those related to water. For example, access to safe water and basic sanitation is above 90 percent in both rural and urban areas. The current challenge is to address the opportunity disparities that exist between different regions.

Water and health

The most serious diseases in Thai people are helminthes, diarrhoea, dysentery and enteric fever (typhoid and paratyphoid fever), which are mainly caused by poor sanitation and insufficient hygiene (see **Chapter 6**).

Despite the development of water supply and sanitation infrastructures, morbidity rates remain high due to the high bacterial contamination of water. The Bureau of Epidemiology (2001) found that acute diarrhoea and food poisoning are still increasing, whereas between 1983 and 2001, the incidences of enteric fevers, dysentery and helminthes decreased. The main reasons for increasing diarrhoea and food poisoning are considered to be unhygienic food handling and a lack of awareness concerning the protection of water resources. Also alarming is the increasing number of diseases caused by chemical and toxic substances contaminating water resources. These contaminants are of domestic, industrial and agricultural origin. For example, lead and tin poisoning has been linked to improper mining practices, and high concentrations of fluoride in groundwater resources have also caused dental problems.

Management conflicts in local authority wastewater treatment systems often result in ineffective and non-continuous performance, which causes high bacterial contamination of receiving water bodies. The major obstacles preventing effective functioning of wastewater treatment facilities are insufficient financing for system operation and a lack of regular maintenance.

Water for food

Its fertile and well-watered central plains have helped to make Thailand a major international exporter of agricultural crops (rice in particular) and processed agricultural products. The cultivated area in Thailand is 28 million ha (54.5 percent of the total land area), approximately half of which is used for growing rice. At present, water used for irrigation is

equivalent to approximately 70 percent of the total water storage capacity of all reservoirs and structures. Agricultural production, although it comprises only 10 percent of the national GDP, is the major source of income for the rural poor. Accordingly, food security remains the primary issue on the political agenda. Thailand allocates about 10 percent of its national budget to irrigated agriculture, and its water policy calls for the nation-wide distribution of water for subsistence irrigation (up to the capacity limits of the river basins). In the mid-twentieth century, government policy promoted conversion of forests and swampland for agriculture, leading to significant deforestation. However, in recent decades, increasing urban migration and employment has reduced Thailand's rural farming population (from around 90 percent in 1950 to 40 percent), creating opportunities for reforestation.

Water for energy and industry

Thailand has a growing energy demand due to rapid industrial development and an increase in domestic demands. Imported fossil fuels and especially natural gas is the main source for energy production. In 2002, fossil fuels provided over 90 percent of national electricity production whereas hydropower was in the vicinity of 3 percent. To be able to meet growing energy demand, Thailand also imports hydro-electricity from neighbouring countries. In order to reduce external dependency on energy and to curb pollution, the government has plans to increase the share of renewable energy through the utilization of solar, wind, biomass and hydropower. Micro-hydropower development schemes, in particular, are considered as good choices given the topographic conditions and ecological sustainability.

The main source of water in industry is aquifers. However, over-utilization of these water resources, especially around Bangkok region, has caused serious land subsidence. For this reason, the government promotes the utilization of alternative sources of water supply and water-efficient processes in industry. The availability of freshwater can thus be a constraint to industrial development in the future. At present, the Thai government encourages the private sector to provide water to industry as well as to the municipalities. For example, Provincial Waterworks Authority of Thailand (PWA) has engaged a private company (East Water Company) to supply water to the industrial sector in the eastern part of Thailand.

Water allocation

In the dry season, the water stored in reservoirs is distributed according to priorities. The first allocation priority is water for household consumption, followed by other sectors, such as agriculture. The allocation system also takes into account the provision of water for the ecosystems and for the prevention of sea water intrusion.

Water allocation for agriculture is conducted at two levels:

- From its main storage to secondary or sometimes tertiary canals, water is allocated by government agencies, which are fully responsible for operation and maintenance.

BOX 14.11: THE IMPACT OF THE TSUNAMI IN THAILAND

The tsunami created by an earthquake in the Indian Ocean on 26 December 2004 caused heavy social and economic damages in Thailand. According to official figures, there were over 5,000 dead, 8,400 injured and 3,000 missing persons. The sectors most badly damaged have been tourism and fishing. The beach resorts along the Andaman Sea coast have been extensively damaged and large amounts of investment are needed to enable

the private sector to recover. Furthermore, thousands of low-income Thais who are dependent on tourism-related industries have lost their jobs.

The extensive destruction of fishing boats has also affected food security in Thailand. It has led to a loss in livelihoods for individual fishing families who also lost their homes and cannot afford to replace their fishing equipment.

The tsunami has also caused severe damage on near shore aquifers as well as ecosystems in coastal wetlands and coral reefs. Furthermore, the spread of various kinds of wastes and industrial chemical solids further threatens the environment (see **Chapter 1** and **Box 14.10** for discussions on the 2004 tsunami).

- At the farm level, it is allocated by farmers and water user groups/organizations.

Thailand increasingly encourages water user groups/organizations to more actively participate in the management and allocation of water in secondary canals.

Water-related disasters

In Thailand floods of varying severity, size and duration are associated with tropical typhoons and usually occur between May and October. However, no matter how small or how large, floods cause serious social and economic damage. In 1995, a flood in the Chao Phraya River basin caused about US \$290,000 in damage and was the costliest in the last seventeen years. In order to prevent flood damage, many structural and non-structural measures are being implemented, including the utilization of GIS and the creation of a flood risk map covering twenty-five basins. Furthermore, the installation of warning systems, such as supervisory control and data acquisition (SCADA), are being suggested.

As Thailand is located in a monsoon-risk area, with low precipitation from December until May or June, drought becomes a problem in various areas of the country. Although the impact of droughts is not as violent as that of floods, from 1989 to 2003, the cumulative damage from drought was in the vicinity of US \$112 million. The droughts especially affect agricultural production, since rainfed irrigation is quite common, and only 23.7 percent of farmland is irrigated.

To prevent and mitigate flood and drought in Thailand, the Department of Water Resources has established the Water Crisis Prevention Center for collecting data, monitoring and formulating disaster policy responses. Unfortunately, at this stage, risk management activities remain poorly implemented.

Transboundary water resources

The Mekong River is the twelfth longest river in the world and has a water basin with nearly 60 million inhabitants distributed over 800,000 km². It encompasses six countries, including Cambodia, China, Lao People's Democratic Republic (PDR), Myanmar, Thailand, and Viet Nam. The Mekong River Commission (MRC) aims to protect the rich and diverse resources of the Mekong River Basin as a combined effort of Cambodia, Lao PDR, Thailand and Viet Nam. The Cooperation for the Sustainable Development of the Mekong River Basin Agreement, signed in 1995, provides the framework of the MRC and promotes basin-wide cooperation. The issue that is given the foremost importance in the 1995 agreement and its strategic plan is ensuring the sustainability of water resources and the environment while promoting overall basin development. Fisheries, agriculture and navigation are only some of the important issues that are also central to the agreement. The programmes established under the MRC strive for capacity enhancement and focus on the current and future needs of riparian countries and are meant to complement and support national and bilateral development initiatives.¹⁴

Conclusion

While Thailand possesses abundant water resources, growing demand coupled with pollution puts an increasing pressure on these resources. For many rural communities, cultivation has been the main source of livelihood and survival. Although the significant expansion of agriculture has contributed to ensuring food security and reducing poverty in Thailand, it has caused significant deforestation and widespread watershed degradation. While industry has become the major source of GDP, toxic wastes have polluted surface and groundwater supplies and damaged aquatic ecosystems. As a country that has achieved most of the MDGs, effective systems for conserving and protecting natural resources have become central to national development projects.

14. More information concerning the MRC can be found at www.mrcmekong.org