

# Climate change situation in thailand environmental sciences essay



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Meteorological forecasts on the future air temperature in Thailand show that the maximum temperature will increase in many parts across the country. The Southeast Asia START Regional Center investigated the future climate in Thailand using the PRECIS (Providing Regional Climates for Impact Studies) model and the global dataset of ECHAM4, the model simulation of present-day climate, to project the climate change scenarios between the 2010s and 2090s . They demonstrated that the increase maximum temperature will widely extend across the country (Figure 4). The annual maximum temperature from 2010 to 2090 will increase from 34-36°C to 38-40°C . Moreover, there has been the prediction on the substantial increase in number of days with average maximum temperature exceeding 35°C. The number of hot days are around 150-240 days in the 2010s and expected to increase 60-90 days of the hot period in the 2090s . SourceFigure 4 Average maximum temperatures (°C) in Thailand between the 2010s and 2090s

## **2. 7 Awareness about heat stress, climate change and health in Thailand**

Recently, climate change in Thailand has received a lot of attention . The impacts of climate change on Thailand have become increasingly visible as Thais experience increasingly hotter weather . This section summarises the national policy responses, some organisations or institutions that deal with climate change in Thailand. Thailand signed the United Nations Framework Convention on Climate Change (UNFCCC) in June 1992 and ratified in March 1995 . Since then several agencies have been participated in the climate change issue; especially the government sectors have a vital role to increase public awareness on climate change. The Ministry of Natural Resources and

Environment (MNRE) established the National Committee on Climate Change Policy in August 2006 which replaced the previous Sub-Committee level that was established in 1993 . Also, there is a new divisional-level office, the Climate Change Coordination Office, established under the Office of Natural Resources and Environmental Policy and Planning (ONEP) to serve as a secretariat of the National Committee on Climate Change Policy, as well as to coordinate the implementing agencies working on the projects related to climate change impact, vulnerability and adaptation . In February 2007, the Thai Meteorological Department (TMD) integrated the Climate group and the Climate Academic group at the TMD into the National Climate Center of Thailand (NCCT). The NCCT is a research centre monitoring and preparing the climate early warning system and provides climate information and climate prediction for local and international sectors . The Southeast Asia START Regional Center is a research institute working on climate change in Thailand . It is a non-government research network hosted by NCCT and operated by Chulalongkorn University in Bangkok since 1994. Their research efforts are related to climate change in Thailand including: capacity building for climate adaptation, greenhouse gas mitigation, providing research on adaptation and mitigation, raising public awareness and public participation as well as supporting international cooperation on climate change mitigation. Regarding the changing climate and the rise in the global temperature is predicted to increase adverse health outcomes in the future. Some organisations and research institutes are now working on climate change in term of human health impacts. For example, a research team at Faculty of Public Health, Thammasat University in collaboration with the " High Occupational Temperature: Health and Productivity Suppression" (HOTHAPS) <https://assignbuster.com/climate-change-situation-in-thailand-environmental-sciences-essay/>

international study is now working on the climate change and occupational heat stress among Thai workers . Also, Ministry of Public Health (MOPH) has been set up the thematic working group to do a research and to coordinate the project of health impact assessment from climate change in Thailand . Regarding the public health concern on climate change in Thailand, most of the operations emphasise on disease incidence, epidemic conditions, protection and prevention. An understanding of the heat stress-related health outcomes in relation to climate change has tended to receive less attention. The heat-related illness is identified and recorded in the tenth revision of the International Classification of Diseases (ICD-10) in category T67 for the effects of heat and light. The heat-related death is classified according to ICD-10 in the category X30 for excessive natural heat exposure and X32 for sunstroke. Table 2 summarises the number of heat-related illness recorded with ICD-10 category T67 in Thailand between 2007 and 2009 . Table 2 Heat-related illness recorded in the ICD-10 category T67 in Thailand during 2007 and 2009

## **ICD-10 category T67**

### **Morbidity**

#### **(person)**

T67. 0 Heat stroke and sunstroke94T67. 1 Heat syncope39T67. 2 Heat cramp15T67. 3 Heat exhaustion, anhydrotic1T67. 5 Heat exhaustion, unspecified30T67. 6 Heat fatigue, transient33T67. 7 Heat edema1T67. 8 Other effects of heat and light4T67. 9 Effect of heat and light, unspecified8

## **Total**

### **225**

Modified from: For heat-related deaths, the Ministry of Public Health reported four deaths from heat stroke in 2008, three deaths in 2009, 15 deaths during summer in 2010, and eight deaths in 2011 . It should be noted that many deaths with the fatal heat stroke were recorded among Thai soldiers who were trained as draftees in military . The number of fatal heat strokes in the Thai mortality statistic seems to be underreported. This may be due to fatal heat stroke is similar to other causes of death such as coronary or cerebral thrombosis . Regarding the high temperature is common in Thailand, thus the diagnosis of heat-related illness or causes of death from heat stress are overlooked as the primary cause of illness or death. However, it is still unclear why the Thai mortality records have such a small number of heat-related deaths. There are very few published studies investigating the association between heat stress and health impacts in Thailand. These studies covered only two metropolitan cities - Bangkok and Chiang Mai . McMichael et al. and Guo et al. found that there is a non-linear relationship between daily mean temperature and non-external deaths. Pudpong and Hajat found that the diabetic and circulatory visits as well as the hospital admission of intestinal infectious diseases were associated with an increase in the daily mean temperature above the threshold of 29°C in Chiang Mai. As mentioned previously, little is known on the effects of heat stress on mortality in a tropical environment, especially in Asia . Furthermore, the interaction of tropical heat, urbanisation and air pollution as health risk factors is complex and little understood. To address this important

knowledge gap, the final section of this chapter summarises the research needs for Thailand.

## **2. 8 Conclusions: research needs for Thailand**

The evidence of association between heat stress and health impacts emerged from existing studies in non-tropical developed countries. There are only a few studies conducted in tropical developing countries such as Thailand. There is a need for epidemiological evidence of the heat stress-related health outcomes among working population and also overall population as well as the future heat-related death from climate change in Thailand.

### 2. 8. 1 Heat stress and health impacts among working population in Thailand

The health impact assessment from heat stress exposure should identify the specific risk groups who are often exposed to heat. Thailand is a middle income tropical country with around 65 million people. Following rapid urbanisation, currently around 46% of the Thai population live in urban areas and it is predicted that by 2030 this will be more than 60% . Social and economic transitions in Thailand lead to an increase in the size of the working population . More than 39 million are people in the workforce of which more than 16 million are agricultural workers . A study of occupational heat stress in Thailand by Langkulsen et al. reported that heat stress in Thailand is a very serious problem (" extreme caution" or " danger") in a wide variety of work settings. They tested a pottery factory, a power plant, a knife manufacturing site, a construction site, and an agricultural site. This study indicated that Thai workers in the industrial and agricultural workplaces faced the excessive heat conditions in which heat-related illness are likely to happen . Another study found that salt production workers in

Thailand worked under heat stress where the average temperature in the working environment was  $33.8 \pm 0.95^{\circ}\text{C}$  and those workers who worked under heat stress were likely to have heat symptoms compared to unexposed group. Moreover, workers should be concerned in terms of heat stress effects on health and their productivity because they are often exposed to heat, especially outdoor workers in the tropical developing countries. Those workers carry out heavy work in hot and humid condition in Thailand may have physiological limit to carry out their strenuous work. To avoid the acute heat-related illness or heat stroke, workers have to avoid working during the hottest part of the day, which may lead to the reduction of their work productivity. As a result, they are likely to lose their income which can increase their mental stress. Moreover, increasing heat stress exposure from rising temperatures with climate change would make this situation worse. Thus, heat stress is already a problem in Thailand and there is a need to be more concerned for occupational heat stress problem among Thai workers. As there is a large number of working population from industrial development, demanding-labour works are need and ongoing climate change will lead to higher heat exposures in workers and most likely affect poor people in labouring occupations. Therefore, this thesis will address the unanswered issue of heat stress-related health outcomes among Thai workers by exploring the association between occupational heat stress and health impacts among workers in Thailand.

## 2.8.2 Heat stress and health impacts among overall Thai population

A large number of people in Thailand have already been exposed to heat beyond the acceptable limits. The rapid economic development and growing urbanisation in Thailand can increase the number of population who are vulnerable to the effects of heat

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stress. However, there are only few studies of heat stress effects on health and well-being in Thailand. Therefore, there is a need to determine heat stress exposure among Thai populations and to investigate the association between heat stress and health outcomes. These results will be beneficial to the public health and related sectors to prepare the implementations to deal with climate change in the future. According to the literature review on heat-related death, methods for describing and measuring heat stress effects on mortality are still under developed and many uncertainties remain. There are only few published studies about heat-related deaths in two cities (Chiang Mai and Bangkok) in Thailand , and it leaves questions about the heat stress effects on health of the whole population across the country. Moreover, the effects of air pollution on mortality were found in few epidemiological studies in Thailand, especially in Bangkok . Wong et al and Vichit-Vadakan et al. presented that the increasing concentrations of particulate matter (PM10) are associated with the increasing mortality which the authors from both studies suggested that the high daily mean temperature in tropical Bangkok is one of the contributing factors. However, the modification effect of heat stress and air pollution on mortality is still unclear and needed further investigation on this issue. Therefore, in the later chapter, the study on the association between heat stress and mortality in Thailand needs to take into account of the air pollution effects on the heat stress and mortality relationship. Research on heat-related death with climate change requires not only exposure–response functions of temperature and mortality, also but information on how these associations differ by geographical locations. The relationship between heat stress and death will be explored in order to present the evidence of the heat stress effects on mortality in each region

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and each season, and also estimate the future heat-related deaths from climate change in Thailand. 2. 8. 3 Future heat-related death from climate change in Thailand Recently, the epidemiological studies analyse the heat stress and health relationship, and also estimate the heat-related deaths in the future as a result of climate change . However, many studies about heat-related deaths were conducted in developed and non-tropical regions. This leaves unanswered questions about the effect of heat stress on health in tropical developing countries where temperatures and humidity are already high. Thailand is a tropical developing country with persistently high temperature and high humidity. The climate change in Thailand is anticipated to have more hot days and warm nights as well as increasing temperature across the countries which can cause impacts to overall population in the future. For human health effects from climate change in Thailand, they still lack of information of the effects of future climate change on heat stress-related health outcomes. Consequently, there is a need to investigate and to assess the potential impacts of climate change on human health in Thailand. It is important to raise awareness of the population regarding climate change in order to minimise the impacts and to cope with the consequence of climate change. Also, this research will be useful for policy makers and related sectors to prevent the adverse heat stress-related health outcomes from future climate change.