MUKDAHAN
THAILAND

CITY DESCRIPTION

Mukdahan is located 642 kilometers northeast of Bangkok on the banks of the Mekong River, opposite the Lao city of Savannakhet. The capital of one of the poorest provinces in Thailand, Mukdahan is less industrialized than other East-West Economic Corridor hubs, but it is the second most important border crossing-point between Lao PDR and Thailand. While agriculture, agricultural processing and retailing are still major sources of revenues for Mukdahan, the government is pushing forward a plan to promote Mukdahan as a special economic zone. With this plan, Mukdahan is experiencing rapid urbanization. Economic growth plans and the increase in industrial activities have changed land use patterns and caused negative effects on watersheds, water quality and water availability. Droughts, floods and storms are also key concerns for Mukdahan.

UCRSEA

The Urban Climate Resilience in Southeast Asia Partnership (UCRSEA) is a five year-program led by the Thailand Environment Institute and the University of Toronto in collaboration with academics, researchers, civil society workers, government officials and students from the Mekong Region and Canada.

As Southeast Asia is one of the most rapidly urbanizing regions of the word with increasingly apparent threats from climate change, UCRSEA recognizes that cities in the region face changing risks and vulnerabilities. The program aims to advance the understanding of contemporary urbanization in Southeast Asian cities, build bodies of knowledge that will contribute to policy change, and provide spaces for informed public dialogue.

UCRSEA activities are concentrated in eight cities. The city briefs serve as an introduction to the UCRSEA focus cities and summary of our preliminary findings. Each of the eight cities was chosen because it was a secondary city with important regional connections facing challenges from both urbanization and climate change.

As the project progresses, UCRSEA will release subsequent versions of the city briefs that reflect our updated research findings and share our improved understanding of the implications and interactions of urbanization and climate change.

URBANIZATION AND REGIONALIZATION

One of Mukdahan's most important features is the border crossing point between Thailand and Lao PDR. Opposite Mukdahan is Savannakhet, a significant trading post between Thailand and Vietnam. Mukdahan's Gross Provincial Product (GPP) is the second highest in the country, probably due to the strength of border trade. Despite this, Mukdahan remains one of Thailand's poorest provinces. The development of the Mukdahan Special Economic Zone (MSEZ) in the area is expected to lead to rapid urbanization as Mukdahan's role as a trade and distribution center grows.

Even though the population growth rate has decreased since 2004, the population of Mukdahan province has grown from around 310,700 in 2000 to 348,500 in 2015 (www.citypopulation.de). As of 2015, approximately 38% of the population already lived in the city of Mukdahan. The growth of the MSEZ may also contribute to the growth of Mukdahan's population as the promise of jobs attracts workers from around the region.

As part of developing the MSEZ, the Thai government has invested in expanding the transportation network of the region. In particular, expanding highway No. 12 and also constructing a train line that will link Mukdahan with Khon Kaen, Mahasarakham, Roi Et, and Nakhon Panom. It is an established pattern observed in other UCRSEA focus cities that that urbanization occurs along the major roadways. Therefore, the development of major highways through the city can be expected to lead to an increase in urban development bordering the highway.

CLIMATE CHALLENGES

Due to its location on the banks of the Mekong River, Mukdahan is vulnerable to flooding during the monsoon season. During the dry season, the city is also vulnerable to drought. Precipitation levels throughout the year vary drastically, with the majority of precipitation occurring between June and September[1]. The Mukdahan Administration Office lists lack of water supply for public consumption, low water retention capacity and insufficient water resources for agriculture during the dry season as the key problems of the city.

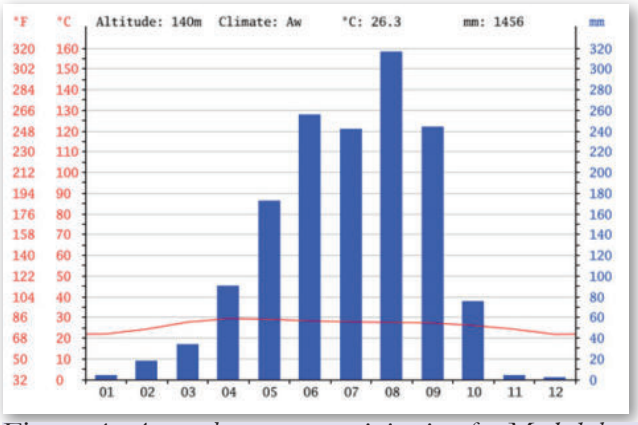

Figure 1 *Annual average precipitation for Mukdahan. Source: Climate-Data.org*

In general, climate change has increased the severity of both monsoon season storms and hot season drought. In the past, the weather and hydrological patterns of the Mekong River changed predictably. Currently, the hot season has increased in temperature and has frequent severe summer storms, which leads to increased runoff. The cool season is much shorter, and has both rainy and warm days. The wet season is increasingly unpredictable and the severity of storms has increased. In the future, people expect even worse storms and unpredictability, making it even more difficult for Mukdahan to prepare for either flood or drought.

Table 6 Summary on Climate change patterns from the SLD

Past (30 year ago)	Current	Future (30 year ago)
• Season changed periodically with predictable pattern • Hydrological pattern of the Mekong River periodically changed with predictable pattern • Summer: could live with air conditioning • Rainy: flooding was experienced repeatedly due to poor drainage system	• Season shift and the Mekong River's hydrological changes are unpredictable • Summer: unbearable heat, severe summer storms • Winter: short-term, found with rainy and warm days • Rainy: unpredictable, severe winter storms	More severe weather

Source: "Situation analysis of Mukdahan Special Economic Zone" by Assistant Prof. Dr. Arika Bridhikitti, Faculty of Environment and Resource Studies, Mahasarakham University, Thailand.

Figure 2 *Climate Change Trends Reported from a SLD with Mukdahan stakeholders.*

[1]Source: http://en.climate-data.org/location/37435/

Air pollution and water pollution are also becoming issues for Mukdahan because of the rapid urbanization and industrialization of the area. The poor water quality results from disposal of wastewater and toxic agricultural runoff directly into the rivers and streams, which spread the pollution throughout the watershed. These issues will become an increasingly severe problem in the future if they continue to go unaddressed.

Mukdahan Province has only one sanitary landfill, approximately 5 km from the city center. With the growth of the MSEZ the amount of waste produced has increased and the singular landfill is insufficient. Mukdahan is currently searching for a location for a second landfill.

In the Department of Public Works and Town Planning's plan for the MSEZ, there is land set aside for green areas, cultural preservation areas, agricultural areas and National parks. However, if the local government does not have the institutional capacity to control the competing economic forces that move into the MSEZ, the plan may be disregarded and those areas turned into industry or urban developments.

URBAN CLIMATE VULNERABILITY

The construction of the Mukdahan Special Economic Zone will drastically reshape the city of Mukdahan. The increase in economic and trade activity along the border will prompt rapid urbanization and construction of various infrastructure projects such as roads and airports. These changes have the potential to provide local communities with opportunities to improve their livelihoods, yet could also provide increased sites of vulnerability. Increased urbanization could also increase communities' vulnerability to air and water pollution. Additionally, Mukdahan will need to find more ways to safely dispose of solid waste, or else the inhabitants will also be negatively impacted by single landfill's inability to keep up with the amount of waste produced by the growing city. Local people also face the risks of displacement and loss of livelihood as foreign workers migrate to the area drawn by the promise of jobs in the SEZ. Even if local people do find employment in the SEZ, such jobs are often low paying and laws protecting workers' rights are not strictly enforced. If urbanization continues without considering these consequences, the negative effects may outweigh any positives for the most vulnerable majority of Mukdahan's local stakeholders.

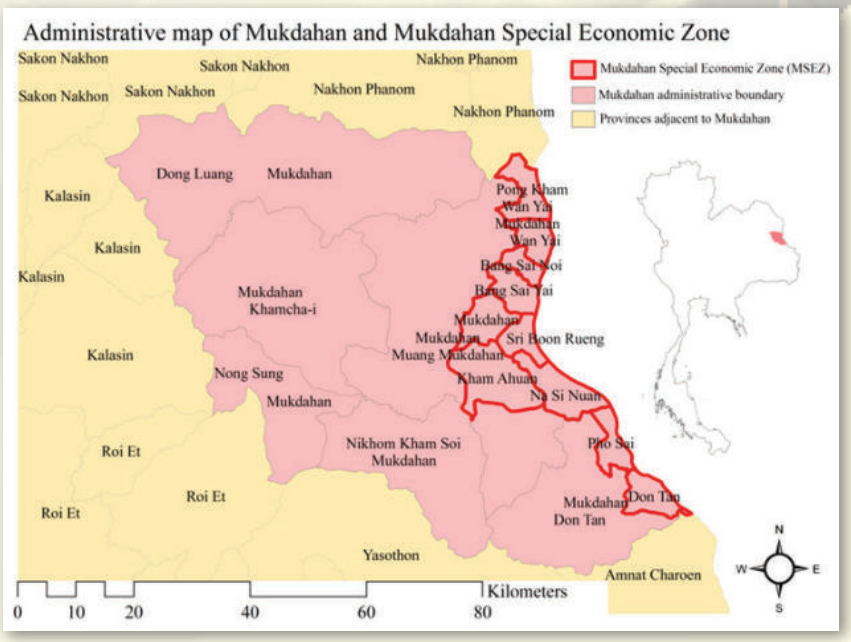

Figure 1 *Administrative map of Mukdahan Province and MSEZ (from SLD, see charts in Situation Analysis doc).*

In planning the SEZ, Mukdahan's governing forces did not take climate change into consideration, nor did they consider the impacts of increased demand for resources such as water, land and energy. As long as they do not acknowledge or plan for the increased unpredictability of weather and climate systems due to climate change, they will be unable to adequately prepare for or respond to climate events, such as drought or flooding. Changing weather patterns make it harder to know when to store or release water from the reservoirs and irrigation systems; attempting to carry on based off of the old patterns may lead to releasing water at the wrong time, or failing to store enough water during the wet season to mitigate drought in the dry season. This lack of proper governance also represents a vulnerability for the Mukdahan communities that rely on the local water system.

Future research in Mukdahan should include a focus on the impact of urbanization and increased regional connectivity on local actors' livelihoods, the impacts of the MSEZ on local resources, infrastructure and urban systems. Another area of particular interest to UCRSEA is the effectiveness of local governance in balancing the demands of the MSEZ investors with local communities, and the local government's effectiveness in responding to climate change related challenges.

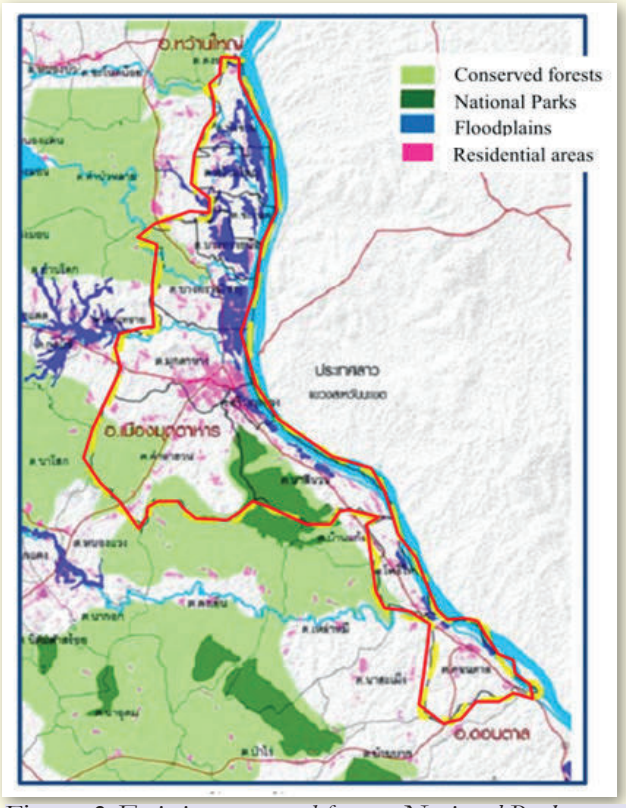

Figure 3 *Existing conserved forests, National Parks, community areas and floodplains in MSEZ*
Source: Department of Public Works and Town Planning, 2016

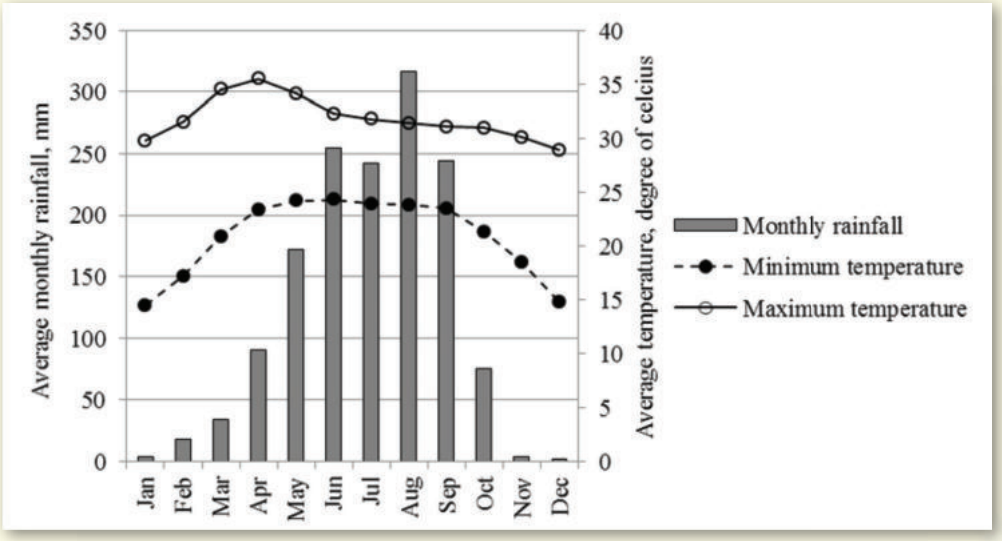

Figure 1 *Average rainfall and temperature for Mukdahan*
Adapted from Climate-Data.org (2016)

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