

BeBrit Extreme Heat Risk Project City Case Study

JAKARTA, INDONESIA

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Background

- Jakarta is one of the largest urban areas in Indonesia and the capital city of Indonesia
- Jakarta consists of a mainland and small islands (Kepulauan Seribu/ Thousand Islands)
- Main climate-related challenges are flood, air pollution and extreme heat



Data Analysis

- **Historical climate data (2010-2020)**
Relative humidity (RH), air temperature (Ta), wind speed (Va) from observation stations of Meteorological, Climatological, and Geophysical Agency (BMKG) in Jakarta
- **Climate projection data (2021-2050)**
Projection of rainfall, air temperature, humidity, and wind speed using CMIP5 with RCP4.5 scenario
- **Universal Thermal Climate Index (UTCI)**
UTCI is used to quantify historical (using historical climate data) and future projection (using climate projection data) of heat stress with the formula below.

$$UTCI = 3,21 + 0,872 * Ta + 0,259 * Tmrt - 2,5078 * Va - 0,0176 * RH$$

UTCI range	Thermal stress level
UTCI > 46	Extreme heat stress
38 < UTCI < 46	Very strong heat stress
32 < UTCI < 38	Strong heat stress
26 < UTCI < 32	Moderate heat stress
9 < UTCI < 26	No thermal stress

Results

Comparison between historical and future projections of heat stress in Jakarta

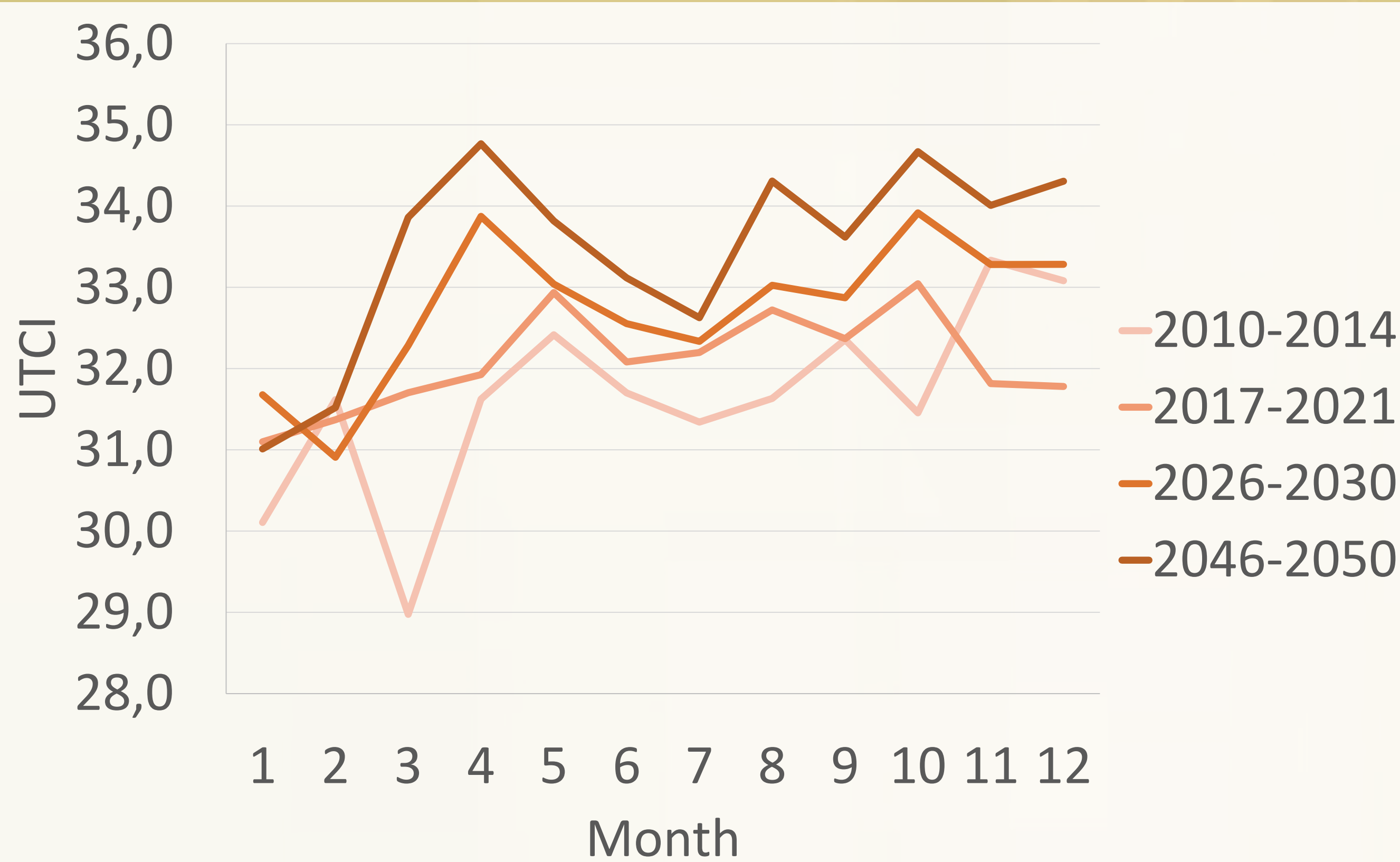


Figure 1. UTCI monthly average

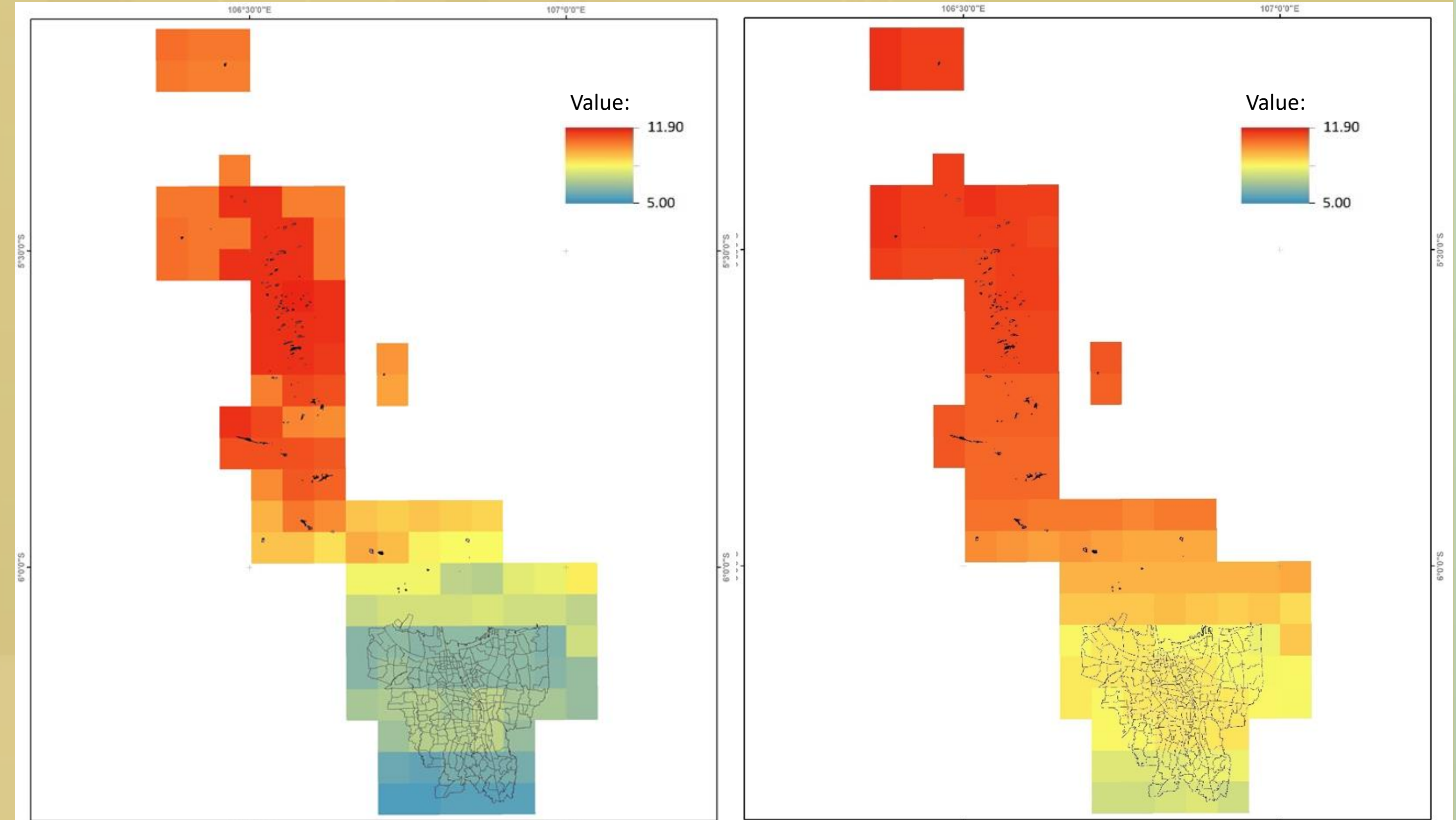


Figure 2. Historical 2010-2020 (left side) and future projection 2041-2050 (right side) of number of months with strong heat stress

- Heat stress level in Jakarta is already moderate to strong and shows an increasing trend in the future (Figure 1)
- In 2050, it is predicted that almost every region in Jakarta especially the coastal area will suffer more months of strong heat stress (Figure 2)
- Current established policy regulation related to extreme heat in Jakarta:
 - **Governor Regulation 90/2021 on Climate Resilient and Low Carbon Development Plan:** includes more detail on activities and programs for mitigation such as carbon reduction and offset; adaptation to climate change; and reducing the level of community's vulnerability to the impact of climate change
 - **Governor Regulation No. 24/2021 on Management and Protection of Trees:** green open space provision could enhance thermal comfort

Conclusion

- Jakarta already suffers from moderate to strong levels of heat stress and this is projected to be an increasing trend.
- A Heat Action Plan has not yet been developed despite the threatening risk of strong heat stress in Jakarta.

Acknowledgement

The authors would like to express their gratitude to the DKI Jakarta Provincial Environment Agency as the primary source of funding and data

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