

Land Surface Temperature and Green Health Vegetation Variability across Lithology and Land Use and Land Cover in the Chrey Bak Catchment

Kakda Pov¹, Kakda Kret^{2,3}, Kimtho Po², Sirisokha Seang³, Christophe Révillion^{4,5}, Thibault Catry⁴, Renaud Hostache⁴, Vincent Herbreteau^{1,4}, Vannak Ann^{1,2*}

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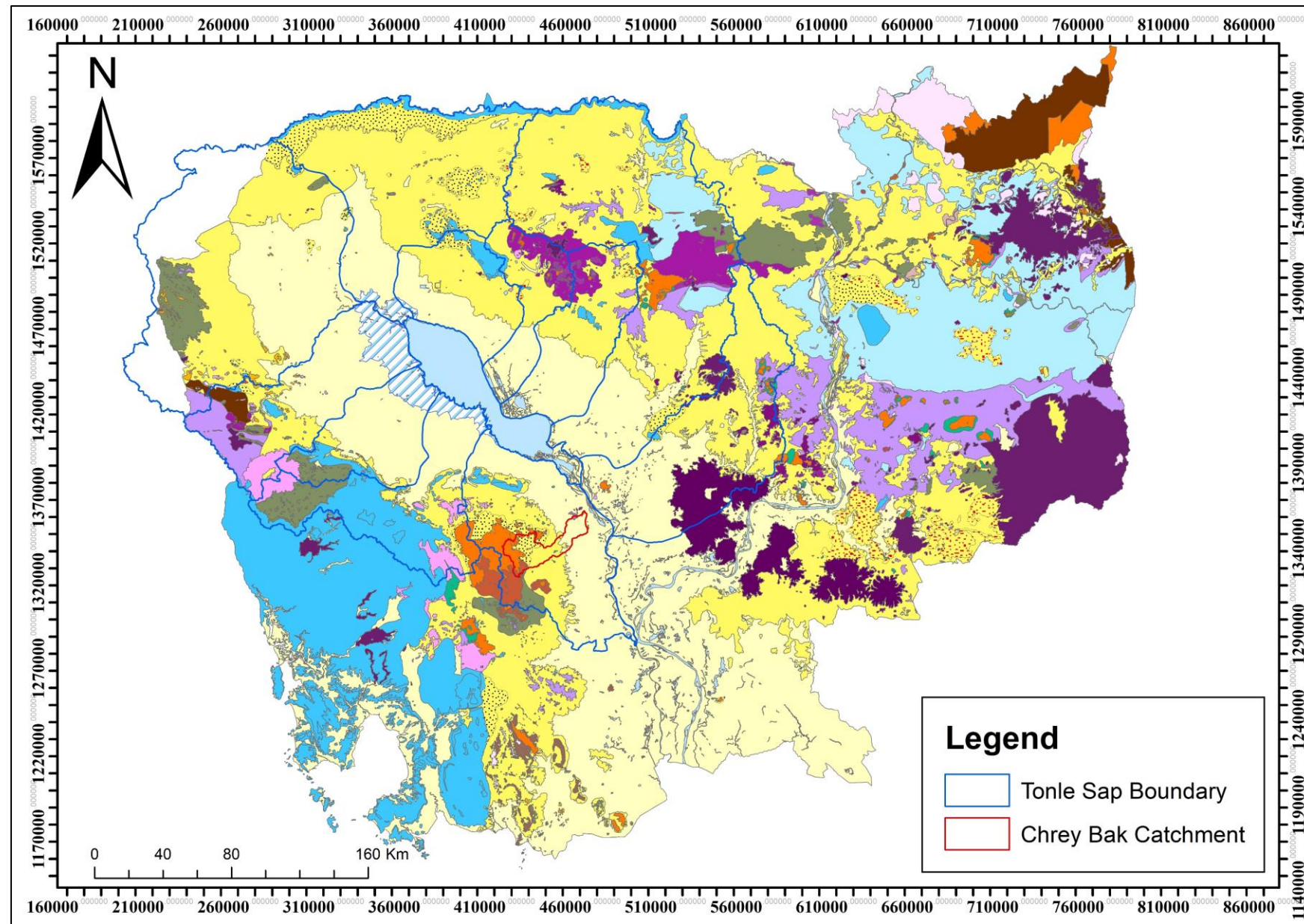


CONCLUSIONS

Introduction

❖ Geological mapping of Cambodia

The lithology map is created from the geological map, which was collected as secondary data, the is derived from the geological map of Cambodia (JICA, 2010).

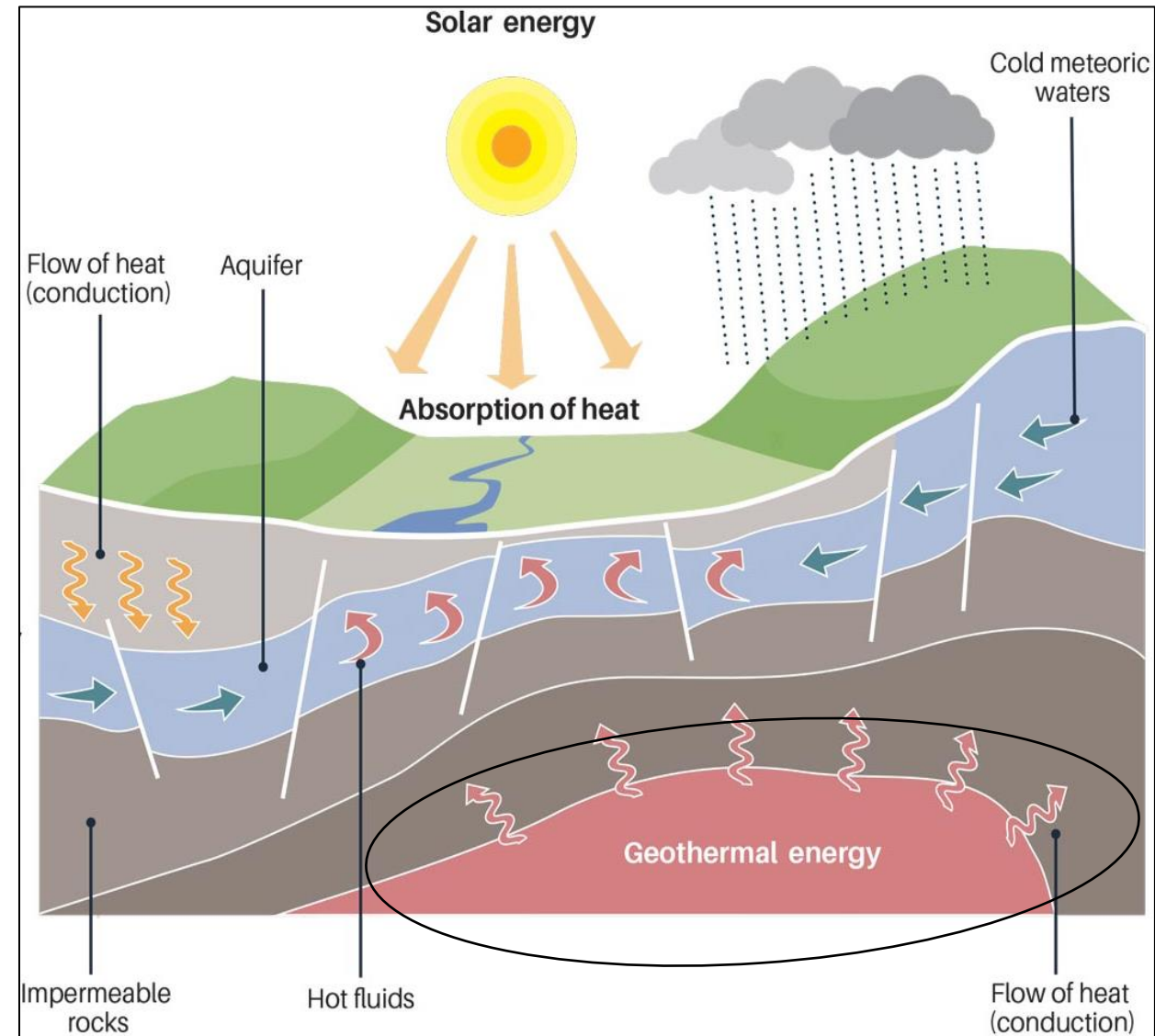


Introduction

- In the Chrey Bak catchment, Cambodia, understanding how land use and land cover (LULC) and lithology influence land surface temperature (LST) and normalized difference vegetation index (NDVI) is crucial for ecosystem management and climate change adaptation.
- This study utilizes nine years of remote sensing data (2015-2023) to analyze the spatial patterns and interrelationships between these factors. By examining these interactions, we aim to provide valuable insights for targeted interventions that promote a healthy ecosystem and enhance the catchment's ability to adapt to a changing climate.

❖ Problem Statement

What are the effects of changes in deforestation on lithology?



Objectives

This study aims to understand the mechanism behavior of Land Surface Temperature (LST) and Vegetation health (NDVI) through Land Use Land Cover and Lithology characteristics in the Chrey Bak catchment using remote sensing techniques. The following objectives are conducted:

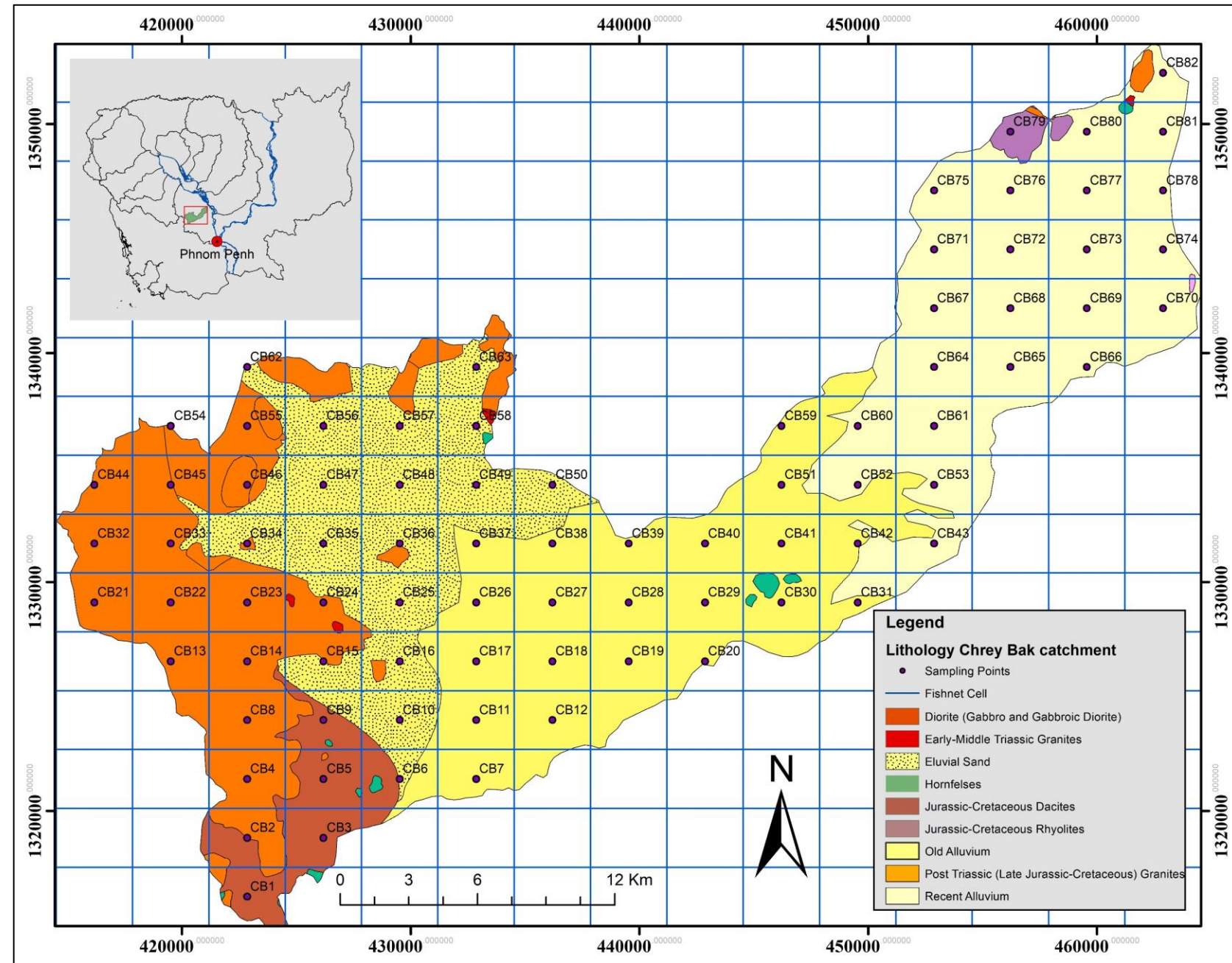
1. Links between LULC, and Lithology impact on LST, NDVI, in Chrey Bak catchment.



METHODOLOGY

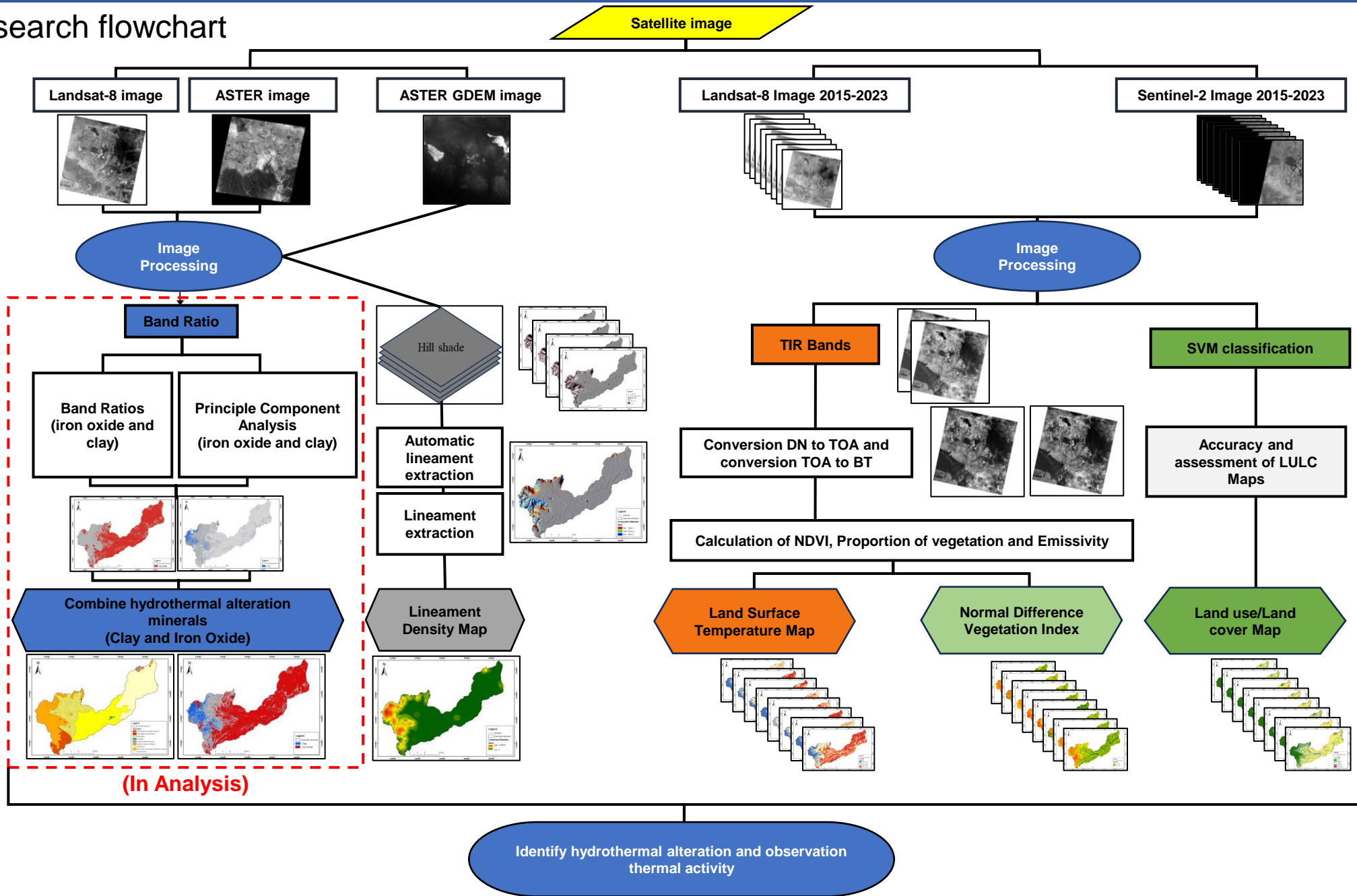
❖ Study Area

- Chrey Bak Catchment is located in the Stueng Boribo sub-basin, one of the Tonle Sap Lake (TSL) basin tributaries.
- This study area covers approximately 700 sq. km.
- It is one of the potential sites for solar farms and many studies have been conducted in various fields of ecology, hydrology, as well as LULC.



METHODOLOGY

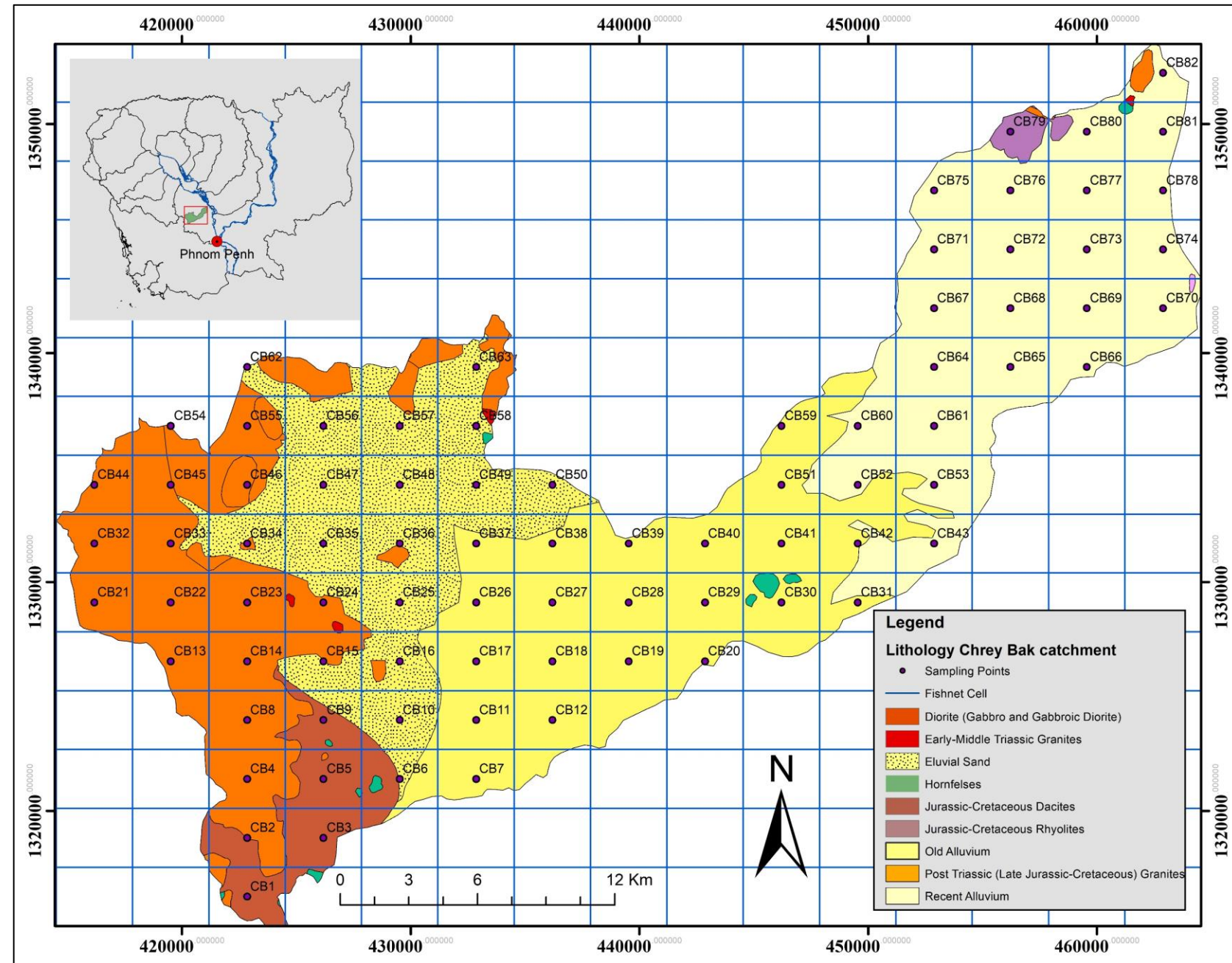
❖ Research flowchart



RESULTS AND DISCUSSION

❖ Lithology mapping

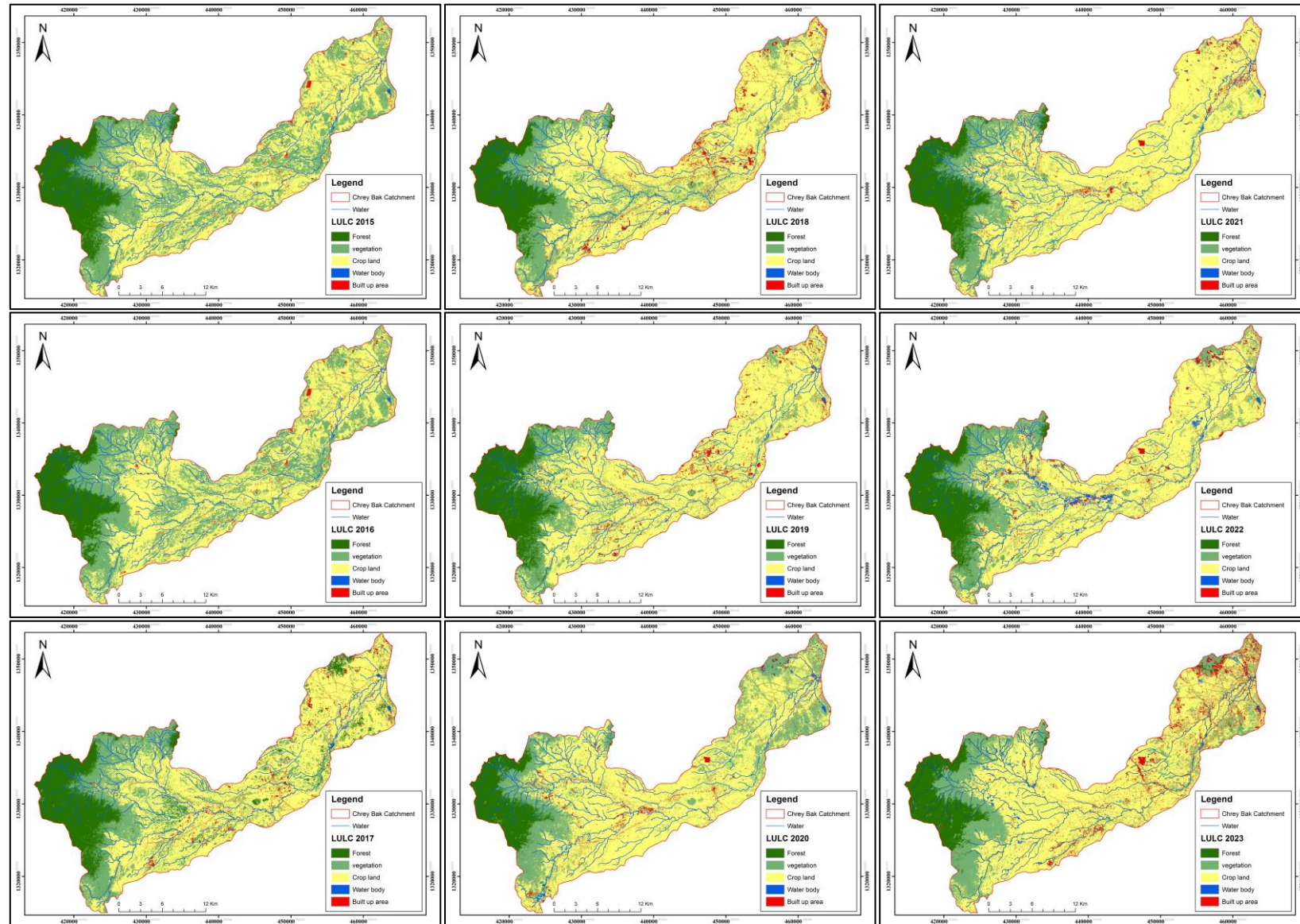
- The Chrey Bak lithology map (700 sq. km) from JICA 2010 was covered by fishnet cells (15 km x 15 km), and the 82 sampling points were in the middle of each cell.
- The lithology comprises six rock units: dacites (0.66%), diorite (5.14%), eluvial sand (19.87%), granites (20.10%), old alluvium (26.55%), and recent alluvium (27.20%).



RESULTS AND DISCUSSION

❖ Land Use Land Cover Mapping

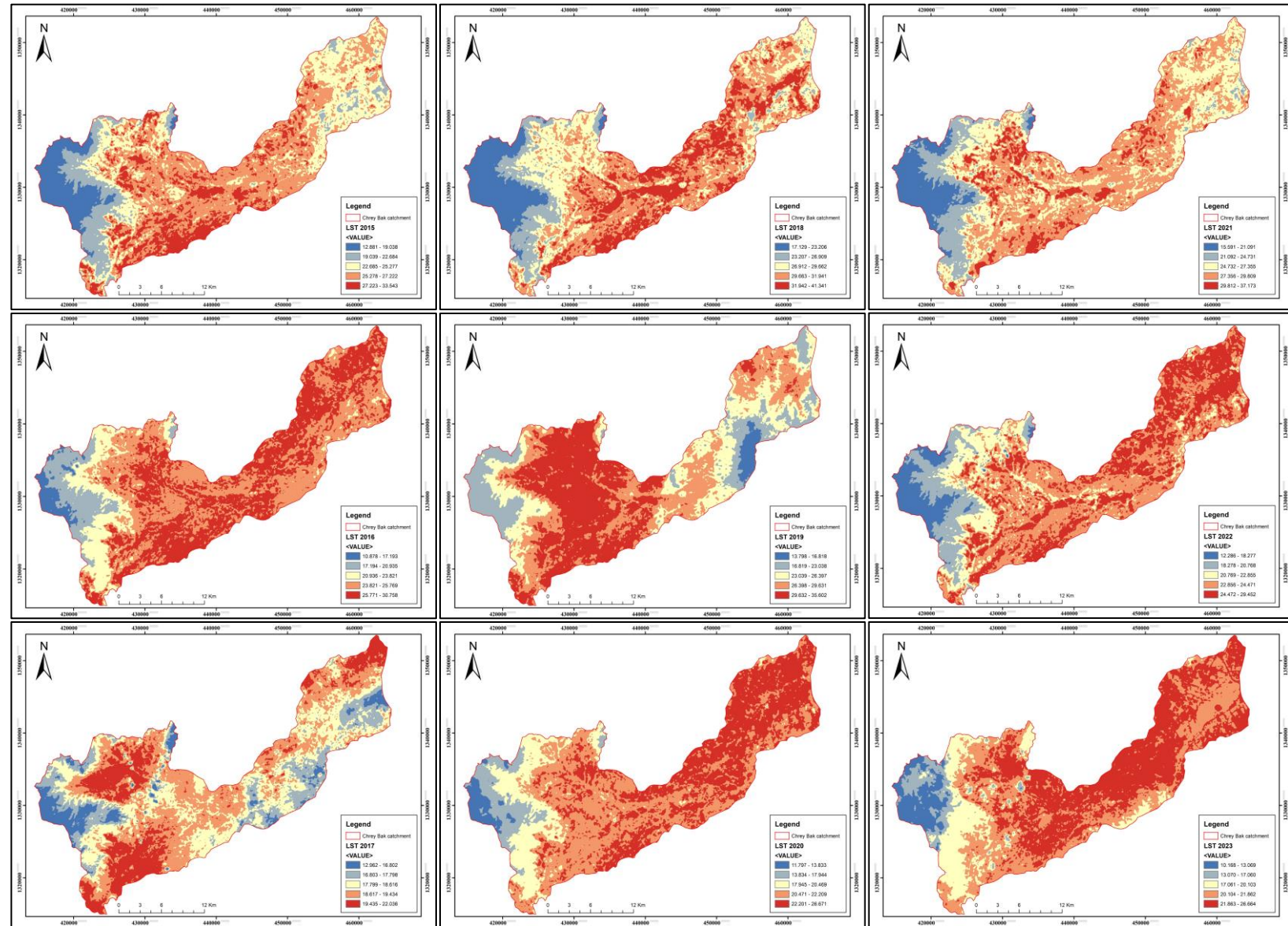
- LULC classes, such as forest ranging from 14.54 to 8.17%, vegetation (16.62-8.45%), crop land (12.33-9.07%), water body (25.25-3.22%), and built-up Area (19.98-5.67%).
- Forest cover appears to be relatively stable over the period, with minor fluctuations.
- Vegetation cover (possibly including crops) seems to have a slight decrease over time.
- The built-up area appears to be increasing over time.



RESULTS AND DISCUSSION

❖ Land Surface Temperature Mapping

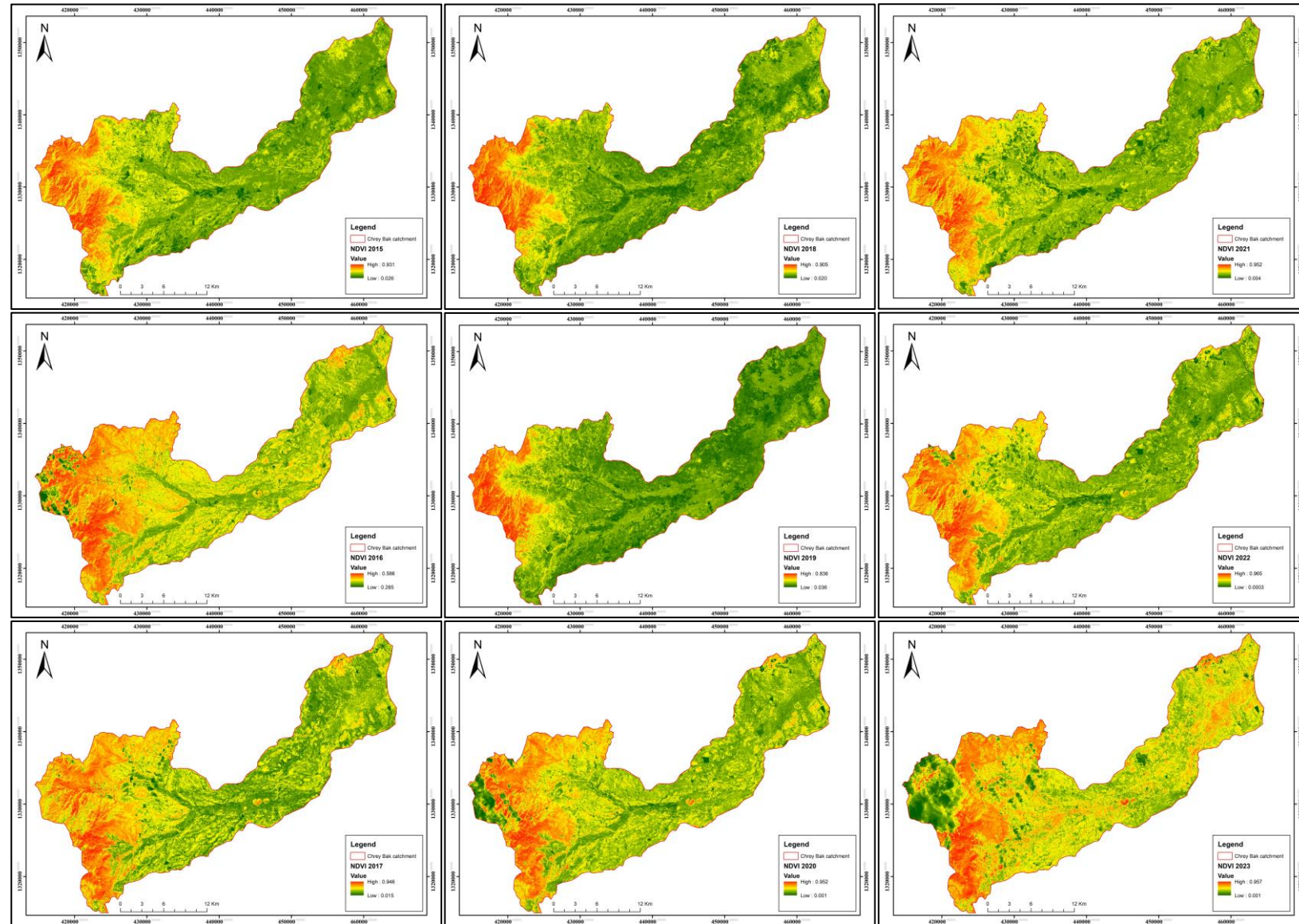
- The study analyzed Land Surface Temperature (LST) values in the Chrey Bak Catchment, revealing a high range of 27°C to 41.50°C over nine years due to active fluid.
- The forest and vegetation cover regions had lower LST values, suggesting cooler conditions. Variations in LST were influenced by seasonal factors such as forest cover, vegetation, cropland, water bodies, and built-up areas. Forest cover stabilized LST maps in built-up regions, reducing heat intensity.



RESULTS AND DISCUSSION

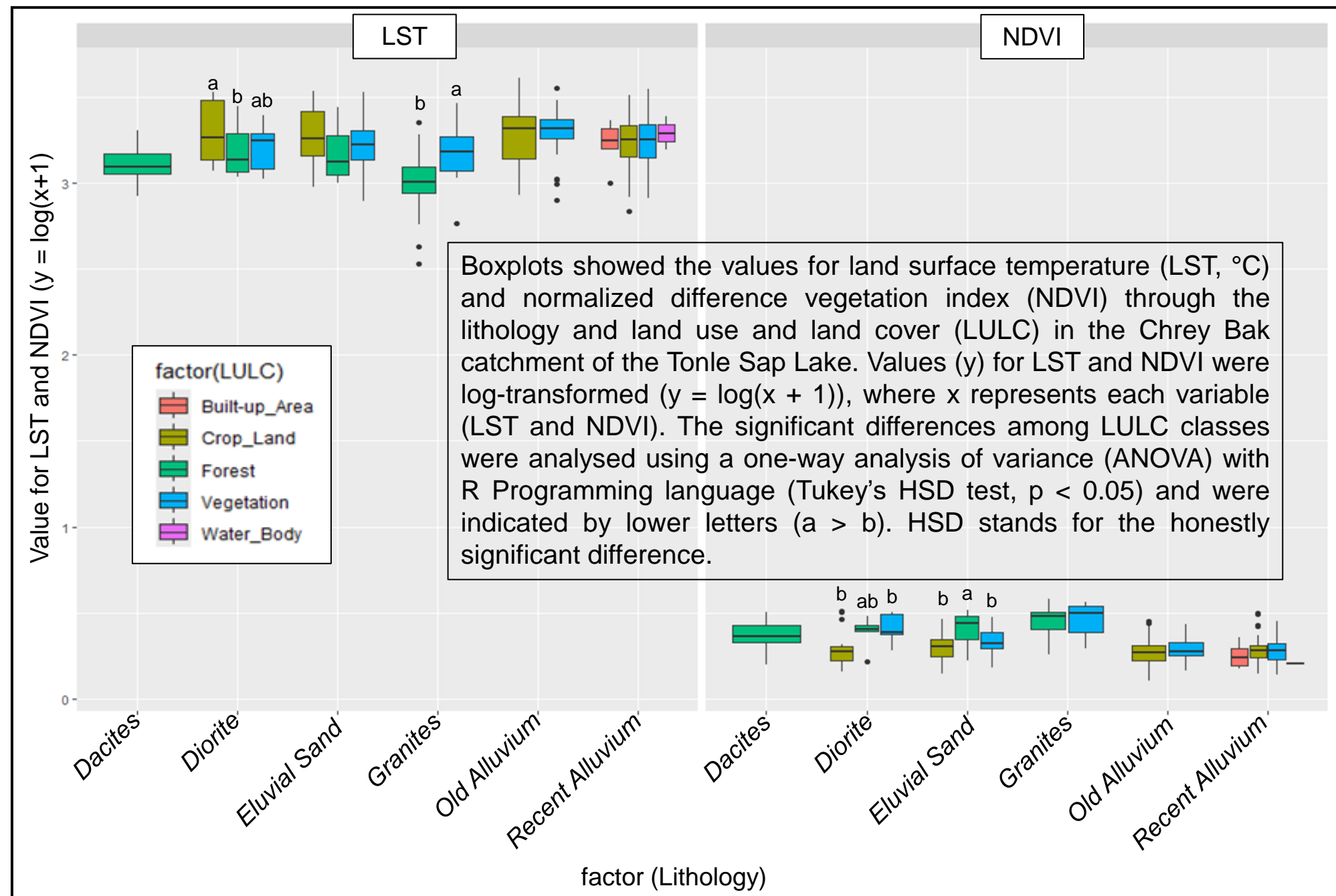
❖ Normal Difference Vegetation Index

- The NDVI model, derived from Landsat images from 2015 to 2023, assesses vegetation spectral properties, and near-infrared radiation. The highest values ranged from 0.026 to 0.935, while the lowest values were 0.001 to 0.972.
- Higher NDVI values indicate more productive areas like vegetation and forests, while lower values indicate less productive areas like cropland, water bodies, and built-up areas.



RESULTS AND DISCUSSION

❖ Relationships of LST, NDVI, Lithology, and LULC



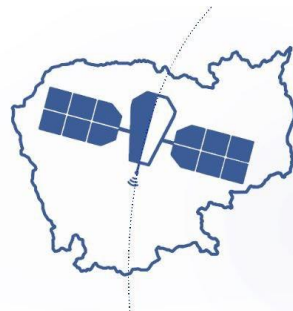
CONCLUSION

- ✓ Land surface temperature (LST) and vegetation greenness (NDVI) are influenced by lithology and land cover dynamics.
- ✓ These findings underscore the significance of investigating the spatiotemporal dynamics of climate-driven and plant responses for the purpose of sustainable management and climate resilience in the Tonle Sap region.



Thank you for your attention!

Acknowledgment



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