



# Utilizing Suomi NPP's Day-Night Band to Assess Energy Consumption and Investigate its Suitability as a Proxy for Poverty in Thailand



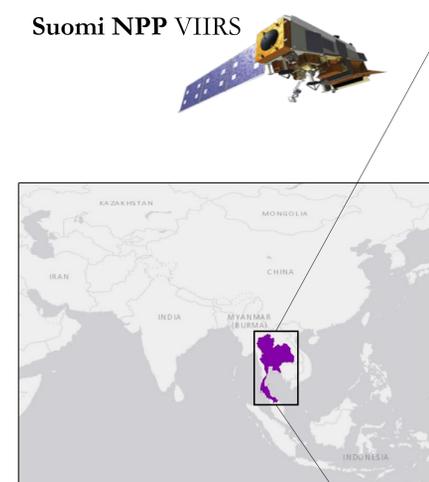
## Abstract

While poverty in Thailand has decreased from 67% in 1986 to 13% in 2012, 6.7 million people were still living within 20% of the poverty line in 2014. Economic uncertainty caused by recurring droughts and decreasing agricultural prices puts this vulnerable part of the population at risk of dropping below the national poverty line in the future. In order to address this issue, the DEVELOP team worked with the Office of Science and Technology (OSTC) at the Royal Thai Embassy, the Asian Disaster Preparedness Center (ADPC), and the NASA SERVIR Coordination Office to formulate a new method of analyzing poverty within Thailand. This project utilized the monthly composite product for 2012-2015 produced by the Earth Observations Group (EOG) at National Oceanic and Atmospheric Administration (NOAA) and National Geophysical Data Center (NGDC). Additionally, the project incorporated socio-economic data from Thailand's Ministry of Information and Communication Technology's National Statistical Office and Ministry of Education's National Education Information System to create an enhanced poverty index. This new poverty index will provide the Thai government a cost-effective way to analyze changes of poverty within the nation and inform policy making.

## Objectives

- ▶ **Utilize** light emissions at night to identify where poverty occurs in Thailand
- ▶ **Explore** how night-time light intensity varies depending on factors such as seasons, distance from roads, distance from cities, and type of land cover
- ▶ **Produce** enhanced poverty indices to help inform and support poverty reduction and aid efforts

## Earth Observations



## Study Area



## Study Period

January 2013-December 2015

## Acknowledgements

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- Gam Bunyakiat (Royal Thai Embassy)
- Dashiell Cruz (NASA DEVELOP at MSFC)
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## Team Members



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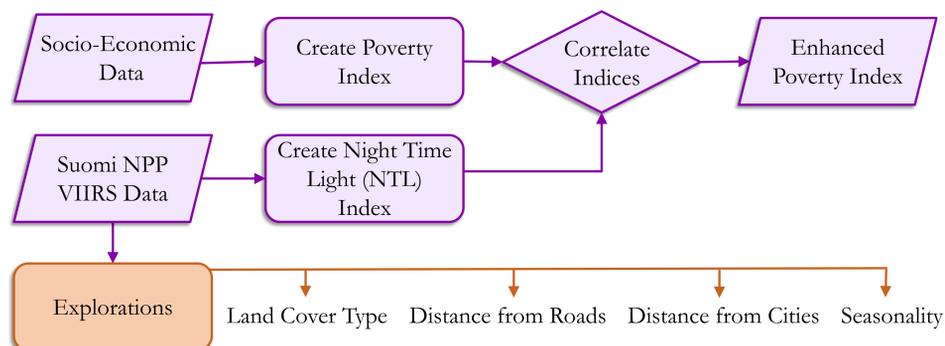


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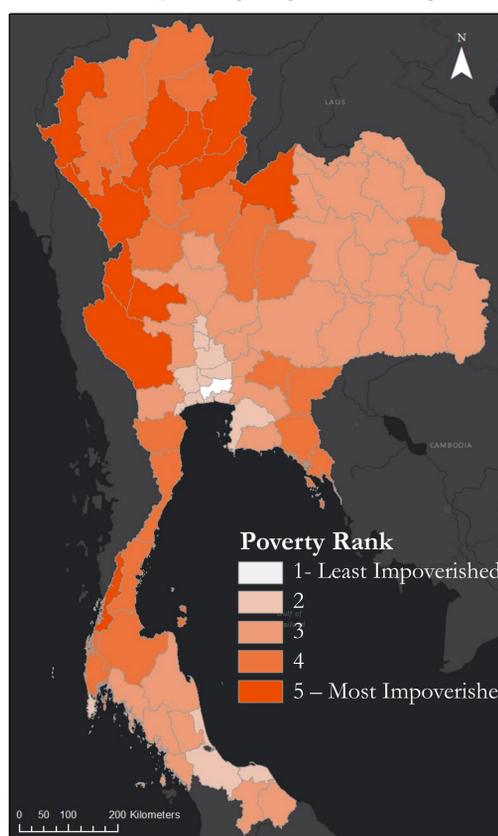
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## Methodology



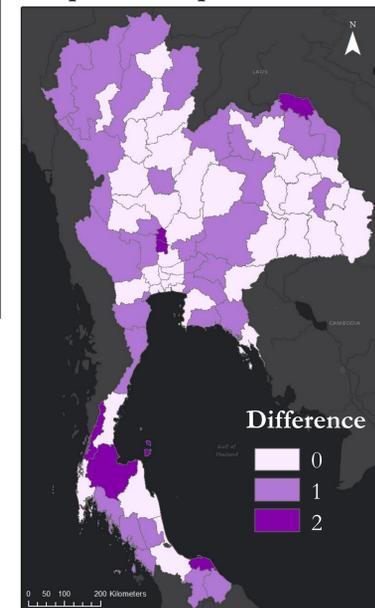
## Results

### Poverty Map Using Night-Time Light



The Poverty Map Using Night-Time Light (left) illustrates the predicted poverty on the provincial level. The rank of most impoverished to least impoverished was determined using the intensity of night-time light emissions and population within each province. The night-time light analyzed in this map is a weighted average covering all months in the study period.

### Comparison Map



The Comparison Map (right) explores the error of using night-time light as a proxy for poverty on the provincial level. It illustrates the absolute difference between the poverty rank as defined by socio-economic factors and the poverty rank as predicted by night-time light emissions during the study period.

## Conclusions

- ▶ Night-time light is proven to be an indicator for poverty. The correlation coefficient between the poverty index and the night-time light index is **0.8277**.
- ▶ **Summer has the highest** night-time light intensity, while **winter has the lowest**.
- ▶ There is a slight correlation between **distance from city centers and decrease of light intensity**.
- ▶ Due to differences in average light intensity between provincial and district levels, future work could include **analysis using socioeconomic data at a higher resolution**.

## Project Partners

- ▶ The Royal Thai Embassy
- ▶ Asian Disaster Preparedness Center (ADPC)
- ▶ NASA SERVIR Coordination Office

