# SIMULATION LULC SCENARIO AND WATER YIELD ESTIMATION FOR WATER SUPPLY AND DEMAND BALANCE ANALYSES


Presented by:

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# Outline

1. Introduction
2. Objectives
3. Research methodology
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# 1 Introduction

- Phuket Island is the largest island of Thailand which locates at the Andaman Sea (Figure 1). It is the most desired place for tourist destination.
- In the past 30 years, Phuket Island is one of the most growths in tourism [1].

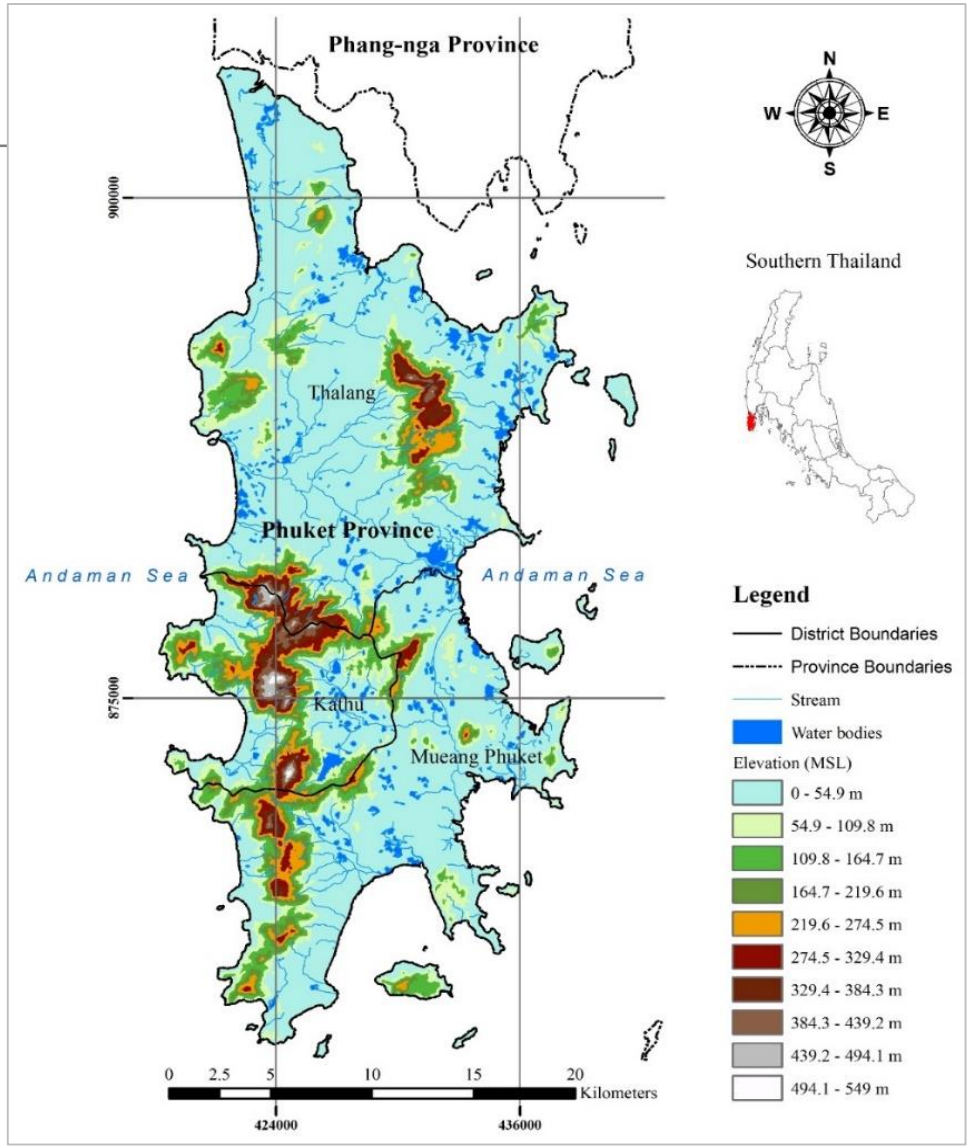



**Figure 1** Study area.

# 1 Introduction

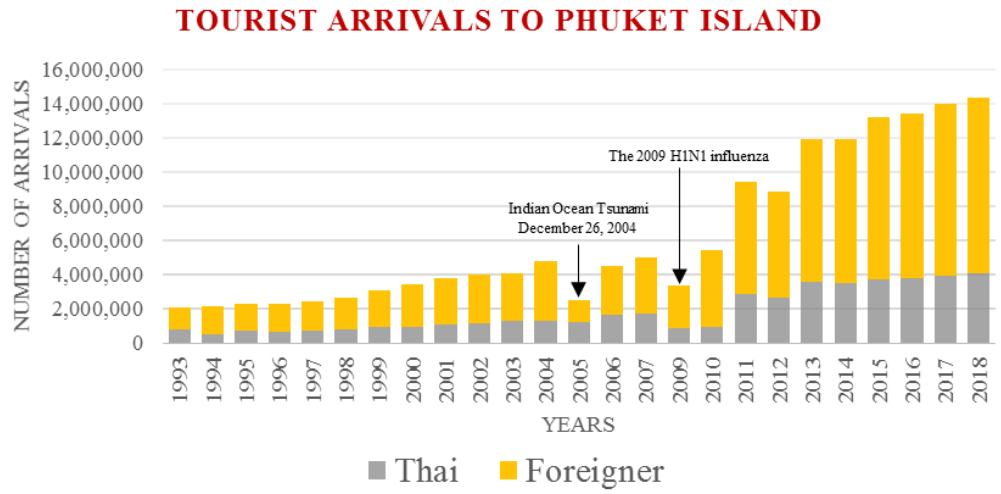



**Figure 2** Tourist arrivals to Phuket Island from 1993 to 2018.

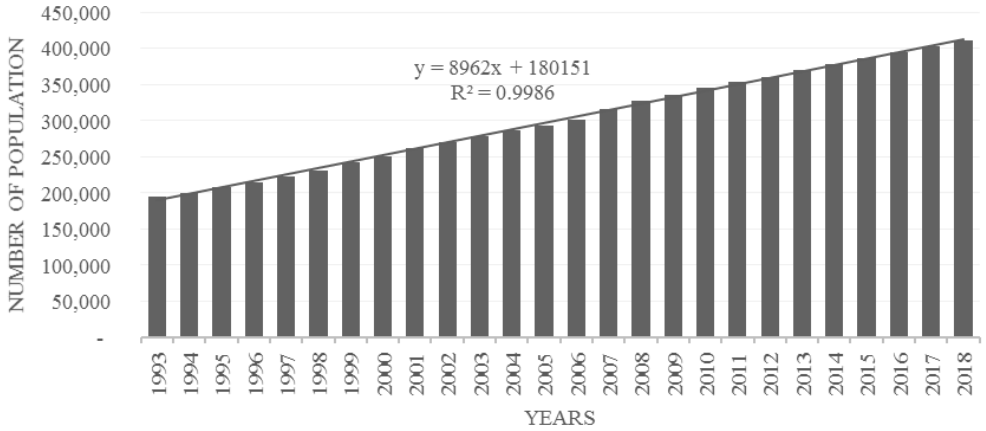



**Figure 3** Number of population of Phuket province from 1993 to 2018.

- The total number of tourists between 1993 and 2018 has dramatically increased from 2,088,179 persons in 1993 to 14,383,348 persons in 2018 [2, 3] (Figure 2).
- In the meantime, number of the registered population of Phuket province have been continuously increased during 1993 to 2018 (Figure 3). Population of Phuket province increased from 194,178

# 1 Introduction

- According to annual report of Phuket province in 2010, it was stated that water demand for consumption was approximately 51 million $m^3$/year, whereas water supply was about 46 million $m^3$/year.
- In addition, average water demand in the future increases about 2% per year according to economic growth and the increase of tourists.



Source: https://bit.ly/2PdISIj

# 1 Introduction

- During the last three decades, research works on water supply, water demand and water balance had been conducted in Phuket Island.

- However, water supply estimation by integration of CLUE-S and SWAT models had not been conducted in this area. Therefore, aims of the study are to simulate LULC change in the future using CLUE-S model, to estimate water supply using SWAT model and to assess water supply by water footprint for water balance analysis.

# 2 Research objectives

1. To interpret actual LULC in 2019 of Phuket Island,
2. To assess LULC status 2014 and 2019 and its change,
3. To simulate LULC changes between 2020 and 2030 under CLUE-S model,
4. To estimate water yield (supply) according to LULC change by using SWAT Model,
5. To assess water demand based on water footprint,
6. To evaluate water balance (supply and demand) between 2014 and 2030,
7. To suggest an appropriate solution for sustainable water

# 3 Research methodology

The framework of research methodology consists of data collection and preparation with five major components which includes

(1) LULC interpretation and assessment,

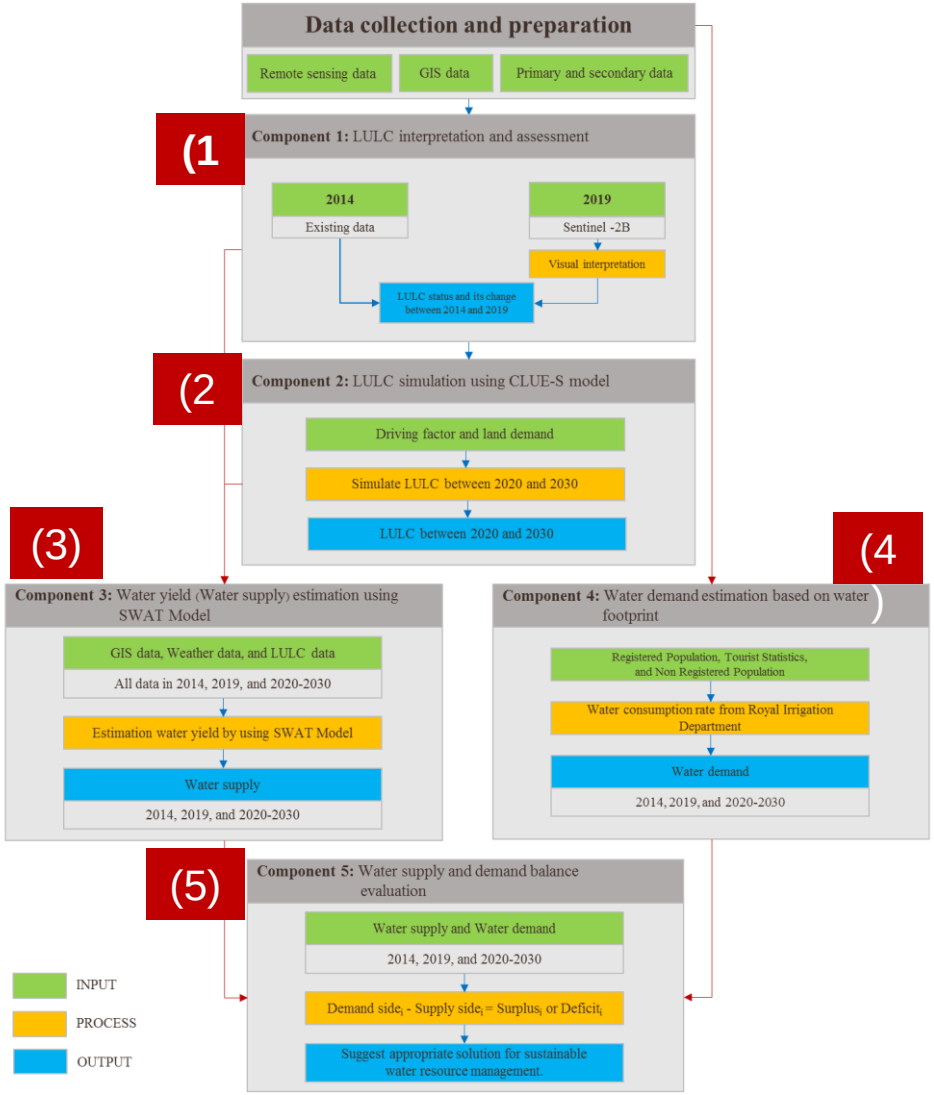
(2) LULC simulation using CLUE-S model,

(3) Water yield estimation using SWAT model,

(4) Water demand estimation based on water footprint, and

(5) Water supply and demand balance evaluation.

# Overview of research methodology framework



# 4 Expected results

The expected results from the study will include:

(1) Status of LULC and its change in the past, present and future between 2014 and 2030,

(2) Water supply and water demand over the study periods,

(3) Water balance in term of surplus or deficit over the study periods,

(4) Recommendation on water resource management for preventing water scarcity.

# References


[1] Sakunboonpanich, Y. (2011). History of modern city of Phuket from 1957 to 2007. M.A. Thesis, Thammasat University.

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[4] Department of Provincial Administration, Ministry of Interior. (2019). Population of Phuket Province during 1993-2018. [On-line]. Available: http://stat.bora.dopa.go.th/new_stat/webPage/statByYear.php.

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# Thank you for your attention