Asia-Pacific Stats Café series
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Analysis of Land Use Cover Change for Sustainable Development

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GIS and application for environment and Health, Internet GIS



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WebGIS, Agroinformatics, Location based services



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Geospatial Data Mining, LULC change in changing climate



Prof. Kiyoshi Honda

Image Processing, Crop Modeling, Sensors Network



Dr. Hiroyuki Miyazaki

Positioning and mobile technology, disaster management, urban infrastructure



Dr. Apichon Witayangkurn

Big Data Processing/Mining, HADOOP, Sensor Network



Dr. Chitrini Mozumder

LULC change analysis and modeling, spatial analysis and decision support

Who we are?

REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS (RS&GIS)

INFORMATION AND COMMUNICATIONS TECHNOLOGIES (ICT)
SCHOOL OF ENGINEERING AND TECHNOLOGY (SET)
ASIAN INSTITUTE OF TECHNOLOGY, THAILAND

- MSc, MEng,
- PhD, DEng,, DTech, and
- Certificates in RSGIS
- Training for government agencies and industry professionals




1984

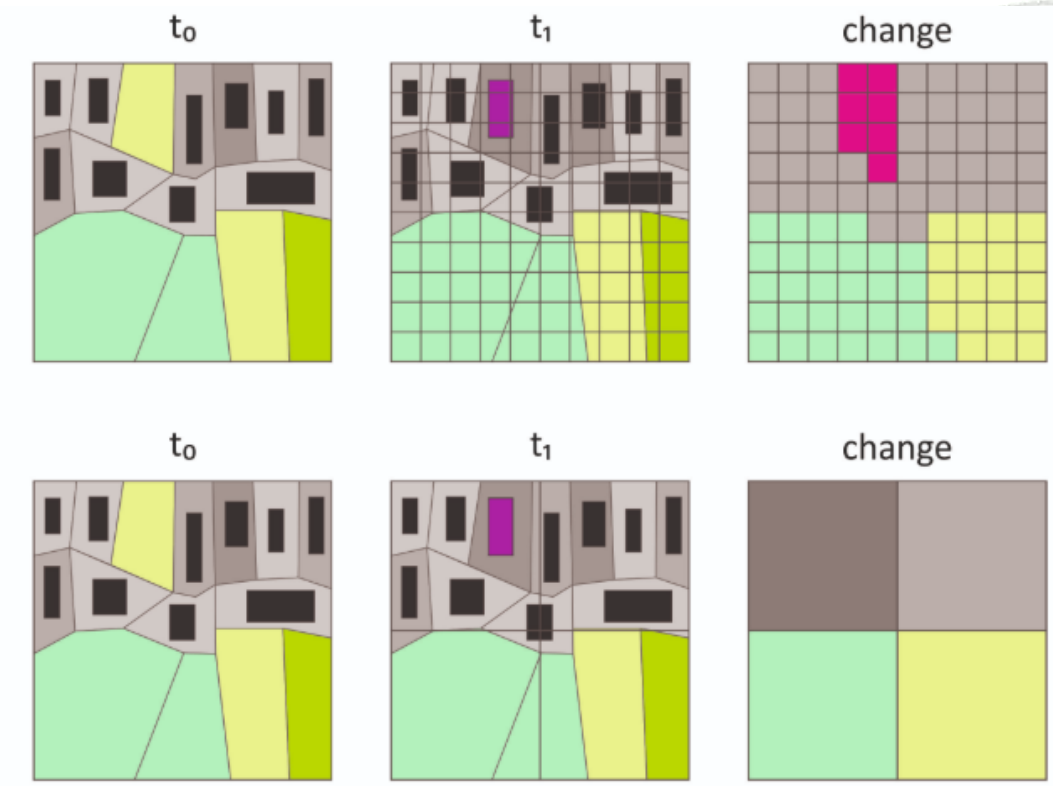

1984


1984
https://earthengine.google.com/timelapse/

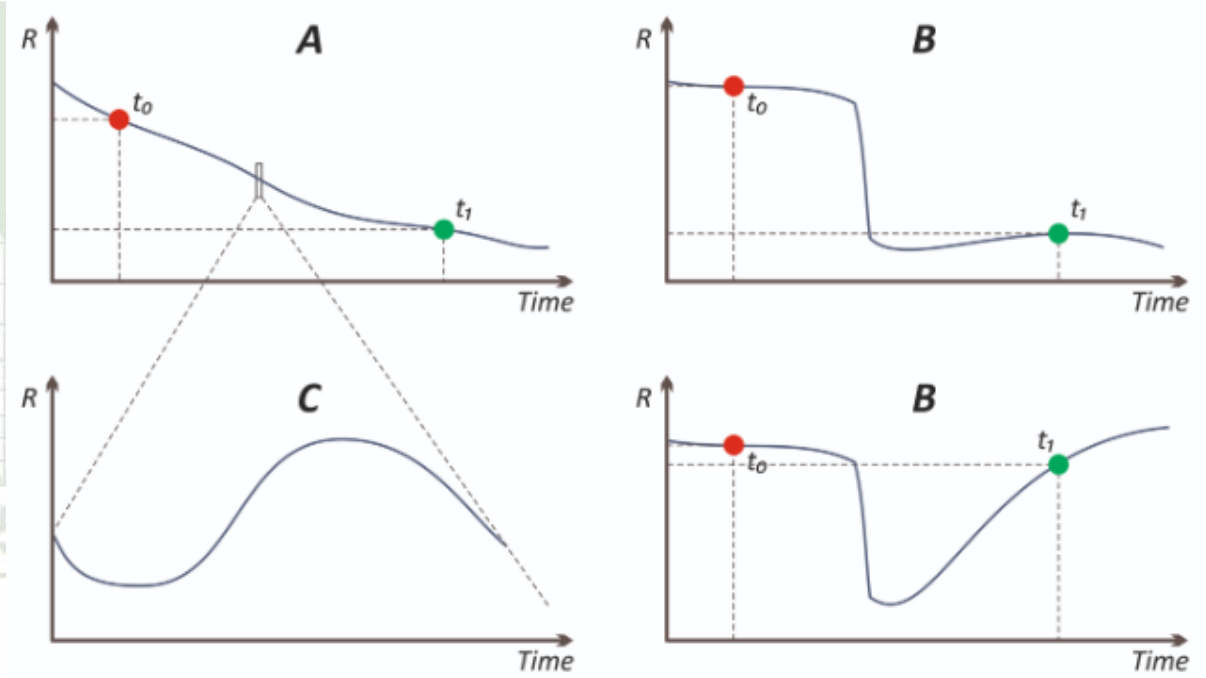
The Land change Analysis: key questions?

- **What's on the land surface?**
  - Urban? Forest? Agriculture?
- **What and how has the land surface changed over time?**
  - A typical change matrix
- **Site specific questions**
  - **E.g.** conversion of rural land to urban (where are how fast?)
  - **E.g.** conversion of agricultural land to urban (food security?)
  - **E.g.** forest degradation/ deforestation (REDD? Natural disaster?
- **Market and non-market monetary value of land**

Land change: Key aspects

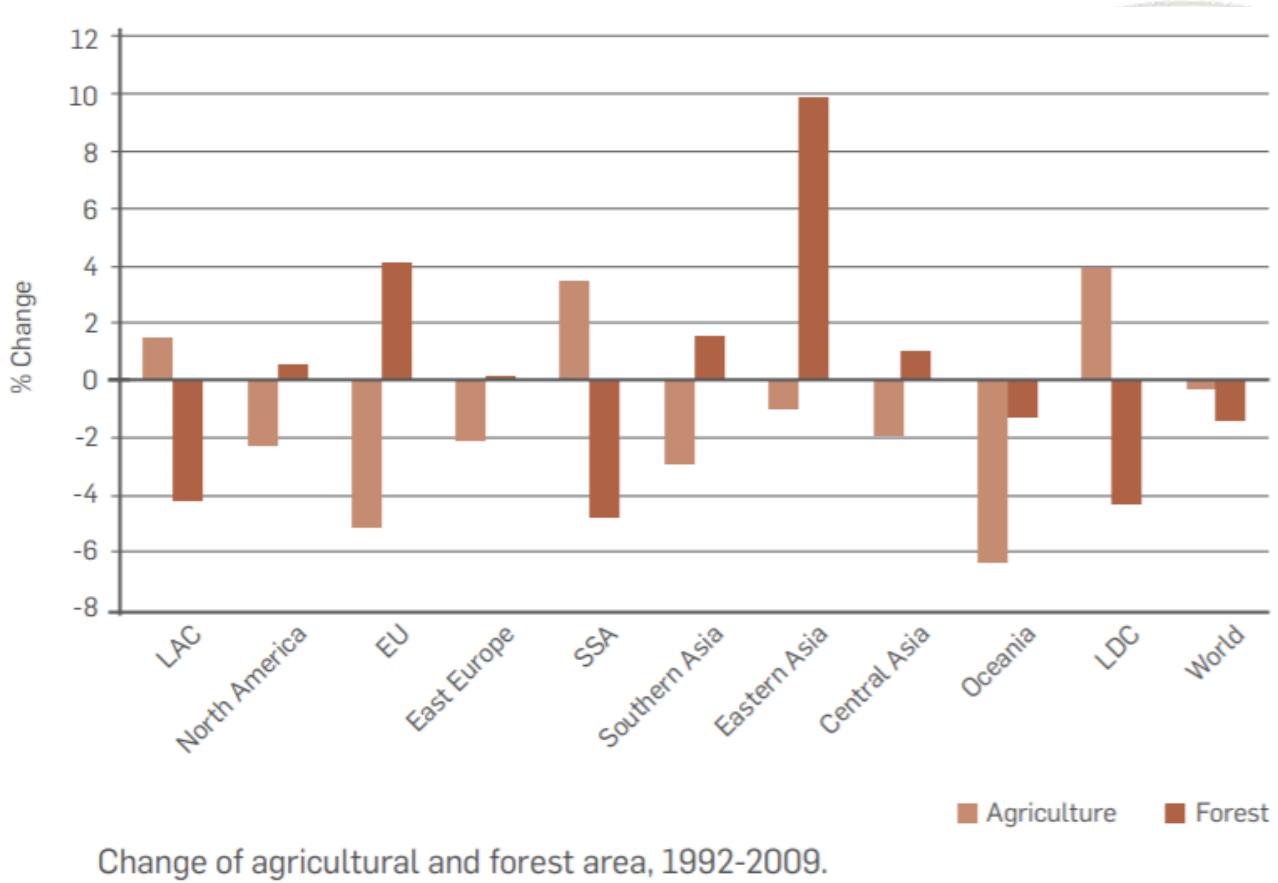


Spatial Aspects



Temporal Aspects

The Land Change Impacts: UN statistics



Change of agricultural and forest area, 1992-2009.

- "It is estimated that the human footprint has affected 83% of the global terrestrial land surface and has degraded about 60% of the ecosystems services in the past 50 years alone."

- "68% of the world population projected to live in urban areas by 2050, says UN"

- Land use and land cover (LUCC) change has been the most visible indicator of the human footprint and the most important driver of loss of biodiversity and other forms of land degradation

"Sustainable land use for the 21st century"
https://sustainabledevelopment.un.org/content/documents/1124landuse.pdf

The Land Change Impacts: Sustainability Solutions

- The Future Earth
  - prioritizes a stronger focus on interdisciplinarity and science that supports sustainability transitions through co-design and co-production of research together with stakeholders.



- The evaluation and design of alternative ways to govern land resources

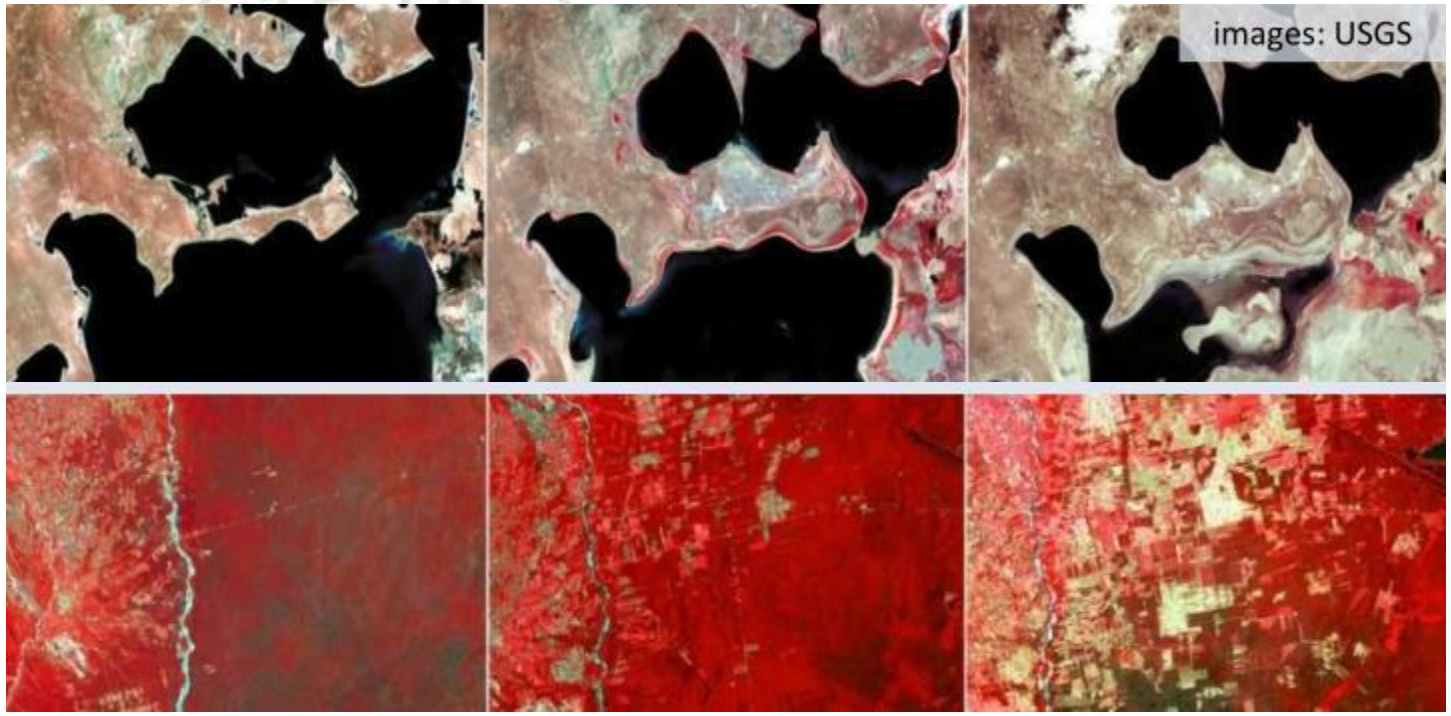
- Solutions to meet the multiple, conflicting, demands on the land system- land use planning and policy

How we can contribute? Simulating land change and the plausible impacts!

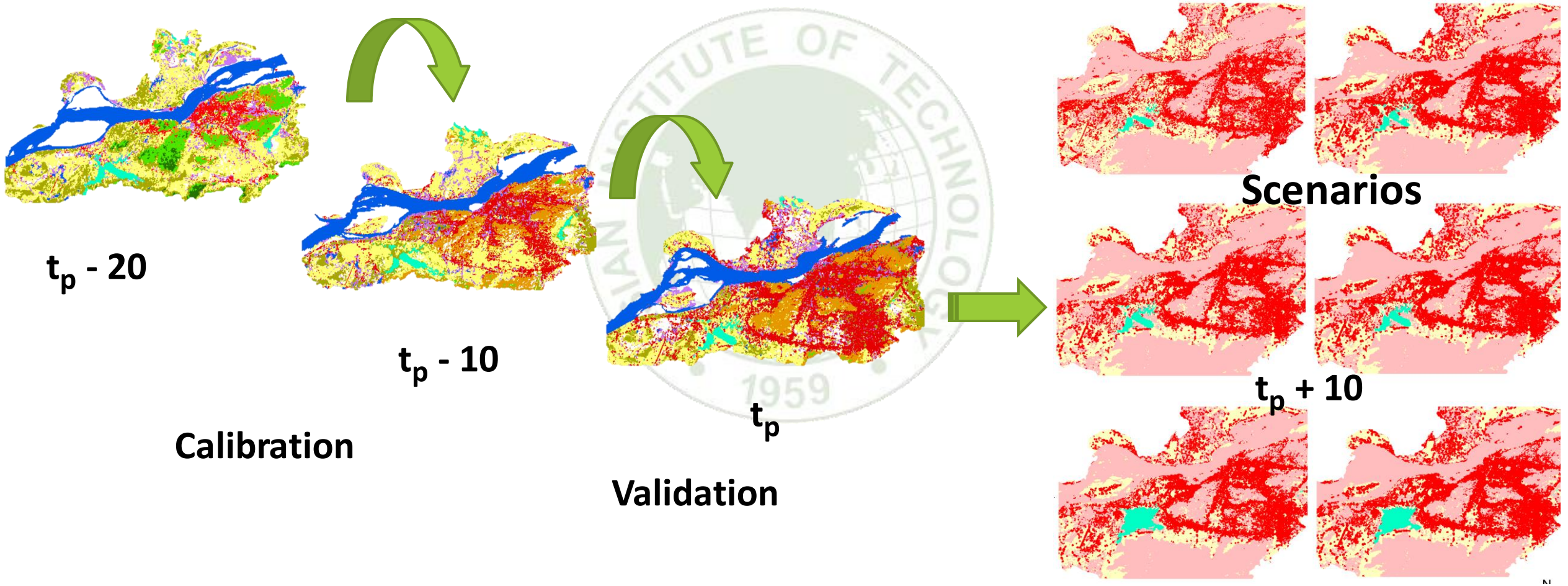
How do we decide on the use of natural resources?

What are the conditions favoring success in natural resource management

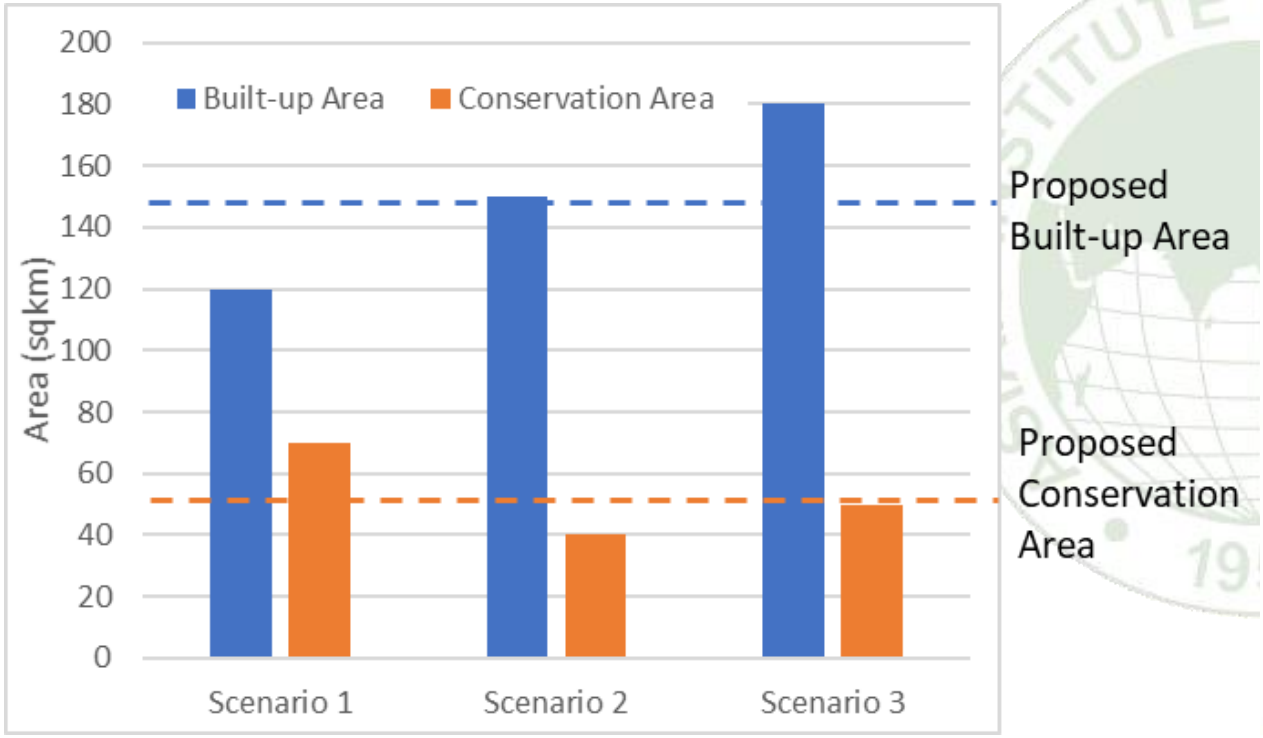
Can we anticipate changes resulting from human decisions?



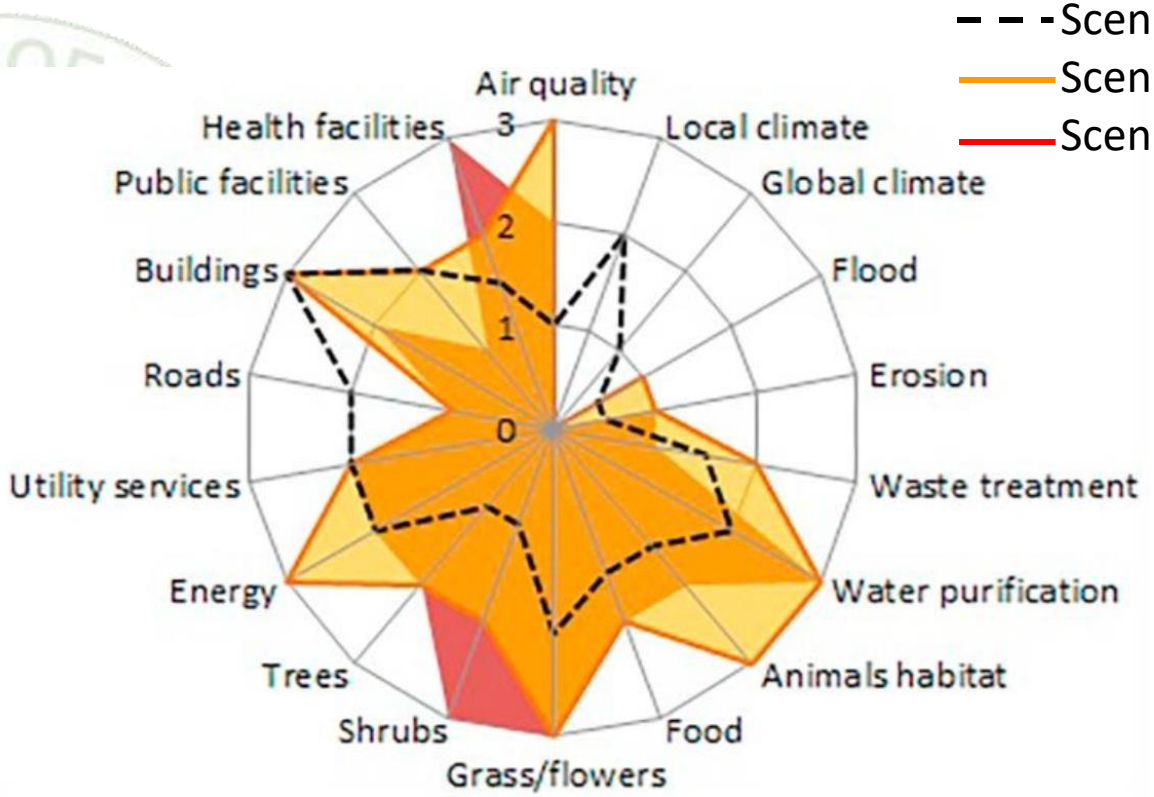
Simulating Land Use Change: calibration, validation and scenarios



Simulating Land Use Change: Scenario Optimization



Area Optimization in t_{p+10}

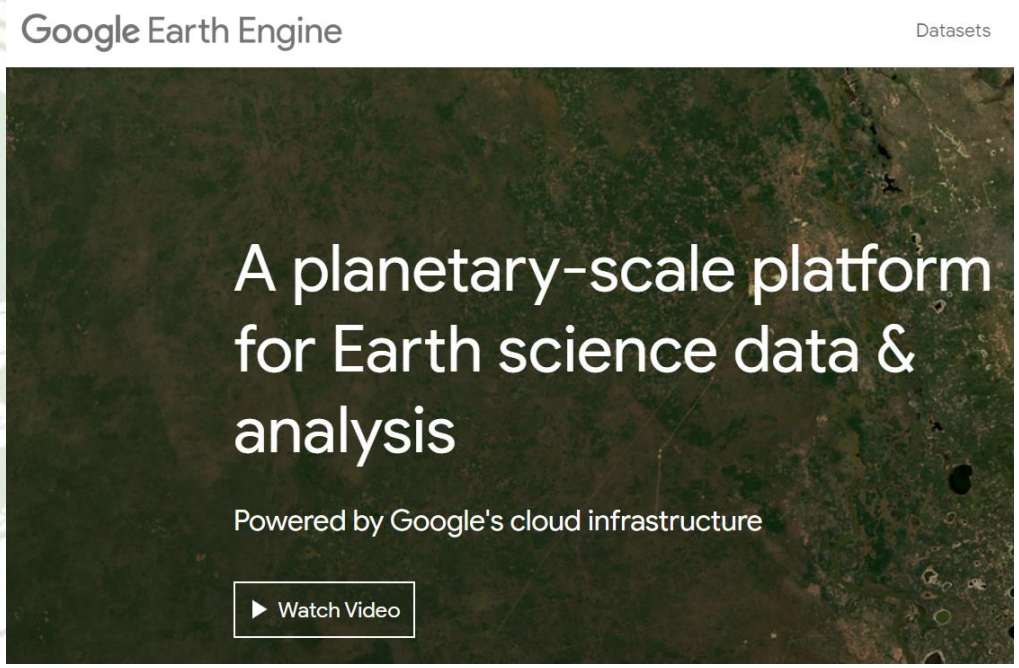


Ecosystem Services in t_{p+10}

Land use Change Visualization

Time lapse: Google Earth Engine

https://earthengine.google.com/timelapse/

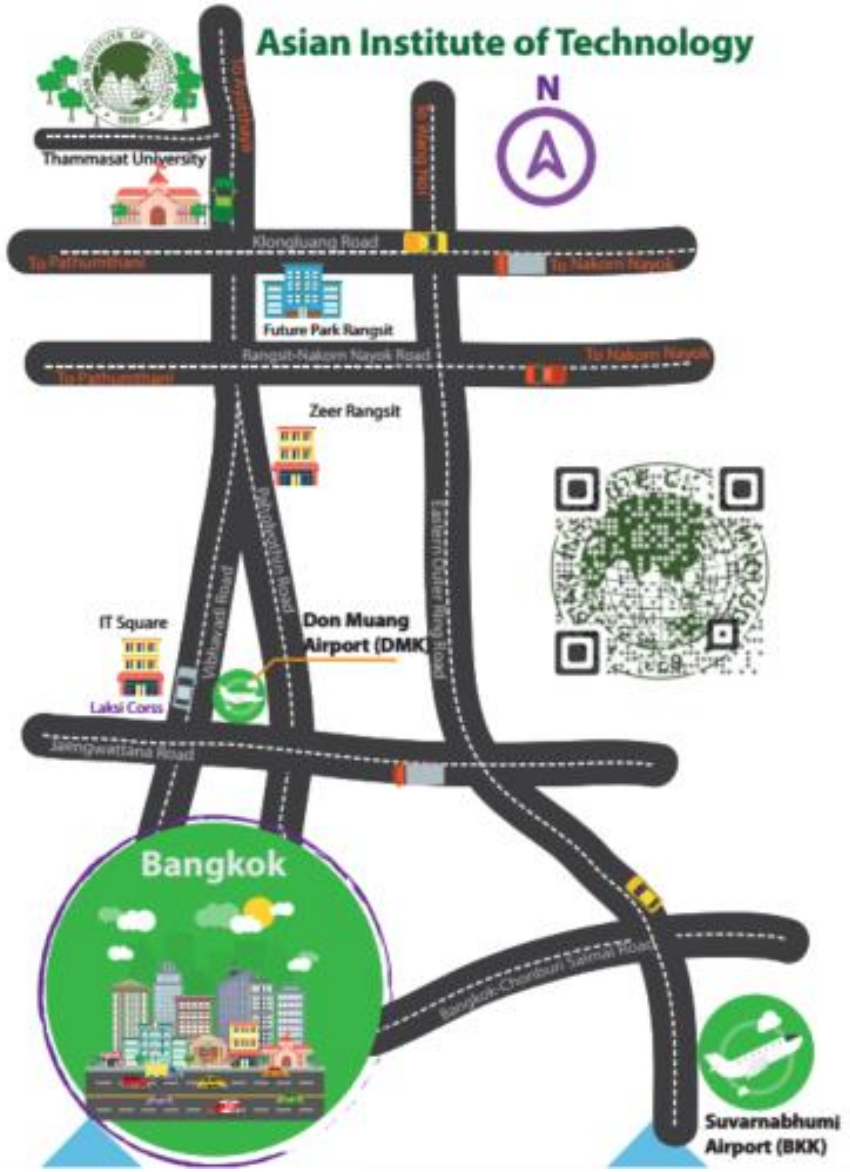


The Living Land

https://storymaps.esri.com/stories/2018/anthropocene/2-the-land.html

Global Forest Change

https://earthenginepartners.appspot.com/science-2013-global-forest



Thank you

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