Framework for a Living Lab on Climate Change Adaptation in Palgongsan National Park

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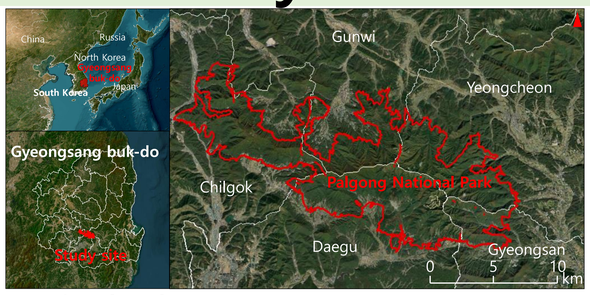
Background

- Degraded areas in national parks hinder biodiversity conservation and forest hazard mitigation, and climate change may exacerbate these issues
- Restoration projects by the Korea National Park Service do not address climate change or include post-restoration evaluations from users
- The multi-criteria approach helps achieve various ecological restoration objectives, while the Living Lab can incorporate user needs, enhance social acceptance, and create additional benefits such as education

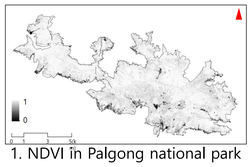
Objectives

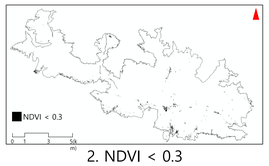
- Assessing the potential of applying the Living Lab approach to climate-adaptive ecological restoration in national parks
- Developing reference materials to support decision-making in ecological restoration

Study site

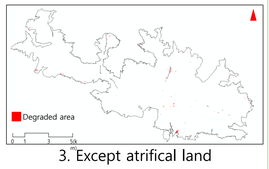


- **Palgong National Park**
  - Located across Daegu and Gyeongsangbuk-do
  - Height : 1,192.8m
  - Area : 126.058㎢
  - Designated as a national park in 2024, climate change adaptation measures are required


1. NDVI in Palgong national park



2. NDVI < 0.3



3. Except atrifical land

- NDVI < 0.3
- Except artificial land(built-up area, agricultural land)

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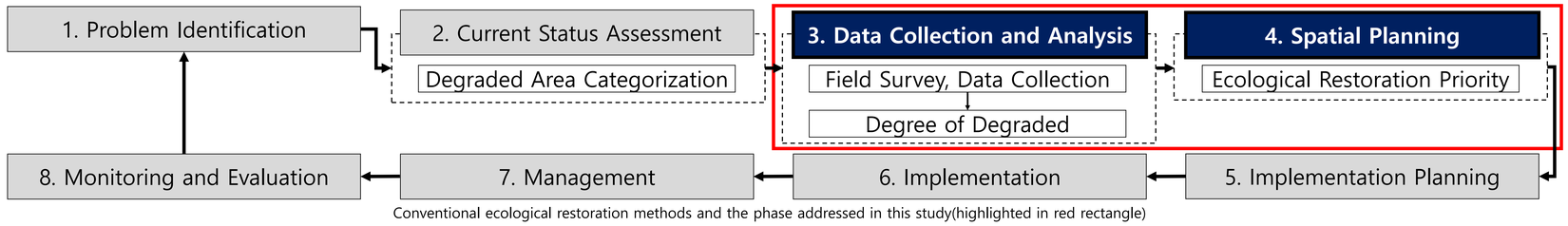
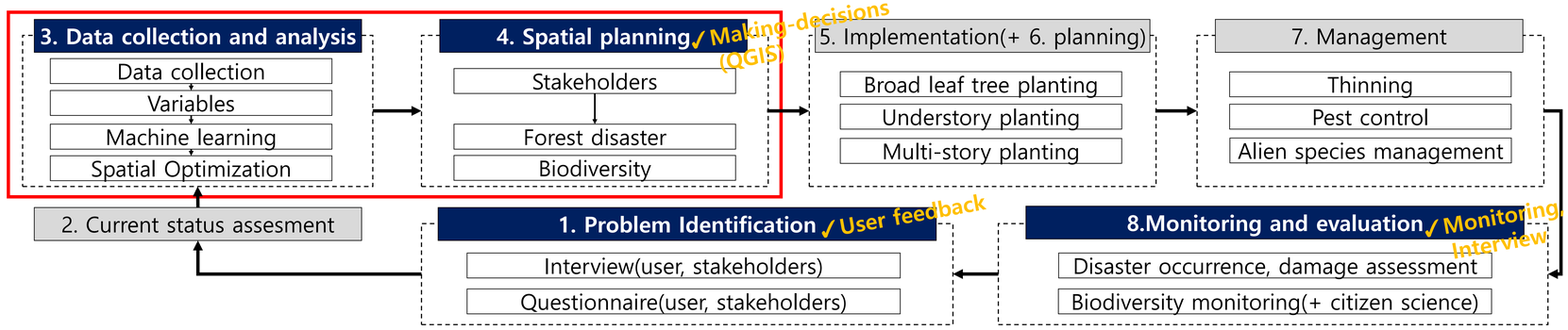
Living lab framework for ecological restoration



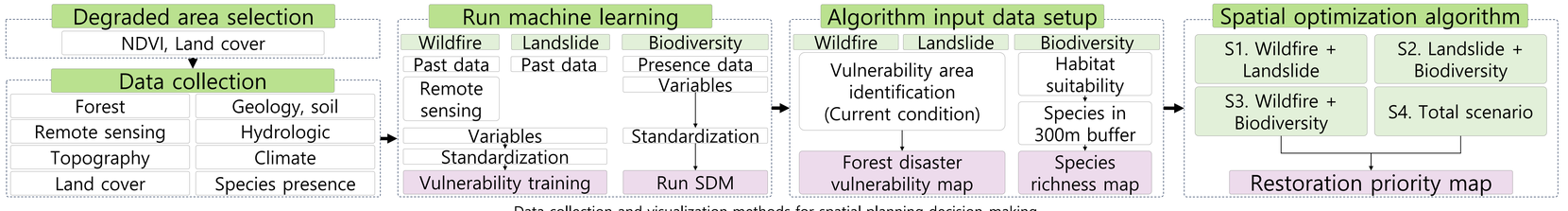
Conventional ecological restoration methods and the phase addressed in this study(highlighted in red rectangle)

- Conventional ecological restoration classifies the types and degrees of degraded areas and assigns **restoration priorities based on field surveys and expert judgment**, **without considering climate change mitigation**
- Our study proposes a **Living Lab framework in the ecological restoration phase**, focusing on **data collection and analysis,** and **spatial planning**



Framework for the Living Lab applied in ecological restoration(The bolded text represents stages where the Living Lab is applied or considered)

- In the **data collection and analysis** phase, **spatial optimization algorithms** create visualization maps for **spatial planning** that **reflect ecological restoration objectives**
- The Living Lab approach can be applied in **spatial planning for stakeholder consensus**, and in **monitoring and evaluation for user-participatory assessment** and **feedback**
- Applying the Living Lab increases social acceptance and provides educational benefits through stakeholder engagement and monitoring



Data collection and visualization methods for spatial planning decision-making

- **Machine learning for algorithm input data**
  - Wildfire : RF, SVM(near fire occurrence point NBR(Normalized Burn Ratio) calculation and fire extent estimation)
  - Landslide : RF, SVM(acquisition of occurrence point data)
  - Biodiversity: MaxENT(presence data of amphibians, reptiles, and plants from the 5th Nationwide Natural Environment Surveys)
- **Spatial optimization algorithm**
  - Using three individual conservation priorities with machine learning to select multi-criteria restoration priorities
  - Generating 4 scenarios that can achieve at least two restoration objectives