GreenCityLabHuế

HUMBOLDT-UNIVERSITÄT ZU BERLIN

GreenCityLabHuế

Strengthening climate resilience of urban regions in Central Vietnam through nature-based solutions for heat adaptation and air quality improvement

Focus 6 – Ecosystem Services and Natural Solutions

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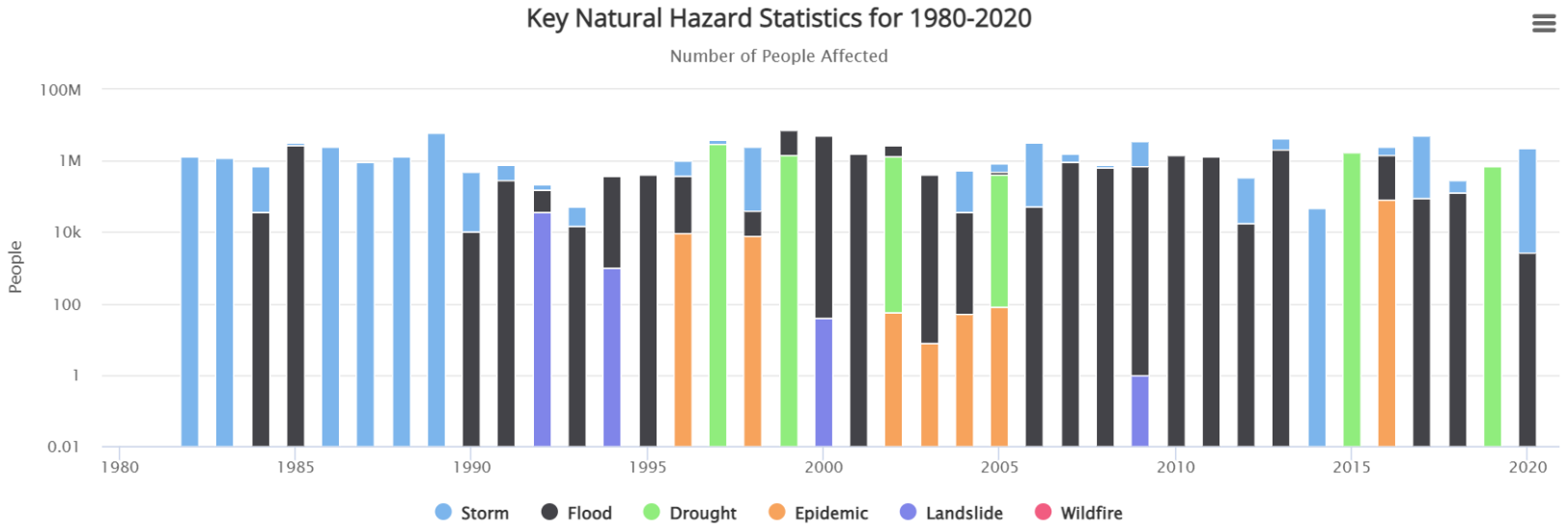
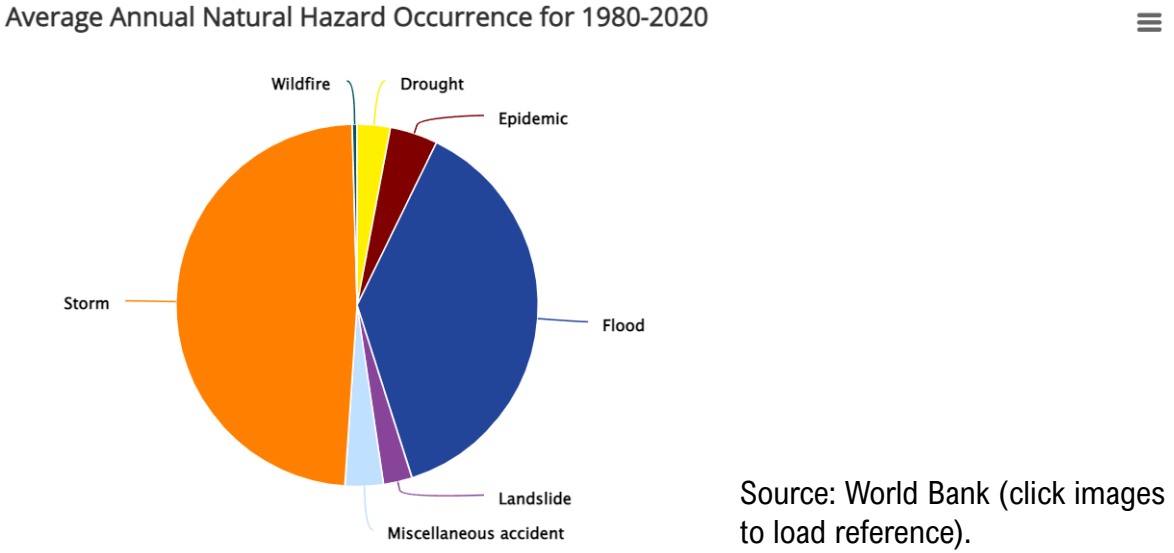
Threats and challenges

- Vietnam has a high exposure to natural hazards
- Ranked 91 out of 191 countries by the 2019 INFORM Risk Index



Source: Disaster Risk Management Knowledge Centre (click images to load reference).

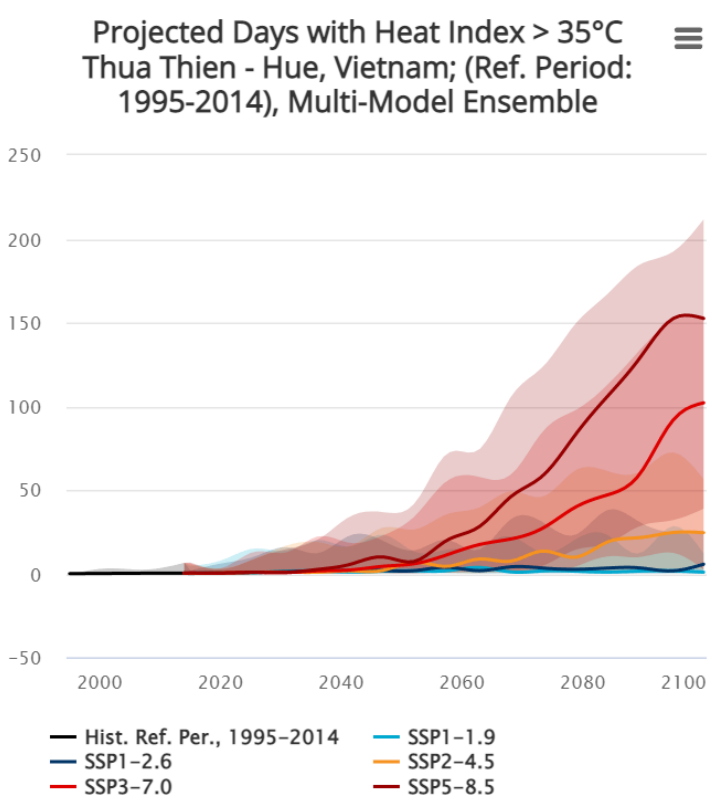


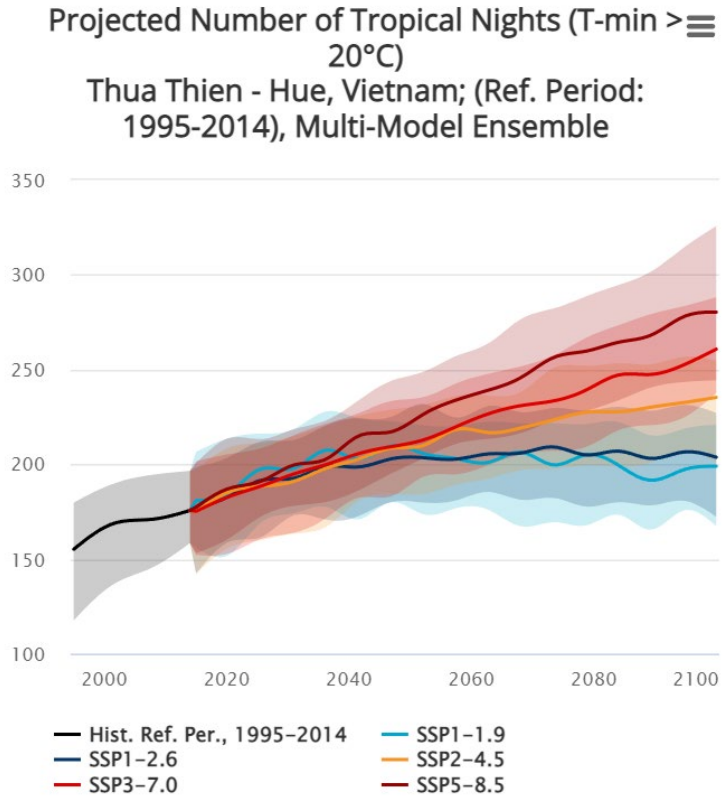
Source: World Bank (click images to load reference).

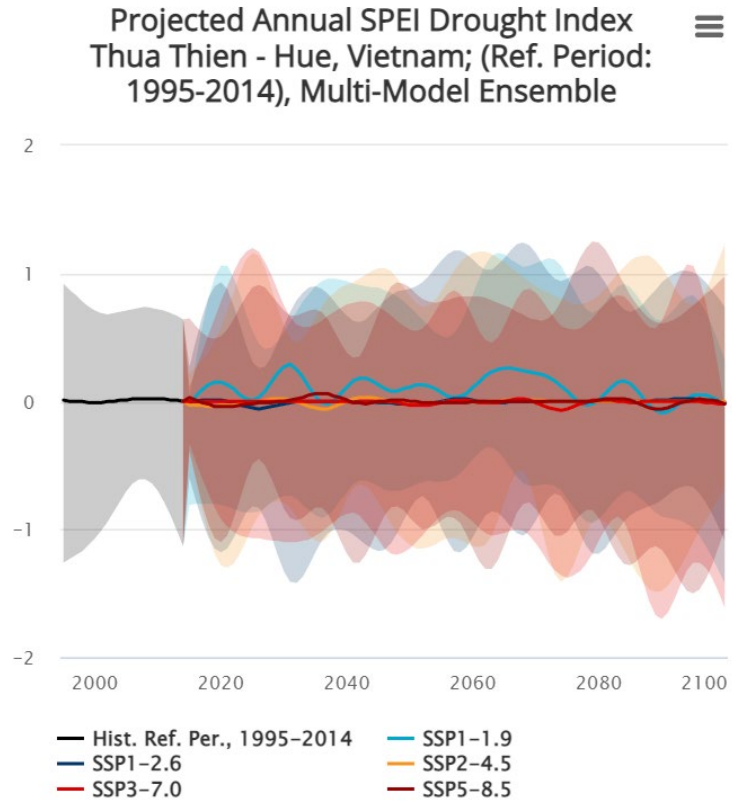
Threats and challenges

- Climate change, climate change-related hazards as major threats to human health and well-being, livelihoods, assets, ecosystems (Asian Development Bank, 2020):
  - Sea-level rise and **coastal flooding** potentially affecting 6–12 mio. people by 2070-2100
  - **Fluvial flooding** likely to affect an additional 3 – 9 mio. people until 2035-2044
  - Increasing temperatures resulting in the **amplification of heat stress, possible chronic heat stress** (increasing daily probability of heat stress)
  - Considerable uncertainty in precipitation trends and variability of precipitation with uncertainty in related hazards (**drought, water availability**)

Threats and challenges







Source: Climate Change Knowledge Portal (click images to load reference).

Source: Morgenpost
(click image to load website)

Increasing resilience and improve human health and well-being

Implemented measures: Estimation of impacts

	Evapotranspiration	Shading	Water infiltration	Water retention	Air purification	Biodiversity	Amenity value function
Trees	++	++	0	0	+	+	++
Intensive green roof	++	+	-	++	0	+	++
Intensive greening (courtyard green)	+	+	+	+	0	+	+
Extensive greening (similar to meadow)	++	+	++	+	+	++	+
Extensive green roof	+	+	-	+	-	+	+
Rain garden	+	+	+	+	0	++	++
Facade-bound green wall	++	++	-	-	+	+	+
Retention basins	+	–	+	++	–	+	+
Permeable surfaces (pavement)	-	-	+	-	-	+	+
Green verges	+	–	+	+	+	+	+
Playgrounds	+	+	+	+	0	+	++
Bioswales	+	–	++	+	–	+	+
Linear woody elements: Hedges	+	0	+	0	+	+	+

Estimated impacts

- \- No impact
- o Unsure impact (depends on quality)
- \+ Positive impact
- ++ Very positive impact

The assessment is based on expert knowledge and the typology developed in UNaLab by Eisenberg et al. (2019).

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LuLab toolbox

- Inform urban planning and support the development of strategies through an exploration tool
- Using a minimum amount of data and driven by a set of assumptions (intervention type, implementation strategies, target areas, policy goals), the exploration tool allows to investigate

    - Possible spatial outcomes of proposed interventions;
    - Feasibility of assumptions, policy goals;
    - Means to reach certain policy goals;
    - Conditions under which planning targets may be achieved.

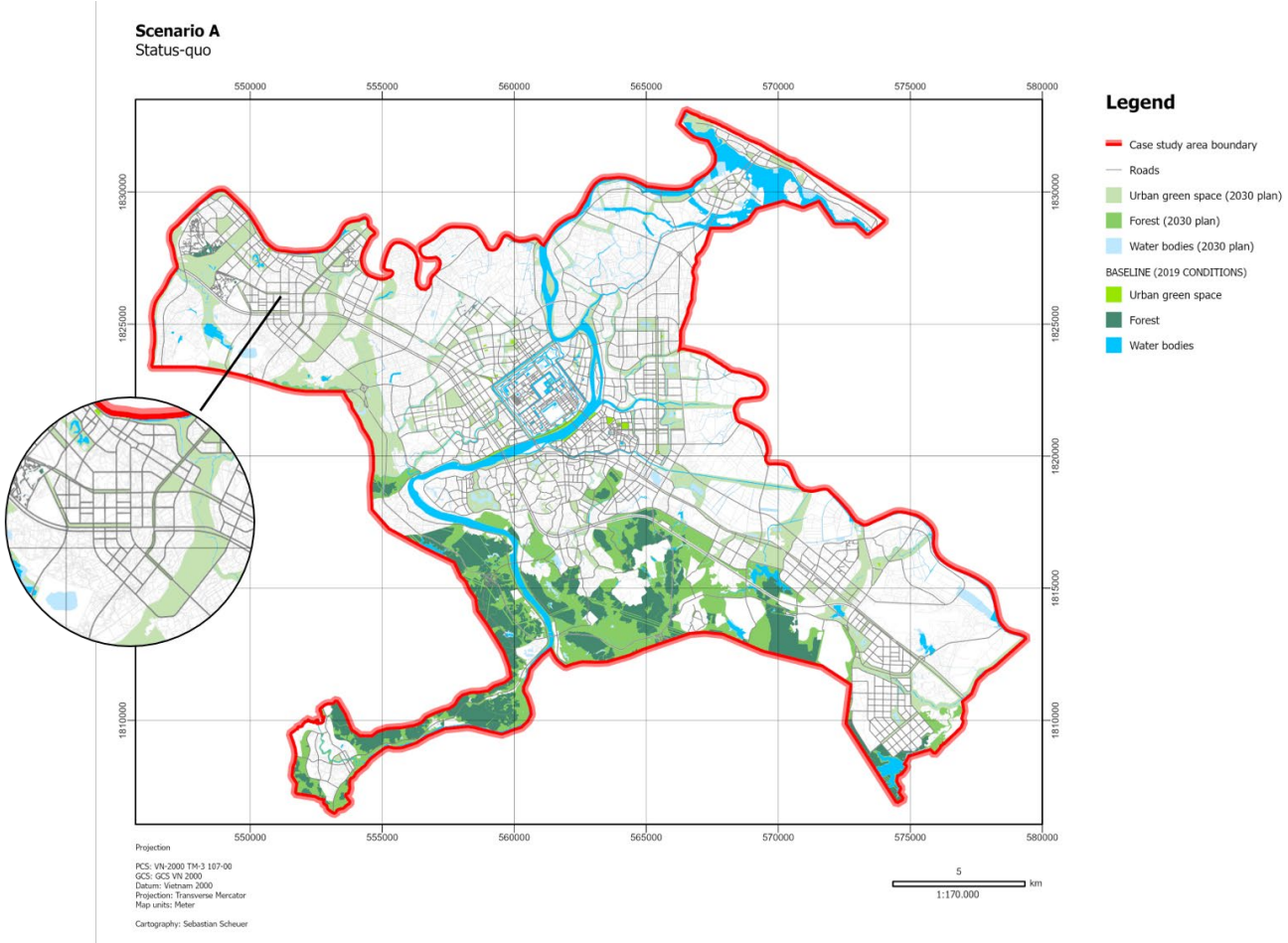
Microclimate models

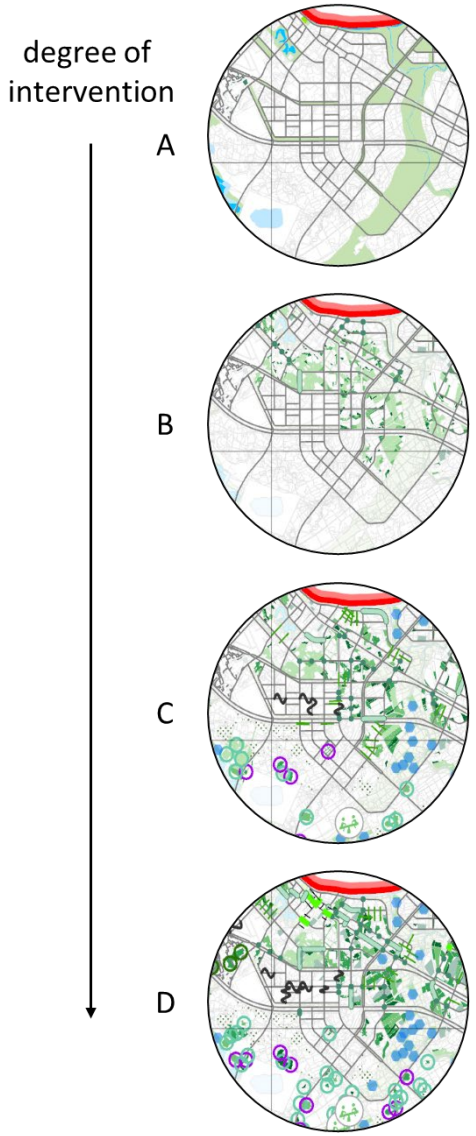
- Illustrate the impact of various greening interventions on local microclimatic conditions (using ENVI-met) for urban planning
- By modelling different urban configurations and implementing the co-designed scenarios with gradually increasing degree of interventions, the microclimate models allow to

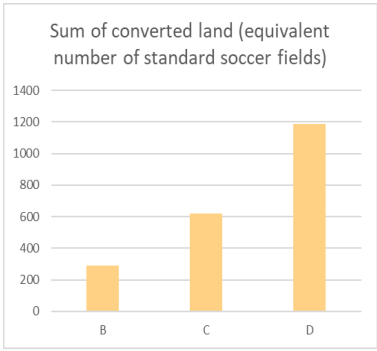
    - Assess the impact of proposed interventions on microclimate;
    - Explore different designing options;
    - Develop greening best-practices for the mitigation of urban heat.

Increasing resilience and improve human health and well-being

LuLab toolbox



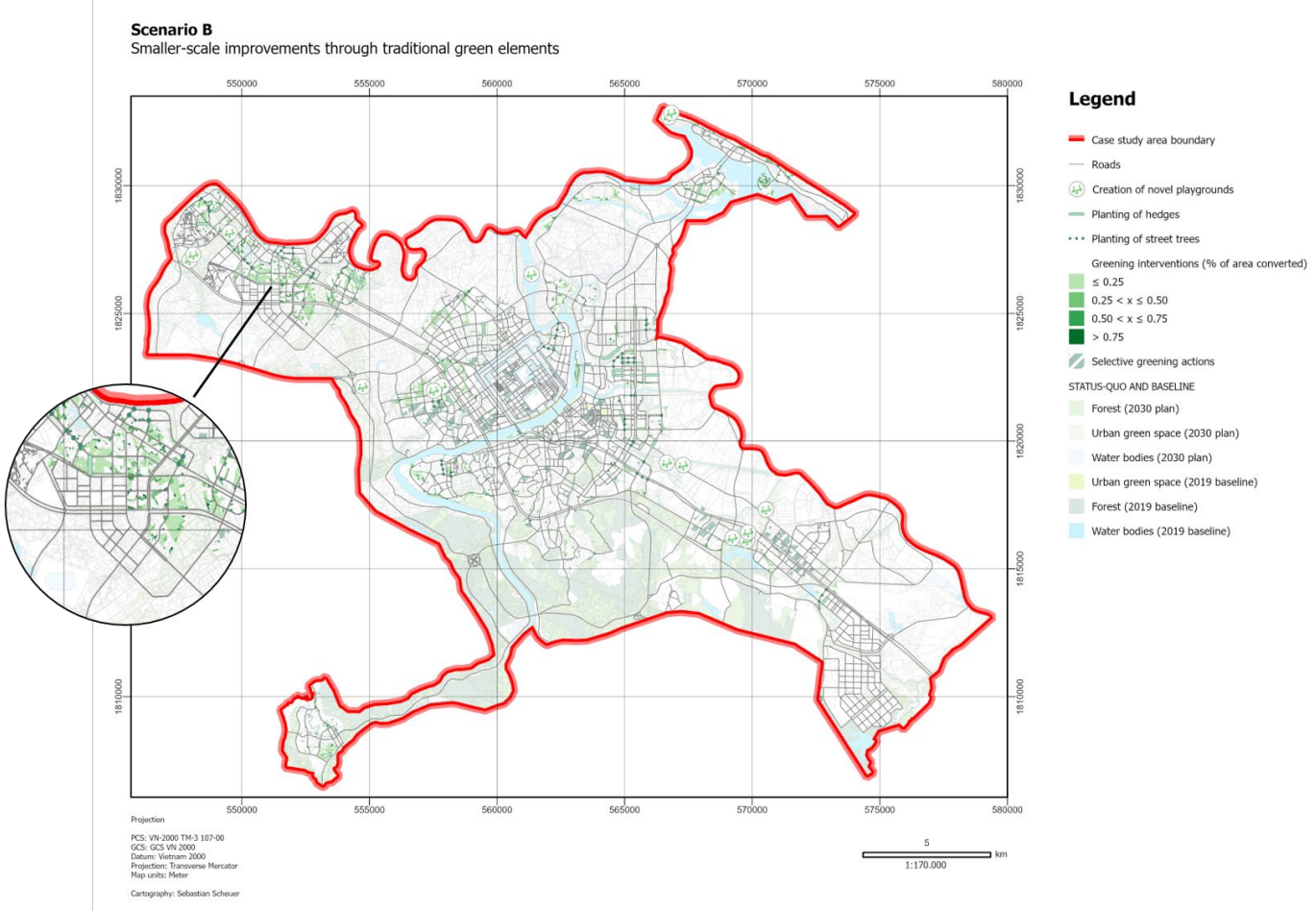


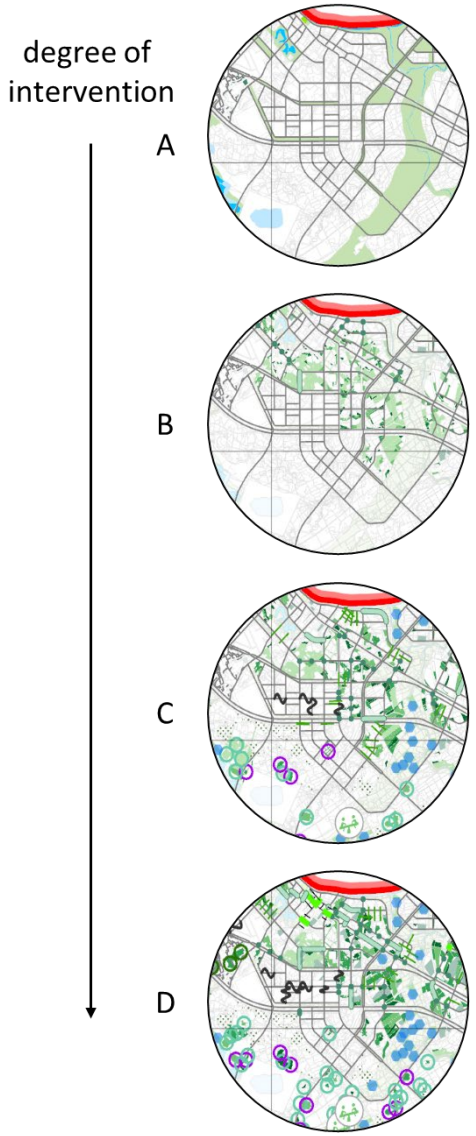


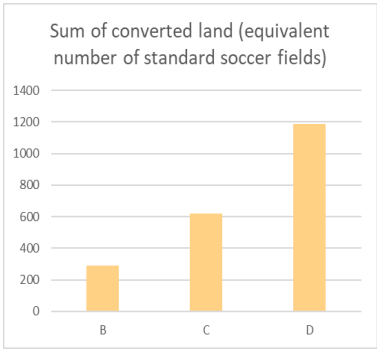
Converted land in addition to status-quo (2030 planning), excluding selective measures and interventions in transportation land.

Increasing resilience and improve human health and well-being

LuLab toolbox







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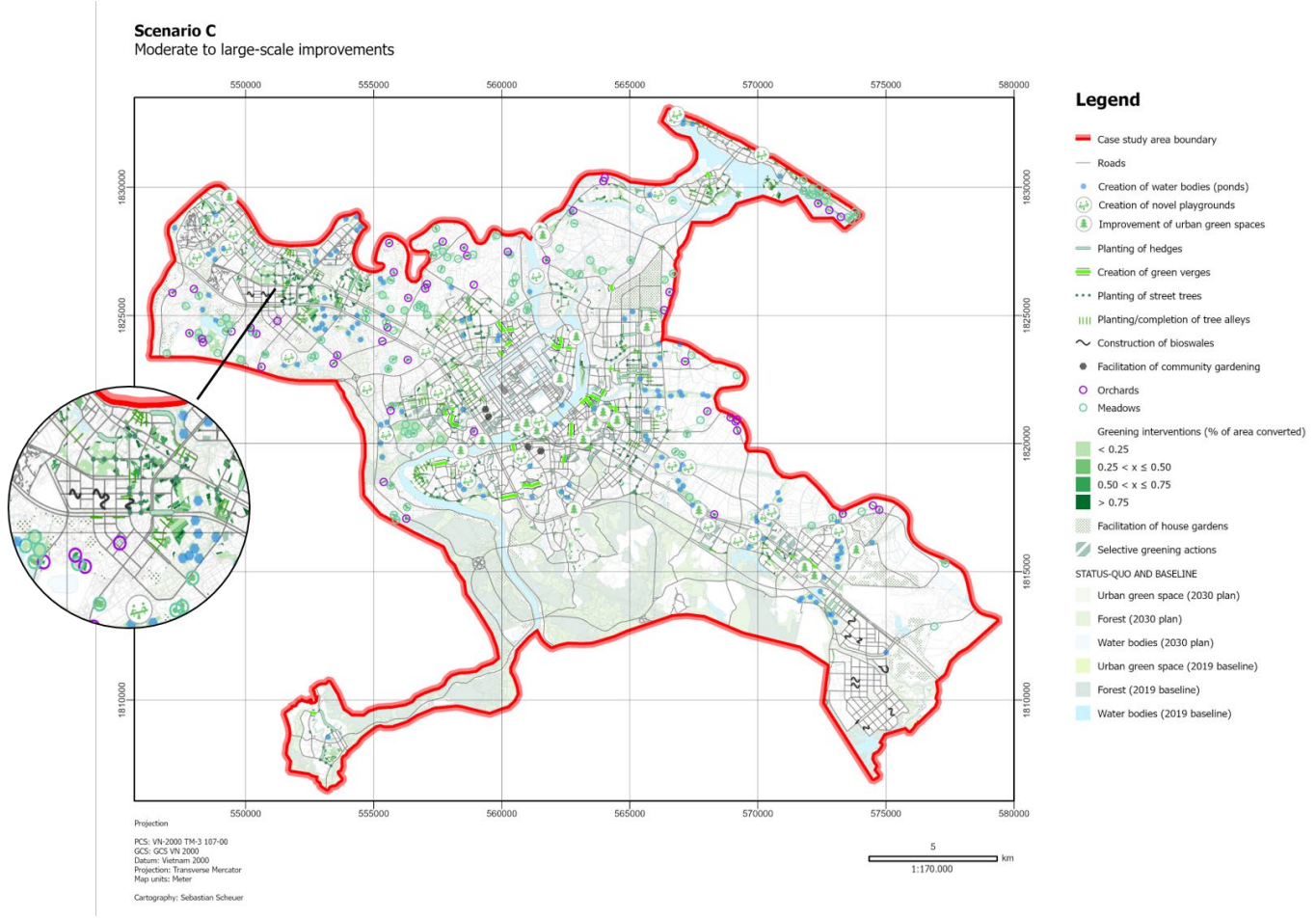

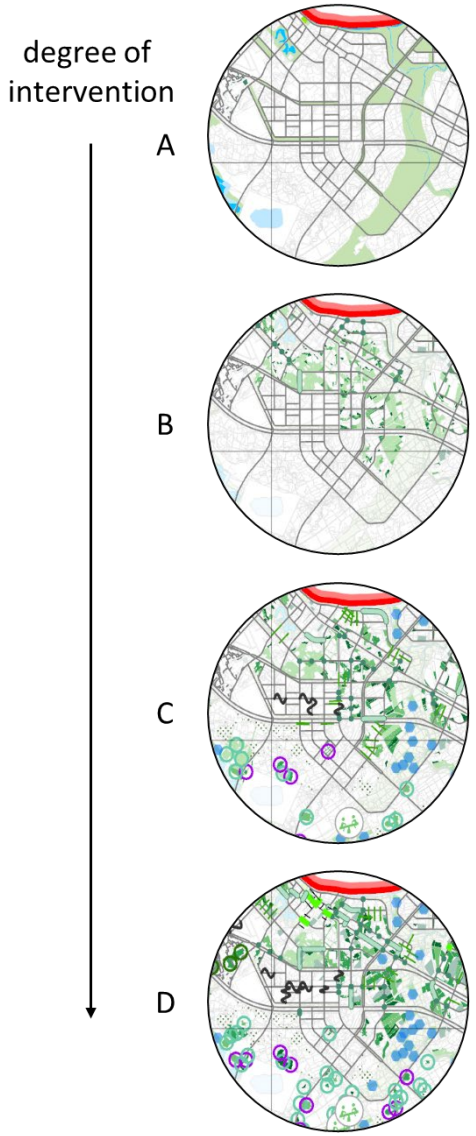

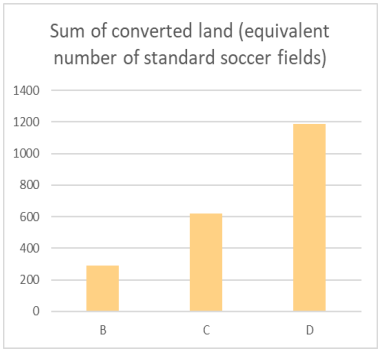

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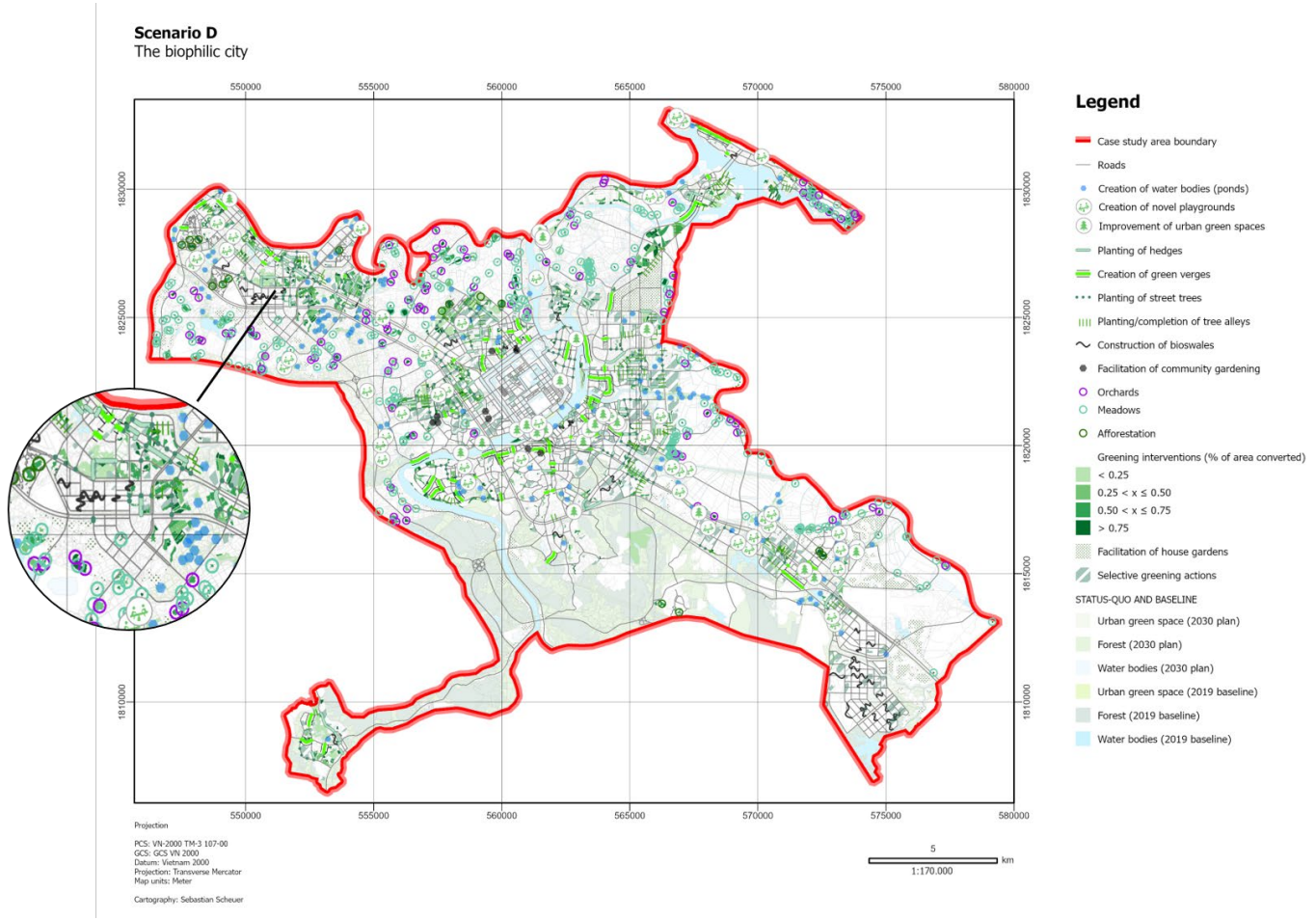

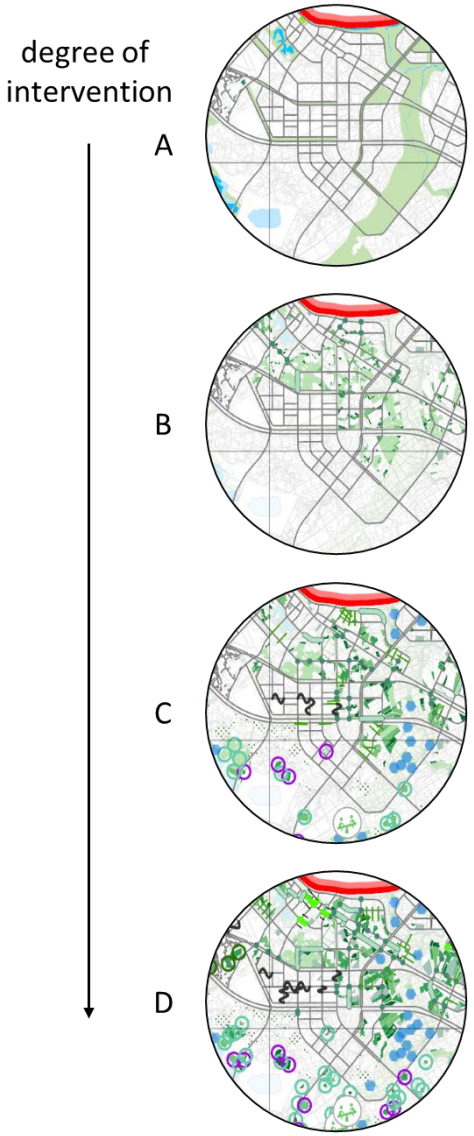

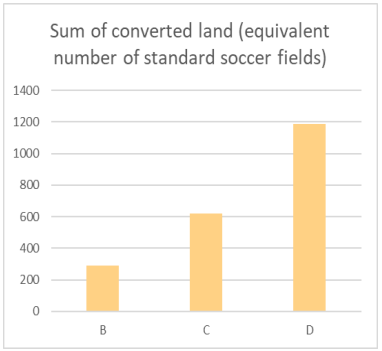

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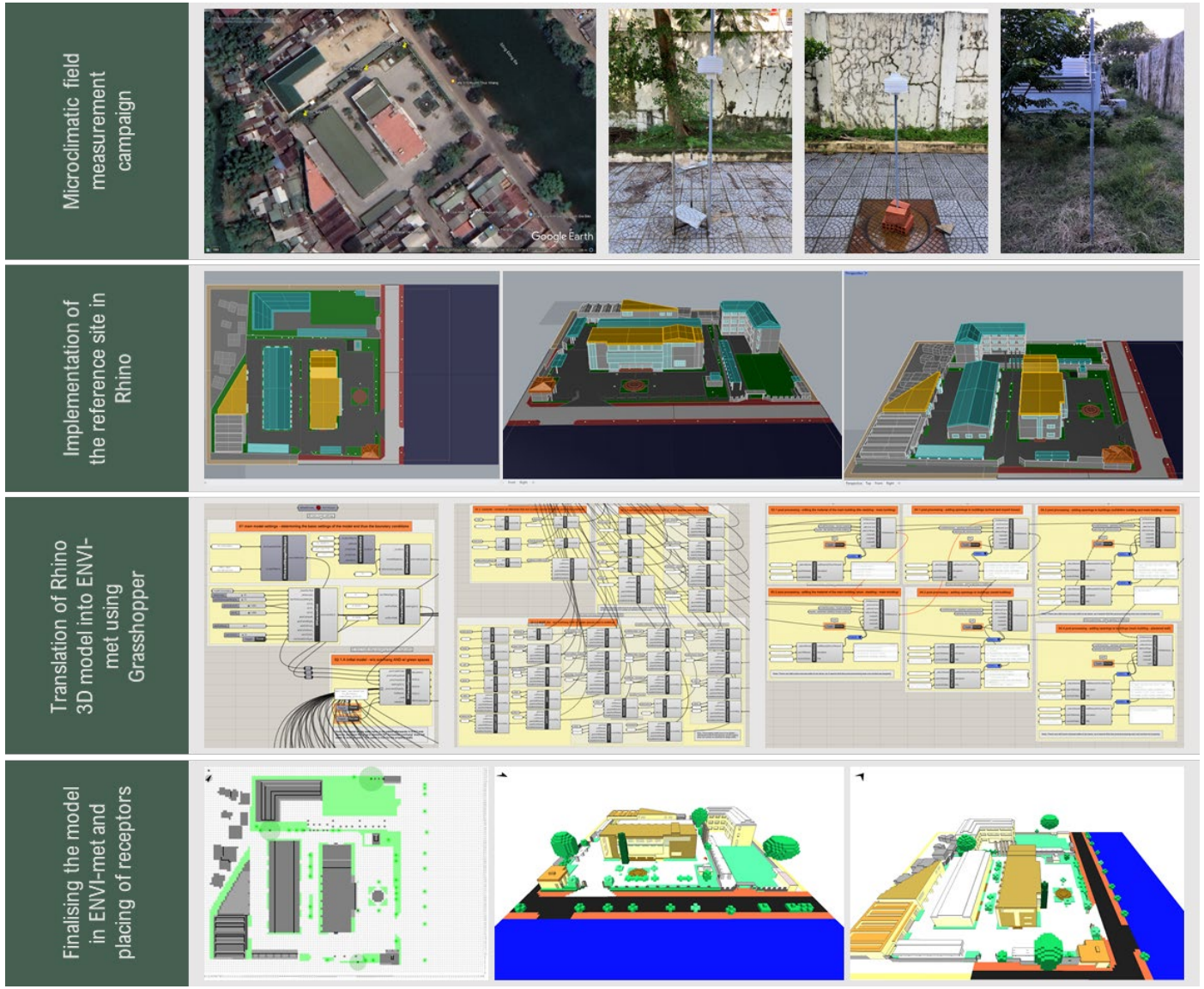

Increasing resilience and improve human health and well-being

Key strategies for a “green, inclusive and resilient recovery” (Asian Development Bank, 2020)

- Increase climate resilience, amongst others, by **facilitating adaptation to heat stress by regulating air temperature and thermal comfort through evapotranspiration, shading**
- Strengthen human health, amongst others, through **removal of air pollutant**
- Protection of biodiversity and ecosystem services, amongst others, to enable **secure access to water**
- Connect actions to local development goals to promote job creation, e.g., in the tourism sector (eco-tourism)

Thank you for your attention!

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