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# Urban Green Infrastructure for Climate Change Adaptation: the case of Addis Ababa

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# Green Infrastructure

- GIs is an important strategy to climate change adaptation and mitigation in urban areas
- IPCC (2014) & SDGs 11 (Sustainable Cities and Communities) suggested maintenance of urban green spaces (UN 2015)
- The integration of GIs in urban planning is an effective approach for climate change adaptation (e.g to improve local temperature, storm water management)



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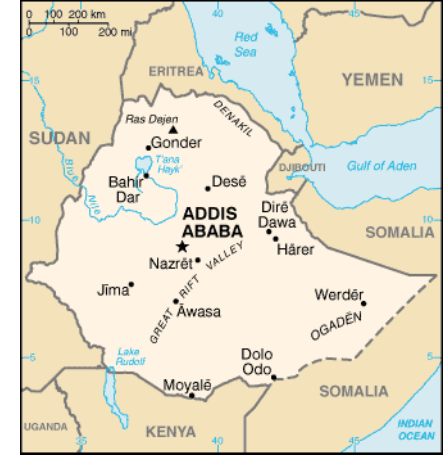
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# Aim

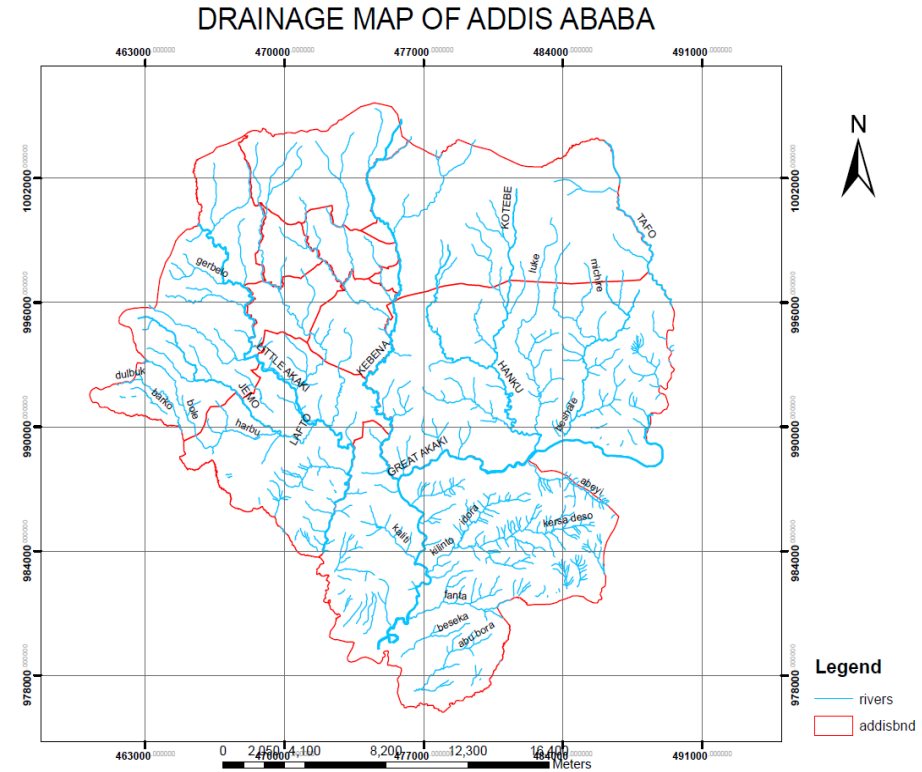
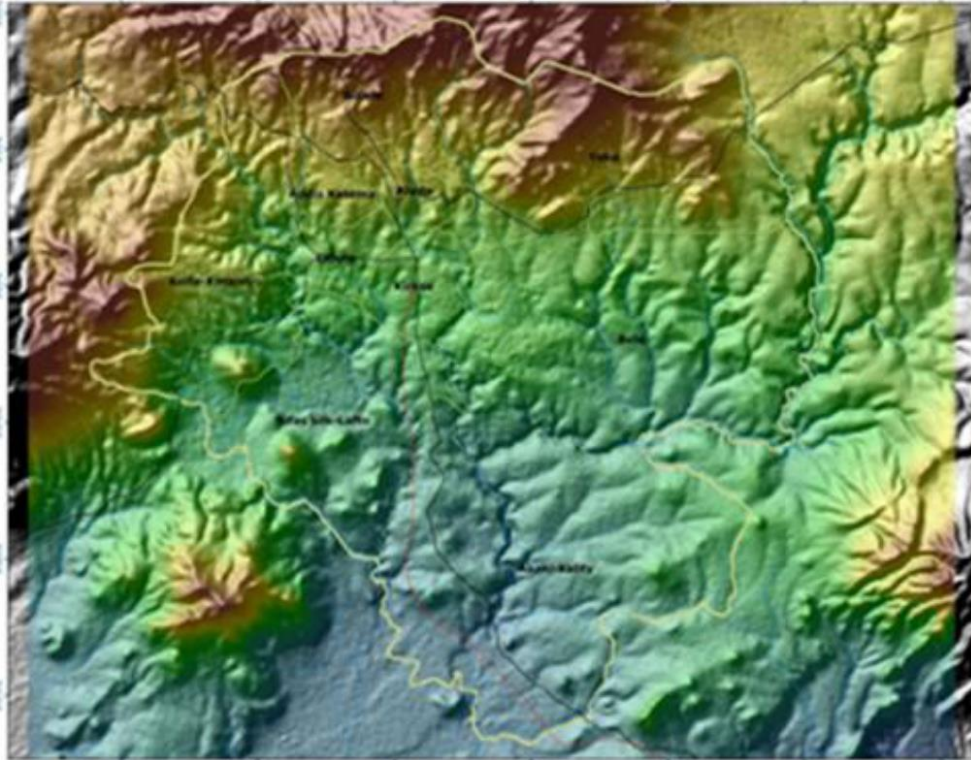
- To present how Addis Ababa city's structure plan considered UGI for climate change adaptation using the implementation of the SDG identified in the city master plan.

# Addis Ababa

- Capital & prime city of Ethiopia
- Seat of African Union and UN-ECA
- Founded in 1886
- Area = 520 km<sup>2</sup>
- Altitude: 2100-→3000 m asl
- Climate: subtropical highland dry winter and wet summer
- Annual Rainfall: 1089 mm
- Mean Temp = 15- 18<sup>0</sup>C
- Population = 4 million
- One municipality
- 11 sub-cities
- 116 woreda (districts)



# Topography and Drainage



- Mountains surround the city
- Slopes: steep, rolling and gentle
- Valleys

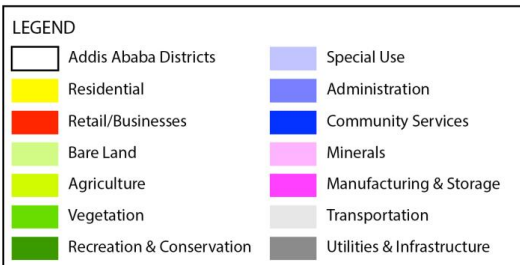
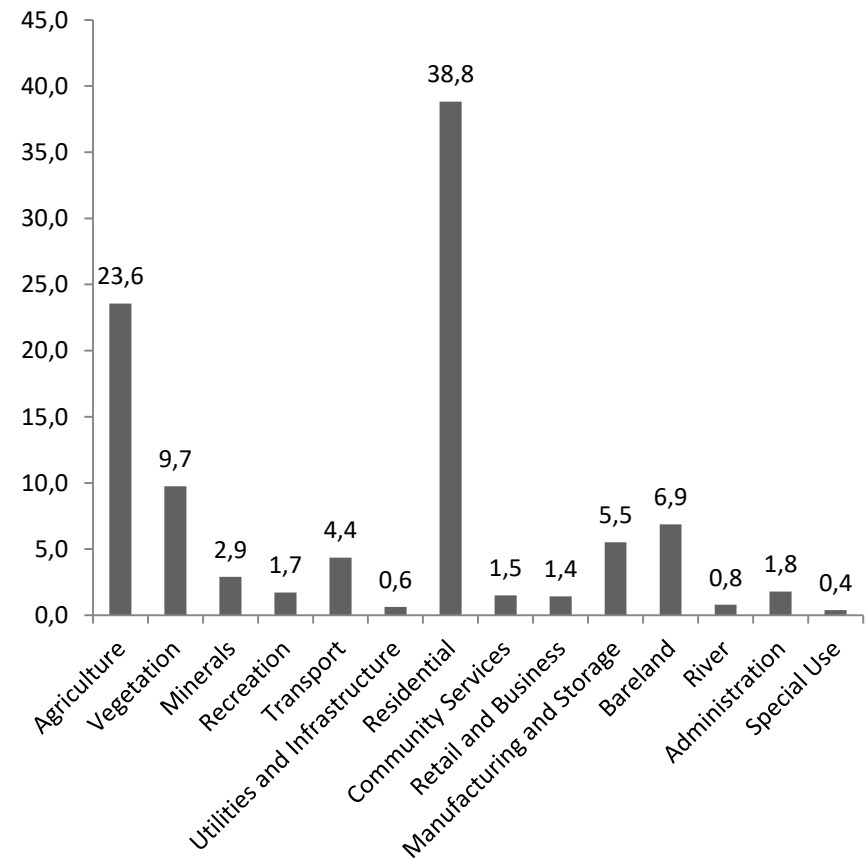
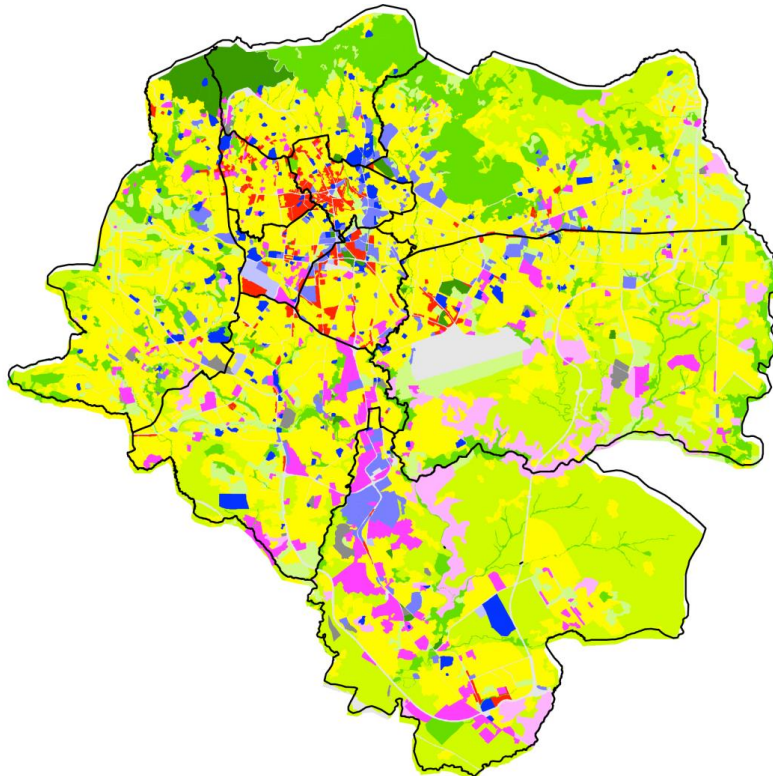
- 7 major rivers
- 72 streams



## Assessment of land use/land cover

Land use of Addis Ababa (Larsen & Yeshitela 2017)

57.6% built up  
35.6% green space  
6.8% bareland





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# Green Space of Addis Ababa



- Field Crop
- Vegetable farm
- Plantation forest
- Institutional forest
- River
- Grassland
- Park



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# Environmental problems

- Inadequate public parks (Per capita GS =  $<1 \text{ m}^2/\text{person}$ )
- Flooding during the rainy season
- Urban heat island







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# Green Space in the Structure Plan of Addis Ababa

The city's development guided by structure plan

Structure plan prepared/revised every 10 years

Urban Green space is part of the environmental  
planning component of the current structure plan

# Core principles of Green Space planning of Addis Ababa

- Environmental features of a landscape characterized by climate, soil, water, topography, flora, fauna and their ecological relationships determine the suitability of the landscape for a certain type of green space.
- Emphasize the multi-functionality and multiple ecosystem services to urban and peri-urban population.
- Ensuring the sustainability of green space and the ecosystem entails providing services not only for the current generation but also for generations to come.

# Green space planning approach

- The planning of green spaces based on the ecosystem services approach.
- ES defined as the benefits/services that a functioning ecosystem provides to people
- The Structure Plan assumed that the ES approach allows taking the SDGs into account in developing ecologically sustainable urban regions



# Green space planning goals








- Goal 1: Bringing networked multifunctional green spaces that could contribute to environmental protection, economic development and social equity
  - Rehabilitation of river buffers
  - Plant shade providing trees on pedestrian walkways
  - Development and management of multifunctional green space on hills and mountains



# Green space planning goals

- Goal 2: Increase the per capita accessible green space
  - Development and management of recreational parks to raise per capita green space to 5.2 m<sup>2</sup>/person
  - Public parks to be developed at distance of 0.3 km to 10 km from residential areas

# Role of GI of Addis and its link to SDGs

SDG	Proposed GS plan in the structure plan
 <p><b>2</b> ZERO HUNGER</p>	Provision of fresh healthy food ( <i>SDG 2-Zero Hunger</i> )
 <p><b>3</b> GOOD HEALTH AND WELL-BEING</p>	Street trees to provide a better pedestrian environment through shading ( <i>SDG 3-Good Health and Well-being</i> )
 <p><b>6</b> CLEAN WATER AND SANITATION</p>	Sustainable stormwater management as a mechanism for reducing water pollution and enhancing water quality ( <i>SDG 6-Clean water and sanitation</i> )
 <p><b>8</b> DECENT WORK AND ECONOMIC GROWTH</p>	Special Parks for enhancing the attractiveness of the city for tourist destination ( <i>SDG 8-Economy</i> )
 <p><b>11</b> SUSTAINABLE CITIES AND COMMUNITIES</p>	Accessible recreational space ( <i>SDG 11-Sustainable Cities and Communities</i> ).
 <p><b>13</b> CLIMATE ACTION</p>	UGI as one tool to combat flooding ( <i>SDG 13-Climate Action</i> ).
 <p><b>15</b> LIFE ON LAND</p>	Conservation forestry on mountains and hills and along rivers for



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# Conclusion

- UGI typology of Addis Ababa captures all dimensions covered within the SDGs
- UGI typology thus provides an important tool for realizing the SDGs through UGI planning and management
- By providing a range of regulating ecosystem services, UGI of Addis Ababa can play a major role in climate change adaptation

Thank you for your attention