Strategic Development Frameworks for 5 Provincial Capital Cities in Afghanistan

Rapid Landscape Assessments and Probabilistic Urban Expansion Scenario Modeling

2019-2020

Justin Kollar, AICP

PhD, Leventhal Center for Advanced Urbanism, MIT

Former Sasaki Associate Urban Planner and Designer

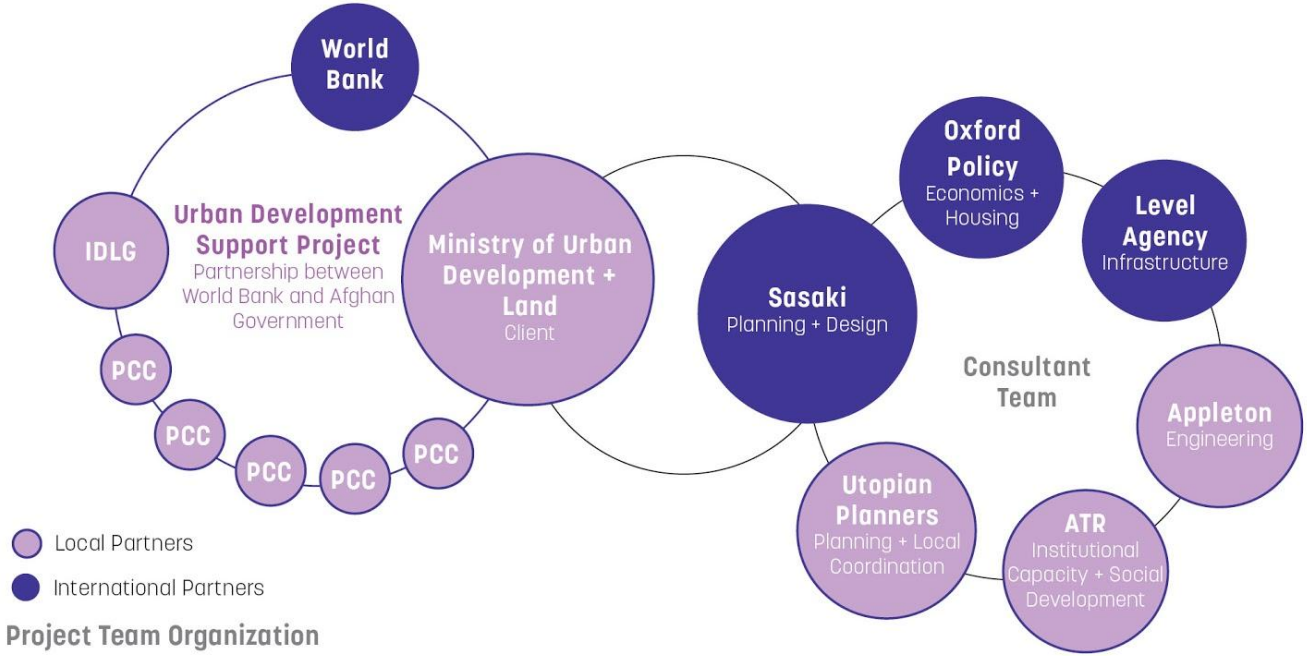
Kai Ying Lau, AICP-C

M.S., Urban and Environmental Policy and Planning, Tufts University

Sasaki Strategies Urban Planner and Spatial Analyst

SASAKI

Team



Project Team Organization

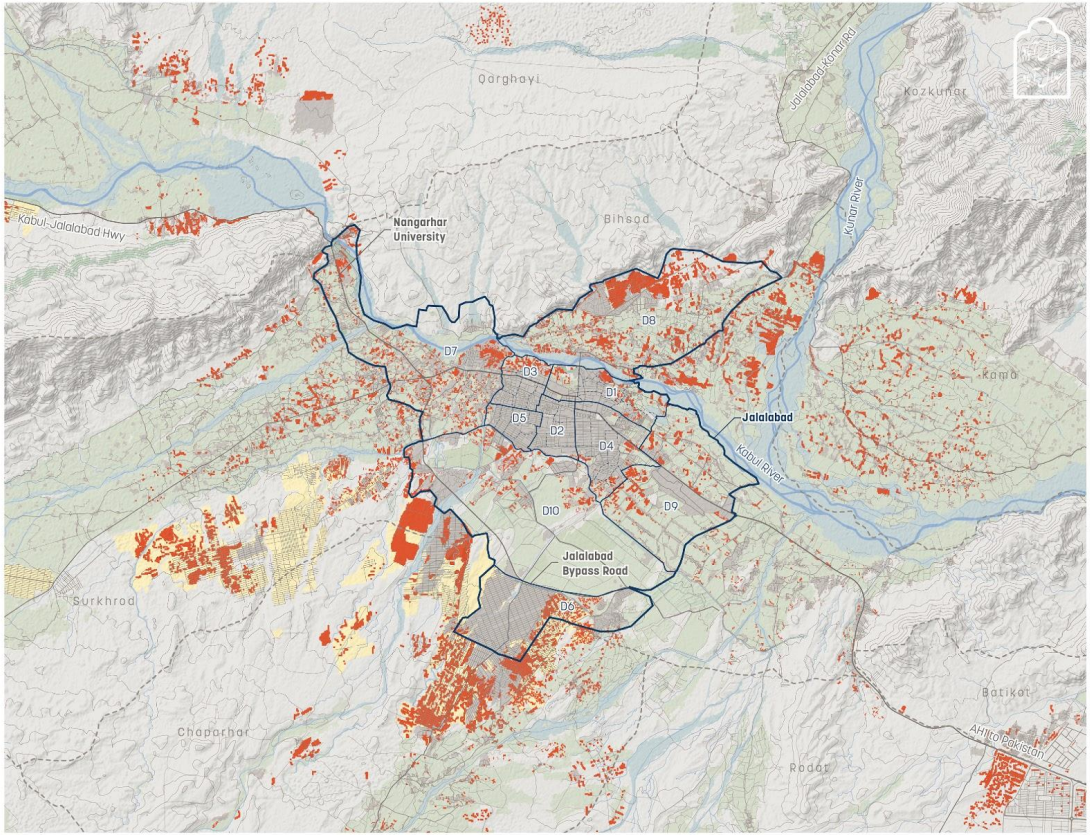
Overall Project Scope

- Evaluate long-term development trajectories of five secondary Afghan cities in the context of uncontrolled, informal urban expansion
- Identify urban design and development strategies to address critical challenges
- Develop a strategic approach for planning with uncertainty that can be translated to other cities in Afghanistan

Key Challenges

1. Rapid urbanization
2. Lack of data and few resources
3. Little urban management capacity and conflict in decision-making circles

Historic Urban Expansion



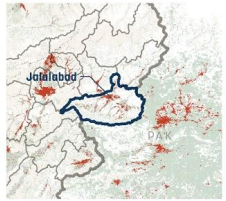
Urban Expansion 2014-2018

Source: FAO Land Cover Database 2015, UN Habitat Land Use Data 2015, Maxar 2018

0 1 2 km N

District Boundary
Municipal Boundary
Nahia Boundary
Gozar Boundary
Roads

Agricultural Areas
Forested Areas
Built-up Areas 2014
Built-up Area Increase by 2018
Plotted Areas (2018)
Water (Floodplain)

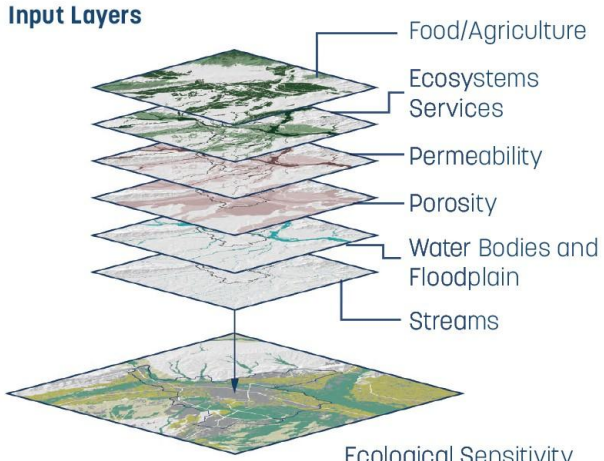


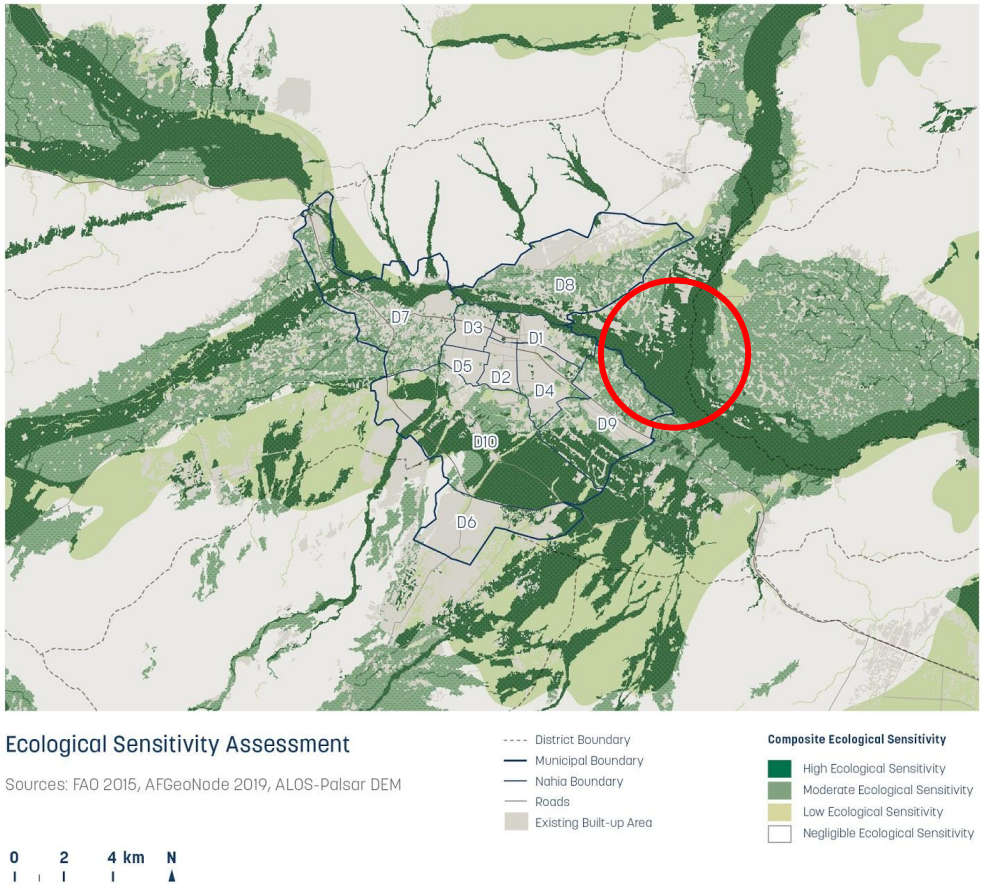
(Right) Urban land cover in Nangarhar province.

Goals for the Analysis

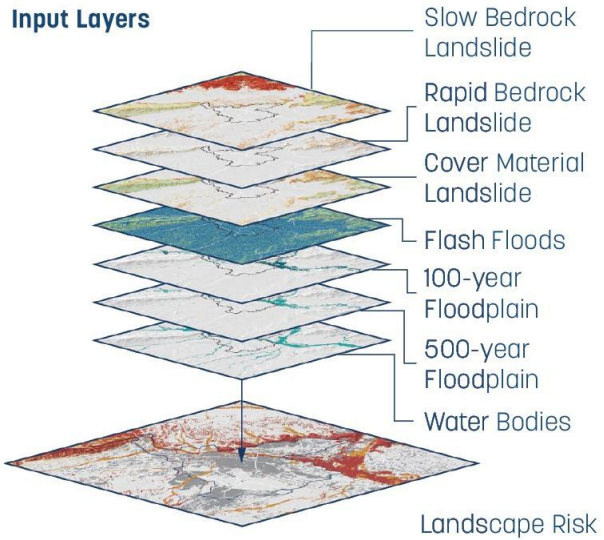
1. Analyze land 'suitability' for directing urban development in a sustainable manner based on unique features of the Afghan context
2. Create models for evaluating urban expansion scenarios based on existing and selected planning and management strategies
3. Convey complex analyses of urban development consequences to a range of engineers, planning staff, and political officials through *visual* representation

Rapid Landscape Assessment: Ecological Sensitivity

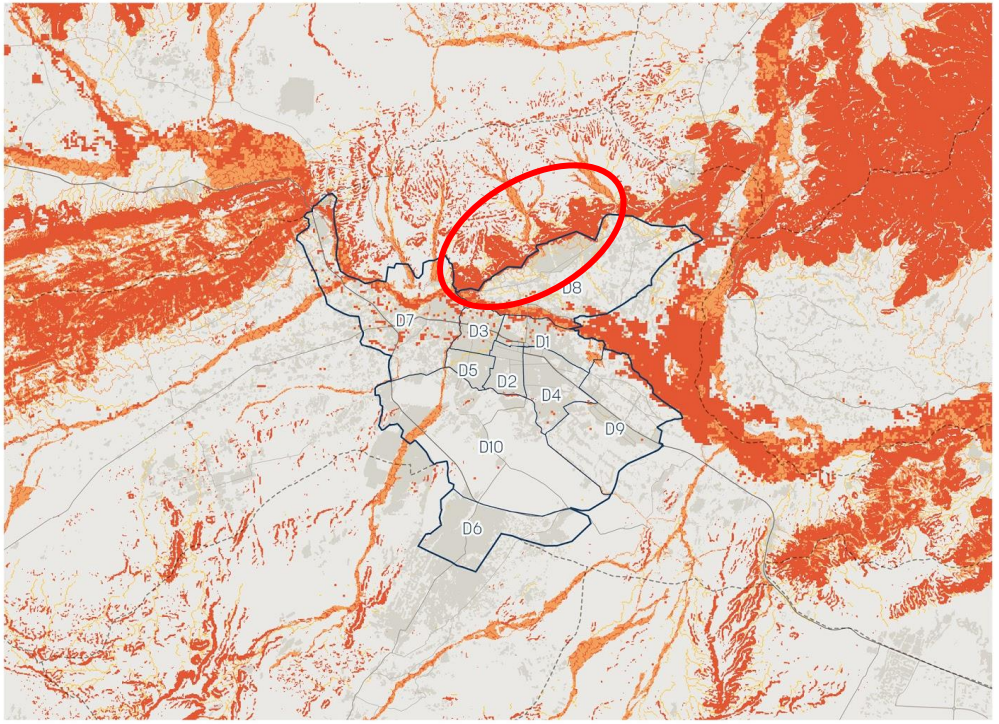




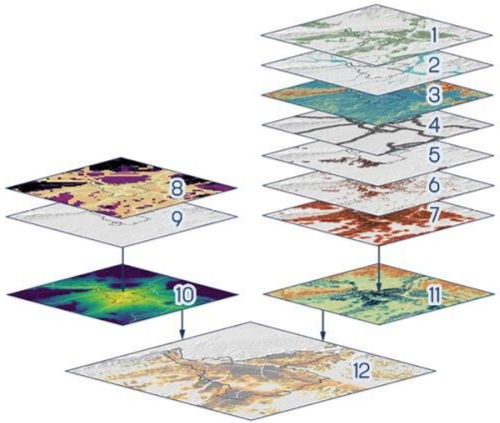
Rapid Landscape Assessment: Environmental Risk



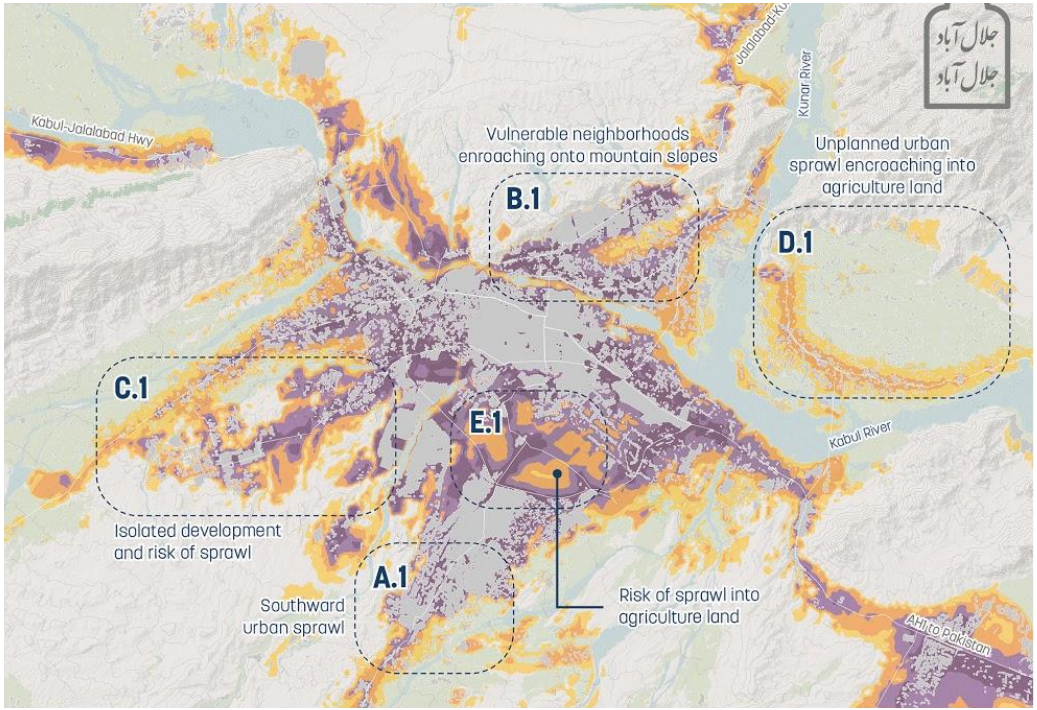
after reclassifying for simple scores



Probabilistic Urban Expansion Scenarios



1. Irrigated Agriculture
2. Water Bodies and Floodplain
3. Slope
4. Proximity to Major Roads
5. Plotted Land
6. Existing Built-up Areas
7. Proximity to Built-up Areas
8. Friction Surface
9. Access Nodes
10. Cost distance (time/ accessibility)
11. Development Desirability
12. Unplanned Urban Expansion (after segmentation by estimated area based on population growth area in 5-year increments)

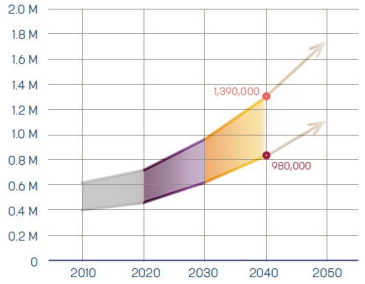


'Business-as-usual' Urban Expansion Scenario

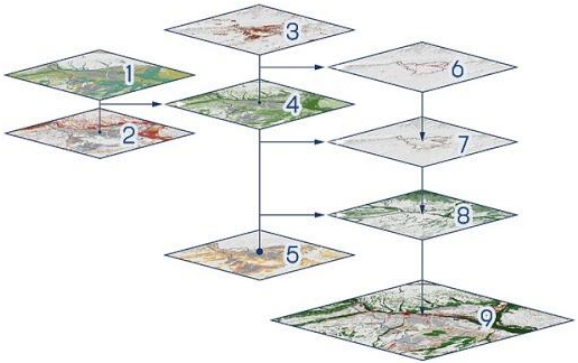
0 1 2 km N

- Existing Built-up Area
- Probable Built-up Area by 2025
- Probable Built-up Area by 2030
- Probable Built-up Area by 2035
- Probable Built-up Area by 2040
- District Boundary
- Municipal Boundary
- Roads
- Agricultural Area
- Water/floodplain

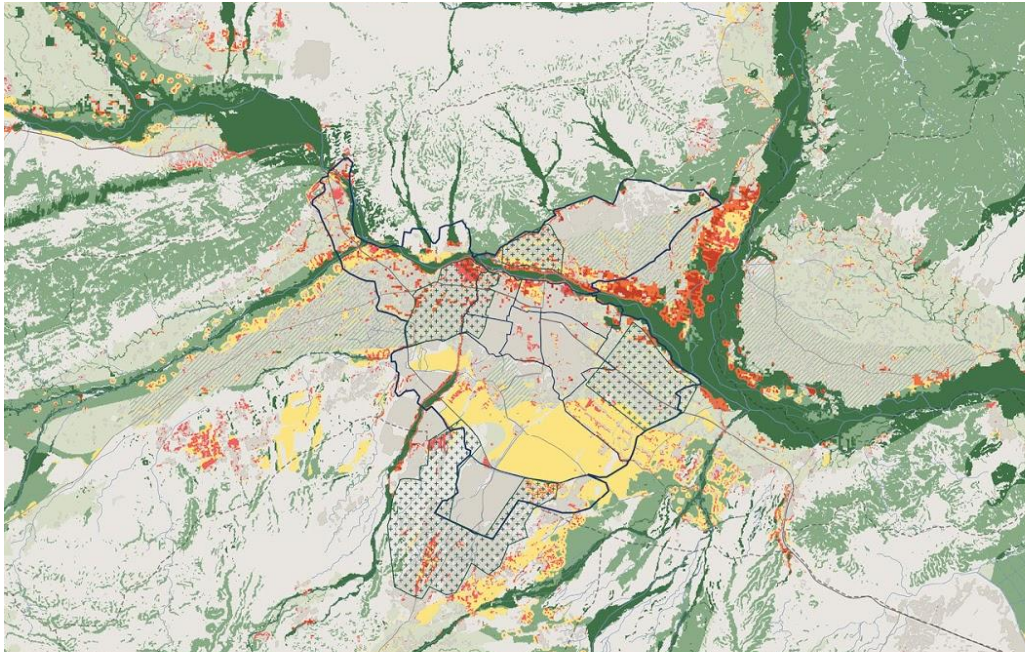
Projected Population Growth:



Spatial Framework Guidelines



1. Ecological Sensitivity
2. Environmental Risk
3. Existing Built-up Areas
4. Composite
5. Urban Expansion Scenario
6. Risk Mitigation
7. Development Limitation
8. Landscape Preservation
9. Preliminary Spatial Framework Zones



0 2 4 km N

Policy Guidelines

High-Priority Mitigation: Identify existing built-up areas within floodplains or on high-slopes with exposure to landslide risk. Prioritize mitigation efforts such as building flood or landscape prevention infrastructure, or consider resettlement program to move populations away from risk areas.

Moderate Mitigation: Identify existing built-up areas within confirmed aquifer recharge capacities. Establish mitigation standards and implement strategies to mitigate pollution and allow for water infiltration.

High-Priority Preservation: Preserve areas that provide high-value ecological services through land use and zoning regulations in coordination with MAIL and NEPA for landscape monitoring.

Evaluation and Protection: Evaluate development pressure and needs. Protect areas that provide moderate ecological services through land use and zoning regulations in coordination with MAIL and NEPA for landscape monitoring.

Development Prevention: Areas with development pressure that have high environmental risk exposure should be limited or deterred from urban development through land use and zoning regulations to mitigate risk or prohibit development

Development Restriction: Place development restrictions in areas with development pressure that provide important ecological services or requirements for implementing development standards to mitigate pollution and allow for water infiltration.

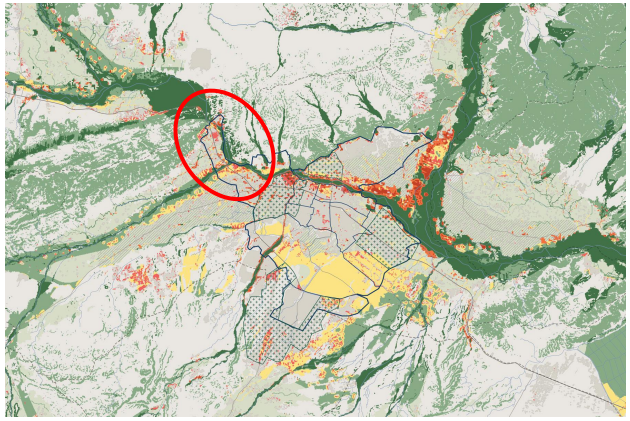
Development Control: Identify areas for control of development. Develop incentives and implement strategies to prepare these areas for sustainable development.

Greenbelt Buffer: Identify agricultural areas to incentivize high-value crop production. Establish development restrictions to disincentivize land conversion, prevent sprawl, and promote compact development

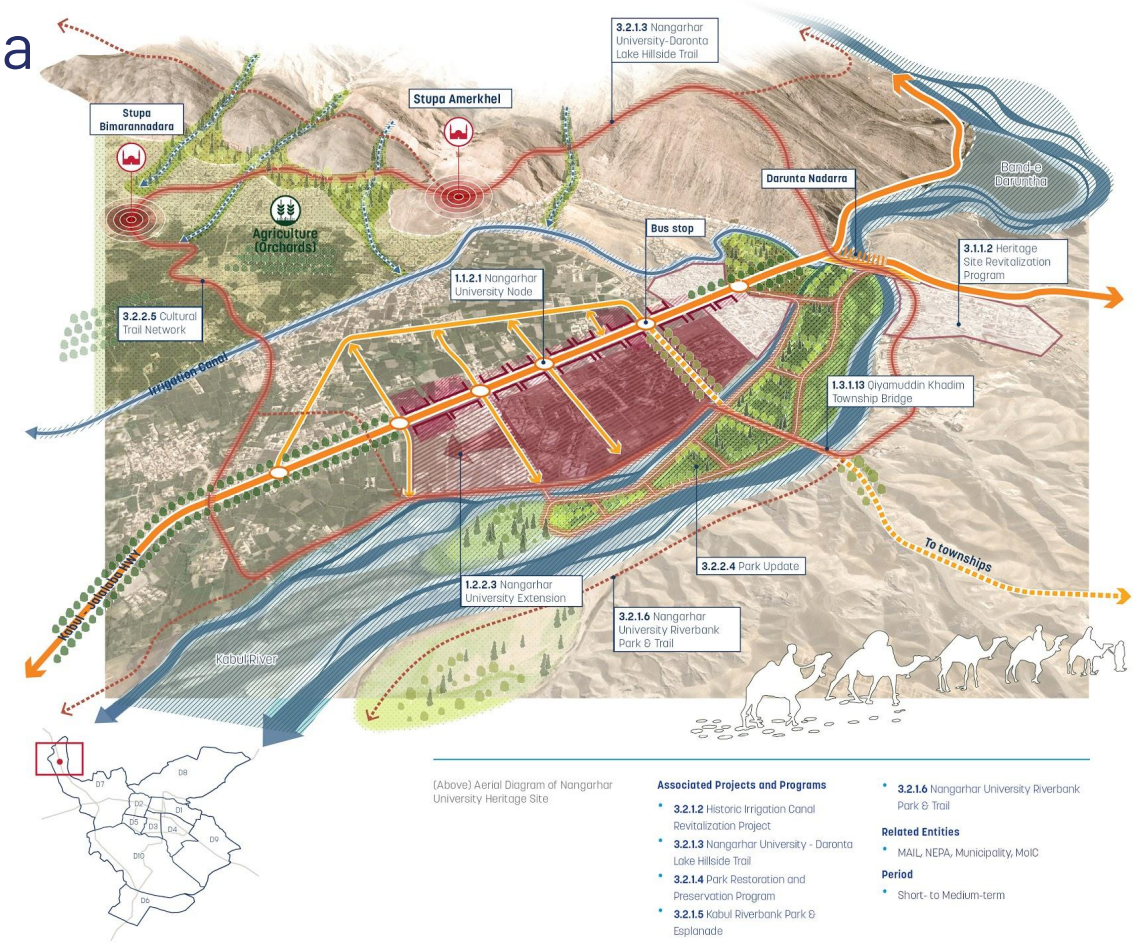
Development Promotion: Existing built-up areas should be reinforced to promote a compact city.

Existing Agricultural Areas: *No particular policy guidelines have been identified, but strategic objectives may make specific recommendations.*

Key Area Example: Nangarhar University Area



Spatial Framework Guidelines



(Above) Aerial Diagram of Nangarhar University Heritage Site

Associated Projects and Programs

- **3.2.1.2** Historic Irrigation Canal Revitalization Project
- **3.2.1.3** Nangarhar University - Daronta Lake Hillside Trail
- **3.2.1.4** Park Restoration and Preservation Program
- **3.2.1.5** Kabul Riverbank Park & Esplanade
- **3.2.1.6** Nangarhar University Riverbank Park & Trail

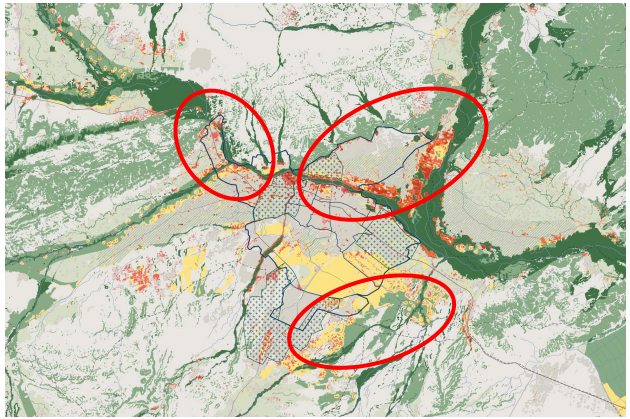
Related Entities

- MAIL, NEPA, Municipality, MoIC

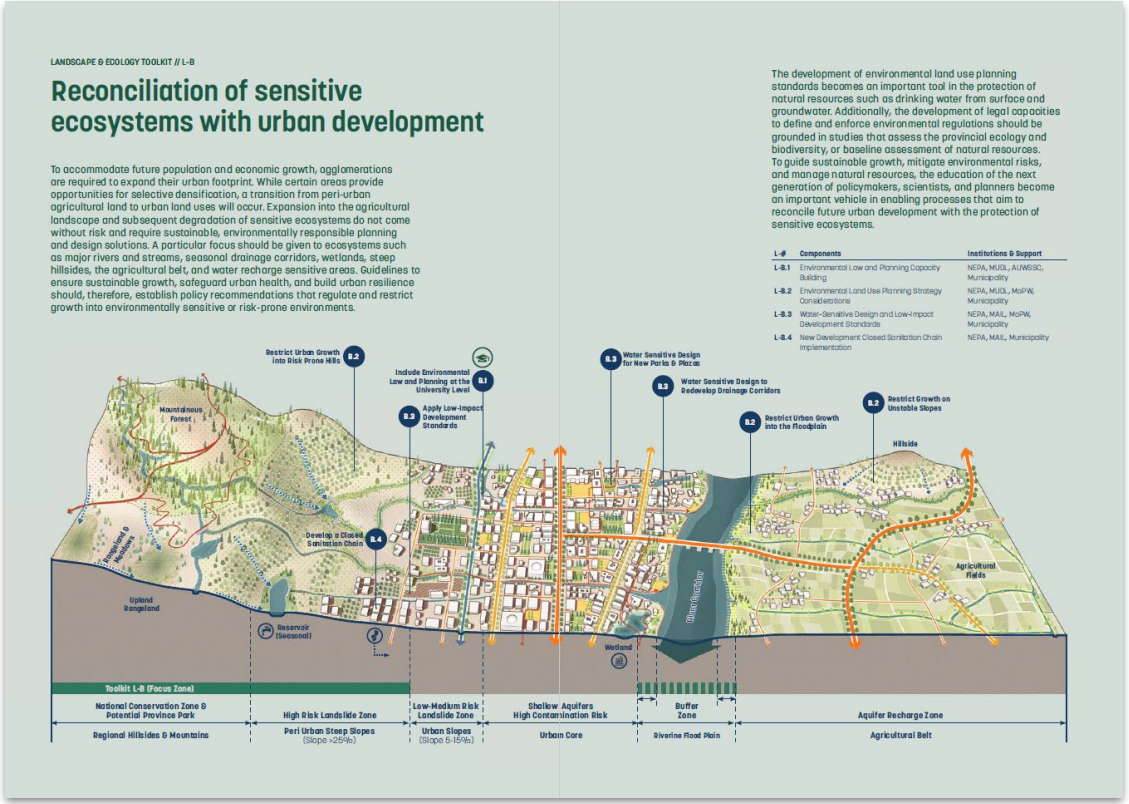
Period

- Short- to Medium-term

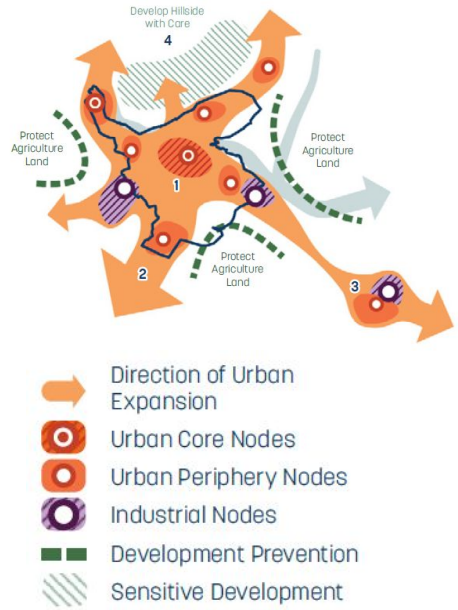
Toolkit Example: Landscape/Urban Interface

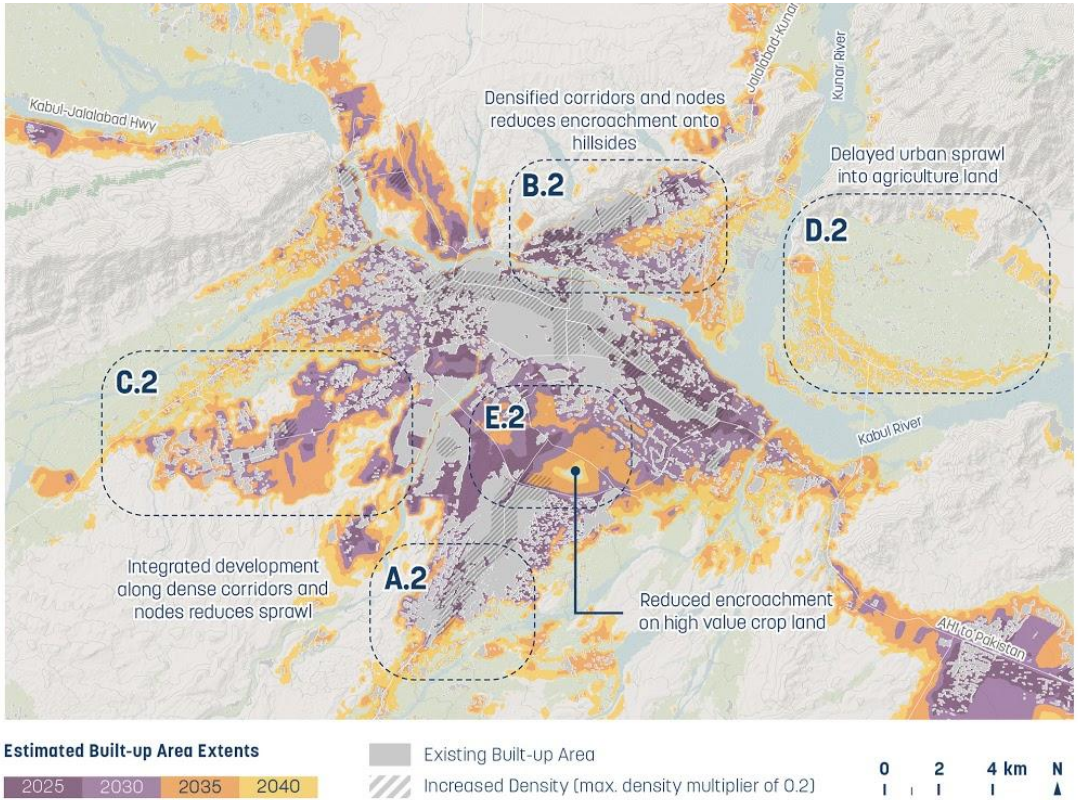


Spatial Framework Guidelines

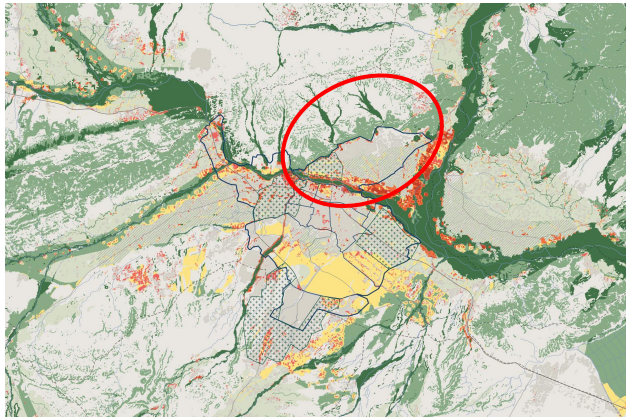


Spatial Framework Guidelines: Recommended Growth Scenario



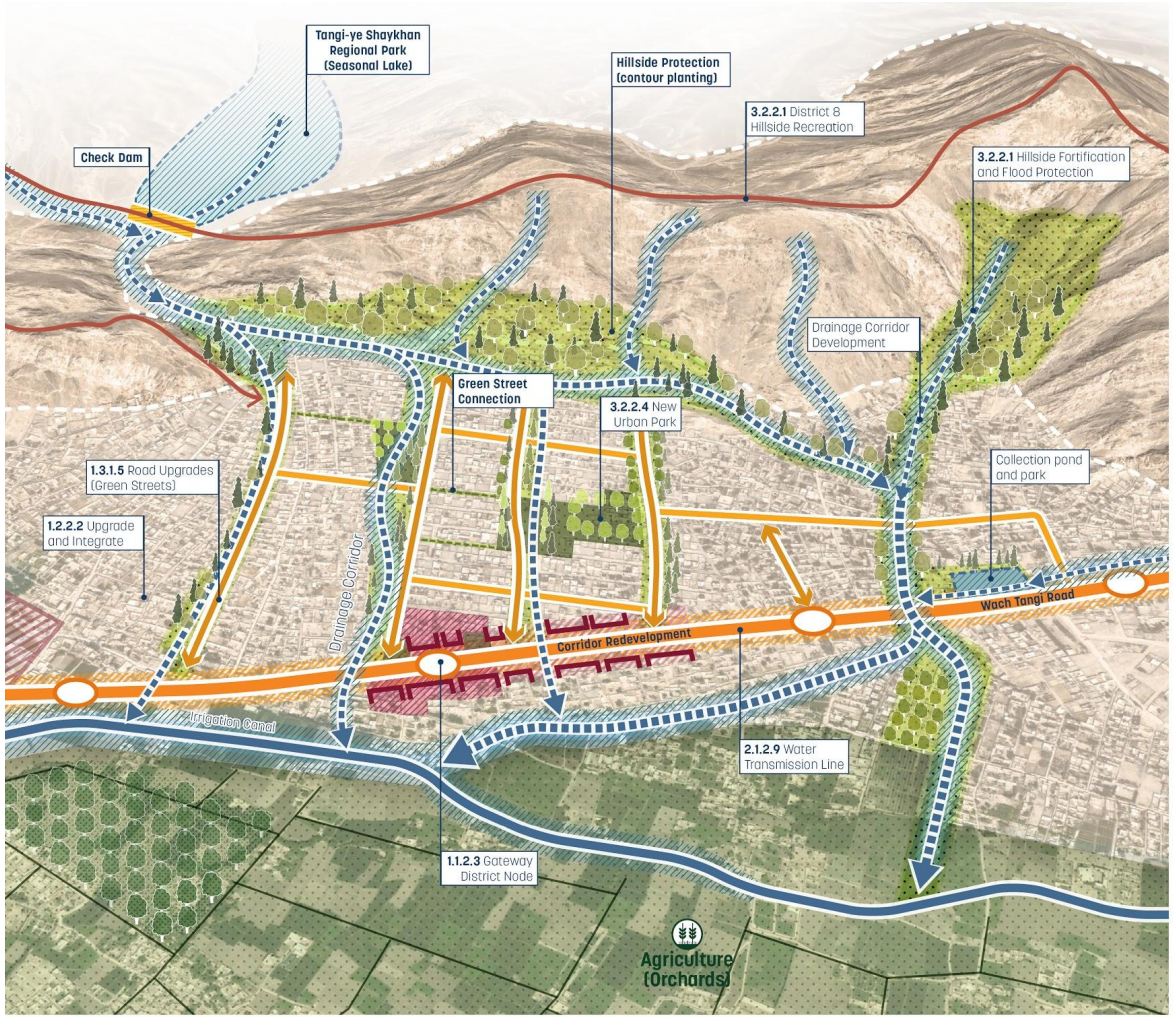


Key Area Example: Northeast Jalalabad



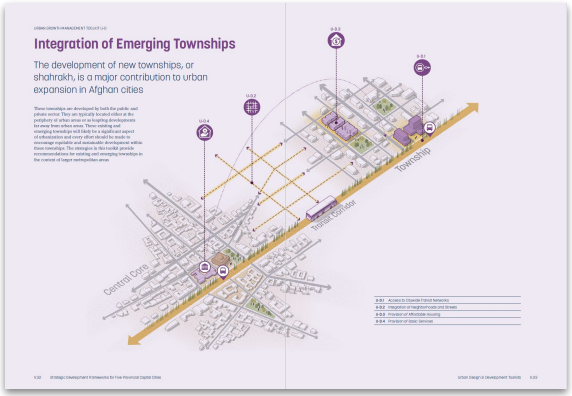
Spatial Framework Guidelines

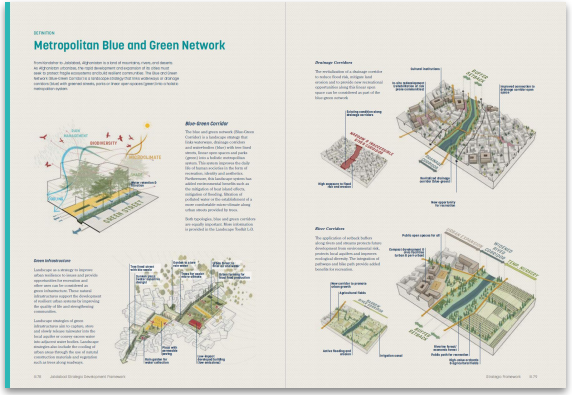
0 2 4 km N



Examples of Themes for Strategies

- Transportation
- Urban Development
- Basic Services
- Cultural Assets
- Landscape and Ecology
- Recreation
- Economic and Social Development
- Governance
- Participation
- ...among others





Future Application

- Further improvement led by Afghan students and planners
- Potential for re-application, flexibility of inputs, and modeling framework that can extend to other cities
- Balance between analysis and open-endedness for a range of administrations

Thank You!

Justin Kollar, AICP
PhD, Leventhal Center for Advanced Urbanism, MIT

justinmkollar@gmail.com
justinkollar

Kai Ying Lau, AICP-C
M.S., Urban and Environmental Policy and Planning, Tufts University

klau@sasaki.com
kaiyinglau