

An aerial photograph of a city and its surrounding landscape. The city is characterized by a dense grid of buildings and streets, with some larger commercial or institutional structures. Surrounding the urban area are extensive agricultural fields, some of which are irrigated, creating a patchwork of green and brown. The overall scene depicts a typical urban-rural interface in a developing region.

Strategic Development Frameworks for 5 Provincial Capital Cities in Afghanistan

Rapid Landscape Assessments and
Probabilistic Urban Expansion Scenario Modeling

2019-2020



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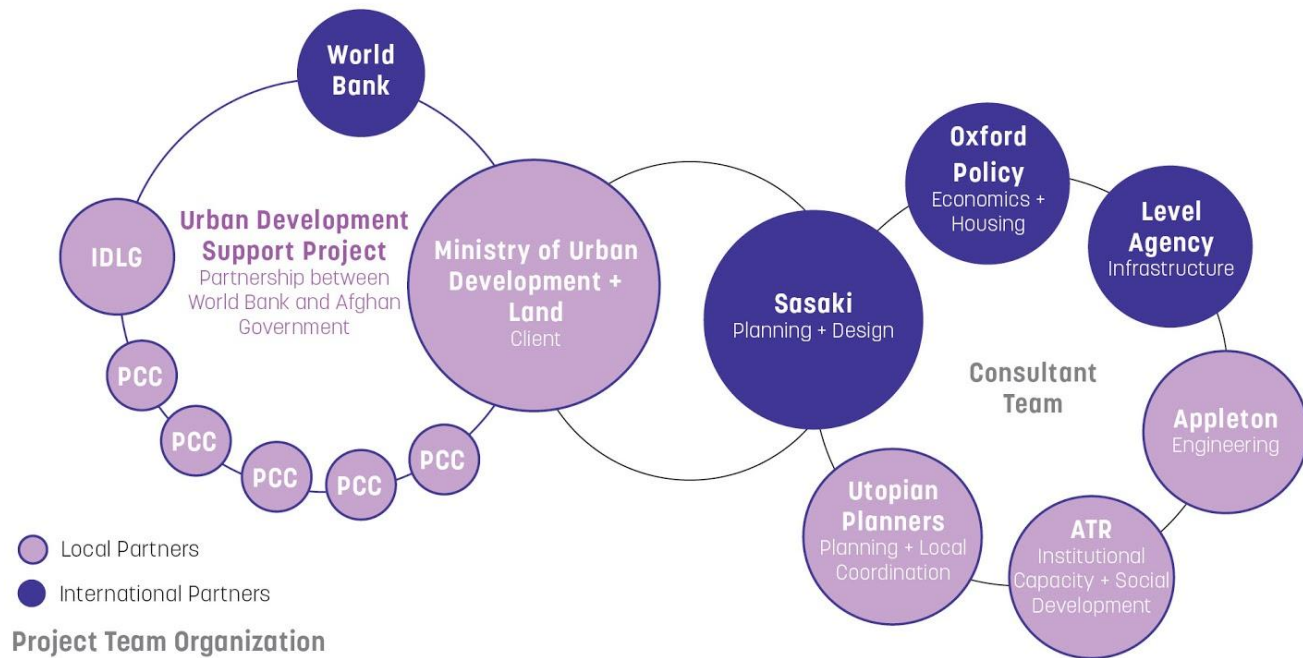
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Sasaki Strategies Urban Planner and
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Team



Overall Project Scope

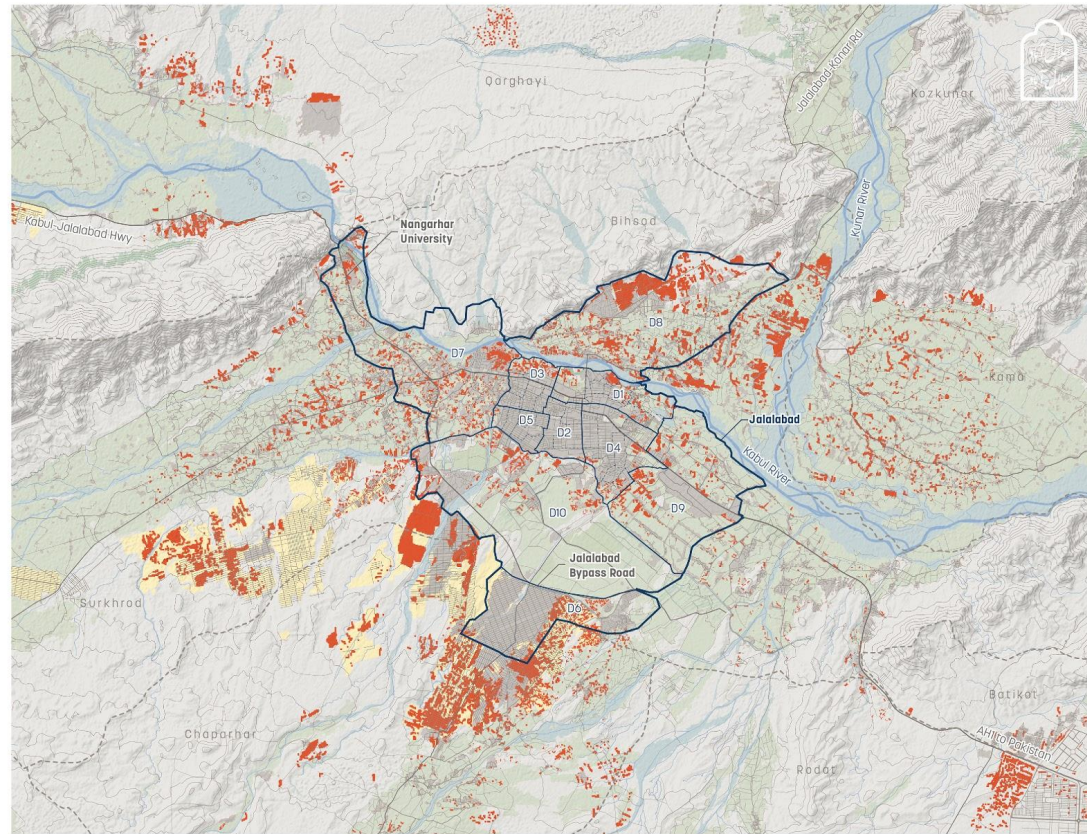
- Evaluate long-term development trajectories of five secondary Afghan cities in the context of uncontrolled, informal urban expansion
- Identify urban design and development strategies to address critical challenges
- Develop a strategic approach for planning with uncertainty that can be translated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

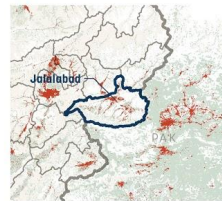


Urban Expansion 2014-2018

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

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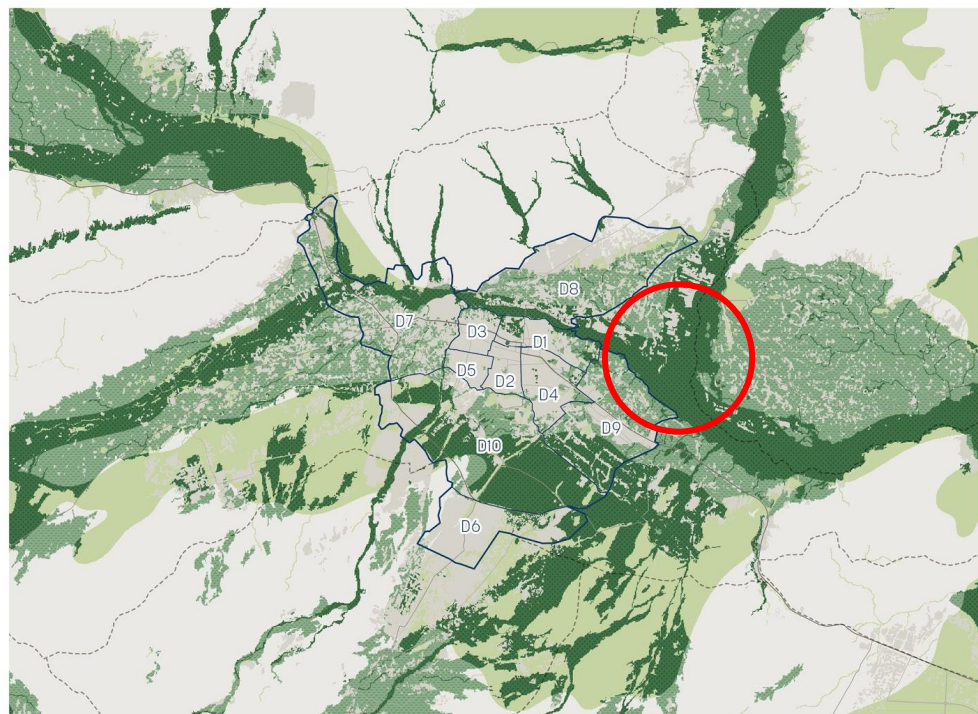
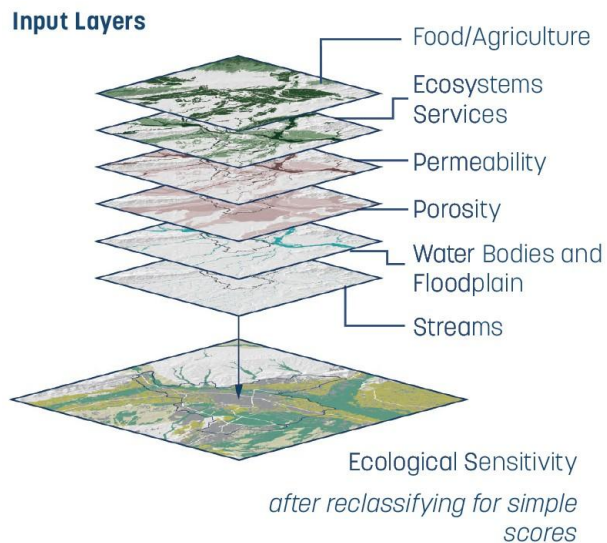
(Right) Urban land cover in Nangarhar province.



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



Ecological Sensitivity Assessment

Sources: FAO 2015, AFGeoNode 2019, ALOS-Palsar DEM

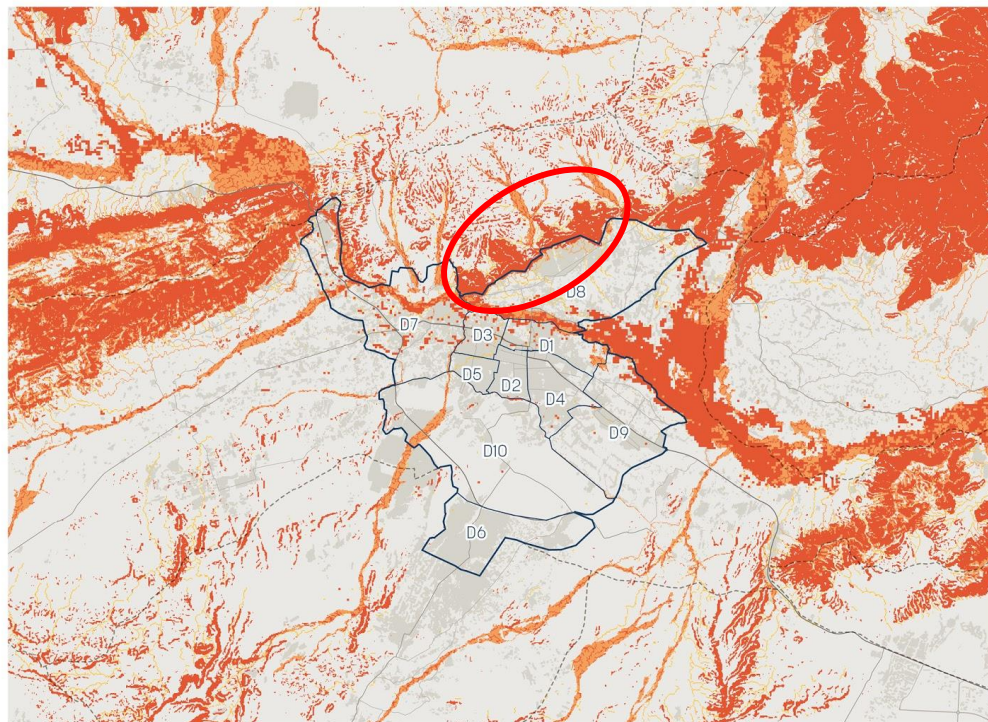
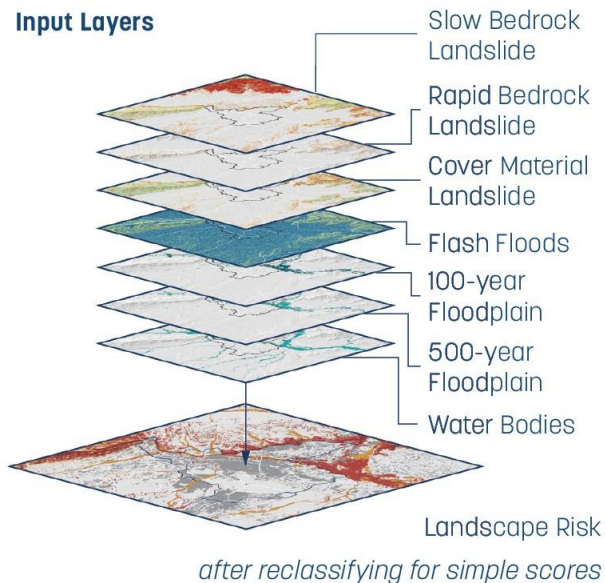
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| | | ▲

---- District Boundary
— Municipal Boundary
— Nahla Boundary
— Roads
Existing Built-up Area

Composite Ecological Sensitivity

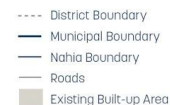
- High Ecological Sensitivity
- Moderate Ecological Sensitivity
- Low Ecological Sensitivity
- Negligible Ecological Sensitivity

Rapid Landscape Assessment: Environmental Risk



Environmental Risk Assessment

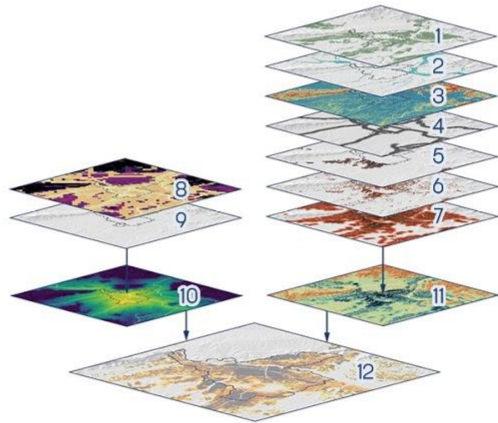
Sources: AF GeoNode 2019, FAO 2015



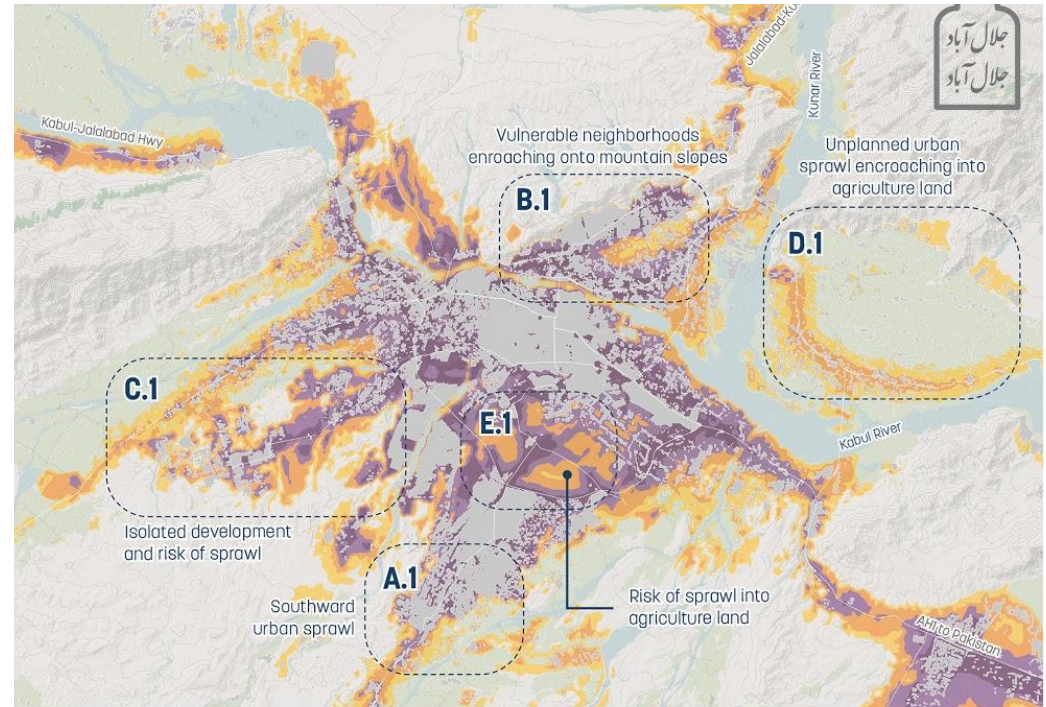
Composite Environment Hazards



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)



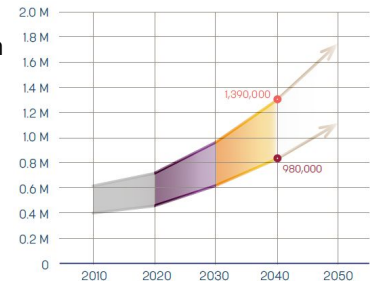
'Business-as-usual' Urban Expansion Scenario



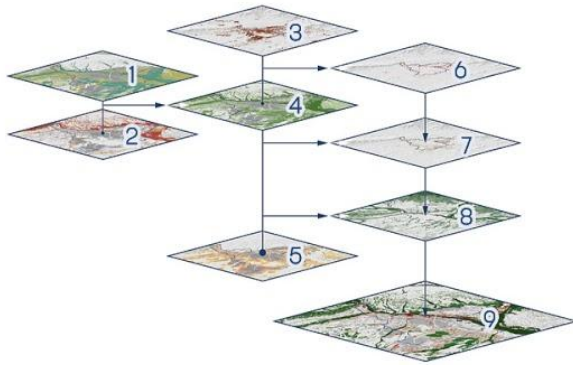
- Existing Built-up Area
- Probable Built-up Area by 2025
- Probable Built-up Area by 2030
- Probable Built-up Area by 2035
- Probable Built-up Area by 2040

- District Boundary
- Municipal Boundary
- Roads
- Agricultural Area
- Water/floodplain

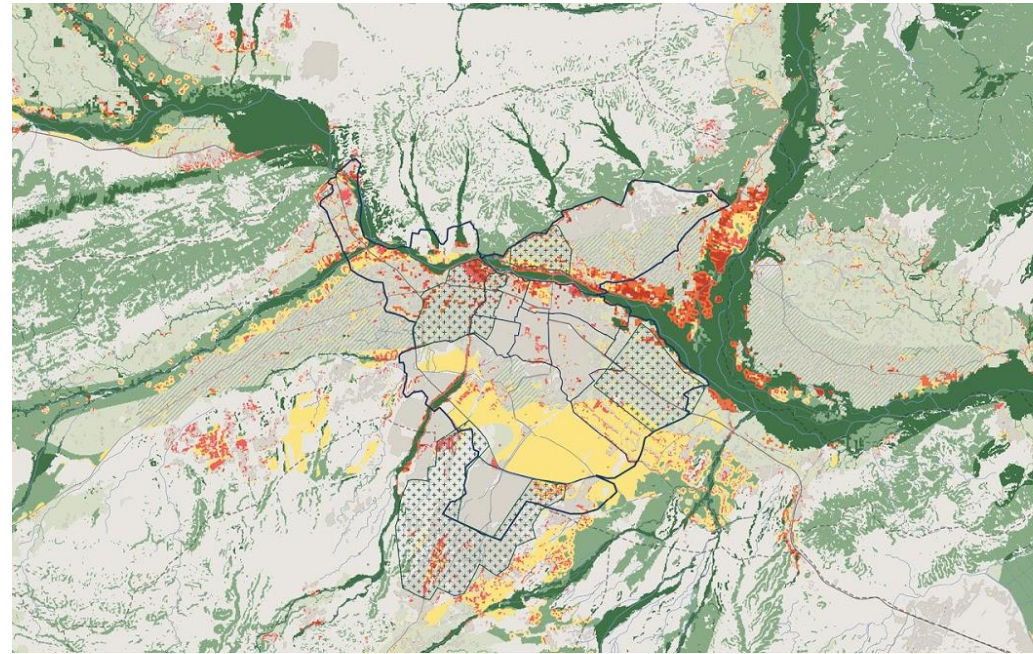
Projected Population Growth:



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



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 landslide 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.

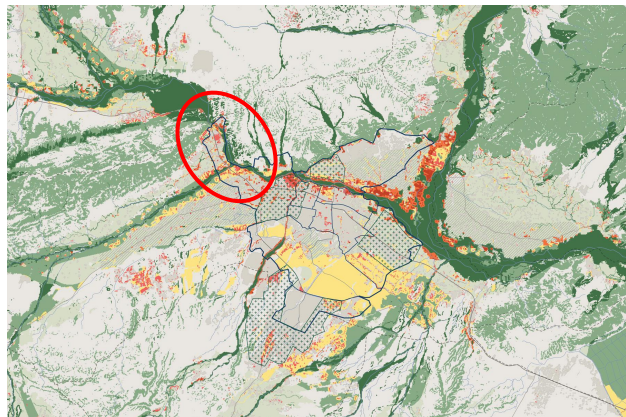
Development Control: Identify areas for control of development. Develop incentives and implement strategies to prepare these areas for sustainable development.

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.

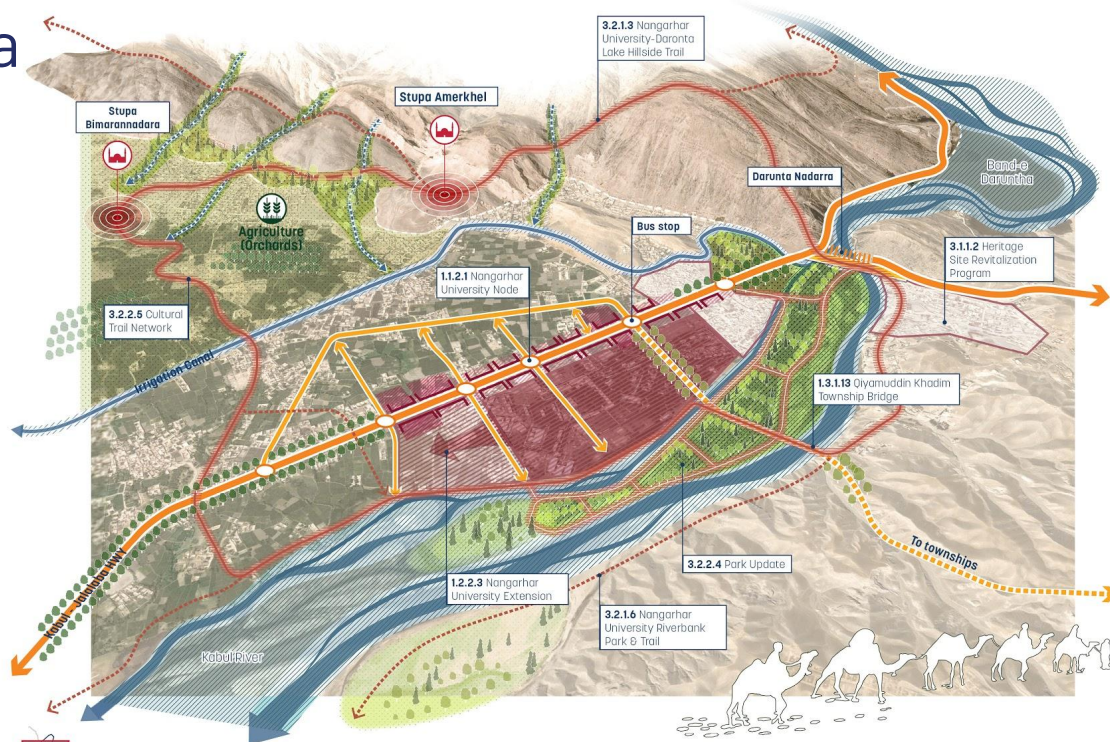
Existing Agricultural Areas: No particular policy guidelines have been identified, but strategic objectives may make specific recommendations.

Key Area Example: Nangarhar University Area



Spatial Framework Guidelines

0 2 4 km N



(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 - Darunta 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

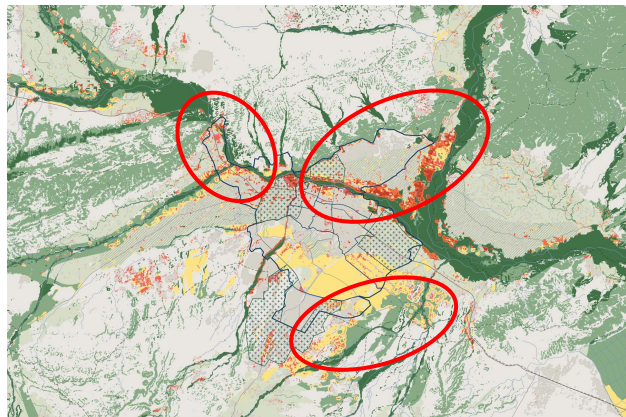
Related Entities

- MAIL, NEPA, Municipality, MoIC

Period

- Short- to Medium-term

Toolkit Example: Landscape/Urban Interface



Spatial Framework Guidelines

0 2 4 km N

LANDSCAPE & ECOLOGY TOOLKIT // L-8

Reconciliation of sensitive ecosystems with urban development

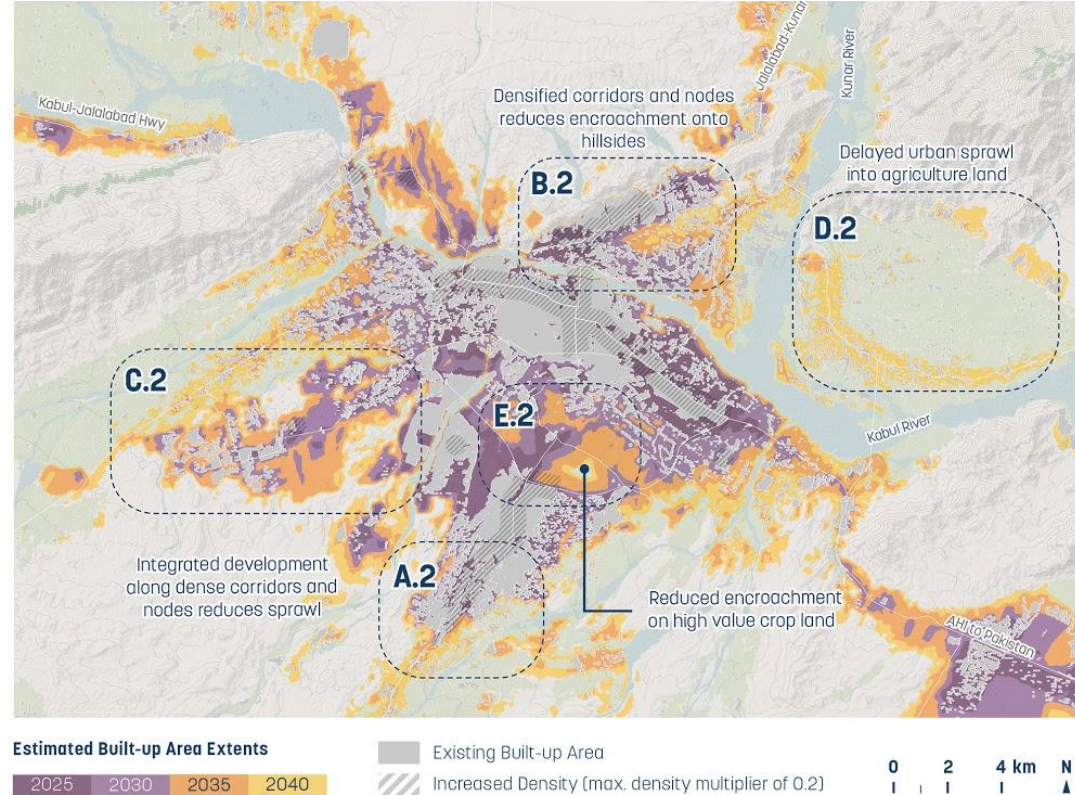
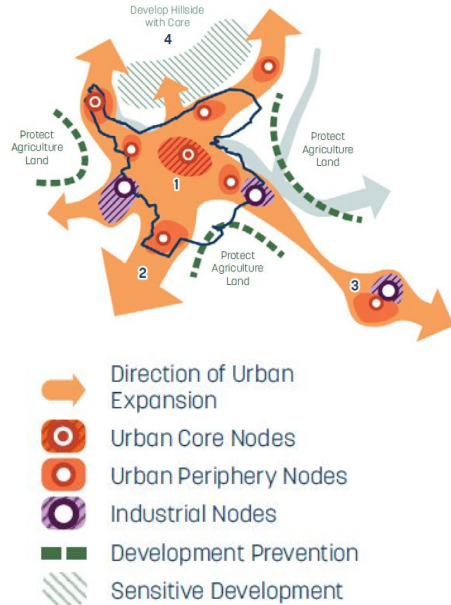
To accommodate future population and economic growth, agglomerations are required to expand their urban footprint. While certain areas provide opportunities for selective densification, a transition from peri-urban agricultural land to urban land uses will occur. Expansion into the agricultural landscape and subsequent degradation of sensitive ecosystems do not come without risk and require sustainable, environmentally responsible planning and design solutions. A particular focus should be given to ecosystems such as major rivers and streams, seasonal drainage corridors, wetlands, steep hillsides, the agricultural belt, and water recharge sensitive areas. Guidelines to ensure sustainable growth, safeguard urban health, and build urban resilience should, therefore, establish policy recommendations that regulate and restrict growth into environmentally sensitive or risk-prone environments.



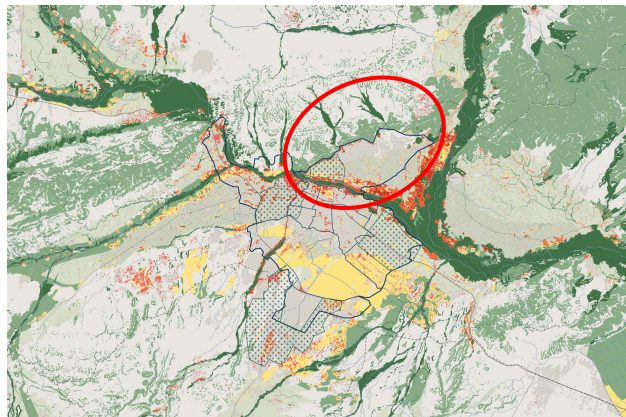
The development of environmental land use planning standards becomes an important tool in the protection of natural resources such as drinking water from surface and groundwater. Additionally, the development of legal capacities to define and enforce environmental regulations should be grounded in studies that assess the provincial ecology and biodiversity, or baseline assessment of natural resources. To guide sustainable growth, mitigate environmental risks, and manage natural resources, the education of the next generation of policymakers, scientists, and planners become an important vehicle in enabling processes that aim to reconcile future urban development with the protection of sensitive ecosystems.

L-#	Components	Institutions & Support
L-8.1	Environmental Law and Planning Capacity Building	NEPA, MUDA, AUWSIG, Municipality
L-8.2	Environmental Land Use Planning Strategy Consultations	NEPA, MUDA, MSPW, Municipality
L-8.3	Water-Sensitive Design and Low-Impact Development Standards	NEPA, MAA, MSPW, Municipality
L-8.4	New Development Closed Sanitation Chain Implementation	NEPA, MAA, Municipality

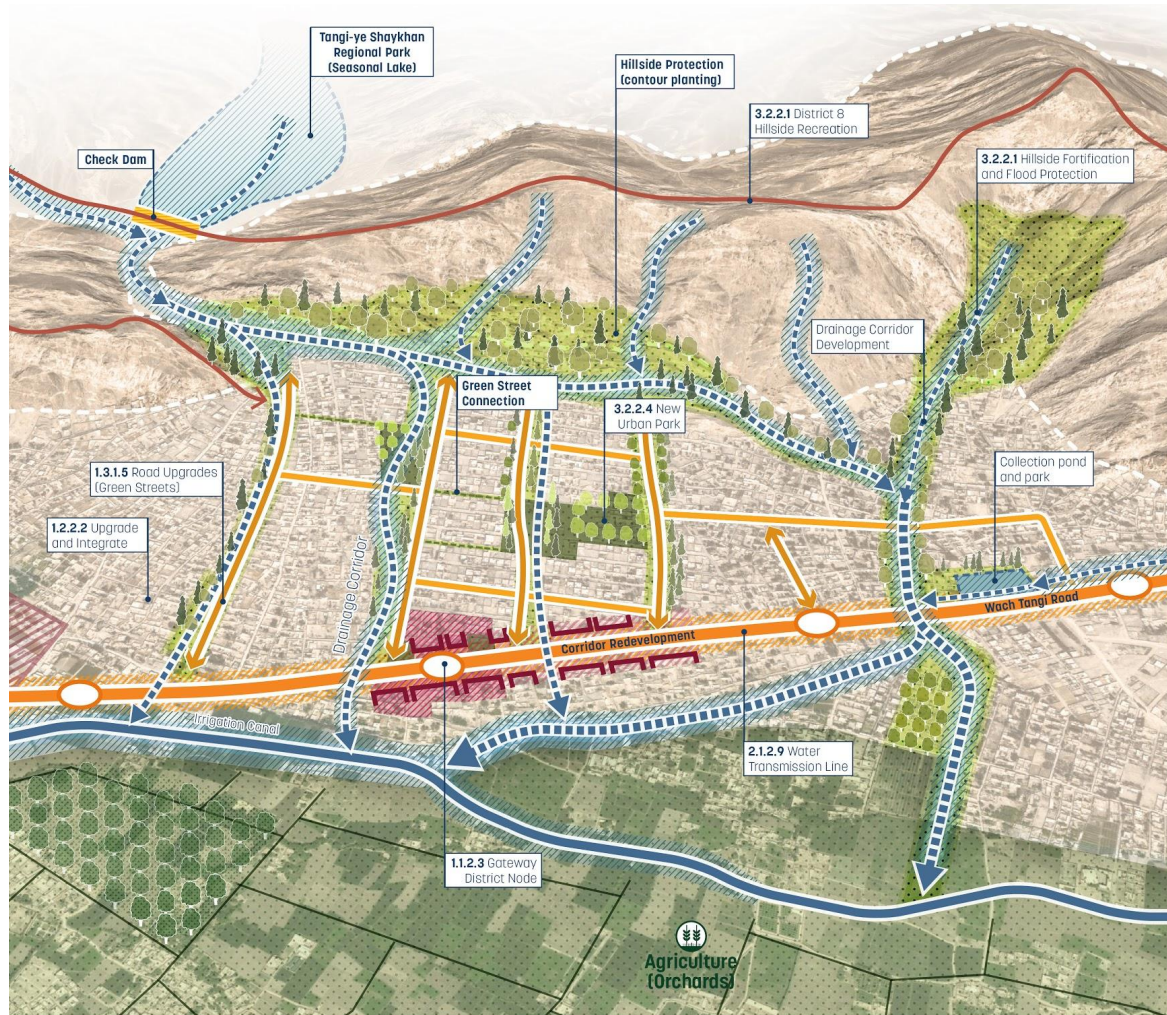
Spatial Framework Guidelines: Recommended Growth Scenario



Key Area Example: Northeast Jalalabad

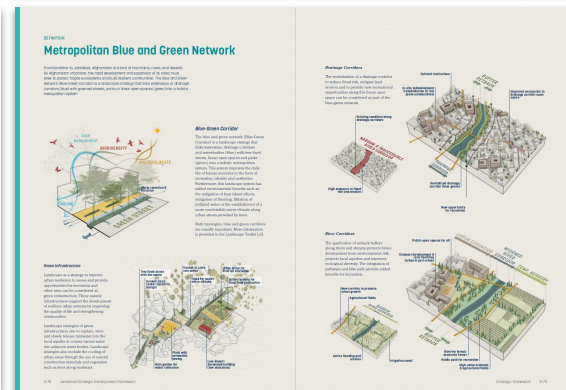
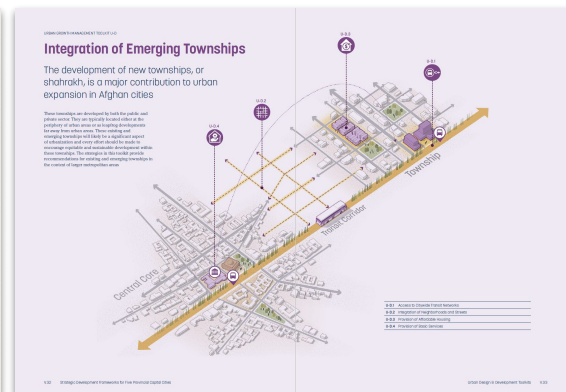


Spatial Framework Guidelines



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!





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