

Urban water in Leh

A political-ecological analysis in the Indian Transhimalaya

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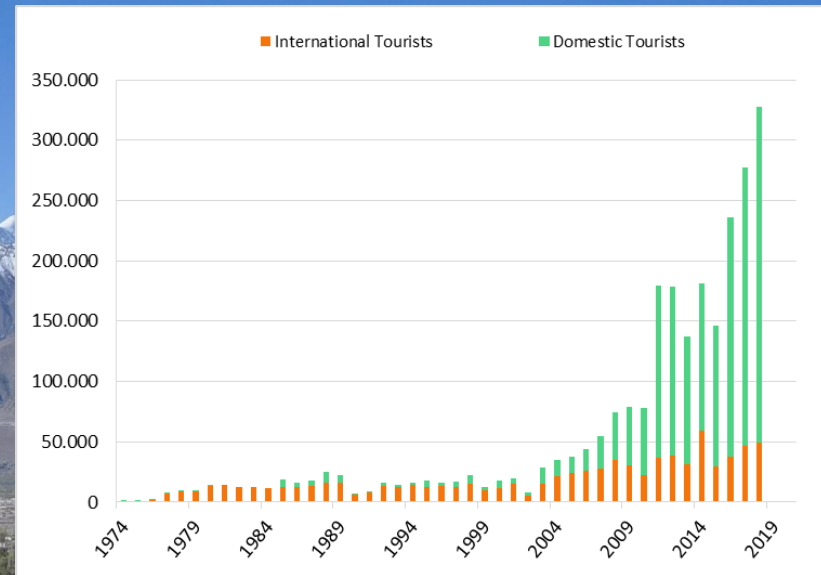
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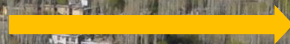
Case Study: Leh (Ladakh)



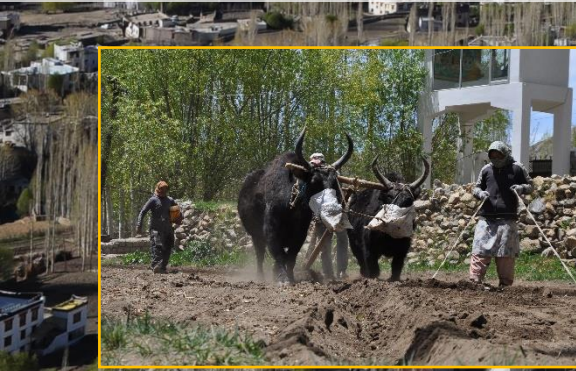
Socio-Economic Transformations



Subsistence agriculture



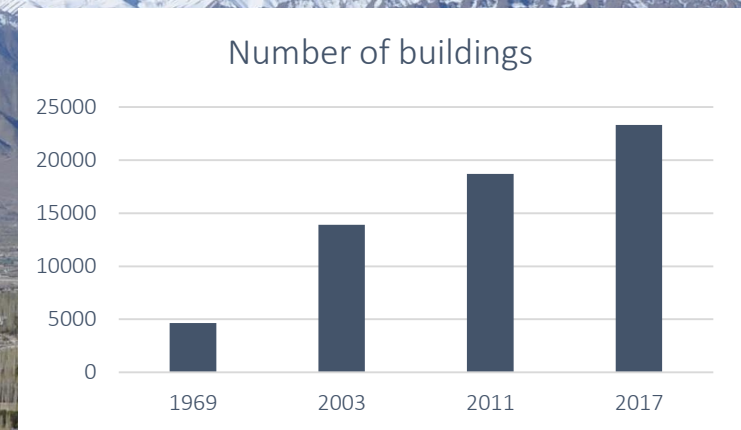
Diversified income activities



Urbanisation

Year	Population Leh District	Population Leh Town
1951	40484	3.546
1961	43587	3.720
1971	51891	5.519
1981	68380	8.718
1991	90200	n/a
2001	117232	28.639
2011	133487	30.870

Source: Census of India



Source: Dame et al. 2019

Urbanisation

“Mountains become a neighbourhood of the metropolitan areas” (Perlik 2019: 155)



Water

49.3% use more water than five years ago (n=295)



Notice:
This spring water is contaminated.
General public is informed not to
consume without proper treatment.





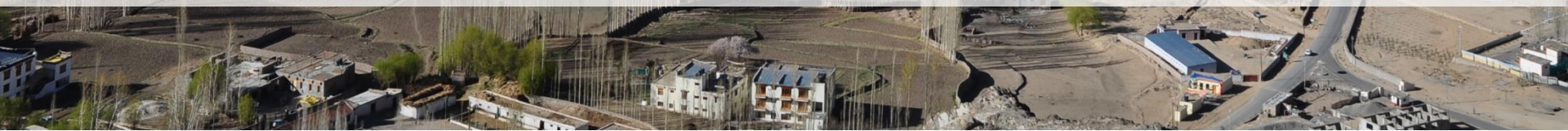
Climate Change

„...glacier dynamics in Ladakh are in the interface between stable conditions and drastic decrease.”

(Schmidt and Nüsser 2017: 12)

Increases in heavy rainfall
(Ziegler et al. 2016)

Climate change projections
(2071-2100): polar tundra (in
higher elevations) will reduce
in favour of arid cold steppe
(Beck et al. 2018)



Socio-Economic Transformations

Urbanisation

Water

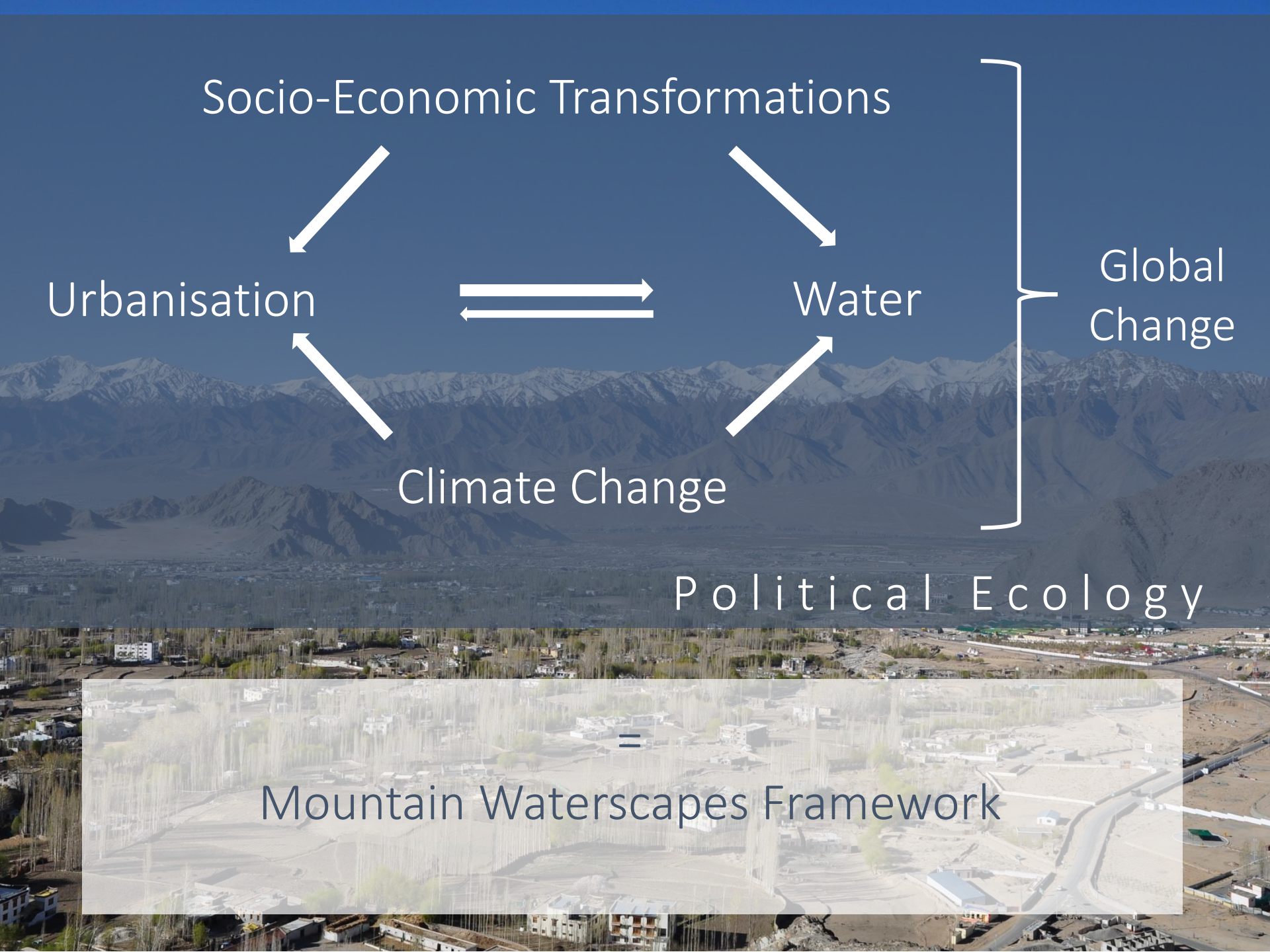
Climate Change

Global
Change

Political Ecology

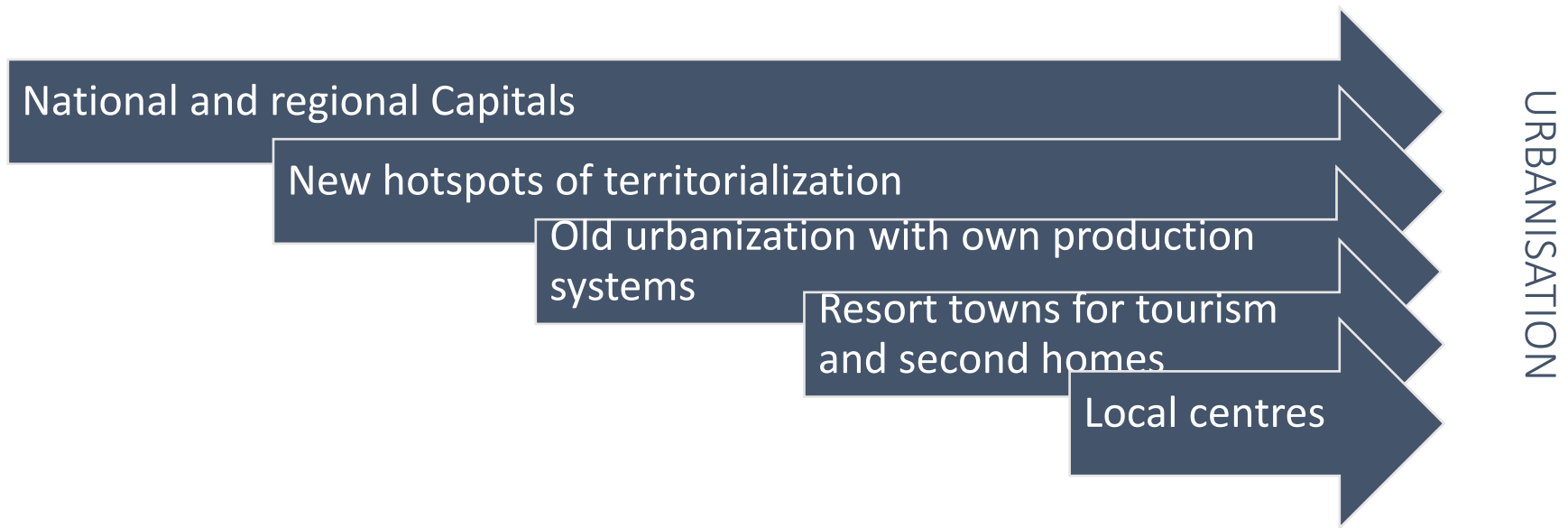
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Mountain Waterscapes Framework

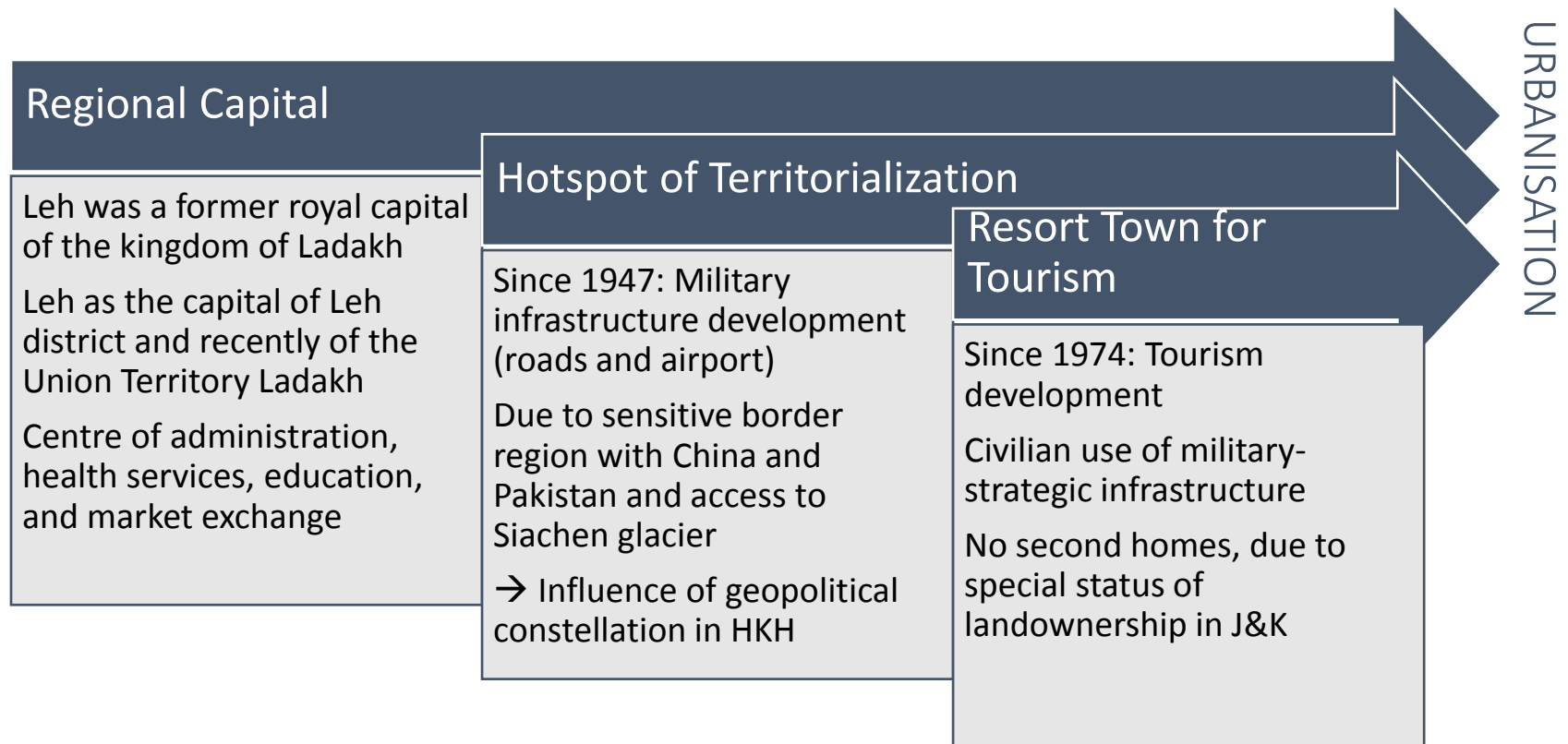


Urbanisation patterns in the Hindu Kush Himalaya

(Wang et al. 2019: 42f.)



Resume: Urbanisation in Ladakh framed with HKH patterns (Wang et al. 2019: 42f.)



Thank you!

References

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Global Change

„**Global Change** can be seen as any change of the Earth system in the global scale on the continents, the oceans, the atmosphere, fauna and flora, the social and economic system, culture and civilization. It includes climate and the atmospheric circulation, ocean circulation, the carbon and nitrogen cycle, the water cycle (including glaciers and permafrost, sea ice and the sea level rise), resource use, energy, economy, transport, communication, technology, land use and—cover, urbanization, nutrition, demographic change and other cultural and environmental changes as biodiversity, pollution, health and more.”

(Borsdorf 2015: 17)

Global Change

„**Global Change** can be seen as any change of the Earth system in the global scale on the continents, the oceans, the atmosphere, fauna and

“In a more dense definition Global Change can be seen as a combination of **Climate Change** and **Globalization**.”

(Borsdorf 2015: 17)

economy, transport, communication, technology, land use and—cover, urbanization, nutrition, demographic change and other cultural and environmental changes as biodiversity, pollution, health and more.”

→ „...the emphasis of global change research should shift from the current **geocentric** approach of IGBP toward a more **holistic concept** with climate as the primary research focus and an emphasis on the **social sciences**...” (Price 1989: 42f.)

Global Change in Ladakh

Climate Change	
Phenomena	Impact
„...glacier dynamics in Ladakh are in the interface between stable conditions and drastic decrease.” (Schmidt and Nüsser 2017: 12)	<ul style="list-style-type: none">- Less water availability in the future: thread for irrigation agriculture, hydropower, freshwater supply- Danger of GLOFs
Increases in heavy rainfall (Ziegler et al. 2016)	<ul style="list-style-type: none">- Flash flood risk (2010, 2015, ...)- Disastrous effect for urbanised areas along the fluvial systems
Climate change projections (2071-2100): polar tundra (in higher elevations of Ladakh) will reduce in favour of arid cold steppe conditions (Beck et al. 2018)	<ul style="list-style-type: none">- increase in temperature that could probably contribute to glacier and permafrost melt

Globalisation in Ladakh

„**Neoliberalism** as the dominant ideology of the age of globalization has been instrumental in the breakthrough of the principles of deregulation, privatization, flexibility, global competition, free transfer of goods and capitals.” (Borsdorf et al. 2015: 51)

→ market-oriented control of regional development and shift in constellation of powerful actors (private actors gain influence compared to public authorities)

- Globalisation and tourism:

- Facilitates mobilities
- Commercialisation of local customs and hospitality

Global Change in Ladakh

Socio-Economic Transformation

Phenomena	Impact
Globalisation	<ul style="list-style-type: none"> - Urbanisation - Decline in agriculture - Shift to tertiary sector - Tourism
Connectivity (technology/mobility)	<ul style="list-style-type: none"> - Socio-cultural changes - Urbanisation - Tourism
Reach of state apparatus	<ul style="list-style-type: none"> - Infrastructure development - „Modernisation“ - Tourism
Decline in agriculture	<ul style="list-style-type: none"> - Depopulation of rural areas - Increased dependance on imported and subsidised foodstuff - Loss of cultural landscape - Leh: Agricultural land loss 8% in 2017
Tourism growth	<ul style="list-style-type: none"> - Rising water use and sanitation water - Increase of car traffic

Urbanisation in Ladakh

- Forms of migration:
 - Amenity migration (Borsdorf et al. 2015)
 - Labour migration (from Nepal and other parts of India)
 - Rural migration
 - Increasing deployment of military
- Socio-spatial dimensions:
 - Urban fragmentation
 - Varying access to water resources and sanitation
 - Loss of local particularities and globalising tendencies of social spaces, e.g. Beautification of Main Bazaar in Leh (Müller and Dame 2016)
 - Multilocality (second homes, studies and employment in lowland metropolises)
- Socio-cultural aspects:
 - Mountain-lowland linkages
 - Decline of extended multi-generational family structures
 - New urban elite

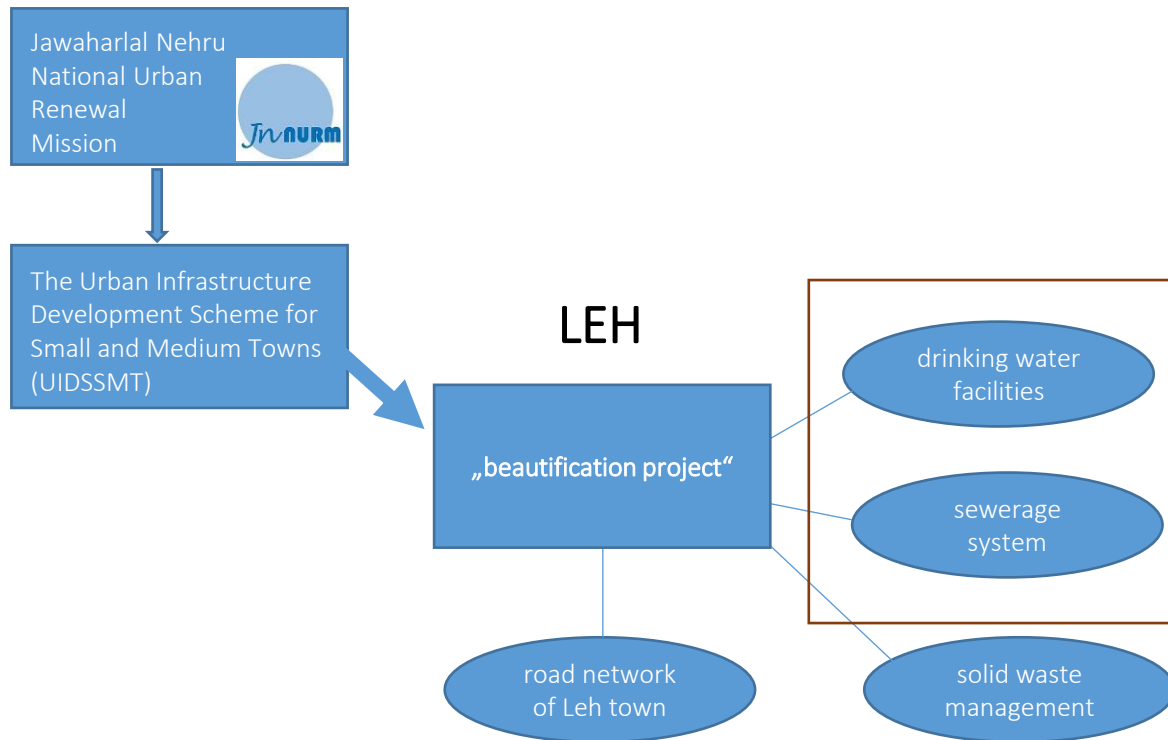
Theoretical Background: Waterscapes

... a “circulation of water [that] is embedded in a series of multiple **power relations** along **ethnic, gender** and **class lines**” (Swyngedouw 1996: 13)

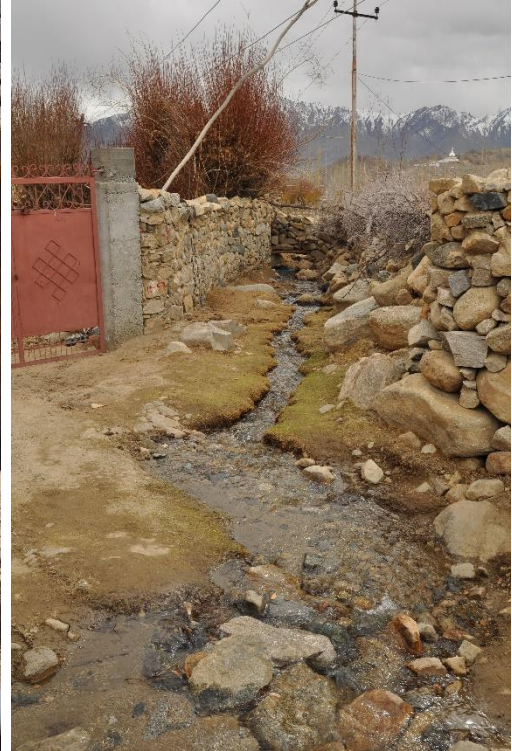
... “a socio-spatial configuration that is constituted by social and ecological processes, which become manifest through the particular nature of **flows, artefacts, institutions** and **imaginaries** that characterize a particular context (Budds and Hinojosa 2012: 125)

... “sensitive towards **historical-geographical conditions** and **geographical situatedness**” (Karpouzoglou & Vij 2017)

National Scale: Water Scheme under UIDSSMT



Household scale:
Diverse water supply



Hydrological Setting and Geographical Constraints

- Semi-arid climate
- Discursive dimension:
→ Many interviewees blame climate change for experienced water scarcity
- Mountain specific risks:



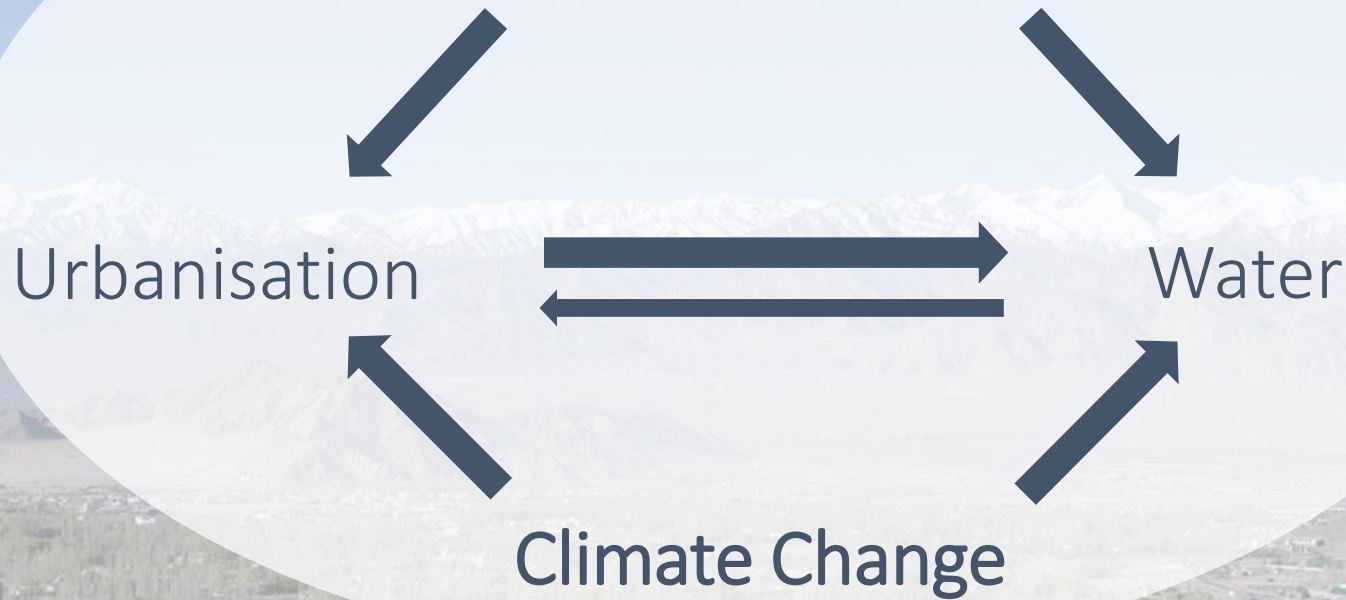
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Political Ecology

Socio-Economic Transformation



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Mountain Waterscapes Framework