

Reviving the Urban-Rural Continuum (URC) — Navigating Renewed Challenges —

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Landscape Ecology & Ecosystem Science (LEES)

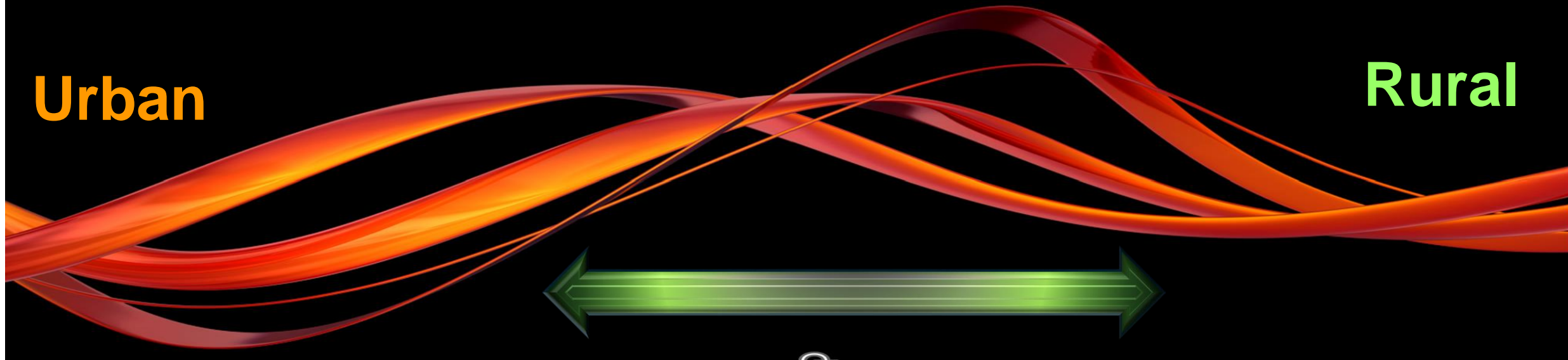
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Hanoi, Vietnam
1/31 – 2/2, 2024

Objectives: URC or RUC, the key word is “continuum”



- 1) To review the URC concept and applications
- 2) To share URC cases in different regions/economies
- 3) To propose **a framework for modeling URC and dynamics** during urban-rural development (SEAL synthesis)

The concept of URC from ChatGPT (Jan 22, 2024):

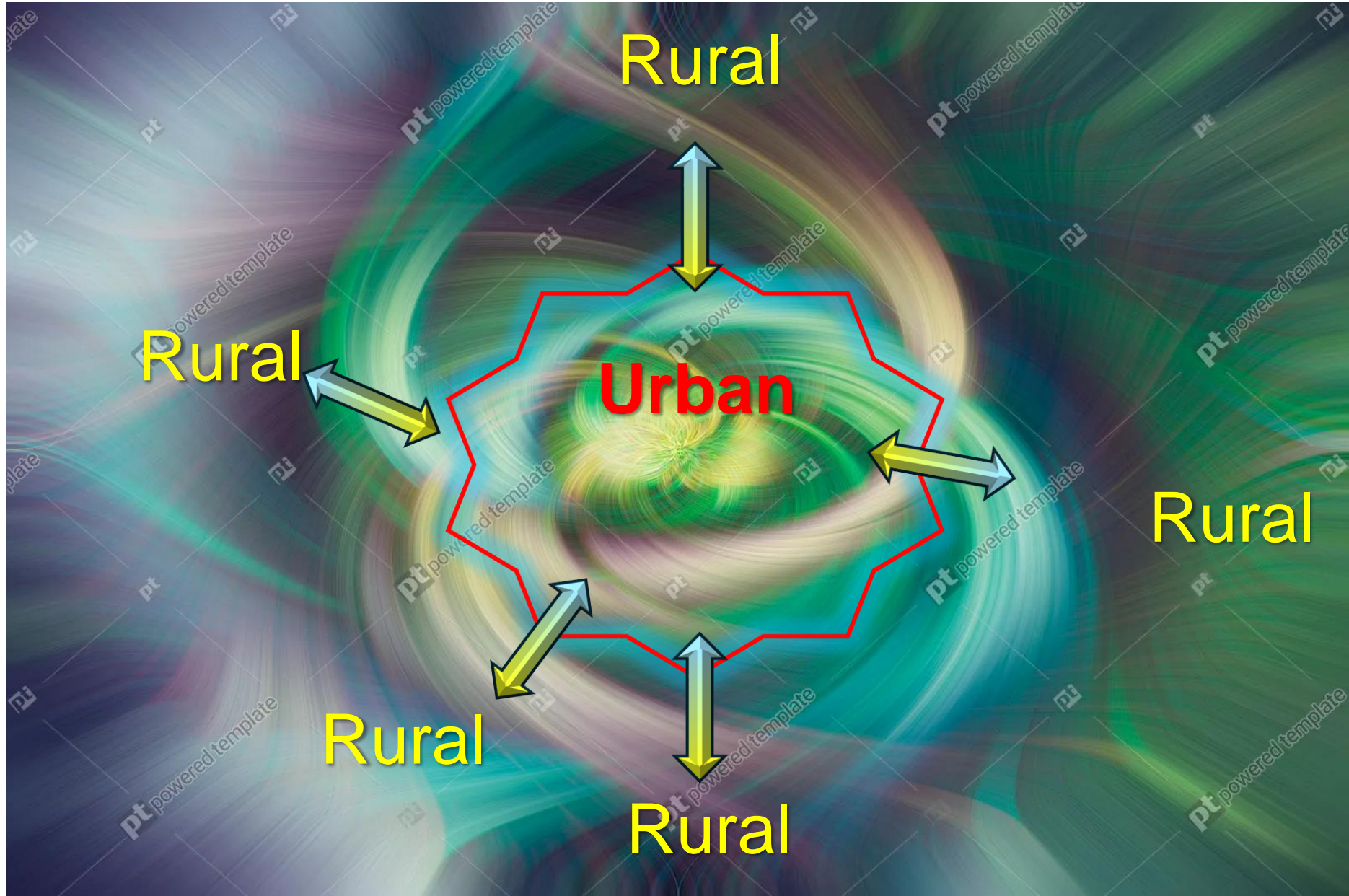
- The urban-rural continuum refers to a spectrum or gradient that describes the **varying degrees of urbanization and rural characteristics** in different areas. It recognizes that regions exist on a continuum between fully urban and fully rural, with many areas exhibiting a mix of both urban and rural features.
- This concept helps capture the diversity and complexity of regions, acknowledging that not all places neatly fit into a strictly urban or rural category. It's a useful framework for understanding the varied economic, social, and environmental characteristics across different geographic areas.

The concept of Rural-Urban Continuum (RUC):

The term was given by Robert Redfield (1930). He made an important contribution to develop the concept of folk, rural and urban continuum. He has constructed a continuum from **small rural villages to large cities**. More urban means that population is more secular, more individualistic and with a greater division of labour.

<https://rashidfaridi.com/>

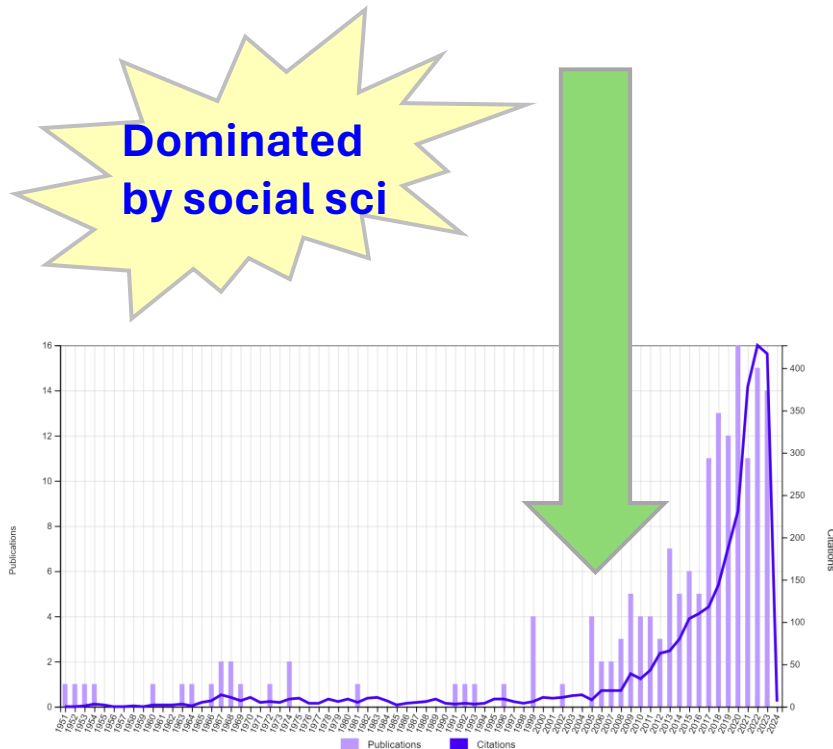
URC or RUC: an integrated, very dynamic system due to urbanization

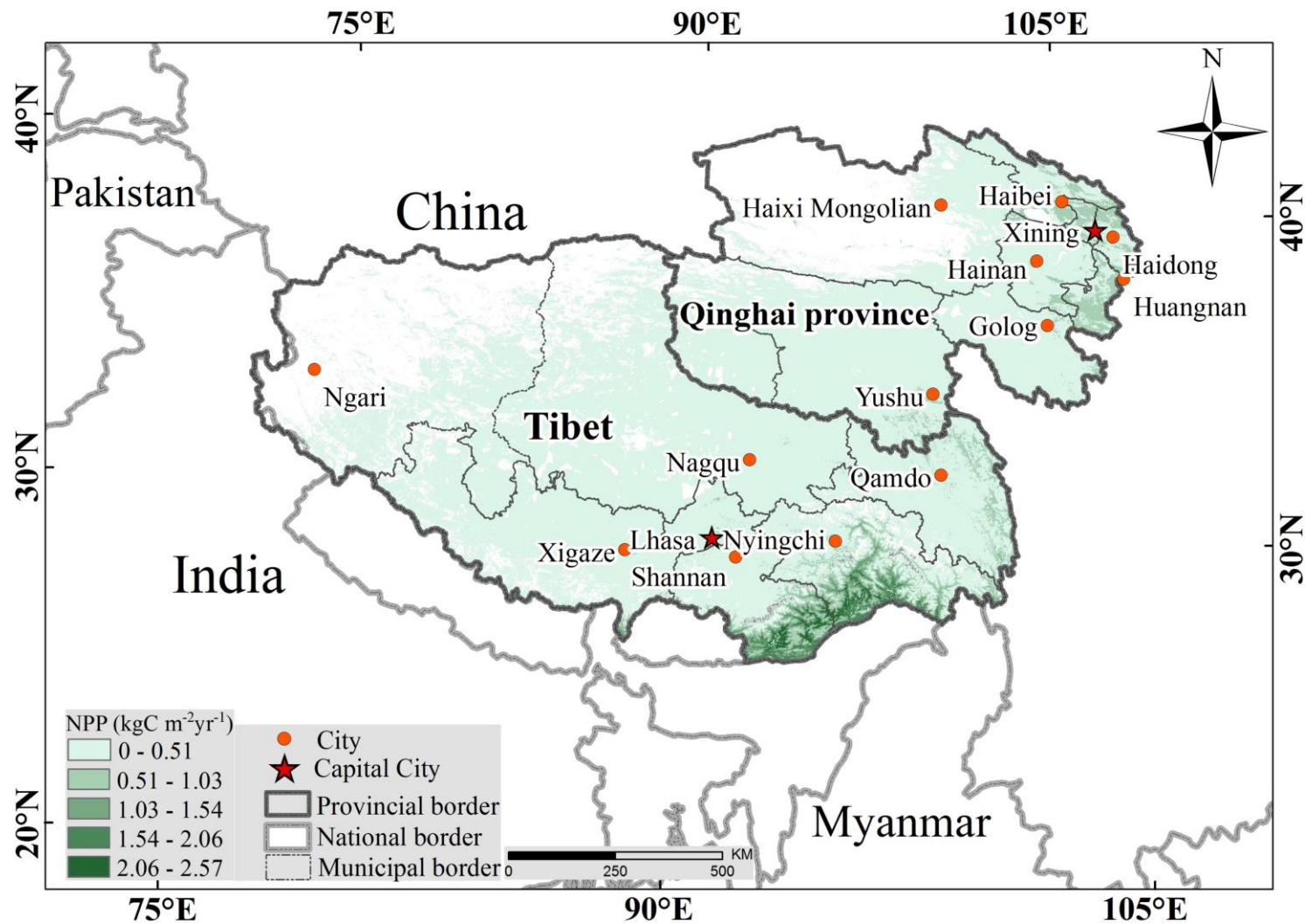


The earliest use of “Rural-Urban Continuum” was found in Spaulding (1951) – a term proposed in social science based on search of Web of Science (1/22/2024). Spaulding, I. A. (1951). Serendipity and the Rural-Urban Continuum. *Rural Sociology*, 16(1), 29.

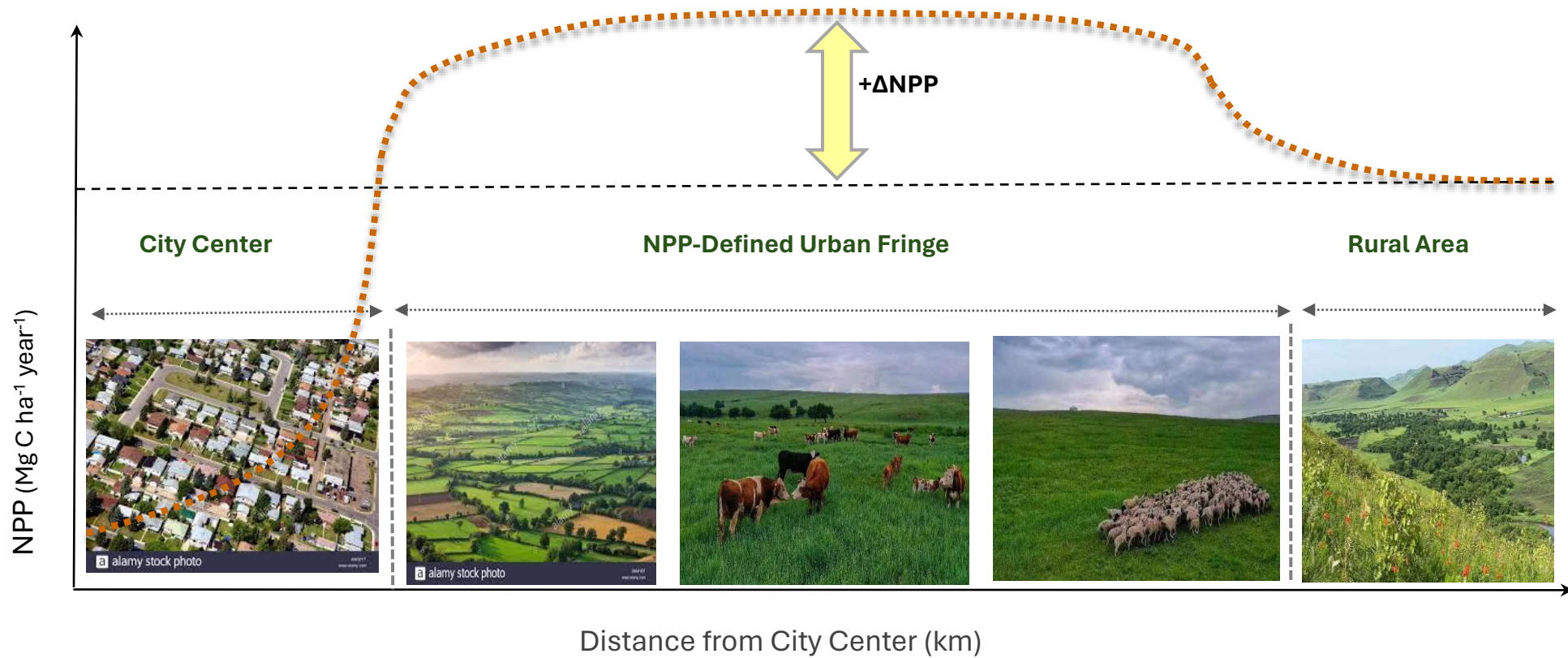
- A total of 168 publications have used this term in their titles since 1951; major promotion since 2005
- Most cited papers (top 5) include:

- 1) Sibley, L. M., & Weiner, J. P. (2011). An evaluation of access to health care services along the rural-urban continuum in Canada. *BMC Health Services Research*, 11(1), 1-11. [cited 182]
- 2) Pahl, R. E. (1966). The rural-urban continuum1. *Sociologia Ruralis*, 6(3), 299-329. [cited 168]
- 3) Dewey, R. (1960). The rural-urban continuum: Real but relatively unimportant. *American Journal of Sociology*, 66(1), 60-66. [cited 146]
- 4) Peters, D. J. (2020). Community susceptibility and resiliency to COVID-19 across the rural-urban continuum in the United States. *The J of Rural Health*, 36(3), 446-456. [cited 142]
- 5) Scala, D. J., & Johnson, K. M. (2017). Political polarization along the rural-urban continuum? The geography of the presidential vote, 2000–2016. *The Annals of the American Academy of Political and Social Science*, 672(1), 162-184. [cited 135]



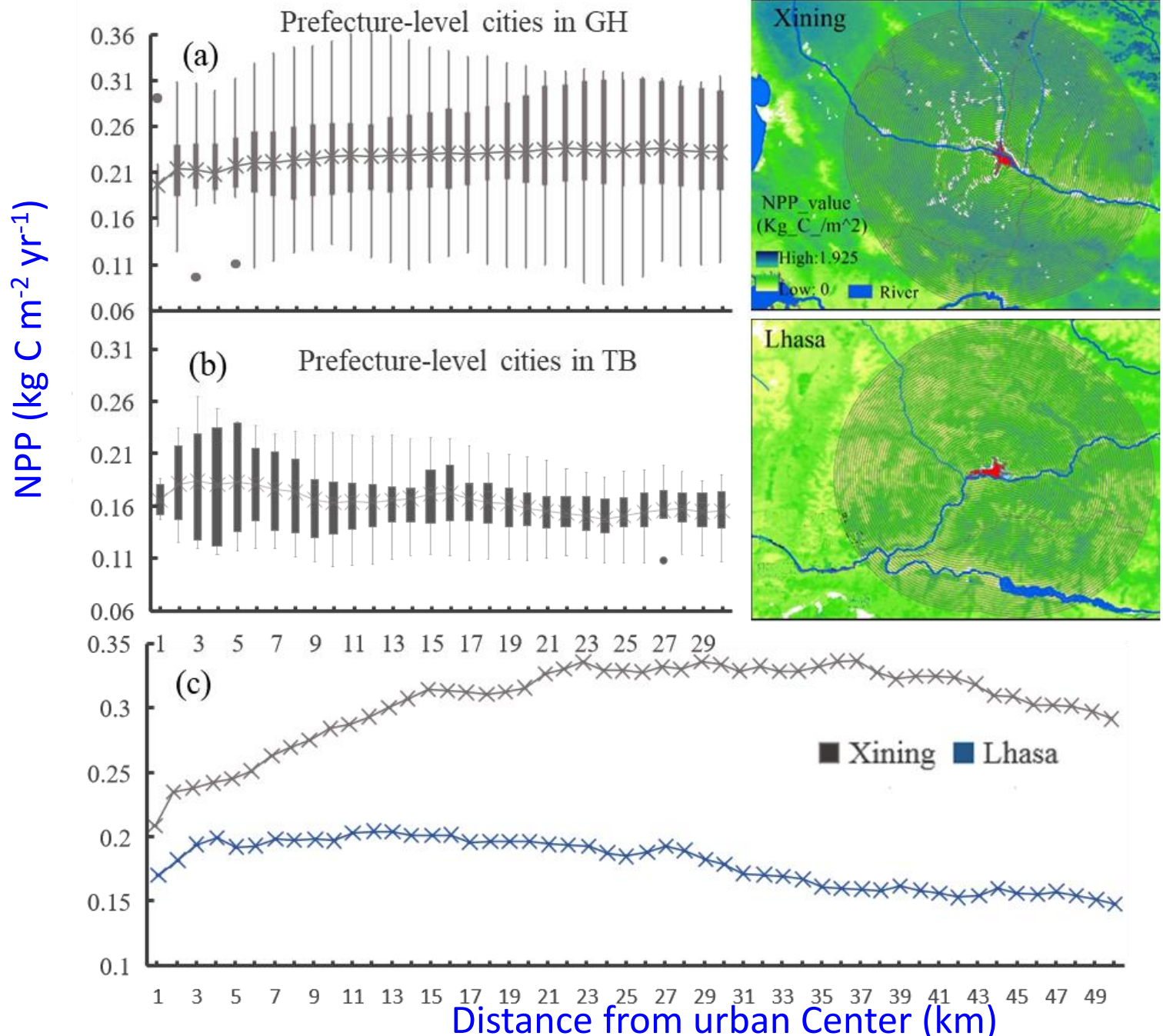


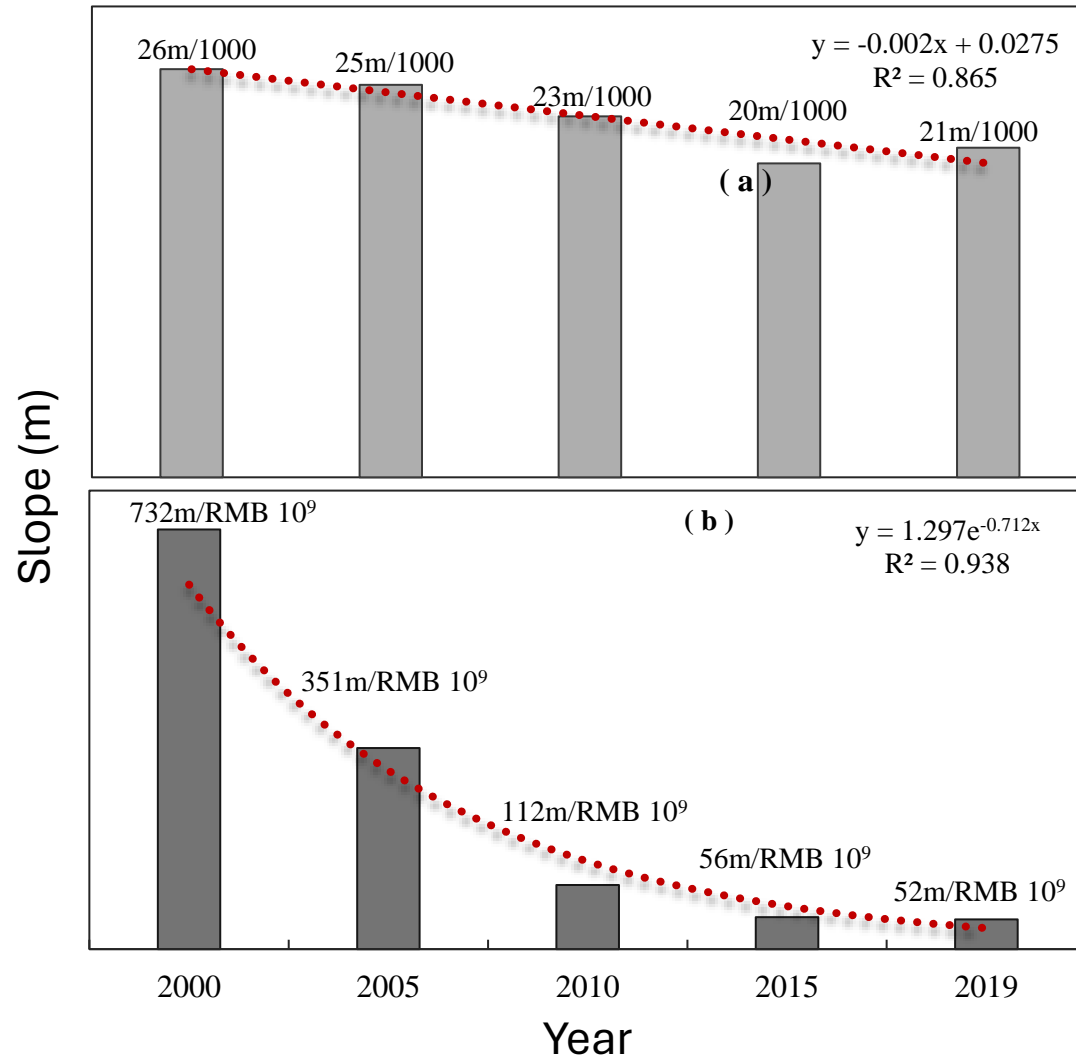
The spatial distributions of the average annual net primary productivity (NPP) and the cities for Qinghai and Tibet province, including the 2 provincial capital cities (Xining & Lhasa) and 13 prefecture-level cities. Tian & Chen (2021), ERL



Hypothesized changes in social-environmental system (SES) functions along URC in Qinghai and Tibet Plateau. **NPP is low within the urban center, peaks within the urban fringes (UF), then gradually decreases to the natural level in the rural areas.** Tian & Chen (2021), ERL

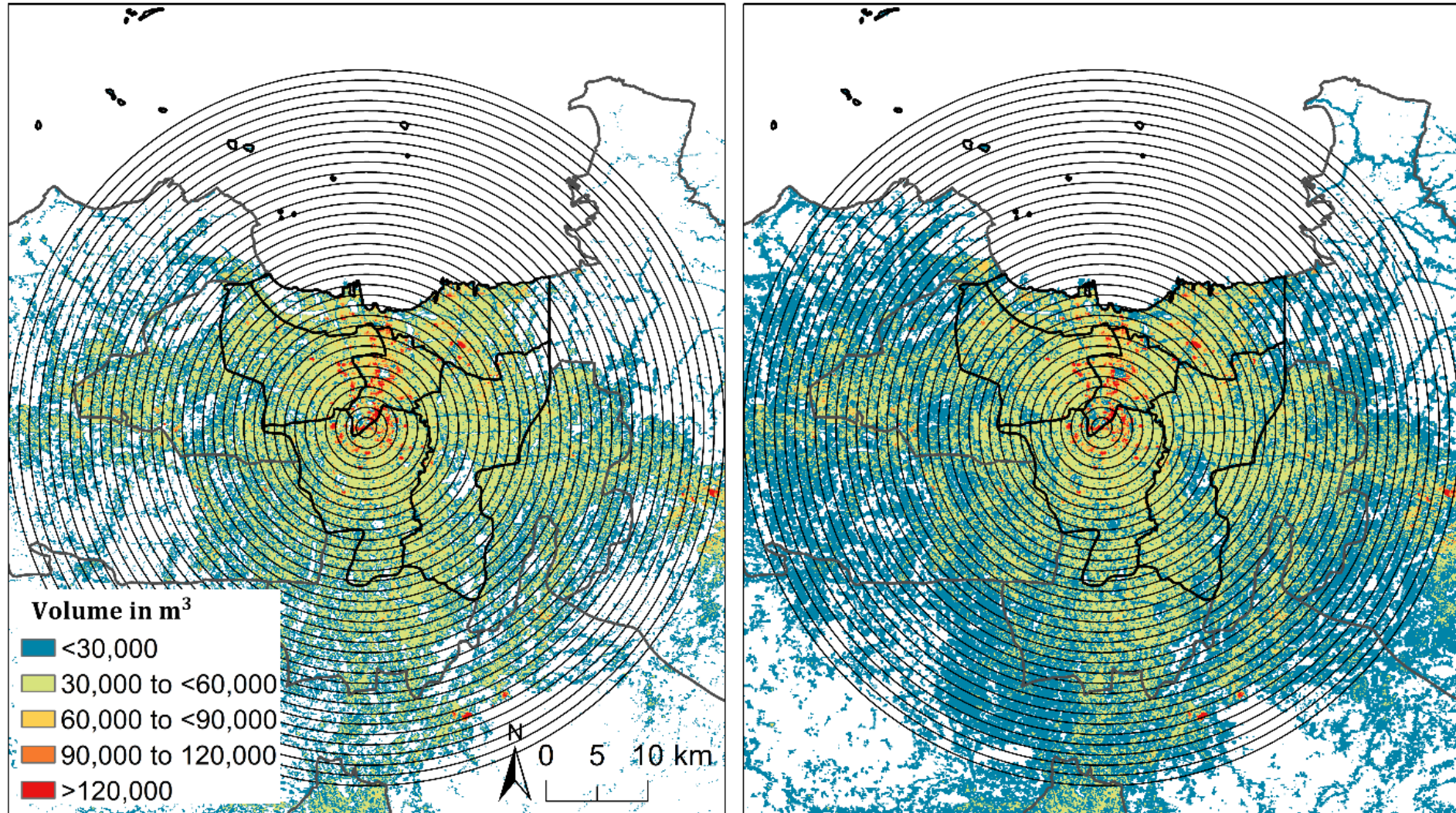
The change of NPP within 30- 50 km from city center to rural on the plateau during 2000–2019: the NPP within 30 km for 7 prefecture-level cities in Qinghai (a), the NPP within 30 km for 6 prefecture-level cities in Tibet (b), the NPP within 50 km for Xining and Lhasa (c).



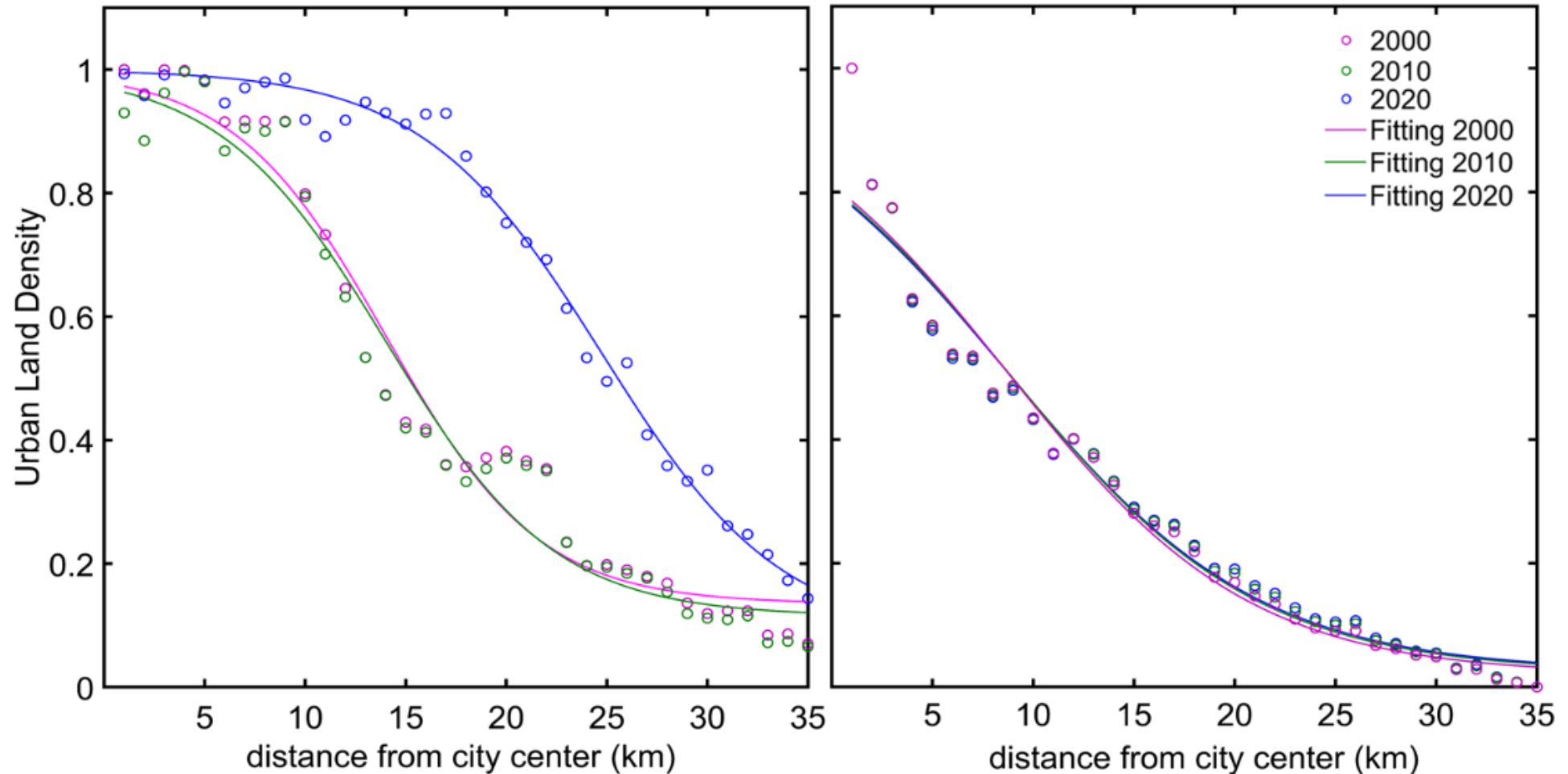


Quantized slope of regression analysis of the UF_w with the POP_{urban} (a) and the UF_w with the GDP₂₋₃ (b) for 14 cities in five different periods.

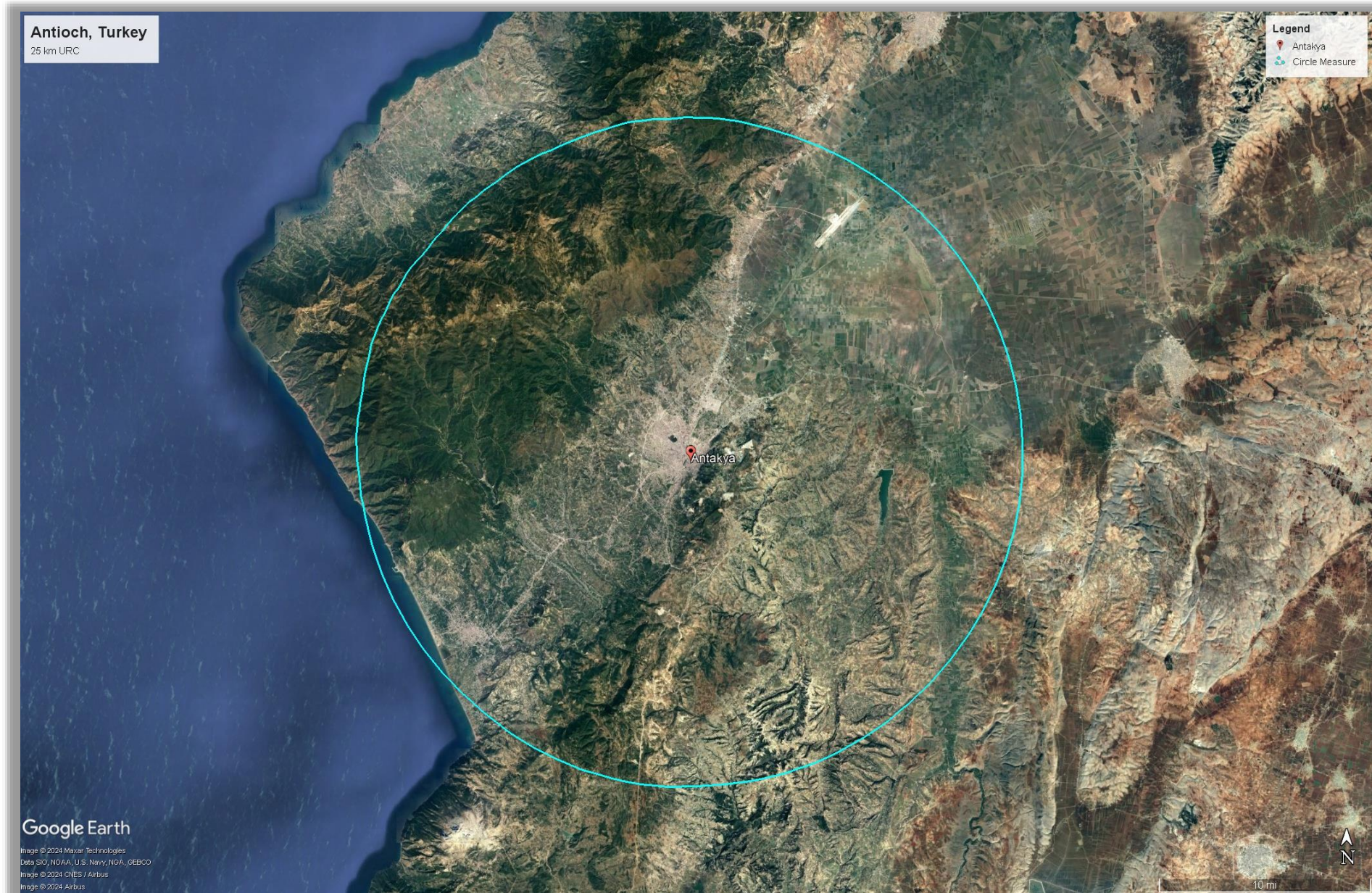
Distribution of urban built-up volume in Jakarta in 2000 (left) and 2020 (right) (Sarker et al. revision in review)



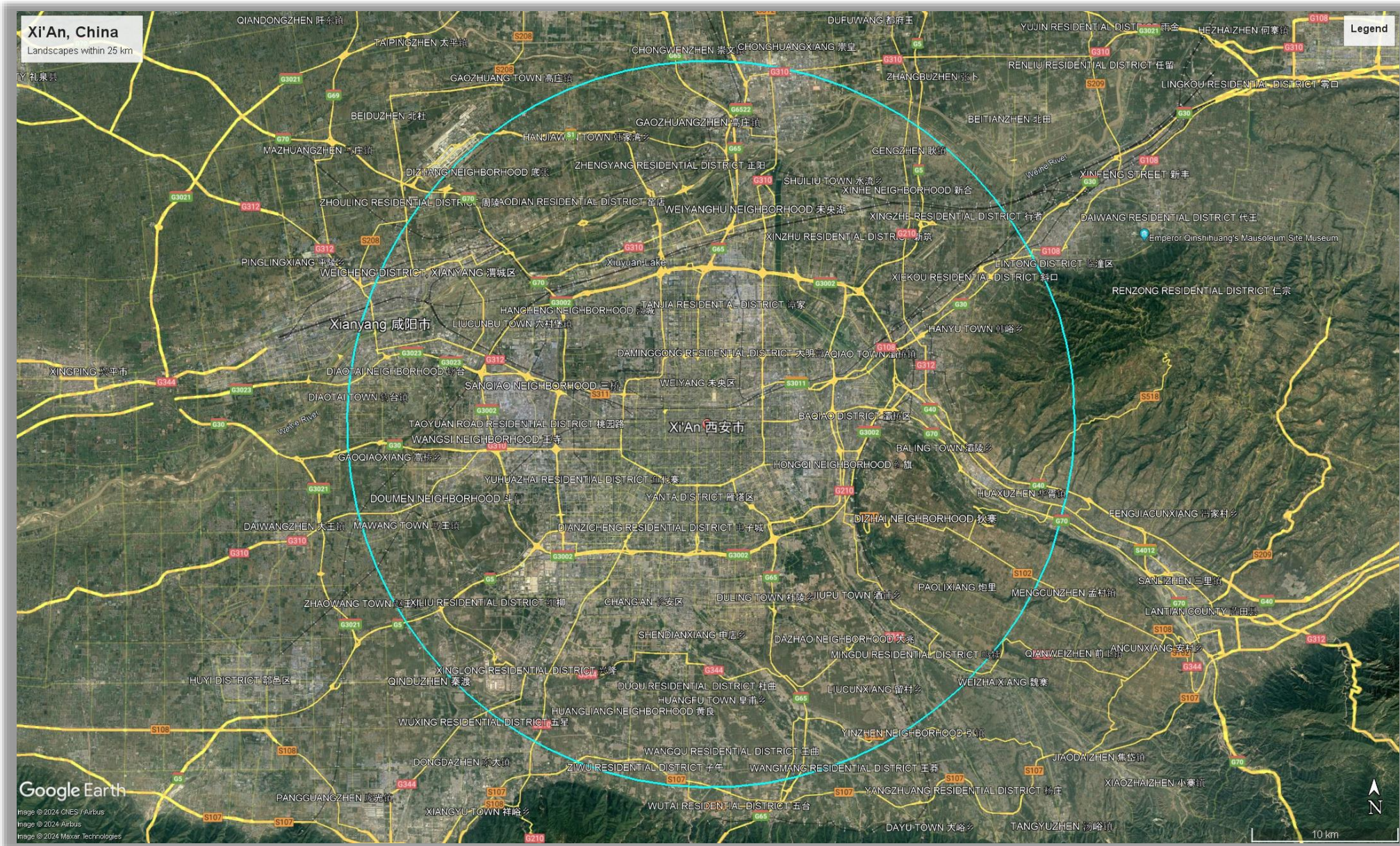
Changes in urban land density with distance from the city center to the suburban area in Jakarta based on ULD_{2D} (left), and ULD'_{3D} (right) (Sarker et al. in review).



The landscape within 25-km of Antioch, Turkey

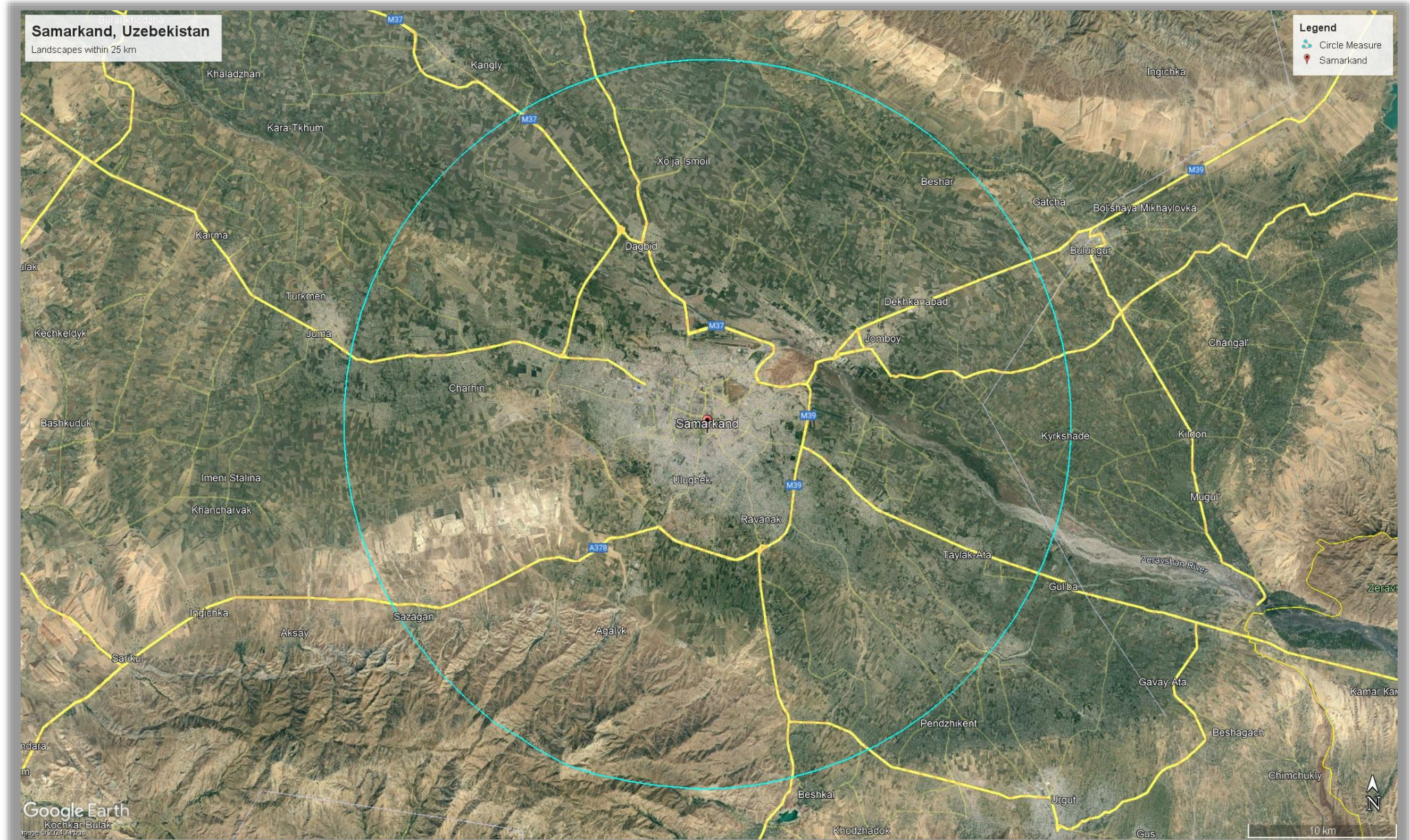


The landscape within 25-km of Xi' An, China

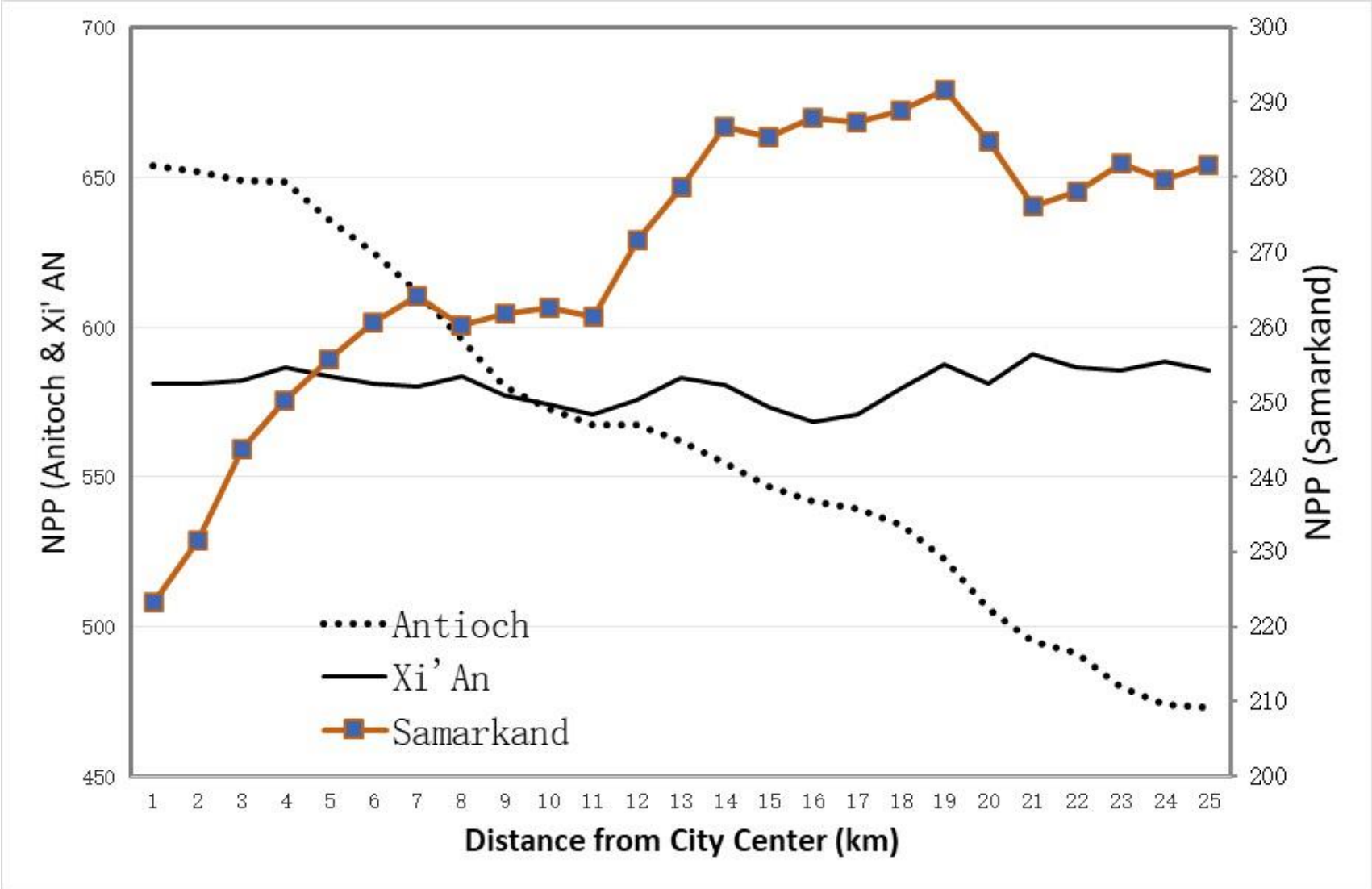


The landscape within 25-km of Samarkand, Uzbekistan

Complexity: population, infrastructure, economic status, asymmetry, etc.

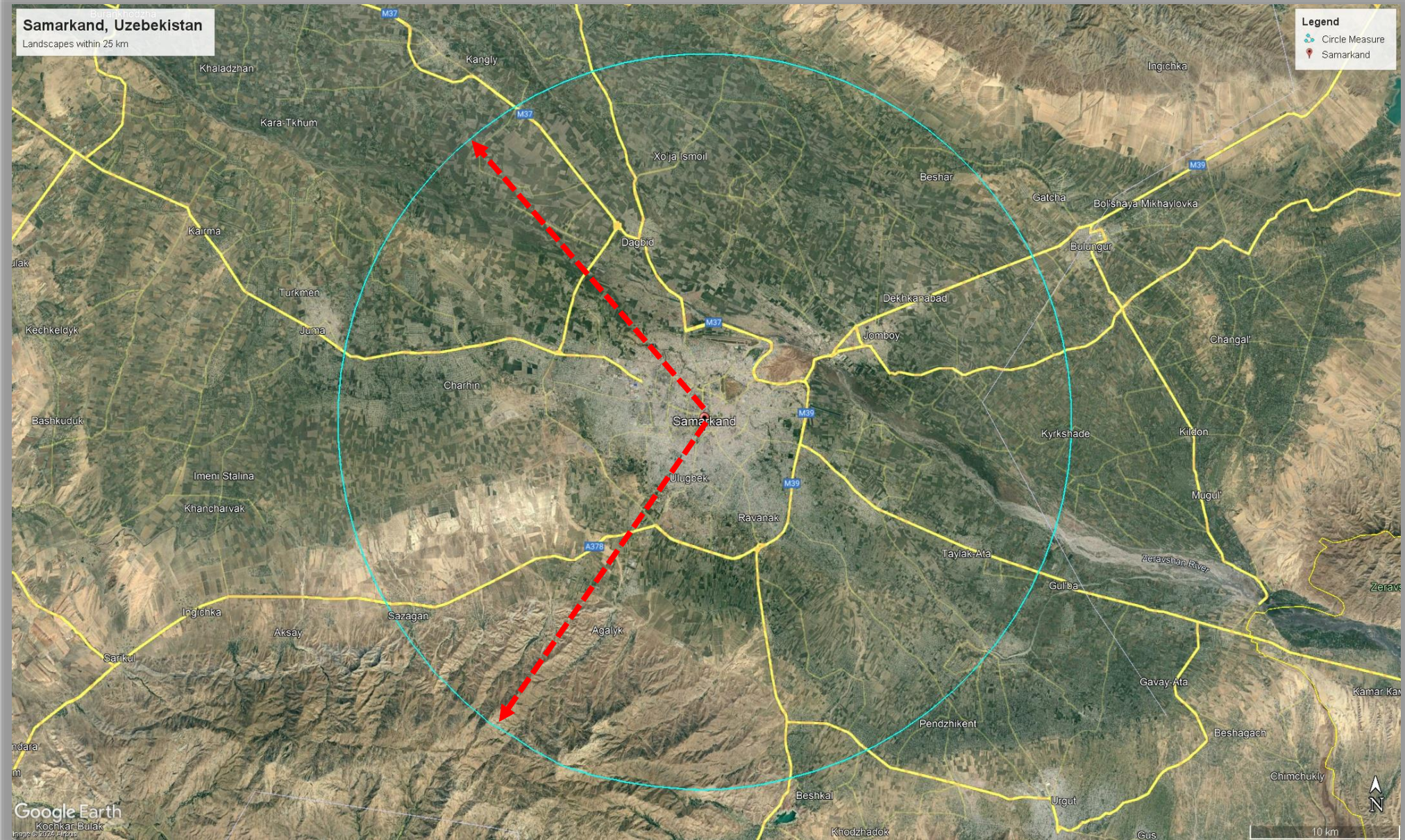


Changes in net primary production (NPP) of 2022 from city center to rural area in 3 study URC sites



The landscape within 25-km of Samarkand, Uzbekistan

Complexity: population, infrastructure, economic status, asymmetry, etc.



The landscape within 25-km of Hanoi, Vietnam

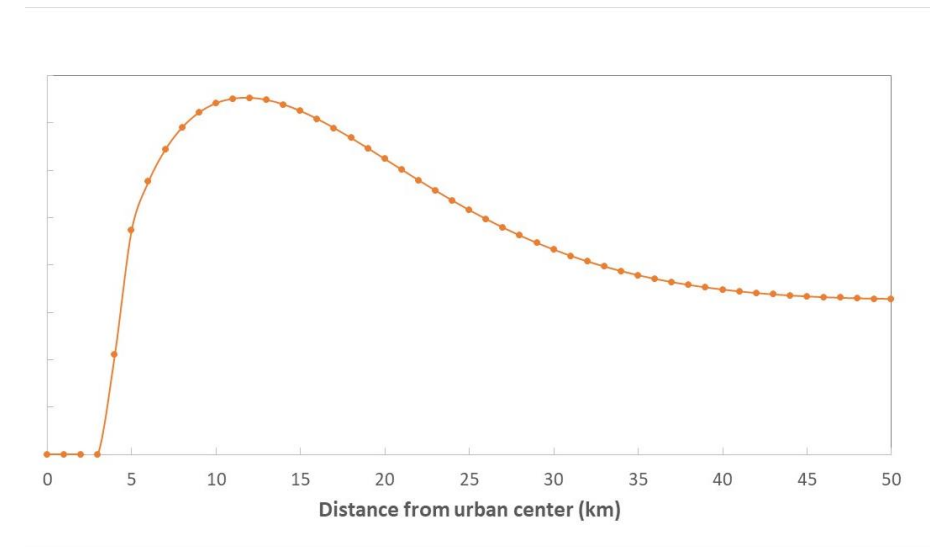
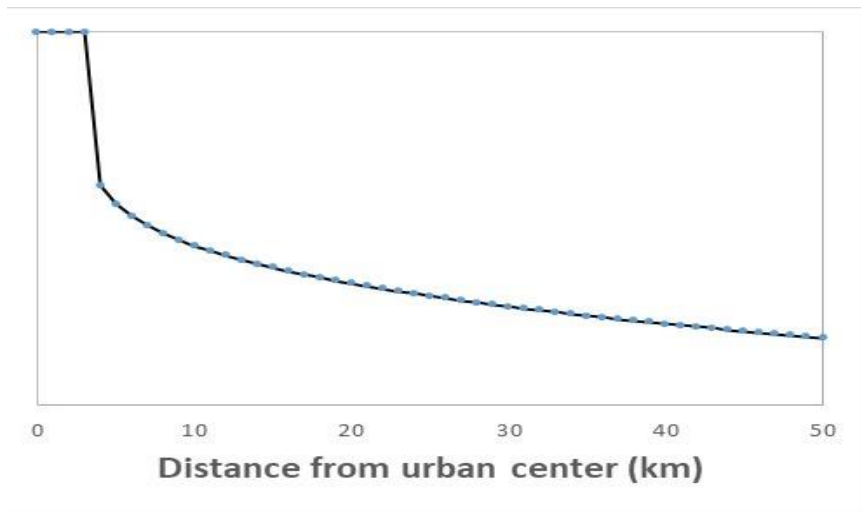
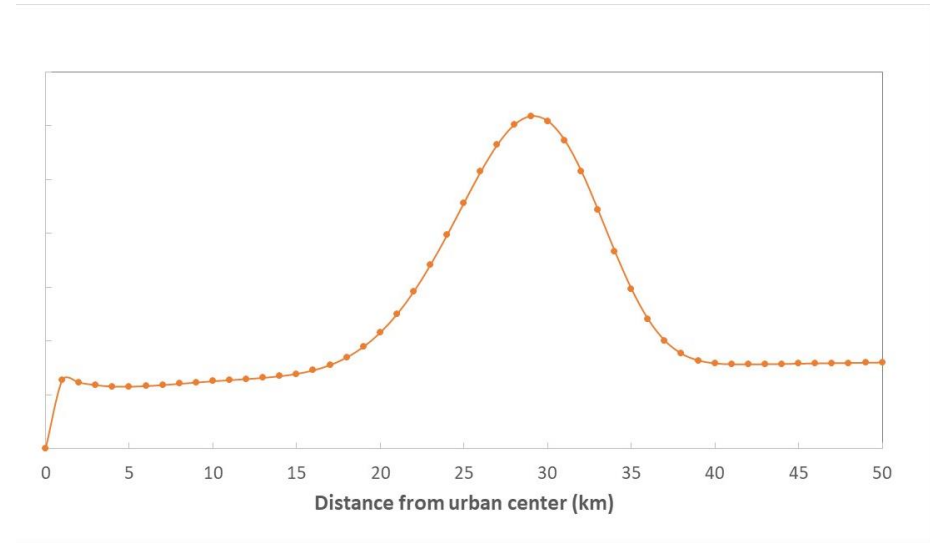
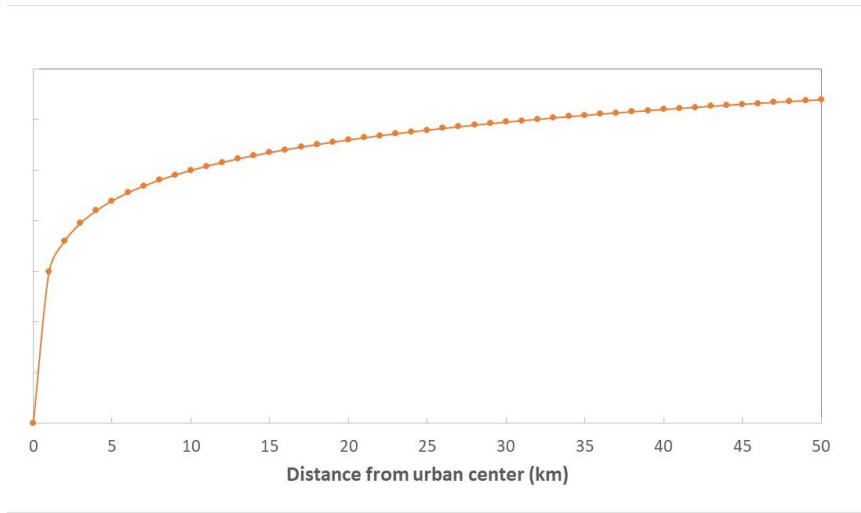


Realization of the differences among cities and URCs

- Size and expansion
- Population and living standards
- Economic status and development
- 2D vs 3D and other infrastructure
- Constraints from physical and social (cultural) history
- **Covariates: variables of concern/interest** (i.e., functional measure such as NPP vs household income), **direction, infrastructure** (e.g., transportation, medical facility, education system, urban planning, policy shift, etc.), **teleconnection, and others**
- ...

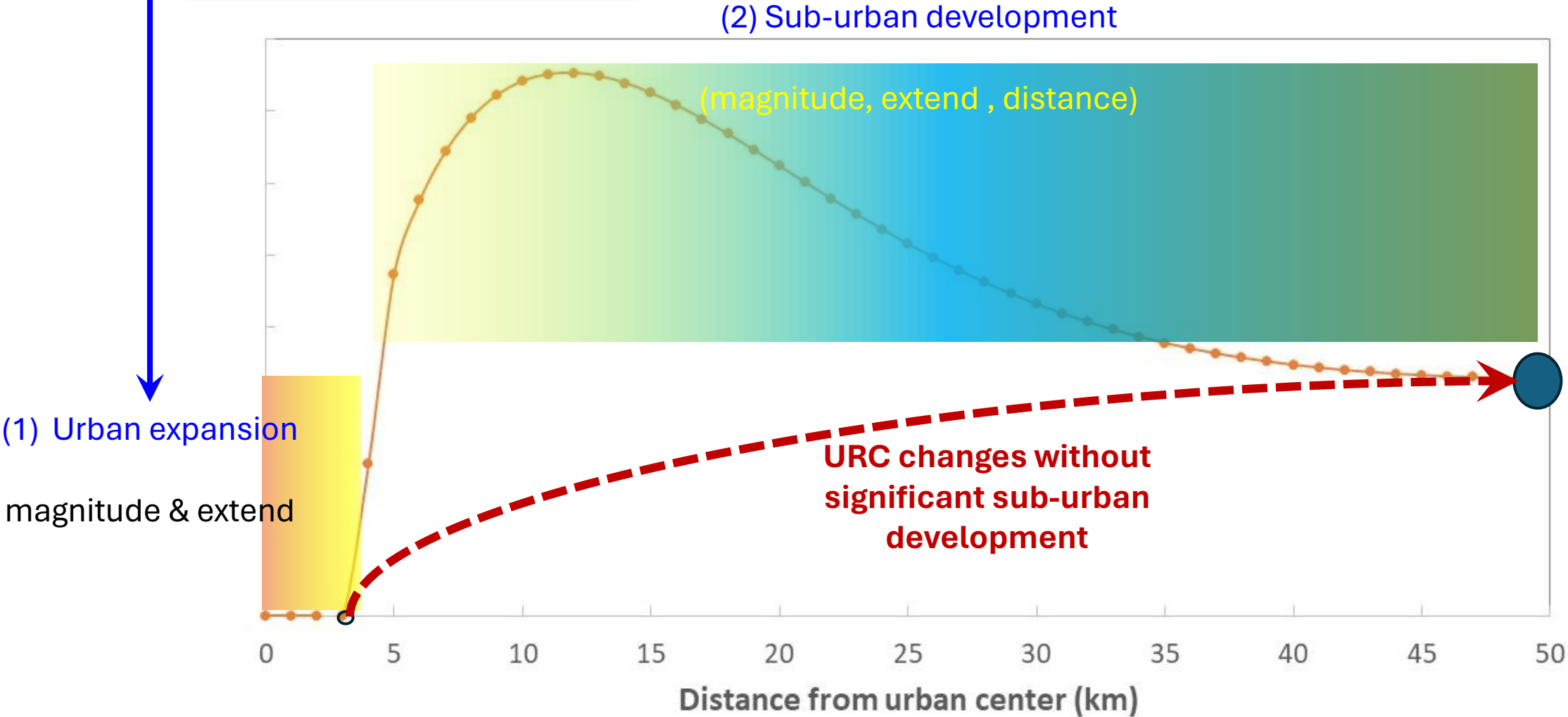
Variations in functional changes from urban center to rural

Function



Modeling URC with two forcing: (1) urban expansion, and (2) suburban development

Interactive Forcing
on URC Dynamics



Synthesis Outlook

- Mechanistic model(s) (e.g., system dynamics)
- Empirical model(s) (e.g., combinations of exponential and Weibull functions)
- Focus on the parameters among the cities for understand the processes
- Differences among cities, URCs by regions, country, etc.
- Implications of URC model(s) for nature and society
- ?

Questions & Interests for Collaborations

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