

Prediction of Synergic Effect of Walkability and Carbon Readiness to Promote Sustainable Mobility in an Industrial Township

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INTRODUCTION & AIM

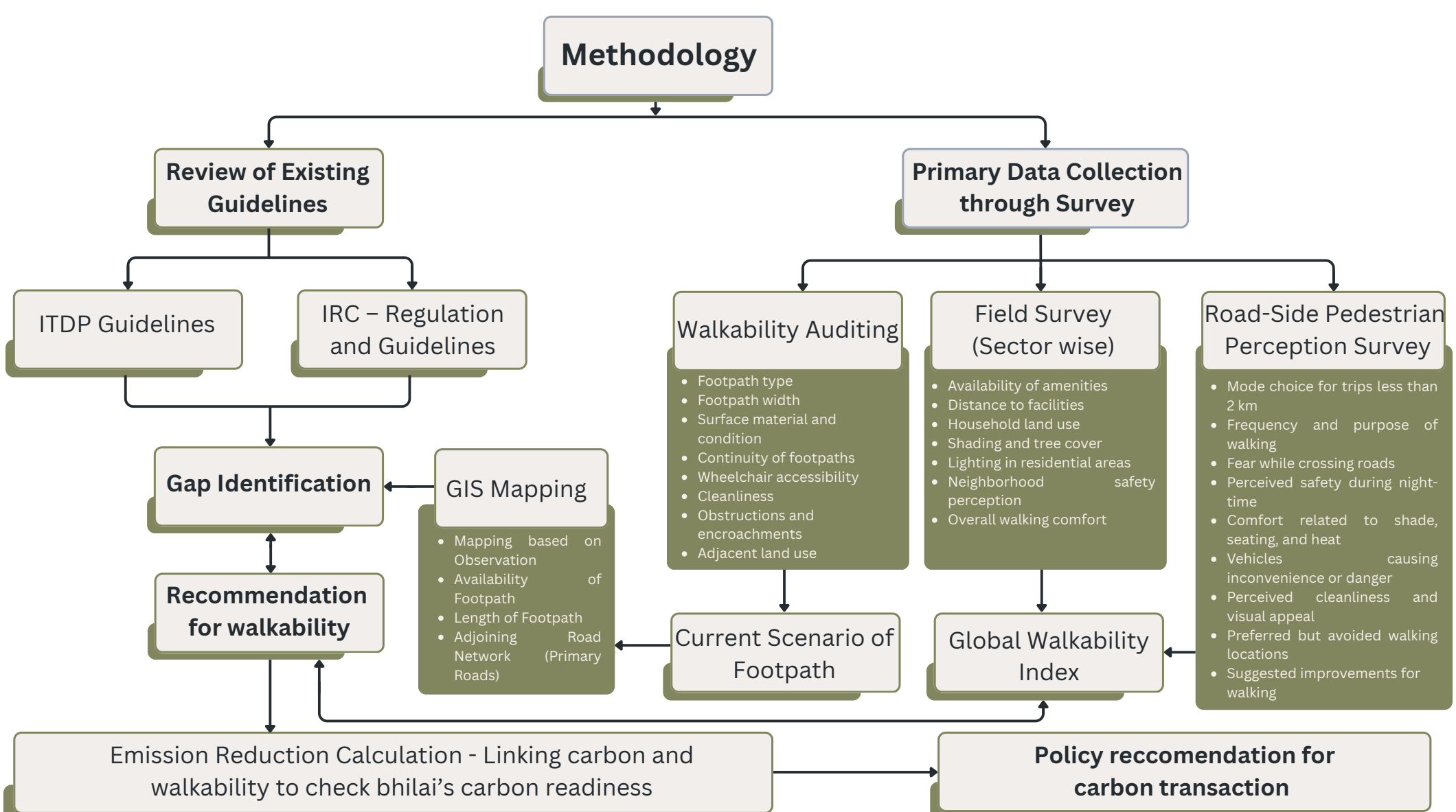
Introduction

Planned industrial townships such as Bhilai were originally designed with compact sectors, mixed land-use distribution, and strong internal accessibility. However, rapid motorization and increasing private vehicle dependence are gradually reducing their pedestrian-oriented character. Existing studies generally assess walkability and low-carbon mobility independently, while the interaction between walkability and carbon readiness remains insufficiently explored in industrial township contexts. This study develops an integrated framework to examine how pedestrian-supportive environments and carbon transition readiness together influence sustainable mobility potential in Bhilai Township.



Aim
To develop an integrated spatial framework linking walkability and carbon readiness for promoting sustainable mobility in Bhilai Township.

METHOD



The study adopted an integrated methodology combining walkability assessment and carbon-readiness evaluation to analyze sustainable mobility in Bhilai Township. Literature review of IRC Guidelines, ITDP Healthy Streets Framework, Global Walkability Index (GWI), and sustainable mobility studies helped identify key indicators.

Primary data was collected through household surveys, pedestrian perception surveys, walkability audits, and GIS mapping. Walkability was assessed using indicators such as sidewalk continuity, accessibility, safety, comfort, lighting, connectivity, and encroachments. Carbon readiness was evaluated through modal shift potential, public transport accessibility, emission reduction potential, and land-use proximity.

The Global Walkability Index (GWI) was calculated using weighted aggregation of four components:

$$GWI = W_{ss}(SS) + W_{ca}(CA) + W_{co}(CO) + W_{pi}(PI)$$

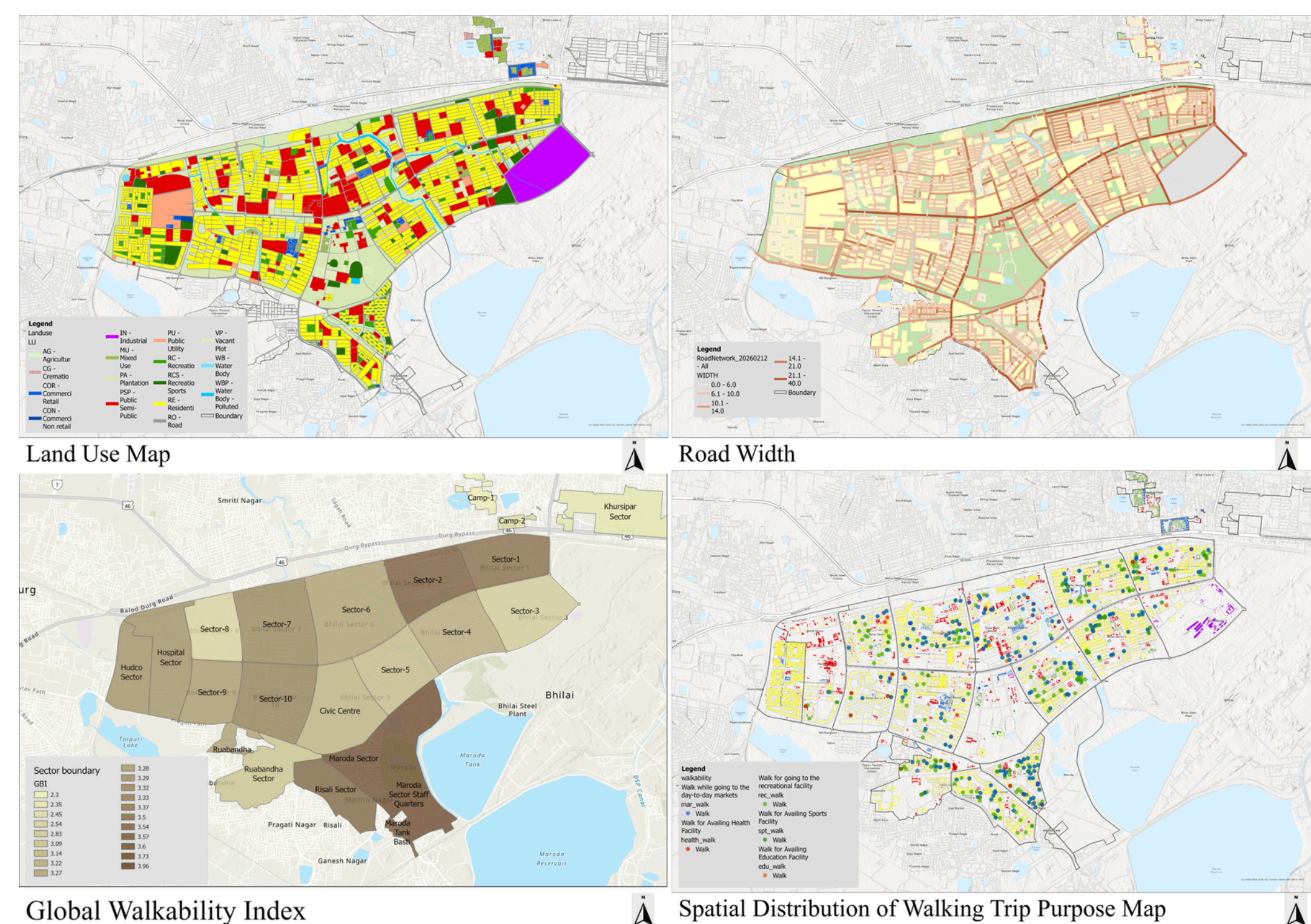
Spatial overlay and scenario analysis were finally used to identify convergence zones with high walkability and carbon readiness for sustainable mobility planning.

RESULTS & DISCUSSION

The study revealed that most sectors in Bhilai Township have fair walkability conditions with moderate pedestrian accessibility. Mixed land-use areas recorded higher walkability scores due to better connectivity and proximity to daily amenities. The planned road network supports internal accessibility and sustainable mobility potential. However, major issues identified include discontinuous footpaths, lack of shading, unsafe crossings, encroachments, and inadequate pedestrian amenities, which negatively affect pedestrian safety and comfort.

Sector-wise Composite Walkability Scores

Sector	Composite Score	Category
Maroda	3.96	Fair-High
Sector 2	3.6	Fair-High
Risali	3.57	Fair-High
Sector 1	3.54	Fair
Sector 6	3.28	Fair
Sector 3	2.83	Poor
Sector 8	2.54	Poor



CONCLUSION

Sectors with high walkability and carbon readiness showed greater potential for reducing short motorized trips, lowering CO₂ emissions, and encouraging walking and public transport use. The study highlights that integrated pedestrian-oriented planning and carbon-readiness assessment can effectively support sustainable mobility planning in industrial townships like Bhilai.

FUTURE WORK / REFERENCES

Future work includes integrating real-time mobility data, cycling infrastructure assessment, digital carbon accounting, and simulation-based emission modeling, while key references include UN-Habitat (2013), ITDP Healthy Streets Framework, GWI, WRI Sidewalk Principles, IRC:103-2012, and COPERT Framework, supported through maps, GIS overlays, audit photographs, and sustainable mobility graphics for poster presentation