Codebook

Code	Description	Text Example
Justifications	refers to the justifications given for the study, not for justifications for the study site or methods.	This research adds to the small, but growing body of research on the fine-scale relationship between tree loss and development. (Guo et al, 2018, 2)
Objectives	refers to the objectives or aims of the study as presented by the authors.	We sought to investigate relationships between field data collection and vegetation indices to test a novel application of drone remote sensing in an urban forest (Wavrek et al, 2023, 7)
Governance	broad claims made by the authors about governance: who has authority and responsibility, and who benefits from this research, according to the author(s).	Investment in UTC assessment is intended to support community develop-ment including long-term economic and en-vironmental improvements (McGee et al, 2012, 2)
State	refers to state-based governance with a focus on the role of the government	Urban policy tends to focus mainly on technical planning measures. (Parsa et al, 2019, 2)
Market	meaning market-based or private sector governance with a focus on profit	These valuable services, once quantified, can be translated into monetary values. (301_Stark_2011, p. 1)
Participatory	refers to inclusive and participatory governance with a focus on citizens	If used appropriately, modelling tools could engage marginal groups in planning processes or illuminate consequences of planned developments on marginal groups' access to trees which otherwise might be overlooked. (181_Saunders et al_2020, p. 10)
Tool Limitations	refers to the limitations of the tool according to the researchers, not citations	
Data Input Issue	not the model, but variables, measurements, data used with the tool	
Temporal Limitations	when the author notes that the data used was not recent, for example	Although orthophotos were utilized to update the DeKalb tree database and circumvent the process of GPS location, error still existed due to time lapse in orthoimagery required t (302_Bergman_2016, p. 67)
Missing Variables	when the author notes limitations due to lack of variables or missing measurements	Secondly, the process of inputting tree data into the database within the program is difficult. Depending on the types of information gathered during ground-truthing, there might be many fields that are left empty when entering tree data. (96_Avey et al_1998, p. 121)
Lack of Data Transferability	for example, the input species data was collected from one place and used in the tool for another place where those species don't exist. Mostly i-Tree problem.	The i-Tree Canopy database of ecosystem services is only provided for US cities.(167_Endreny et al_2017, p. 2)
Model Issue	involve projections of future scenarios, not data measurements	
Error/Uncertainty	author acknowledges error or uncertainty in the model or modeling process	BVOC emissions are estimated based on species factors and meteorological conditions (i.e., air temperature and daylight) but the uncertainty of the estimate is unknown. (284_Baro et al_2014, p. 11)
Lack of Transferability	such as the inability to use the model elsewhere because the data is not applicable (different from data transferability)	Fourthly, LiDAR360 offers only one algorithm for CHM segmentation, based on a paper that uses an algorithm where the research location is oak savannah woodland, not an urban forest. (182_Blackman & Yuan_2020, p. 16)
Inconsistent	whereby the model is not able to achieve the same results using the same data	Using the same tree dbh and height but different biomass equation for the same species can result in dramatically different estimates. (65_Aguaron-Fuente_2011, p. 40)

Reductive	refers to simplifying assumptions that do not account for more variables. Also includes the potential 'limited scope' of the models' outputs and that the model may 'not be customizable' for other uses or situations.	Whilst comparable, i-Tree random-point-based assessment only shows the total coverage of the classes and cannot detail the locations of canopy change over time. (182_Blackman & Yuan_2020, p. 15)
Imagery	authors note an issue with the imagery used	
Misclassification	The imagery or photo does not capture all features and misclassifies objects or features.	Indeed, when assessing these, the bare soil in between rows of trees is not detected as pervious. Moreover, surfaces with dry vegetation or barren land are rarely classified as pervious. (341_Codemo et al_2022, p. 13)
Software Limitation	In transforming an image for use with a tool, sometimes the software can cause issues.	Image stitching can also pose challenges for image processing on steep slopes and dense canopies. (119_Wavrek et al_2023, p. 8)
Scale or Resolution	imager scale or resolution limits the capabilities of the tool or procedure	However, its relatively coarse resolution makes its accuracy and precision questionable in urban areas, especially where landscapes are heterogeneous and
Access	refers to the ability to use the digital tool	
Not User Friendly	not easily used by someone without background or training in modeling, geospatial technologies, remote sensing, etc.	However, although low-density LiDAR data is becoming more commonly available, a significant challenge is the appropriate application of the complex techniques required to accurately estimate UTC. (136_Parmehr et al_2016, p. 11)
High Cost	Using the digital tool is cost prohibative.	However, considering the high cost of WorldView-3 data, the user needs to evaluate carefully, if the multi-temporal or more spectral bands are benefi-cial to the extra costs. (269_Jha et al_2018, p. 81)
Hardware	refers to a drone or camera limitation, for example.	the urban setting poses several challenges for drone flights, including proximity to airports with restricted flight areas and transmission tower guide cables creating an obstacle for clear flight paths (119_Wavrek et al_2023, p. 8)
Implications	Refers to the stated implications of the study. Generally, these will be around the policy or planning implications, but not always.	
Policy Recommendation	is specific to policy or city council, also includes ways funds could be used	
Equity Issue	Findings from the study suggest how policies could better address equity and justice issues.	The history, demographic characteristics, and current tree canopy in Madison-Eastend and Berea suggest environmental injustice. A program such as TreeBaltimore may provide an opportunity to mitigate those injustices. (34_Battaglia_2010, p. 105)
Tree Goals	suggest policies related to greening, ecosystem services, or other tree-realted goals.	This type of evidence is fundamental to guiding future planning and investment, including monitoring progress towards resource management goals and ecosystem service goals such as shading and cooling. (43_Plant et al_2016, p. 7)
Zoning Update	recommend cities update zoning regulations	In addition, these maps can provide decisionmakers with additional information to support policy development such as tree and landscape ordinances that stipulate a percent canopy cover for new development or retention and protection of large and valuable trees. (300_McGee et al_2012, p. 10)
Management Recommendation	covers multiple management suggestions, includes planning recommendations	
Tree Planting	refers to planting, but also increasing canopy cover, for example	Therefore, planting distant from the pollution source, in small and isolated patches should be recommended for this tree type. (268_Xing et al_2019, p. 7)

Urban Infrastructure	includes use of park maintenance equipment, concrete removal, etc	Create bioretention areas to reduce run-off in urban areas, and for purifying, storing and reusing rainwater. (121_Chaparro et al_2009, p. 78)
Participation	suggests ways to enhance participation, or a need for participation	The idea of having self reporting residents through an online database could also help urban foresters quantify and reach canopy cover targets. (187_Winmill_2015, p. 102)
Tree Protection	includes tree maintenance	The results indicate that many campus trees currently receive less maintenance than needed. (101_Kulhavy et al_2014, p. 11)
Tree Selection	refers to they types of trees that should be used	Environmental planners could adopt a strategy of planting more deciduous trees and the present study identifies where reductions in solar radiation could be prioritised (271_Wang et al_2016, p. 9)
Tool Recommendation	refers to the ways the tool can be used or improved	
Tool Use	specifically in how the tool could be used	Therefore, both the current extent of existing tree canopy and a target standard error should be considered when determining an optimal point sample. (151_Hwang et al_2020, p. 10)
Tool Development/ Improvement	recommends how the tool could improve or the need for further development	The integration of the method in open-source GIS ensures that the method can be improved beyond the current state, for instance by implementing new viewshed parametrisation functions. (92_Cimburova and Blumentrath_2022, p. 7)
Tool-Aided Finding	come from results but are descriptive implications that do not include recommendations	
Tool Use	generally specific to the tool and how it can/is used; also refers to ways that author(s) contribute to their field, more broadly	Examination of NDVI values provides insight into the differences in accuracy consistency between classification treatments within the study area.(102_Baller_2008, p. 37)
Tree Benefits	refers to the benefits that trees offer	Specifically, results clearly demonstrate the importance of canopy closure for the mitigation of summer urban surface temperature increase. (152_Greene et al_2017, p. 13)
Tree Planting	refers to findings about tree planting	Our framework is flexible to handle a range of urban greening scenarios that can satisfy different environmental, economic, and social requirements of tree planting initiatives in different cities, potentially
Equity Issue	referes to an issue with equity or justice, but not a recommendation	Regardless of the cause of inequality in tree cover, the tree cover disparity between low- and high-income blocks potentially has health implications. That is, whatever its historical causes, the fact that currently some neighborhoods have lower tree cover has potential effects on the health of those who live there. (262_McDonald et al_2021, p. 20)