Learning about urban climate solutions

Supplementary information

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Additional Figures and Tables

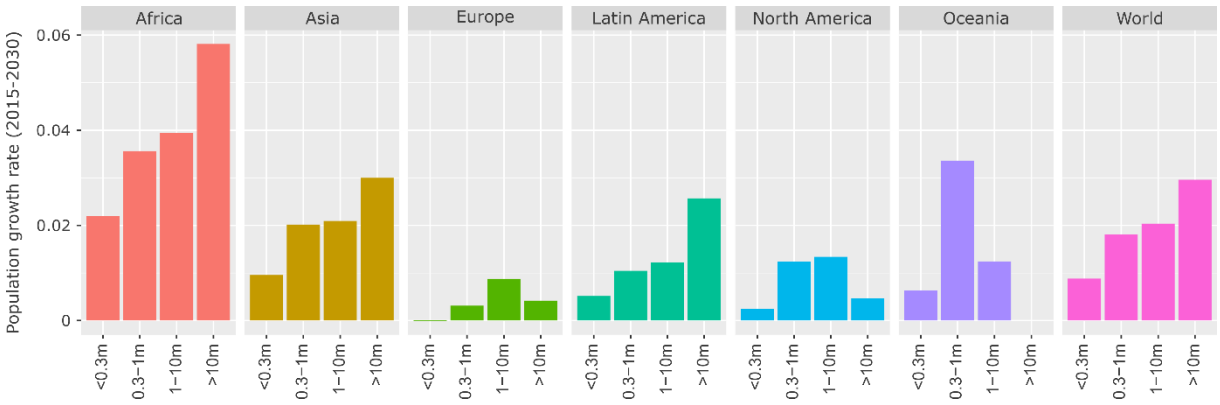

Figure 1: Projected population growth rate by region and city size, 2015-2030. *Population data from ref 7, using agglomeration data where available.*

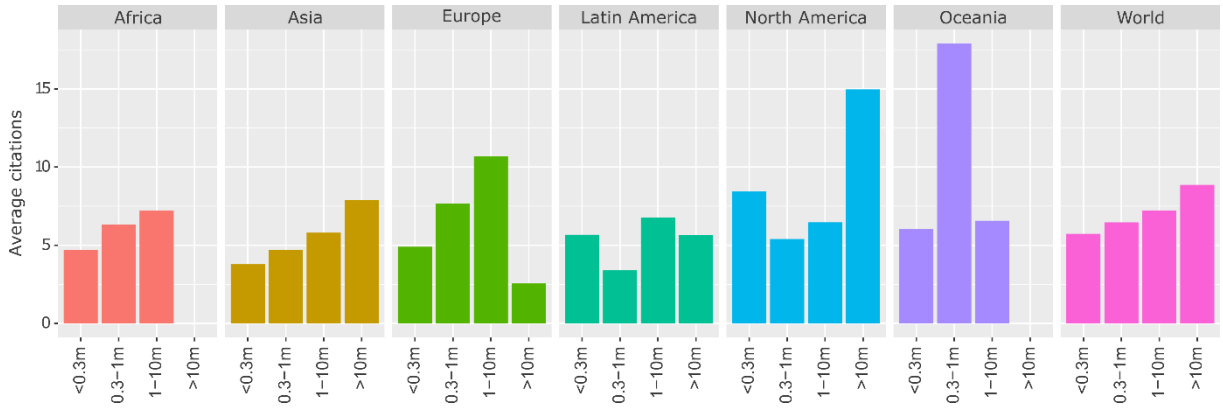

Figure 2: Average citations of urban case studies by region and city size. *Citations are divided equally among cities in double-counted articles. Population data from ref 7, using agglomeration data where available.*

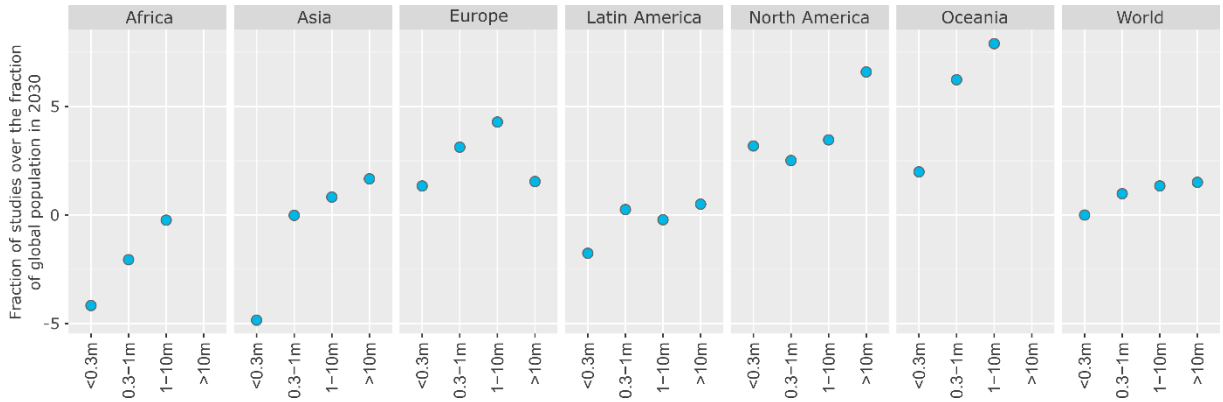

Figure 3: The global distribution of urban case studies versus population*. To normalise, where the numerator (% of global population in a region & city size) exceeds the denominator (% of case studies in a region & city size), we subtract the fraction from 2. Population data from ref 7, using agglomeration data where available.*

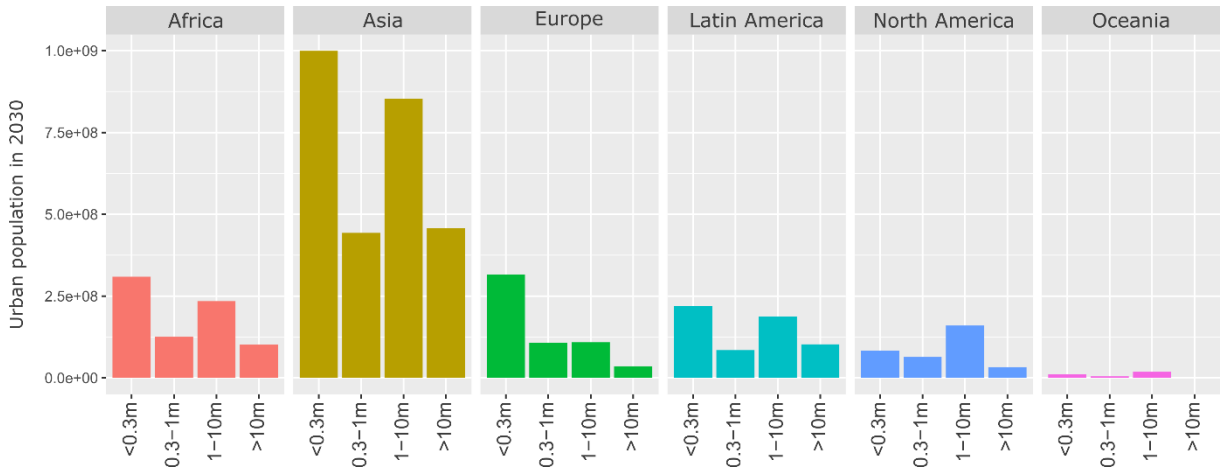

Figure 4: Total urban population in 2030 by region and city size. *Population data from ref 7, using agglomeration data where available.*

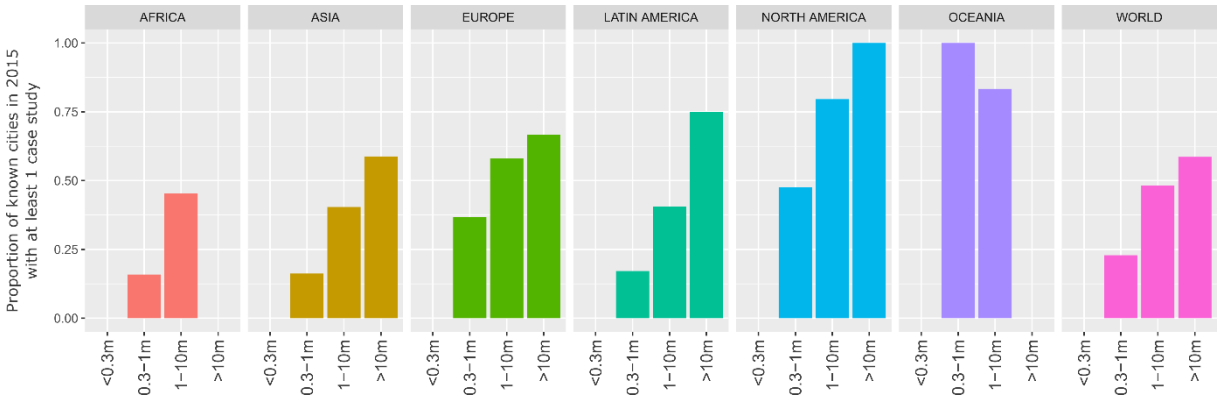

Figure 5: Direct coverage of case studies. *Missing values for small cities are due to absent data; missing values for mega-cities (Africa, Oceania) indicate no documented mega-cities in these regions as of 2015. Population data from ref 7, using agglomeration data where available.*

ID	Topic Name	Stemmed Keywords	Marginal Topic Distribution
1	Urban governance	citi; polici; govern; local; develop	9.3
2	Energy consumption	energi; consumpt; effici; sector; beij	7.9
3	Urban form	urban; area; land; ecolog; model	7.2
4	Solar PV	system; solar; power; electr; energi	7.0
5	CO_2 emissions	carbon; emiss; industri; china; lowcarbon	6.8
6	Buildings	build; design; energi; perform; residenti	6.8
7	Climate adaptation	climat; chang; adapt; risk; govern	6.5
8	Air pollution	air; pollut; health; qualiti; concentr	6.2
9	Transportation	transport; travel; traffic; public; car	5.7
10	GHG emissions	ghg; emiss; greenhous; gas; reduct	5.4
11	Vehicles	vehicl; electr; fuel; drive; emiss	4.8
12	Households	household; incom; electr; survey; hous	4.7
13	Waste management	wast; landfil; solid; manag; msw	4.6
14	Water demand	water; suppli; manag; demand; treatment	4.6
15	Heat demand	heat; district; thermal; demand; network	4.6
16	Green roofs	roof; temperatur; cool; green; surfac	4.5
17	Urban ecology	tree; forest; plant; speci; sequestr	3.4

Table 1: List of topics and their keywords. *Topic names are manually coded by the authors based on a review of the stemmed keywords and associated documents. The marginal topic distribution denotes the percentage of the document set where this topic is found.*

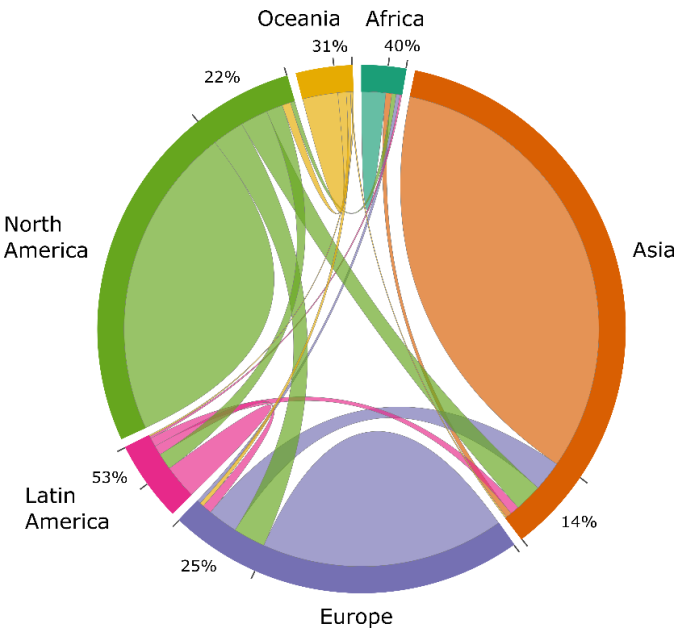

Figure 6: Inter and intra-regional comparative research on urban climate mitigation. *Each link in the chord diagram is based on the pairwise coupling of two cities within a document. Documents where more than one city is mentioned in the abstract are used, totalling 699 studies. The proportion of regional couplings that pair with other regions (i.e. inter-regional urban comparisons) are indicated as percentages.*

Authors	Year	Title	Topics
Khalil, H.A.E.E.	2009	Energy efficiency strategies in urban planning of cites	Urban governance; Energy consumption; Urban form
Attia, S & De Herde, A	2010	Active solar retrofit of a residential house, A case study in Egypt	Buildings; Heat demand; Green roofs; Solar PV
Fahmy, M & Sharples, S	2011	Urban form, thermal comfort and building CO2 emissions - a numerical analysis in Cairo	Buildings; GHG emissions; Green roofs; Urban form
El-Deeb, K, El-Zafarany, A & Sherif, A	2012	Effect of building form and urban pattern : On energy consumption of residential buildings in different desert climates	Buildings; Urban form

Verdeil, E, Arik, E, Bolzon, H & Markoum, J	2015	Governing the transition to natural gas in Mediterranean Metropolis: The case of Cairo, Istanbul and Sfax (Tunisia)	Urban governance; Energy consumption; Heat demand; Urban form
Dabaieh, M, Wanas, O, Hegazy, MA & Johansson, E	2015	Reducing cooling demands in a hot dry climate: A simulation study for non-insulated passive cool roof thermal performance in residential buildings	Buildings; Green roofs
Kares, M & Singh, P	2016	Assessment of building integrated photovoltaics for the residential section in representative Urban areas in Egypt	Buildings; Energy consumption; Households; Solar PV; Urban form
Aboulnaga, M.	2016	High-rise buildings in context of sustainability; urban metaphors of greater Cairo, Egypt: A case study on sustainability and strategic environmental assessment	Buildings

Table 2: Urban climate mitigation literature on Cairo

Topic	**Proportion**	**Topic**	**Proportion**
GHG emissions	0.19	Urban form	0.08
Transportation	0.16	Water demand	0.08
Air pollution	0.16	Waste management	0.07
CO2 emissions	0.14	Solar PV	0.07
Energy consumption	0.12	Households	0.06
Urban governance	0.11	Heat demand	0.06
Vehicles	0.10	Urban ecology	0.05
Climate adaptation	0.10	Green roofs	0.04
Buildings	0.10		

Table 3: Topic proportions of 'forward-looking' case studies

Region	No. case studies	No. 'forward-looking' studies	Fraction
Africa	175	4	0.02
Asia	1761	190	0.10
Europe	1207	129	0.11
Latin America	246	26	0.11
North America	1126	84	0.07
Oceania	184	19	0.10

Table 4: Regional coverage of 'forward-looking' case studies

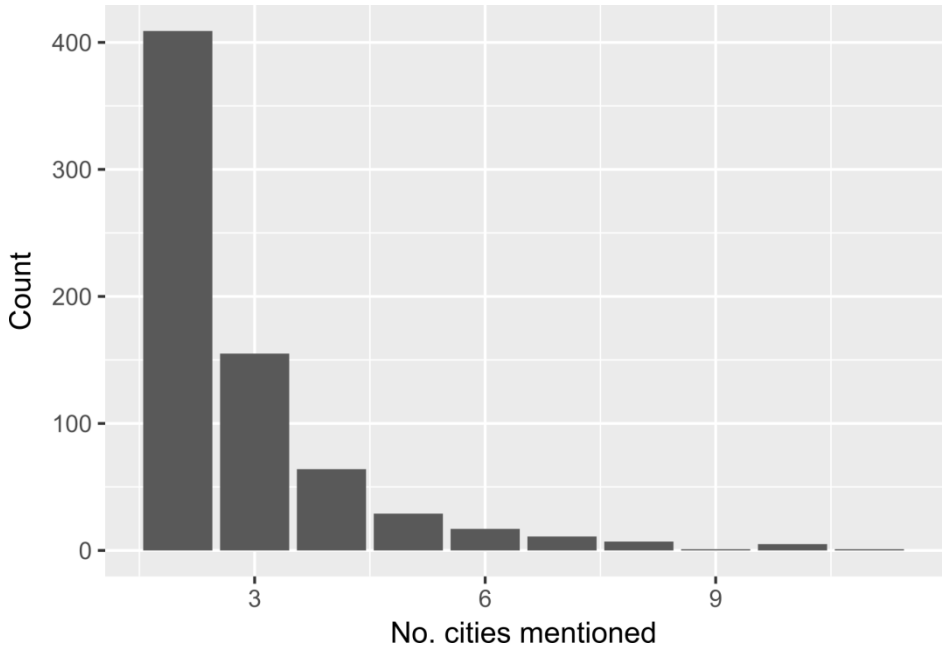

Figure 7: Number of cities mentioned in comparative studies