How green is a "Green City"? A review of existing indicators and approaches

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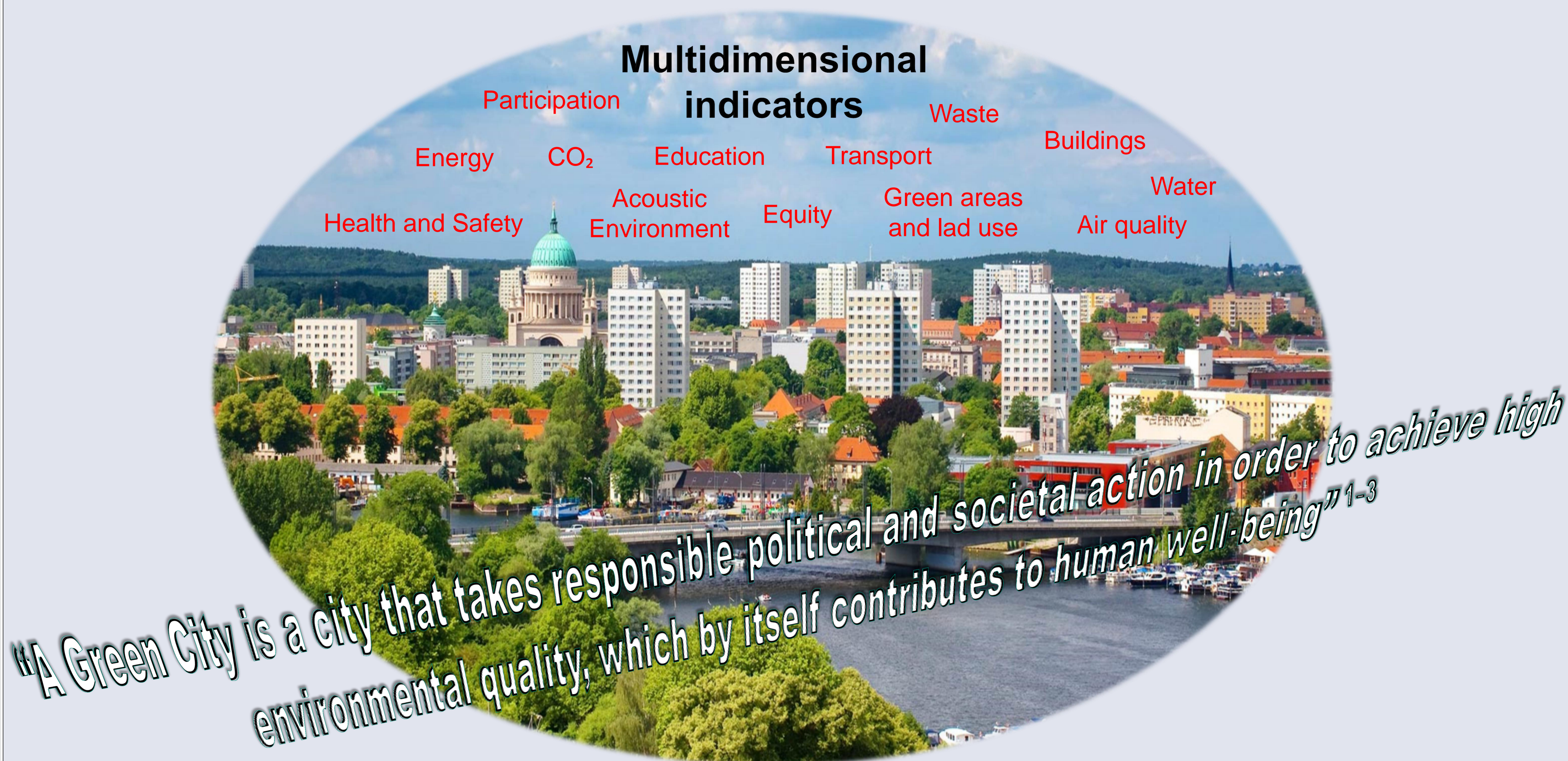[2] Department of Geography, Humboldt University, Berlin, Germany
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OBJECTIVE

- Create more coherence in the understanding and evaluation of "**Green Cities**" by identifying a set of **multidimensional indicators.** Dimensions considered are "**Environmental quality**", "**Human well-being**" and "**Societal and political action**".

METHODOLOGY

- Reviewing existing indices (including Sustainable Developing Goal, SDG 11)

- Defining 13 categories of indicators: **CO_2, Air quality, Energy, Buildings, Transport, Water, Waste, Green areas and land use, Acoustic Environment, Health and Safety, Education, Equity, Participation**;

- Selecting indicators based on (1) **coherence** and (2) **recurrence** and distinguishing between **quantitative** (with a unit of measure) and **qualitative** (without a unit of measure) ones.

REVIEWED DEFINITIONS				INDICATORS		
	PERIO-DICITY	AUTHOR	TARGET CITIES	CATEGORIES USED	No Quant.	No Qual.
Urban Ecosystem Europe	(2006) 2007	Ambiente Italia	32 European	**Air quality**, Acoustic Environment, Water, Energy, **Waste**, **Transport**, Green areas, Building, CO_2, Health, Equity, Education, Participation	21	4
Eur. Green City Index	2009	Economist Intel. Unit	30 European	CO_2, Energy, Building, **Transport**, Water, **Waste**, **Air quality**	17	13
European Green Capital Award	Annually since 2010	European Commission (DG Environment)	European cities >200.000 inhabitants	Climate Change, **Transport**, Green Areas, Biodiversity, **Air quality**, Acoustic Environment, Waste, Water, **Waste** Water, Eco-innovation, Energy, Environmental management	52	3
SDG 11	-	United Nations	Any	Building, **Transport**, **Air quality**, **Waste**, Green areas, Education, Equity, Safety, Health, Participation	10	3

Characteristics of "Green City" indices analyzed. The categories in bold are present in all the indices.

Multidimensional indicators

Participation · Waste · Energy · CO_2 · Education · Transport · Buildings · Acoustic Environment · Equity · Green areas and lad use · Water · Health and Safety · Air quality

"A Green City is a city that takes responsible political and societal action in order to achieve high environmental quality, which by itself contributes to human well-being"[1-3]

Monitoring scheme for Green City performance

GREEN CITY		
Societal and political action	**Environmental quality & Human well-being**	**Examples**
Quantitative and Qualitative indicators	Quantitative indicators	CO_2 emission, female employment, ...
Implementation of rules	Specific performance	tons head^{-1}, percentage, rates, ...
Impact evaluation	Monitoring	measuring stations, questionnaires, ...
Comparison of results		

CONCLUSIONS

- Existing indicators for the Green City concept are grouped and evaluated.

- A set of multidimensional repeatable indicators is selected and proposed for future assessments.

- The development of an universal index showing the environmental impact of urbanization which is independent of city size is suggested.

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