

Supplementary Material II: Selected Documents for Literature Review and Delphi method results

1. Selected documents for the literature review

Name/Title	Year	Type	Topic	# of indicators proposed/identified/used	Reference
Indicators for Sustainable Cities	2015	Review	Urban	24 (Indicator sets)	European Commission: Directorate-General for Environment (2015)
Sustainability on the urban scale: Proposal of a structure of indicators for the Spanish context	2015	Indicator set	Urban	73	Braulio-Gonzalo et al. (2015)
City Prosperity Index	2016	Index	Urban	25	UN Habitat (2016)
Reference Frameworks for Sustainable Cities	2016	Indicator set	Urban	>100	RFSC (2016)
Carey & Dubbeling (2017)	2017	Indicator set	Food	210	Carey & Dubbeling (2017)
ETSI TS 103 463 V1.1.1	2017	Indicator Set	Urban	73	ETSI (2017)
United for Smart Sustainable Cities Initiative (U4SSC) Key Performance Indicators for Smart Sustainable Cities	2017	Indicator set	Urban	91	U4SSC (2017)
Urban food systems strategies: A promising tool for implementing the SDGs in practice	2017	Review	Food	247	Ilieva (2017)
A holistic sustainability assessment method for Urban food system governance	2017	Assessment/ Indicator set	Food	97	Landert et al. (2017)
Urban sustainability assessment and ranking of cities	2017	Indicator set	Urban	46	Phillis et al. (2017)
Urban Food Systems Diagnostic and Metrics Framework	2017	Indicator set	Food	>120	FAO and World Bank (2017)
Urban Sustainability Framework	2018	Indicator set	Urban	180	GPSC (2018)
Characterisation of sustainability in urban areas: An analysis of assessment tools with emphasis on European cities	2018	Review	Urban	21	Feleki et al. (2018)
ISO 37120:2018	2018	Indicator set	Urban	109	ISO (2018)

Global urban sustainability assessment: A multidimensional approach	2018	Assessment	Urban	17	Shmelev and Shmeleva (2018)
Applying the SDGs to cities: Business as usual or a new dawn?	2018	Review	Urban	11	Zinkernagel et al. (2018)
Assessing the sustainability of Spanish cities considering environmental and socio-economic indicators	2018	Assessment	Urban	31	González-García et al. (2018)
The Milan Urban Food Policy Pact monitoring framework	2019	Indicator set	Urban	44	Carey & Cook (2021)
The Lisbon ranking for smart sustainable cities in Europe	2019	Assessment/Index	Urban	15	Akande et al. (2019)
A criterion for modelling the 'live-and-work' city index using sustainable development indicators	2019	Indicator set/Index	Urban	30	Fouda and Elkhazendar (2019)
Measuring progress in sustainable food cities: An indicators toolbox for action	2019	Indicator set	Food	44	Moragues-Faus and Marceau (2019)
Sustainable urban liveability: A practical proposal based on a composite indicator	2019	Index	Urban	16	Valcárcel-Aguar et al. (2019)
Embedding environmental, economic and social indicators in the evaluation of the sustainability of the municipalities of Galicia (northwest of Spain)	2019	Assessment/Indicator set	Urban	40	González-García et al. (2019)
The 2019 SDG Index and Dashboards Report for European Cities (prototype version)	2019	Indicator set	Urban	56	SDSN and Telos (2019)
Indicators framework for sustainable urban design	2020	Review	Urban	48	López Chao et al. (2020)
Holistic methodological framework for the characterization of urban sustainability and strategic planning	2020	Indicator set	Urban	21	Feleki et al. (2020)
Assessing the sustainability dimension at local scale: Case study of Spanish cities	2020	Assessment	Urban	38	Rama et al. (2020)
NUA Monitoring Framework and related indicators	2020	Indicator set	Urban	77	UN Habitat (2020)
Indicators for urban sustainability: Key lessons from a systematic analysis of 67 measurement initiatives	2020	Review	Urban	34	Merino-Saum et al. (2020)

Sustainable urban development: A review of urban sustainability indicator frameworks	2021	Review	Urban	38	Michalina et al. (2021)
Urban sustainability deficits: The urban non-sustainability index (UNSI) as a tool for urban policy	2021	Index	Urban	40	Raedo (2021)
Defining a procedure to identify key sustainability indicators in Spanish urban systems: Development and application	2021	Assessment	Urban	37	Rama et al. (2021)
Mapping sustainability and circular economy in cities: Methodological framework from Europe to the Spanish case	2022	Indicator set	Urban	155	Bote Alonso et al. (2022)
Challenges facing indicators to become a universal language for sustainable urban development	2022	Review	Urban	225	Ruan & Yan (2022)
Sustainable Cities Index	2022	Indicator set	Urban	24	Arcadis (2022)
Global Urban Monitoring Framework (UMF)	2022	Indicator set	Urban	77	UN Habitat (2022)
City Region Food System Resilience Indicator Framework	2023	Indicator set	Food	155	Carey & RUAF (2023)
LEED v4.1 Cities and Communities	2023	Rating system/ Indicator set	Urban	41	USGB (2023)

2. Results Delphi R1 & R2

Indicators	Round 1					Round 2				
	Relevance		Actionability		Status	Relevance		Actionability		Status
	Median	% agreement (7-9)	Median	% agreement (7-9)		Median	% agreement (7-9)	Median	% agreement (7-9)	
1. Socio-ecological Dynamics										
1.1 Social Justice										
#1. Population at risk of poverty rate	8	90.91	8	72.73	Included					
#2. Gender pay gap	8	77.27	7	54.55	Modified/ Aspirational	8	81.25	7	75.00	Included
#3. Prevalence of food insecurity	9	90.91	7	59.09	Revision/ Aspirational	9	100.00	7	62.50	Aspirational
#4. Beneficiaries of social assistance					Added	8	93.75	9	93.75	Included
#5. Beneficiaries of food assistance in cash or kind					Added	9	93.75	8	87.50	Included
1.2 Culture and tourism										
#6. Food festivals held	6	36.36	7	63.64	Deleted					
#7. Tourist intensity (number of tourist beds per 1000 inhabitants)	6	45.45	8	72.73	Revision	7	71.43	9	100.00	Deleted
#8. Number of same-day visitors per month	7	58.33	8	75.00	Added	7	56.25	8	62.50	Deleted
#9. Tourism companies actively taking measures to source local, sustainable, and fairtrade food.					Added	8	81.25	6	43.75	Aspirational
#10. Tourism infrastructure					Added	7	68.75	9	87.50	Deleted
#11. Cultural infrastructure					Added	6	43.75	8	87.50	Deleted
#12. Cultural participation					Added	7	50.00	7	68.75	Deleted
#13. Relative contribution of tourism to the municipality's economy (% of GDP)					Added	8	75.00	8	81.25	Included
1.3 Housing										
#14. Housing costs	8.5	86.36	8	81.82	Included					
#15. Number of available places in tourist establishments	6	36.36	7	54.55	Deleted					
#16. Homeless population	8	90.91	6.5	50.00	Revision/ Aspirational	8	75.00	7	62.50	Aspirational
#17. Residential urban vulnerability	8	90.91	6.5	50.00	Modified/ Aspirational	8	81.25	7	68.75	Aspirational
#18. Social housing rate					Added	7	68.75	9	93.75	Deleted

#19. Beneficiaries of social housing					Added	8	81.25	9	81.25	Included
1.4 Education										
#20. Educational attainment level of the adult population (between 24 and 65 years old)	7	54.55	8	90.91	Modified	8	75.00	9	100.00	Included
#21. Participation in formal education for the promotion of healthy and sustainable diets					Added	9	87.50	7	43.75	Aspirational
1.5 Environment										
#22. CO2 emissions (by sector, including agriculture, food industry, etc.)	8	68.18	6.5	50.00	Modified	9	81.25	7	62.50	Aspirational
#23. Annual particulate matter levels	7	54.55	7	54.55	Revision	7	50.00	8	68.75	Deleted
#24. Share of GHG emissions by the agricultural sector	8	72.73	5.5	45.45	Deleted					
1.6 Biodiversity										
#25. Number of types of crop varieties and livestock breeds	9	77.27	6.5	50.00	Revision/ Aspirational	9	93.75	7	56.25	Aspirational
#26. Number of native species registered in the municipality	7	63.64	5	18.18	Revision	8	87.50	7	56.25	Aspirational
#27. Area dedicated to the recovery and conservation of agricultural biodiversity					Added	9	100.00	8	68.75	Aspirational
1.7 Land use										
#28. Built-up land-use mix	8	77.27	8	77.27	Included					
#29. Surface area designated for natural protection	7	72.73	9	90.91	Included					
#30. Tree area surface	7	63.64	7	59.09	Deleted					
1.8 Demographics										
#31. Population under 16 years old	8	86.36	9	100.00	Included					
#32. Population over 65 years old	8	86.36	9	100.00	Included					
#33. Immigration rate	7.5	81.82	9	86.36	Included					
#34. Cultural diversity					Added	8	62.50	8	62.50	Deleted
1.9 Economy										
#35. Municipality unemployment rate	8	95,45	9	90,91	Included					
#36. Average household income	9	90,91	8,5	86,36	Included					
#37. Average income of agri-food system workers, including small producers	9	95,45	5	36,36	Revision/ Aspirational	9	100.00	7	68.75	Aspirational
#38. Household expenditure on key food items	9	100,00	6	45,45	Revision/ Aspirational	9	93.75	7	56.25	Aspirational
#39. Income inequality (Gini coefficient/index)	8	68,18	8	63,64	Revision	9	87.50	8	81.25	Included

1.9 Agriculture and food	#40. Gross domestic product (GDP) per capita disaggregated by sector [e.g., agriculture, manufacturing, tertiary]	7	54,55	8,5	72,73	Modified	8	87.50	9	87.50	Included
	#41. Agriculture's share in GDP	8	86,36	7	68,18	Deleted					
	#42. Employment in manufacturing sector	7	54,55	8	68,18	Deleted					
	#43. Employment in the agri-food chain	9	86,36	8	86,36	Modified	9	100.00	9	81.25	Included
	#44. Distribution of employment by sector [e.g., agriculture, manufacturing, tertiary] in the municipality					Added	8	87.50	9	87.50	Included
	#45. Cost of a healthy diet					Added	9	100.00	8	68.75	Aspirational
1.10 Health & Diet											
	#46. Average life expectancy at birth	8	81,82	9	81,82	Included					
	#47. Prevalence of obesity and overweight in adults and children	9	100,00	8	90,91	Included					
	#48. Consumption of a minimum of 5 servings of fruits and/or vegetables per day	9	86,36	5	22,73	Modified/ Aspirational	9	93.75	6	31.25	Aspirational
	#49. Consumption of fast food/(ultra-)processed food at least once a week	9	86,36	5,5	27,27	Modified/ Aspirational	9	93.75	6	31.25	Aspirational
	#50. Per capita meat consumption (by type of meat)	9	90,91	5,5	27,27	Modified/ Aspirational	9	100.00	6	31.25	Aspirational
	#51. Proportion of organic food consumption	9	95,45	6	22,73	Modified/ Aspirational	9	93.75	6	25.00	Aspirational
	#52. Public provision of health promotion programmes					Added	9	87.50	8	81.25	Included
	#53. Legume consumption per capita					Added	8	87.50	6	25.00	Aspirational
	#54. Prevalence of Type 2 diabetes in the adult population					Added	9	93.75	9	75.00	Included
2. Urban infrastructure and form											
2.1 Transport networks											
	#55. Access to public transport	8	86,36	7	72,73	Included					
	#56. Length of bike network	8	72,73	8	81,82	Included					
	#57. Modal Split	8	72,73	6	40,91	Modified/ Aspirational	7	50.00	7	50.00	Deleted
	#58. Car ownership	7	59,09	8	86,36	Revision	6	31.25	9	93.75	Deleted
	#59. Pedestrian zone area					Added	6	37.50	8	81.25	Deleted
2.2 Food infrastructure											

#60. (Potential) area for agriculture and livestock within the municipality adjusted for population density and total area	9	90,91	9	90,91	Modified	8	87.50	8	75.00	Included
#61. Number of community gardens (by type)	9	86,36	8	77,27	Included					
#62. Number of certified organic farms	9	86,36	9	95,45	Included					
#63. Number of municipal and collective food processing and distribution infrastructures	9	95,45	7	63,64	Modified/ Aspirational	9	100.00	8	87.50	Included
#64. Food environment	9	95,45	7	63,64	Modified/ Aspirational	9	100.00	7	68.75	Aspirational
#65. Proportion of agricultural area under certified organic farming					Added	9	87.50	9	93.75	Included
2.3 Utilities										
#66. Household access to basic services	8	77,27	9	86,36	Included					
#67. Proximity to basic health services	7	54,55	9	86,36	Modified	9	81.25	8	75.00	Included
#68. Proximity to basic services					Added	8	100.00	7	68.75	Aspirational
#69. Household access to sanitation facilities, food storage, and kitchen facilities					Added	8	93.75	7	56.25	Aspirational
2.4 Design & planning										
#70. Population density	8	77,27	9	95,45	Included					
#71. Ratio between land use and population growth	8	81,82	8	72,73	Included					
#72. Informal settlements area	8	63,64	7	54,55	Revision	8	62.50	8	68.75	Deleted
2.5 Green spaces & parks										
#73. Green space per capita	9	81.82	8	90.91	Included					
#74. Proximity to green areas					Added	8	87.50	8	75.00	Included
3. Networked resource flows										
3.1 Energy										
#75. Per capita energy consumption	7	72,73	8	81,82	Included					
#76. Proportion of renewable energies in final energy consumption	7	63,64	7	59,09	Modified	7	56.25	8	87.50	Deleted
#77. Fuel poverty	8	90,91	7	68,18	Revision/ Aspirational	8	87.50	8	81.25	Included
3.2 Waste										
#78. Urban solid waste generated	9	81,82	8	72,73	Included					
#79. Municipal solid waste collected and treated	8	81,82	8	77,27	Deleted					
#80. Municipal waste recycling rate	8	86,36	8	77,27	Included					
#81. Municipal waste reused as soil conditioner and/or fuel	9	90,91	7	45,45	Modified/ Aspirational	9	100.00	8	87.50	Included

#82. Annual volume of food losses and waste	9	90,91	5	27,27	Revision/ Aspirational	9	87.50	7	68.75	Aspirational
#83. Total food redistribution per year					Added	9	93.75	7	50.00	Aspirational
#84. Number of circular programs and initiatives addressing food loss and waste in the urban region					Added	9	100.00	8	81.25	Included
3.3 Food flows										
#85. Municipal food production by food group	9	95,45	6	36,36	Revision/ Aspirational	9	100.00	7	62.50	Aspirational
#86. Food consumption by food group	9	90,91	6	31,82	Revision/ Aspirational	9	100.00	7	56.25	Aspirational
#87. Local basic food self-sufficiency	9	86,36	5	18,18	Revision/ Aspirational	9	93.75	7	50.00	Aspirational
#88. Ratio of food exports to imports	9	86,36	6	36,36	Revision/ Aspirational	9	93.75	6	43.75	Aspirational
3.4 Water										
#89. Per capita water consumption	8	77,27	8	72,73	Included					
#90. Drought frequency	9	81,82	9	72,73	Included					
#91. Proportion of water reused-recycled for peri-urban and urban agriculture	9	86,36	7	50,00	Modified/ Aspirational	8	75.00	7	62.50	Aspirational
#92. Per capita water footprint linked to municipal food consumption					Added	9	100.00	6	43.75	Aspirational
#93. Water use by economic sectors					Added	8	93.75	7	56.25	Aspirational
4. Governance dynamics										
4.1 Actors & networks										
#94. Presence of an active multi-stakeholder food planning and policy structure	9	86,36	9	86,36	Included					
#95. Presence of an active municipal inter-departmental body for food policy and program decision-making	9	86,36	9	86,36	Included					
#96. Presence of inter-jurisdictional collaborations in the municipality for food policy development	9	77,27	8	72,73	Included					
#97. Share of environmentally certified companies	7	50,00	8,5	63,64	Revision	7	62.50	9	87.50	Deleted
#98. Level of multi-actor representation and integration in the active food planning and policy structure	9	81,82	9	68,18	Modified/ Aspirational	9	87.50	8	81.25	Included
#99. Budget for the active multi-actor food planning and policy structure					Added	9	93.75	8	81.25	Included

#100. Sources of funding for the active multi-actor food planning and policy structure					Added	9	87.50	8	81.25	Included
#101. Number of activities and projects implemented by the multi-actor food planning and policy structure					Added	8	81.25	9	87.50	Included
#102. Number of meetings/events held/participated by the active multi-actor food policy framework					Added	8	81.25	9	81.25	Included
4.2 Public Policies										
#103. Presence of food as a key pillar in the urban sustainability	9	90,91	9	86,36	Included					
#104. Presence of food as a key pillar in the municipal health strategy	9	86,36	9	86,36	Included					
#105. Presence of healthy and sustainable food as a key pillar in the social services strategy	9	90,91	9	86,36	Included					
#106. Presence of food as a key pillar in urban planning	9	90,91	9	81,32	Included					
#107. Presence of a municipal urban food policy or strategy and/or action plans	9	86,36	9	86,36	Included					
#108. Existence of an emergency food supply/resilience plan for the municipality based on a vulnerability assessment	9	86,36	9	77,27	Included					
#109. Presence of food in the sustainable procurement policy	9	90,91	9	86,36	Included					
#110. Presence of food as a key pillar in the integrated Urban Strategy	9	86,36	9	81,82	Included					
#111. Municipal government budget allocated to the food strategy	9	90,91	9	86,36	Included					
#112. Existence of food policies targeting groups with specific social vulnerabilities					Added	9	93.75	9	93.75	Included
4.3 Participation, transparency, and inclusion										
#113. Representation of women in the municipality	8	68,18	9	81,82	Modified	7	62.50	9	93.75	Deleted
#114. Citizen participation in environmental, public health and cultural associations	8	81,82	6,5	45,45	Revision/ Aspirational	8	93.75	7	62.50	Aspirational
#115. Presence of a mechanism for collecting and analysing data on the urban food system	9	90,91	8,5	63,64	Modified/ Aspirational	9	100.00	9	93.75	Included
#116. Voter turnout in the most recent municipal elections	6,5	45,45	9	77,27	Revision	7	50.00	9	75.00	Deleted

#117. Representation of specific vulnerable groups in food governance bodies						Added	9	100.00	9	87.50	Included				
4.4 Finance															
#118. Municipal financial debt						7	54,55	8,5	86,36	Revision	7	50.00	9	100.00	Deleted
#119. Municipal budget dedicated to healthy and sustainable food										Added	9	100.00	8	81.25	Included
#120. Commitment to sustainable public food procurement										Added	9	100.00	8	81.25	Included
#121. Municipal support for food markets or retail stores providing fresh food										Added	9	93.75	8	81.25	Included
#122. Resources dedicated to urban strategies and action plans, and proportion of these resources dedicated to healthy and sustainable food										Added	9	87.50	8	75.00	Included