14.13 Proportion of elderly residents

Project Name: PHUSICOS (Grant Agreement no. 776681)

Author/s and affiliations: Gerardo Caroppi[1,2], Carlo Gerundo[2], Francesco Pugliese[2], Maurizio Giugni[2], Marialuce Stanganelli[2], Farrokh Nadim[3], Amy Oen[3]

[1] *Aalto University, Department of Built Environment, Espoo, Finland (gerardo.caroppi@aalto.fi)*

[2] *University of Naples Federico II (UNINA), Department of Civil, Architectural and Environmental Engineering, Naples, Italy*

[3] *Norwegian Geotechnical Institute (NGI), Oslo, Norway*

Proportion of elderly residents	**Place Regeneration**
Description and justification	The main proportion of inhabitants in rural and mountainous landscapes is people over 65 years of age. Inhabitants of these areas are economically disadvantaged regarding the supply of essential services for daily life such as health services care and basic goods stores. This combination of reduced communities with limited facilities and economic options can cause the abandonment of these areas by young people. If the depopulation trend continues, the impact on ageing population will be felt more and more dramatically; as the maintenance of basic services declines further and there are fewer younger people to help in the care of these dependents (Gellrich & Zimmermann, 2007; Molina Ibanez & Farris, 2011; Mottet et al., 2006). Decreasing in Elderly Rate can be used as an Indicator of the performance of the Design Scenario in terms of quality of life.
Definition	The Indicator can be defined as the change, in terms of percentage, of the elderly rate in the area where the new infrastructure (both NBS, Hybrid solutions and Grey infrastructures) is implemented. This Indicator will be equal to 0 in the Baseline Scenario and will be assessed in the Long Term Scenario computing the percentage difference between the Elderly Rate in the Design Scenario and the Elderly Rate in the Baseline Scenario. In the Long-term scenario Elderly Rate should be calculated considering statistical data made available some years after NBS/Grey/Hybrid solutions have been implemented.
Strengths and weaknesses	It could be difficult to get the data concerning population living in the area in the Long Term Scenario
Measurement procedure and tool	*Elderly rate* at a given time can be expressed by the following formula: $$ER = \frac{P_{>65}}{P} \cdot 100$$ where

	$P_{>65}$ is the population over 65 years old; P is the total population. *Elderly* $$\Delta ER = \frac{ER_{LTS} - ER_{BS}}{ER_{BS}} \cdot 100$$ where ER_{BS} is the Elderly Rate in the area at the Baseline Scenario; ER_{LTS} is the Elderly Rate in the area at the Long Term Scenario (e.g., 5-10 years after NBS or solutions and Grey infrastructures have been implemented).
Scale of measurement	%
Data source	National Statistical Institute and/or Municipal General Register Office
Required data	Population data
Data input type	Quantitative
Data collection frequency	Annual
Level of expertise required	Medium
Synergies with other indicators	
Connection with SDGs	11
Opportunities for participatory data collection	
Additional information	
References	Gellrich M., Zimmermann N.E. (2007). Investigating the regional-scale pattern of agricultural land abandonment in the Swiss mountains: A spatial statistical modelling approach. Landscape and Urban Planning, 79(1), 65-76. DOI: 10.1016/j.landurbplan.2006.03.004 Molina Ibáñez M., Farris M. (2011). Políticas públicas para el desarrollo rural: un análisis multiescalar. Geographicalia, 59-60, 225-265. DOI: 10.26754/ojs_geoph/geoph.201159-60836 Mottet A., Ladet S., Coque N., Gibon A. (2006). Agricultural land-use change and its drivers in mountain landscapes: A case study in the Pyrenees. Agriculture, Ecosystems and

Environment, 114(2-4), 296-310. DOI: 10.1016/j.agee.2005.11.017

14.14 Areal sprawl

Project Name: Nature4Cities (Grant agreement: No. 730468)

Author/s and affiliations: Flora Szkordilisz[1], Nicola Pisani[2], Barnabás Körmöndi[1]

[1] *Hungarian Urban Knowledge Center, Budapest, Hungary*

[2] *Colouree, Genova, Italy*

Areal Sprawl	**Place Regeneration**
Description and justification	Areal sprawl is the territorial aspect of several urban transitions. According to literature (Speck, 2013; Saelens et al. 2003.) the planning of city centres can avoid areal sprawl. If downtown is liveable, less people will tend to move to the outskirts of the city and undertake the burden of daily commute for the desired quality of their place of residence. Nature-based solutions are highly relevant from compact urban form point of view. Compactness can be also achieved with the balanced availability of green spaces and ecosystem services. In addition, unrestricted urban sprawl endangers natural environment around the city and the protective zones that mitigates the intensity of urban heat island.
Definition	Areal sprawl indicator describes the level of compactness of a city, as the ratio between total building floor area to the area of the convex hull of the built space. The convex hull of a set of points is the minimal convex envelope that contains those points. Computing this shape gives a fair ground to compare different cities or neighbourhoods, and a closer approximation to the actual built density.
Strengths and weaknesses	
Measurement procedure and tool	• computation of convex hull • collection or calculation of total floor area • ratio $\mathrm{Conv}(S) = \left\{ \sum_{i=1}^{\lvert S\rvert} \alpha_i x_i \;\middle\vert\; (\forall i : \alpha_i \geq 0) \wedge \sum_{i=1}^{\lvert S\rvert} \alpha_i = 1 \right\}.$ General formula for a convex hull: AS = $A_{\text{convex hull}}/A_{\text{built space}}$ Output measurement unit: m^2 / m^2 (or m^3/m^2)