

Measuring The Implementation Of Sustainable Development Goals At A Local Level: The WeGlx Index



Gisela Marta Oliveira^{1,a}, Diogo Guedes Vidal^{1,b}, Lilian Monteiro Ferrari Viterbo^{1,2,c} & Rui Leandro Maia^{1,3,d}

¹UFP Energy, Environment and Health Research Unit (FP-ENAS), University Fernando Pessoa, Praça Nove de Abril, 349, 4249-004. Porto, Portugal

²Petrobras, Salvador, Bahia, Brasil

³Transdisciplinary Research Centre "Culture, Space and Memory" (CITCEM), Faculty of Arts and Humanities of the University of Porto, Portugal

^agisela@ufp.edu.pt; ^bdiogovidal@ufp.edu.pt; ^clilianmferrari@gmail.com; ^drmaia@ufp.edu.pt

I. INTRODUCTION

The broadness and ambition of the UN 2030 Agenda for Sustainable Development calls for commitment and effort from all society sectors [1-2]. Either at national or local level, where the action of communities and governance is of the utmost importance for the implementation and operationalization of such an interconnected and transformative agenda, adequate means for monitoring, measurement and accountability of plans and actions are also required. Academia, being one of the strongest pillars of the contemporary societies, should embrace its role as both a promoter and supporter of this universal Agenda, not only by developing fundamental scientific knowledge and educational resources but by also acting as advisers for governmental decisions and the establishment of proper and tailored public policies [3]. This work describes the design and application processes of WeGlx - a composite indicator aiming to be a global objective measure of communities' quality of life, at municipality level. WeGlx quantifies a combination of forty-three variables contributing to tackle municipalities' (N = 308) global progress, in an integrated manner, on SDGs 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 15 and 16. WeGlx study target area is Portugal (92212 km²) and the analysis period is from 2009 to 2017. Portugal is located on the south-eastern region of Europe, its mainland being part of the Iberian Peninsula and two Atlantic archipelagos: Açores and Madeira.

II. MATERIALS & METHODS

Table 1. Variables selected to organize WeGlx

SDG	POSITIVE INDIVIDUAL INDICATORS	CORRESPONDENCE TO UN SDGS INDICATORS	LINK TO CROSS-CUTTING SDGS	TIME SERIES	SDG	NEGATIVE INDIVIDUAL INDICATORS	CORRESPONDENCE TO UN SDGS INDICATORS	LINK TO CROSS-CUTTING SDGS	TIME SERIES
3	6 Number of health care professionals	3.3		[2009-2017]	1	1 Social Security beneficiaries of Guaranteed Minimum Income and Social Integration Benefits	4	11	[2009-2017]
	7 Number of hospitals	3.29		[2009-2016]		2 Infant mortality rate	17	1	[2009-2017]
	8 Number of primary health care centres	3.29		[2009-2012]		3 Deaths by HIV and Tuberculosis	20:21	1:48:11	[2009-2016]
10	10 Number of persons enrolled in basic education	33	5:8	[2009-2017]	3	4 Deaths by circulatory, cancer, diabetes and chronic respiratory diseases and suicide	23	11:16	[2009-2016]
	11 Number of persons enrolled in pre-graduate studies	35	5:8	[2009-2017]		5 Deaths by car accident	25	9:11	[2009-2017]
12	12 Number of persons in higher education	37	5:8	[2009-2017]	4	9 Number of illiterate persons	4.5	1:5	2001;2011
	14 LLL Number of persons in lifelong learning	4.6	1:5;8:16	[2009-2017]		13 DR Dropout rate	4.3	1:5;8:16	2001;2011
17	17 Population connected to public water supply systems	45	1:2;3;9:11	2009	5	15 Gender gap in wages	5.1	8	[2009-2016]
	18 PSS Population connected to sewerage systems	45	1:2;3;9:11	[2009-2016]		16 Gender gap at professional position	5.2	8	[2009-2016]
20	20 Water quality for human consumption	46	1:2;3;9:11	[2009-2016]	6	19 Water supplied/consumed	46	1:2;3;9:11	[2009-2016]
	23 Purchasing power per capita	8.1	1:11	2009;2011;2013;2015		21 Domestic electricity consumption	51	1:3;9:11;12	[2009-2016]
8	25 Average monthly salary	8.4	1	[2009-2016]	7	22 Consumption for motor fuel by inhabitant	7.1	1:9;11;12;13	[2009-2016]
	26 Number of persons working at industries	9.2	8	[2009-2016]		24 Inactive young population (15-34 years)	8.8	1:4;11;16	2001;2011
9	27 Number of industrial enterprises	9.2	8	[2009-2016]	28	28 NOx emission s	a	9:11;12;13	2009;2015
	32 Selective urban waste collection	71	14	[2009-2016]		29 PM ₁₀ emissions and PM _{2.5} emissions	69	9:11;12;13	2009;2015
36	36 Area of land used for urban equipments and parks identified in the PMOT	70	13:17	[2009-2013]	30	30 CO2 emission s	62	9:11;12;13	2009;2015
	37 Investments in waste management of municipalities	71	14	[2009-2016]		31 Burnt Area ^a	a	13:15	[2009-2017]
38	38 Non-conventional dwellings	66	1:5;7	2001;2011	33	33 Undifferentiated urban waste collection	71	14	[2009-2016]
	39 Natura 2000 land area	87		[2011-2016]		34 Incinerators _{a,b}	a	12	2016
15	41 Investments on protection of biodiversity and landscapes of municipalities	a		[2009-2016]	35	35 Landfills _{a,b}	a	6:12	2014-2016
						40 Rural forest fires	89	2:13	[2009-2017]
					42 Crimes Registered	88	3:9;11	[2009-2016]	

^a This indicator is not identified as SDG indicator
^b This indicator is not available in databases. Data was collected from technical reports

$$WeGlx_i = \frac{\sum_{p=1}^{12} NI_{p|i}^+}{12} - \frac{\sum_{n=1}^{17} NI_{n|i}^-}{17}; i \in [1, 308]$$

Equation (1) WeGlx formula

IV. CONCLUSIONS

The design of governance strategies and public policies should express, enhance and strengthen this diversity and, most important, should not be the cause of inequalities reproduction nor an opportunity for asymmetries worsening. The value of WeGlx should be considered in this context: the objective measurement of life conditions at a local scale.

III. RESULTS & DISCUSSION

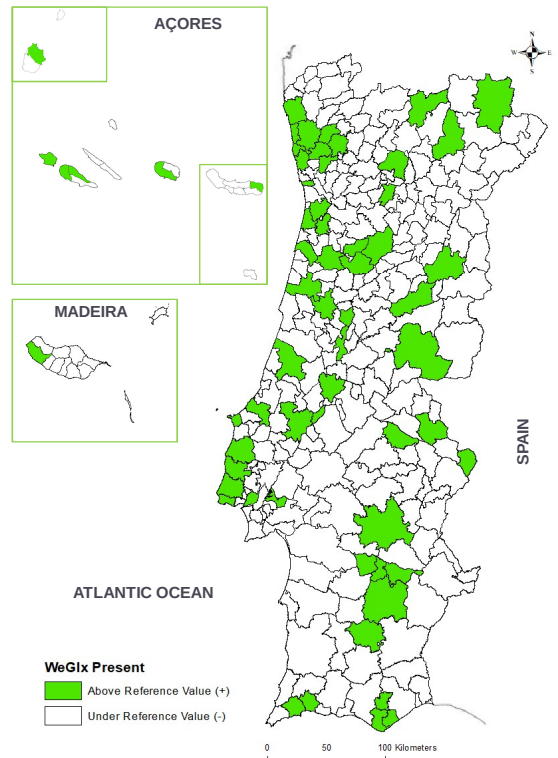


Figure 1. Cartographic representation of WeGlx scores for the present

Portugal is small and mainly rural but the country considerable diversity becomes clear through WeGlx results. This is also a marked inequality within the country (SDG 10): some regions of the archipelagos still suffer from the consequences of the geographical isolation mirrored in the absence of statistical data [4]. At present, the scenario is worse than in 2009 (at the time the country was in financial crisis), now, almost two-thirds of the country population experiences sustainable life conditions below the national average. The WeGlx benchmark is Portugal national average: $WeGlx|_{Portugal} = 0$

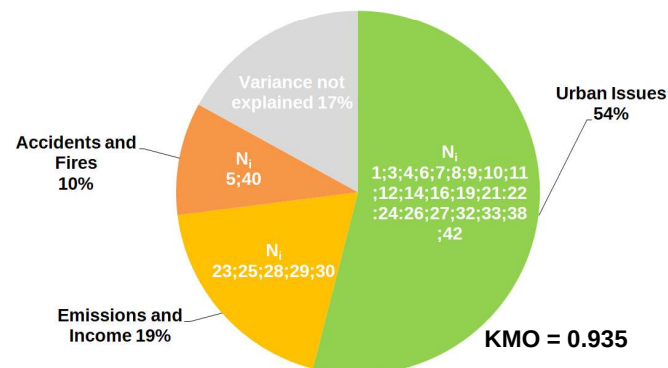


Figure 2. Factor analyses of WeGlx and correspondent variance explained

SWOT

STRENGTHS

- Simplicity of a single score outcome
- Tailored designed for Portugal
- Focused on local communities and territories
- Based only on credible data sources (the national statistical office)
- Adaptable to other regional scale
- Easy reading graphical presentation

WEAKNESS

- Does not cover all SDGs
- Unbalance of individual indicators
- Variables selection dependent on data availability
- Poor punctuality of some data: time lag over 7 years
- Allows only comparative analysis

OPPORTUNITIES

- Allows the follow-up of local interventions and plans at a year base
- Shows the need to improve data collection and management

THREATS

- WeGlx is one more in a myriad of indices
- May be replaceable by other local index to come
- Being used for political action instead of serving for information

Figure 3. SWOT analyze of WeGlx

V. REFERENCES

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