

12th September 2019

Data analysis of environmental factors measurements

Aims:

- Data analysis of environmental factors measurements to make an environmental diagnosis of the sustainability of “Los Toruños”.

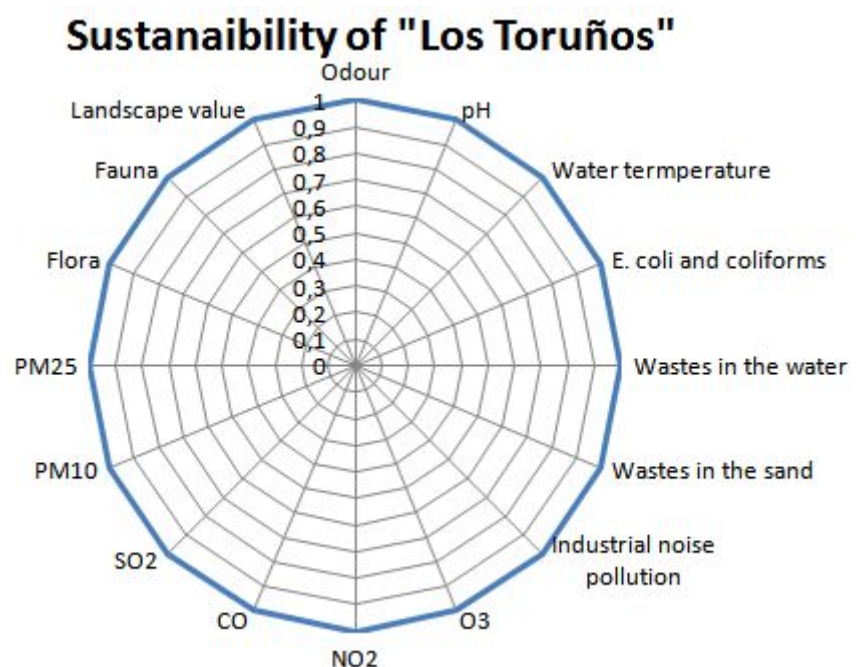
Done at google form: <https://forms.gle/agJy3guCAJ1WPsGSA>

To make a diagnosis of “Los Toruños” you will need the measurements you did last Monday. You are going to use the 16 environmental factors to make a sustainability chart, adjusting the measured values on different scales to a common scale in order to compare factors and analyze them together. To do that, you will use different kind of functions and tables.

In the common scale, the factors will have any value between 0 and 1, the value 1 means that factor is not influenced by the shipyard at all and 0 means that the factor is utterly influenced by the shipyard.

Once you have all the factors with values between 0-1, you have to make the sustainability chart in Google Sheets, a regular polygon with 16 vertices in which each vertice is a factor. Bear in mind that the distance between each vertice and the center of the polygon will be the value of the factor.

The value of sustainability will be the area of that polygon, and it will be between numbers 0 and 3. For instance, if all the factors had a value of 1, the chart would be like the one you can see below, and sustainability would be 3 out of 3. The area is going to be measured in Geogebra.



12th September 2019

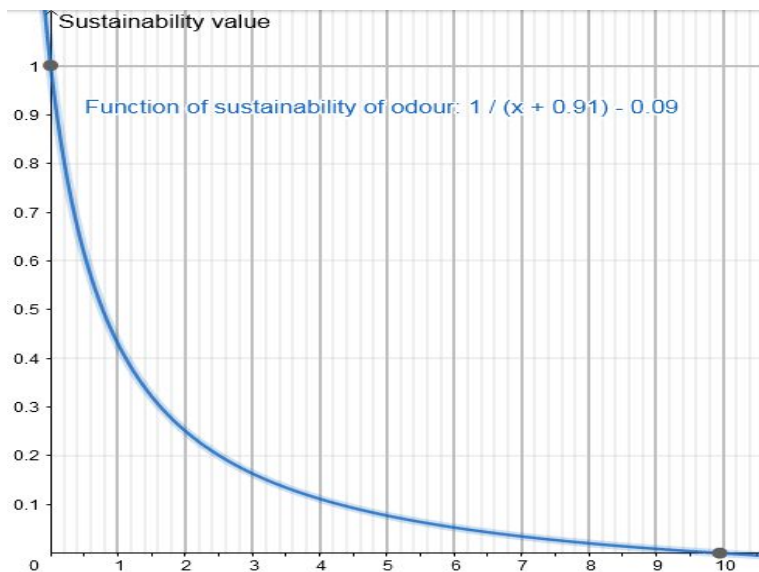
Write down in this table the sustainability values you get from the charts and tables

(https://docs.google.com/spreadsheets/d/18Z6f63q_t_fN4t6G7Sh0mWNqhO35qLv73DykNm8bN3I/edit?usp=sharing)

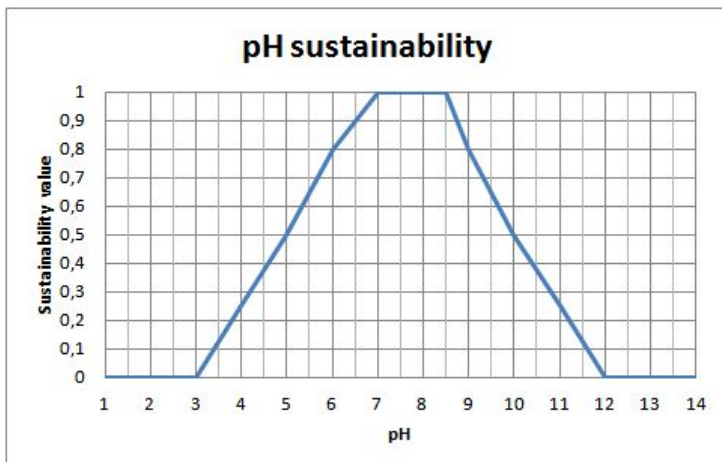
Factor	Od.	pH	WT	Bac	Ww	Ws	INP	O ₃	NO ₂	CO	SO ₂	PM10	PM25	Flor	Fau n	Land
E. Value																

1. How to get the common scale?

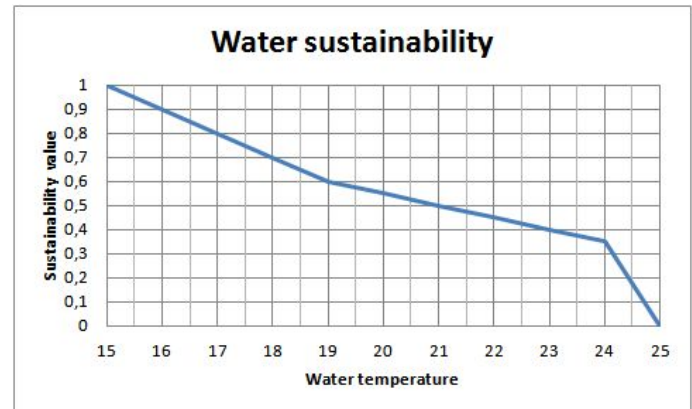
- Environmental factor 1: Odour



- Environmental factor 2: pH



- Environmental factor 3: W. temperature



- Environmental factor 4: E. Coli and Colif.

Parameter	Excellent	Good	Adequate	Inadequate
Escherichia coli and coliforms (UFC/100 mL)	≤250	≤400	≤500	>500
Sustainability value	1	0,6	0,5	0

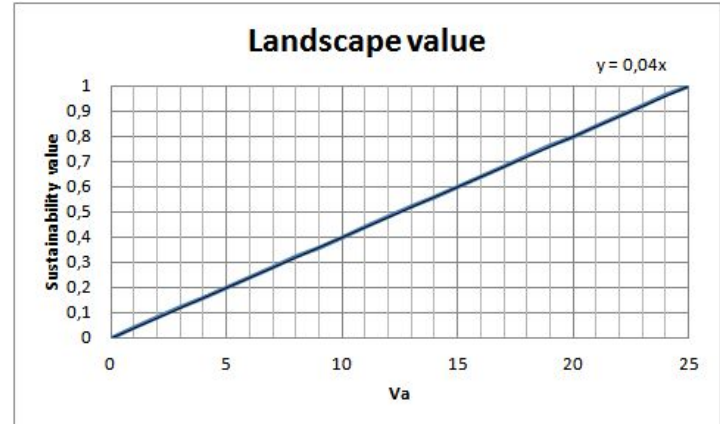
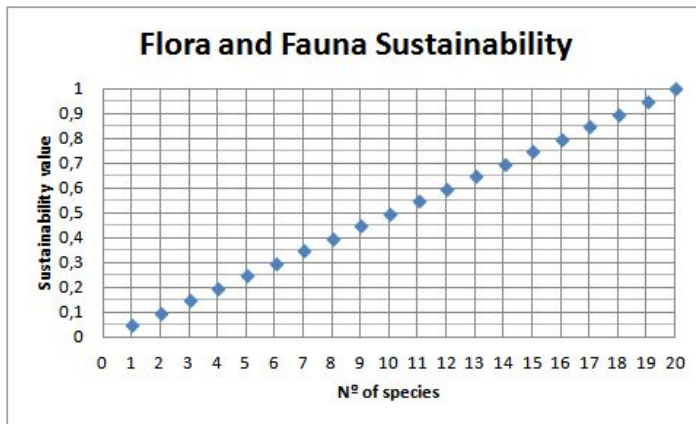
- Environmental factor 5, 6 and 7: Wastes in the water, wastes in the sand and industrial noise pollution: use function of sustainability of odour.
- Environmental factors 8, 9, 10, 11, 12, 13:

Sustainability value	O ₃	NO ₂	CO	SO ₂	PM ₁₀	PM _{2,5}
1	0-100	0-35	0-3	0-70	0-25	0-15
0,6	≥100-130	≥35-80	≥3-6	≥70-125	≥25-40	≥15-25
0,4	≥130-180	≥80-200	≥6-10	≥125-350	≥40-50	≥25-40
0,2	≥180-240	≥200-400	≥10-15	≥350-500	≥50-75	≥40-60
0	≥240	≥400	≥15	≥500	≥75	≥60

12th September 2019

- Environmental factors 14, 15: Flora and fauna:

- Environmental factor 16: Landscape value



2. Analyse the sustainability chart and measure the area of the polygon?

Enter the sustainability values that you have obtained in the previous sections in the "Geogebra environmental factors diagnosis" You will find the geogebra app created in <https://ggbm.at/rxmn84bj>

Which is the area of the hexadecagon?

3. Conclusions

- Reason why is or is not sustainable to have the Industrial Park of "Trocadero" and "Río San Pedro" near "Los Toruños" natural reserve?
- Reason why is or is not sustainable to have the Valdelagrana Touristic zone near "Los Toruños" natural reserve?
- Based on the environmental factor diagnosis obtained in the Geogebra sustainability chart, which suggestions would you make to the authorities of the Industrial Parks, "Trocadero" and "Río San Pedro" and the Valdelagrana Tourist zone to increase the sustainability of "Los Toruños" natural reserve?

Literature: PGOU of El Puerto de Santa María and own elaboration.

