



## Wellbeing Module development

This Section details all the necessary data transformations that have been carried out for the calculation of wellbeing. Additionally, a module has been prepared where different Machine Learning-based models have been trained to predict wellbeing. For this purpose, data from the different districts of the city of Seville from 2015 to 2018 was used. This data is composed of different columns, and these columns can belong to three groups:

**Social columns:** The columns grouped under this category represent a factor related to the sociological situation of the inhabitants residing in each district. Some columns can affect positively (e.g., neighbourhood associations) or negatively (e.g., number of detainees) to the Wellbeing calculation.

**Environmental columns:** These columns represent different environment-related variables in the district. As in the previous case, some columns will increase the value of wellbeing, and others will decrease it.

**Economic columns:** Columns related to the economy in a specific sector or district within the city. Following the same methodology as the previous ones, some economic columns can positively (e.g., activity percentage) or negatively (e.g., increase in unemployment compared to previous years) affect the Wellbeing calculation.

The rest of this section is organised as follows: (1) details the steps that comprise the data; (2) presents the calculation of wellbeing value; (3) proposes a Machine-Learning method to predict the wellbeing; and (4) concludes this research work with future research directions.

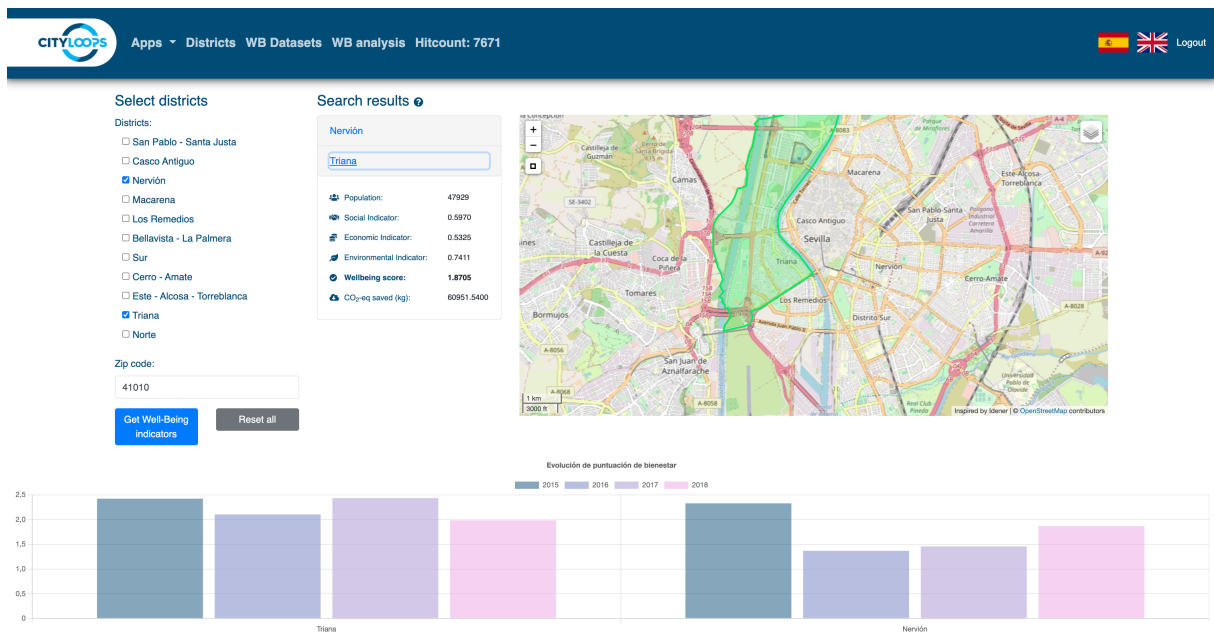
## Citizen platform

On the [WB main page](#), the user will see a form including a list of the city districts and a text box where they will introduce their zip code. Two buttons are located below the form: the left one submits the form (“Get Well-Being indicators”), and the right one resets all the form fields (Figure 18). At the right of the form, a map of Seville will be shown.

The screenshot shows the main interface of the Wellbeing platform. At the top, the CITYLOOPS logo is on the left, and navigation options (Apps, Districts, WB Datasets, WB analysis) and a hitcount (7669) are in the center. On the right, there are flags for Spain and the UK, and a 'Logout' link. Below the header, the 'Select districts' section lists various districts of Seville with checkboxes. A 'Zip code:' input field is provided, followed by 'Get Well-Being indicators' and 'Reset all' buttons. To the right of the form is a map of Seville. The footer contains logos for the European Union, CITYLOOPS, idener, LIPASAN, NO DO, and EMASESA, along with project funding information.

Figure 1. WB platform main page.

When the user clicks on the submit button, the application will show the results in a column that will appear between the original form and the map (Figure 19). The column will contain a collapsible with each district that the user selected in the form. Inside each section, the user can see the Wellbeing score for that district and its social, economic, and environmental indicators as well as the CO<sub>2</sub> equivalent saved by the separate organic waste collection and valorised through Anaerobic Digestion process. Finally, the user will see historical information on wellbeing score of the selected districts by graphics at the bottom of the results page.



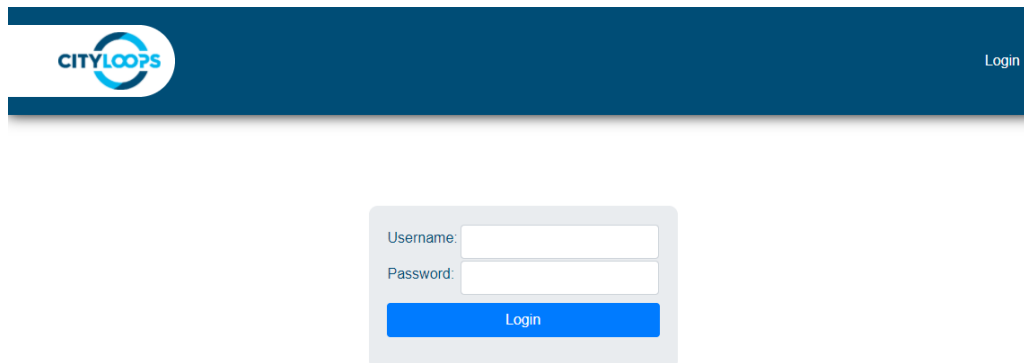
## Functionalities of WB platform for citizens

- Forms for query: The citizen will provide data about its location. The WB CityLoops platform for citizens will show the wellbeing indicators, circular indicators and composite indicators per district and city.
- Dropdown list: The citizen could select a district. The WB CityLoops platform for citizens will show the demonstration actions deployed and the estimated impact on the indicators.
- Map showing: A widget with a map (using OpenStreet Maps) will be presented to the citizens showing the city's current status regarding the indicators.
- Dashboard showing the current data on indicators: The dashboard will show the data on each indicator measurement.
- Control panel: A set of buttons will be included in the application to clean the forms, do the query, and export information. Logos of the involved partners (Emasesa, Lipasam, Municipality of Sevilla, CityLoops project) will be included providing additional information.

## Manager platform

The manager platform has several pages to perform actions related to the management of the application and its resources.

To access the manager platform, the user must click the “Login” link at the top right corner of the page. This will lead them to the login page, in which they can enter their username and password to access the manager platform (Figure 20).



*Figure 2. Login screen.*

Once the user has logged in to the application, users will be able to access the pages to manage the entities of the application i.e., districts, dataset, and Well-Being analysis (Figure 21). Each of the buttons located at the top bar of the page regarding these entities leads to the list of said entities. Through this list, the user can see the different attributes of each entity created.

### Districts

| #  | Distri_11d                  | Distri_6d             | Dirección  | Teléfono    | Fax         | Web                         | Área          | Superficie         | Pob. 2016             | Edit              |
|----|-----------------------------|-----------------------|--|-------------|-------------|-----------------------------|---------------|--------------------|-----------------------|-------------------|
| 1  | San Pablo - Santa Justa     | Nervión - San Pablo   | Calle Jerusalem, s/n   | 955471977.0 | 955471992.0 | <a href="#">Ir A La Web</a> | 5.62567435305 | 5,63 km2 (3,96%)   | 60.734 hab. (8,69%)   | <a href="#">✎</a> |
| 2  | Casco Antiguo               | Casco Antiguo         | Calle Credito, 11  | 955471743.0 | 955471745.0 | <a href="#">Ir A La Web</a> | 4.22726175725 | 4,23 km2 (2,98%)   | 58.951 hab. (8,44%)   | <a href="#">✎</a> |
| 3  | Nervión                     | Nervión - San Pablo   | Avenida Cruz del Campo, 38 B                                 | 955472065.0 | 955472070.0 | <a href="#">Ir A La Web</a> | 3.20214162295 | 3,20 km2 (2,25%)   | 51.293 hab. (7,34%)   | <a href="#">✎</a> |
| 4  | Macarena                    | Macarena              | Calle Manuel Villalobos, s/n (Antiguo Mercado de la Barzola) | 955472001.0 | 955472018.0 | <a href="#">Ir A La Web</a> | 3.1728763212  | 3,17 km2 (2,23%)   | 74.633 hab. (10,68%)  | <a href="#">✎</a> |
| 5  | Los Remedios                | Triana - Los Remedios | Avenida Republica Argentina, 27B, 1ª planta                  | 955470453.0 | 955470459.0 | <a href="#">Ir A La Web</a> | 15.5617992382 | 15,56 km2 (10,95%) | 25.441 hab. (3,64%)   | <a href="#">✎</a> |
| 6  | Bellavista - La Palmera     | Sur                   | Avenida de Jerez, 61   | 955470891.0 | 955470894.0 | <a href="#">Ir A La Web</a> | 16.0357470993 | 16,04 km2 (11,23%) | 41.642 hab. (5,86%)   | <a href="#">✎</a> |
| 7  | Sur                         | Sur                   | Calle Jorge Guillen, s/n                                     | 955472580.0 | 955472595.0 | <a href="#">Ir A La Web</a> | 7.48511950944 | 7,49 km2 (5,27%)   | 71.013 hab. (10,16%)  | <a href="#">✎</a> |
| 8  | Cerro - Amate               | Este                  | Calle San Juan de la Cruz (Esq. Avda. Juan XXIII)            | 955471518.0 | 955471523.0 | <a href="#">Ir A La Web</a> | 7.49963061303 | 7,50 km2 (5,28%)   | 88.479 hab. (12,66%)  | <a href="#">✎</a> |
| 9  | Este - Alcosa - Torreblanca | Este                  | Calle Cueva de Menga, s/n (Urb. Los Minaretes)               | 955470380.0 | 954516645.0 | <a href="#">Ir A La Web</a> | 31.3794572718 | 31,38 km2 (22,09%) | 104.208 hab. (14,92%) | <a href="#">✎</a> |
| 10 | Triana                      | Triana - Los Remedios | Calle San Jacinto, 33  | 955473508.0 | 954590969.0 | <a href="#">Ir A La Web</a> | 9.32522620244 | 9,32 km2 (6,56%)   | 48.554 hab. (6,95%)   | <a href="#">✎</a> |
| 11 | Norte                       | Macarena              | Calle Estrella Proción nº8 (Junto al IES Julio Verne)        | 955472035.0 | 955472048.0 | <a href="#">Ir A La Web</a> | 38.5664273992 | 38,57 km2 (27,14%) | 73.742 hab. (10,56%)  | <a href="#">✎</a> |

One of the main functionalities of the manager is to analyse the Well-Being of the districts in the city. To do this, a dataset with demographic information by districts has been set with socio-economical information and environmental data. The manager can update or modify the dataset through the WB dataset menu.

Once the manager checks the dataset, different analyses on the Well-Being in the city can be done by the WB analysis menu. Those simulations by ML contribute more information about the impact of different indicators considered in the dataset and can help in the decision-making process to prioritize the actions to be done in each district or identify the required actions or areas in which different actions are needed. To get the Well-Being indicators, the manager just selects the dataset, and the weights of the data areas in the dataset i.e., social, economic, and environmental areas, and has to determine the year of study for the simulation.



Figure 3. WB analysis.

Additionally, you can make quick simulations introducing new data not considered into the dataset in order to see the impact in comparison with the analysis without considering them. To do this, the manager selects the box "Include custom fields" and then, fills the text boxes with the required information per district including the area (social, economic, or environmental), year of data, and weight.

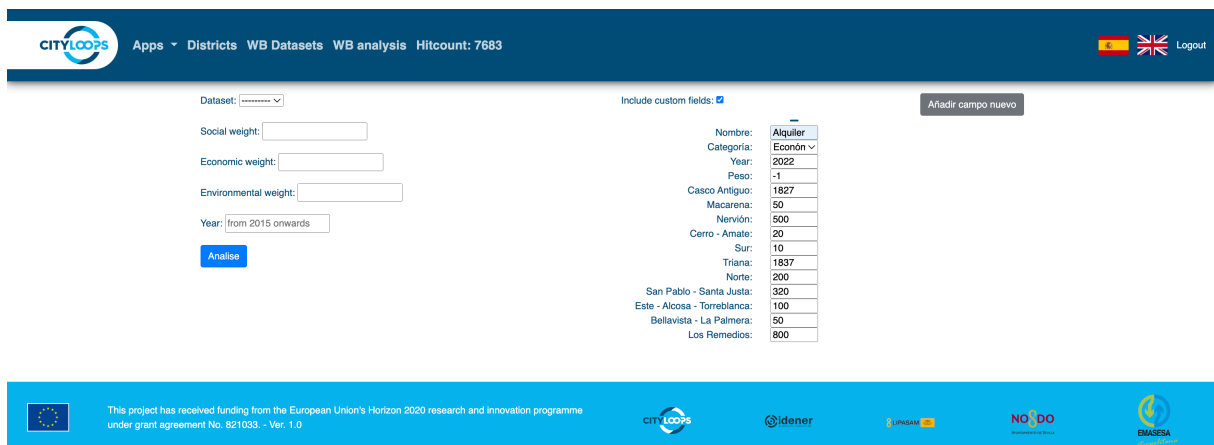


Figure 4. WB analysis including new data

Managers can simulate different scenarios determining different weights in each area of the dataset (social, economic, and environmental). So, the Well-Being analysis is very resilient to different political frameworks or political will due to the weight of the areas being totally defined by managers. To get the estimations, the manager just selects the correct dataset, and weights of areas and has to determine the year of study for the simulation. When the user presses "Analyse", the app shows the results (Figure 22). Results show the year of estimation, the population of each district, Social indicator, Economic indicator, Environmental indicator, and finally, Well-Being indicators.

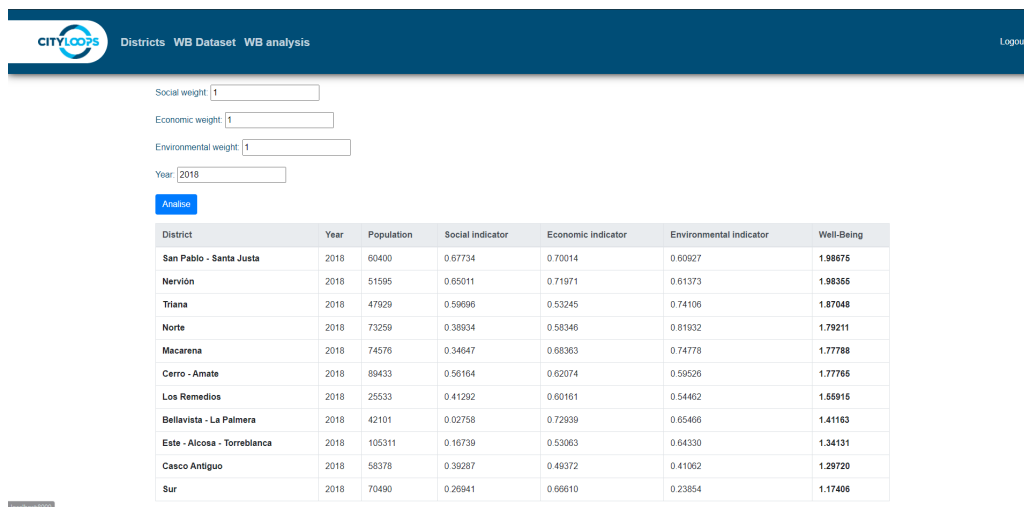
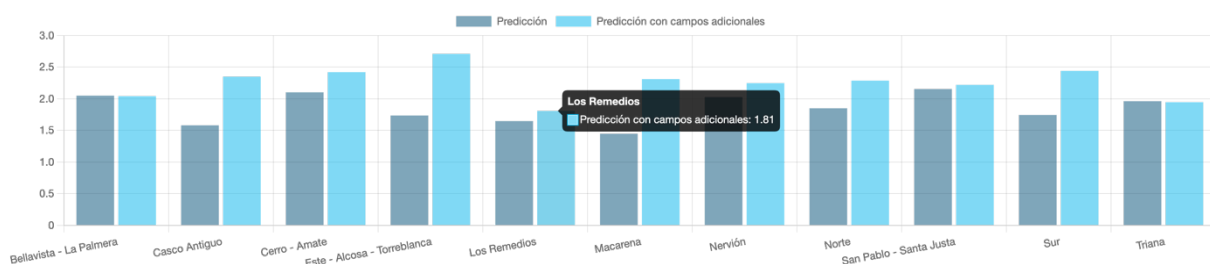


Figure 5. WB analysis result.

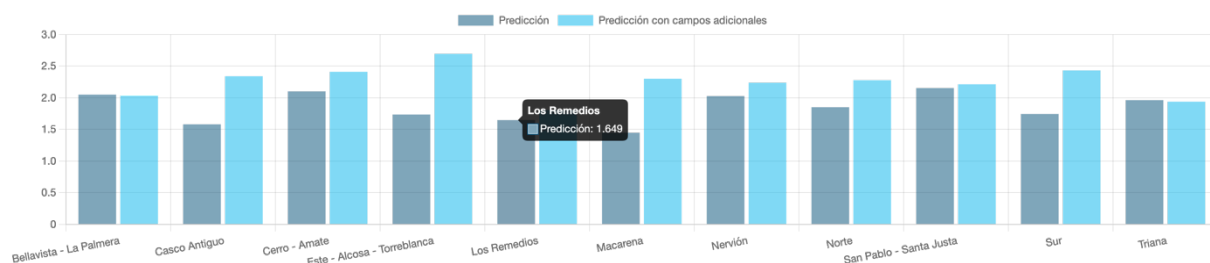
Different simulations have been made by the managers of the Municipality of Seville in collaboration with Lipasam and Emasesa (some can be seen in Annex XI) who also keep increasing the dataset with internal data. Below an example is shown with two simulations: one introducing the house rent pressure in the districts of Seville and the other one including the separate organic waste collection, both for 2030. The analysis of obtained indicators showed that both new sets of data have an impact on the Well-Being of the different districts.

This result is due to, on the one hand, the house rent pressure in the districts is a recent issue aggravated by the limited offer of the house to rent and the competition with the tourist ones. This situation is producing an increasing unrest which harms the wellbeing of citizens. The main reasons of this unrest are the increase of the house rent prices and the waste production associated with this kind of tourism. On the other hand, the implementation of the separate organic waste collection results in an increase of the wellbeing, in general, mostly due to the increase of the number of bins and segregation of the municipal waste that cause an improvement on the disposed waste on the streets. Results will definitely help in the decision-making process to take the advance of this information and adapt the municipal waste services collection in the present scenario and short future one. In fact, recently, Lipasam has arranged a specific meeting with local association on house rents and local stakeholders to face the waste collection in those districts with more house rent pressure. Those meetings will be carried out during the end of 2023.



### Resultados de la Regresión Lineal Multivariante

| Distrito                    | Predicción de Puntuación de Bienestar | Predicción de Puntuación de Bienestar con campos adicionales |
|-----------------------------|---------------------------------------|--|
| Bellavista - La Palmera     | 2,0506                                | 2,0426   |
| Casco Antiguo               | 1,5815                                | 2,3514   |
| Cerro - Amate               | 2,1031                                | 2,4218   |
| Este - Alcosa - Torreblanca | 1,7366                                | 2,7113   |
| Los Remedios                | 1,6484                                | 1,8096   |
| Macarena                    | 1,4491                                | 2,3119   |
| Nervión                     | 2,0279                                | 2,2477   |
| Norte                       | 1,8508                                | 2,2875   |
| San Pablo - Santa Justa     | 2,1556                                | 2,2202   |
| Sur                         | 1,7450                                | 2,4415   |
| Triana                      | 1,9627                                | 1,9466   |



### Resultados de la Regresión Lineal Multivariante

| Distrito                    | Predicción de Puntuación de Bienestar | Predicción de Puntuación de Bienestar con campos adicionales |
|-----------------------------|---------------------------------------|--|
| Bellavista - La Palmera     | 2,0508                                | 2,0339   |
| Casco Antiguo               | 1,5815                                | 2,3415   |
| Cerro - Amate               | 2,1024                                | 2,4111   |
| Este - Alcosa - Torreblanca | 1,7363                                | 2,6962   |
| Los Remedios                | 1,6487                                | 1,8072   |
| Macarena                    | 1,4496                                | 2,3016   |
| Nervión                     | 2,0279                                | 2,2395   |
| Norte                       | 1,8519                                | 2,2781   |
| San Pablo - Santa Justa     | 2,1548                                | 2,2141   |
| Sur                         | 1,7450                                | 2,4328   |
| Triana                      | 1,9635                                | 1,9391   |

## WELLBEING MONITORING TOOL

IDENER has developed digital tools to integrate available data on environmental, economic and social development in Seville municipality in order to facilitate data-driven decision-making and better understanding of the impacts of policies and initiatives on citizen wellbeing, and to ensure the city is on the right track towards the sustainable development goals. Citizens will also be able to access information about their waste generation, and how city initiatives are impacting a series of sustainability and wellbeing indicators.



### **Lessons learned**

There are a lot of socio-economic and environmental indicators related with the wellbeing in a city. A good understanding about the impact of those indicators in the wellbeing can facilitate the transition to a circular economy. Further analysis and a frequent update of the dataset as well as the selected indicators is required in order to help in the decision-making process on circular economy and required mechanisms. In the implementation phase of the demonstration actions, Emasesa and Lipasam set a target in their Strategy to enable the transition to a circular economy focused on the circular management of CDW as well as to minimise the illegal dumping of CDW. Good monitoring of the implementation actions made during CityLoops implementation as well as keeping fluent communication with the other municipal companies of the municipality as well as private stakeholders will allow to scale up the circular economy approach in the city. From results, it has been highlighted that the municipal waste management as well as the house renting pressure in the city have critical impact in the wellbeing of citizens. For this reason, in September of 2023 Lipasam will stablish specific meetings with different associations a municipal stakeholder in order to adapt the municipal waste collection service in those districts with higher house rent pressure. Finally, CityLoops results contribute to the development of the Local waste prevention and management Plan of Seville (currently in draft status).

<https://wb-app.idener.es/>

### **Functionalities of WB platform for managers.**

- District representation of Seville Data: The city of Seville will be divided into a discrete representation of districts and overlapped over a real map of the city, including public infrastructures related to wellbeing.
- Data request of each district: Each district will be represented by different social and economic aspects, public infrastructure, and the potential demonstration actions from the CityLoops project.
- Evolution of the well-being indicators: Data about the evolution of the well-being indicators will be represented in a time-lapse, showing in the last frame the estimation in the next years according to the data provided by the manager through the platform.
- Evolution of the circular indicators: Data about the evolution of the circular indicators will be represented in a time-lapse showing in the last frame the estimation in the next years according to the data provided by the manager through the platform.
- Estimation of the well-being CityLoops indicators: Using the data provided by the managers, and the results from the analysis through the ML methods, the platform will present the indicators' values.

## How wellbeing is calculated and how the data can be used for decision making processes.

### Wellbeing calculation

This section presents how the well-being value is calculated based on coefficients. This will be done in four steps:

- The first step consists of giving a coefficient to each column category (social, environmental, economic). The sum of this weight should be 1; therefore, a higher weight will represent that wellbeing is favoured by that group of columns. For example, a coefficient of 0.5 for social, 0.2 for environmental, and 0.3 for economic means that the columns within the social category have a greater impact than the economic and environmental categories. The following formula will give the weight of each column.

$$coeff_{social} + coeff_{environmental} + coeff_{economics} = 1 \quad (2)$$

- Once this value has been defined, the next step is to give a weight to each column within the category. This weight will be given in a range from 0 to 10, whereby 0 means that it contributes nothing to wellbeing and 10 means that it contributes as much as possible to wellbeing within the weight of this category.

$$\sum_{i=1}^{N^{\circ} \text{ of columns}} coeff_{col_i} = 1 \quad (3)$$

$$coeff_{soc\_col_i} = \frac{weight_{col_{social_i}}}{(N^{\circ} \text{ of social cols})} * coeff_{social} \quad (4)$$

$$coeff_{env\_col_i} = \frac{weight_{col_{env_i}}}{(N^{\circ} \text{ of environmental cols})} * coeff_{environmental} \quad (5)$$

$$coeff_{ecs\_col_i} = \frac{weight_{col_{economics_i}}}{(N^{\circ} \text{ of economics cols})} * coeff_{economics} \quad (6)$$

Where,  $coeff_{soc\_col_i}$ ,  $coeff_{env\_col_i}$ ,  $coeff_{ecs\_col_i}$  are the coefficients that represent the importance of each column in well-being.  $weight_{col_{social_i}}$ ,  $weight_{col_{env_i}}$ ,  $weight_{col_{economics_i}}$  are the weights defined by a user/researcher set to each column, ranging from 0 to 10, given the importance of each column based on scientific knowledge.  $coeff_{social}$ ,  $coeff_{environmental}$ ,  $coeff_{economics}$  are another coefficient previously set by the user/researcher that represents the importance that each category affect to wellbeing. In case it is desired that all three categories affect the same, it is only necessary to enter the same value in all three categories.

- Once the coefficients representing the weight of each wellbeing column are obtained, the next step consists of multiplying this coefficient by the corresponding column. The value of this column has been previously normalised between 0 and 1 for columns that have a positive effect and between 0 and -1 for columns that have a negative impact. The following images show the dataset before/after this stage.

| poblacion_ini | densidad_ini | poblacion_fin | densidad_fin | Hombres 0-4 | Hombres 5-9 | Hombres 10-14 | Hombres 15-19 | Hombres 20-24 | Hombres 25-29 | ... | Mujeres TOTAL | Nucleo familiar con 0 Hijos | Nucleo familiar con 1 Hijos |
|---------------|--------------|---------------|--------------|-------------|-------------|---------------|---------------|---------------|---------------|-----|---------------|-----------------------------|-----------------------------|
| 0.004436      | 0.001115     | 0.004505      | 0.001145     | 0.010282    | 0.004779    | 0.034291      | 0.010094      | 0.010021      | 0.003361      | ... | 0.003502      | 0.002271                    | 0.000158                    |
| 0.292211      | 0.155234     | 0.283969      | 0.153669     | 0.101475    | 0.134926    | 0.156627      | 0.153696      | 0.162422      | 0.235714      | ... | 0.314498      | 0.499148                    | 0.215064                    |
| 0.421042      | 0.551409     | 0.414355      | 0.551440     | 0.232007    | 0.233824    | 0.221810      | 0.183002      | 0.218789      | 0.337815      | ... | 0.430835      | 0.810733                    | 0.264803                    |
| 0.330280      | 0.650262     | 0.329715      | 0.656430     | 0.244524    | 0.208456    | 0.223973      | 0.210029      | 0.245929      | 0.263445      | ... | 0.353773      | 0.483135                    | 0.217117                    |
| 0.796346      | 0.465435     | 0.801869      | 0.473183     | 0.653107    | 0.646324    | 0.645042      | 0.493650      | 0.722756      | 0.960924      | ... | 0.810984      | 1.000000                    | 0.712301                    |

| poblacion_ini | densidad_ini | poblacion_fin | densidad_fin | Hombres 0-4 | Hombres 5-9 | Hombres 10-14 | Hombres 15-19 | Hombres 20-24 | Hombres 25-29 | ... | Mujeres TOTAL | Nucleo familiar con 0 Hijos | Nucleo familiar con 1 Hijos |
|---------------|--------------|---------------|--------------|-------------|-------------|---------------|---------------|---------------|---------------|-----|---------------|-----------------------------|-----------------------------|
| 0.000028      | 0.000035     | 0.000170      | 0.000072     | 0.000194    | 0.000030    | 0.000216      | 0.000063      | 0.000252      | 0.000021      | ... | 0.000044      | 0.000043                    | 0.000002                    |
| 0.001838      | 0.004882     | 0.010716      | 0.009665     | 0.001915    | 0.000849    | 0.000985      | 0.000967      | 0.004086      | 0.001482      | ... | 0.003956      | 0.009418                    | 0.002705                    |
| 0.002648      | 0.017340     | 0.015636      | 0.034682     | 0.004377    | 0.001471    | 0.001395      | 0.001151      | 0.005504      | 0.002125      | ... | 0.005419      | 0.015297                    | 0.003331                    |
| 0.002077      | 0.020449     | 0.012442      | 0.041285     | 0.004614    | 0.001311    | 0.001409      | 0.001321      | 0.006187      | 0.001657      | ... | 0.004450      | 0.009116                    | 0.002731                    |
| 0.005008      | 0.014636     | 0.030259      | 0.029760     | 0.012323    | 0.004065    | 0.004057      | 0.003105      | 0.018183      | 0.006044      | ... | 0.010201      | 0.018868                    | 0.008960                    |

Figure 6. Dataset before/after of coefficient stage.

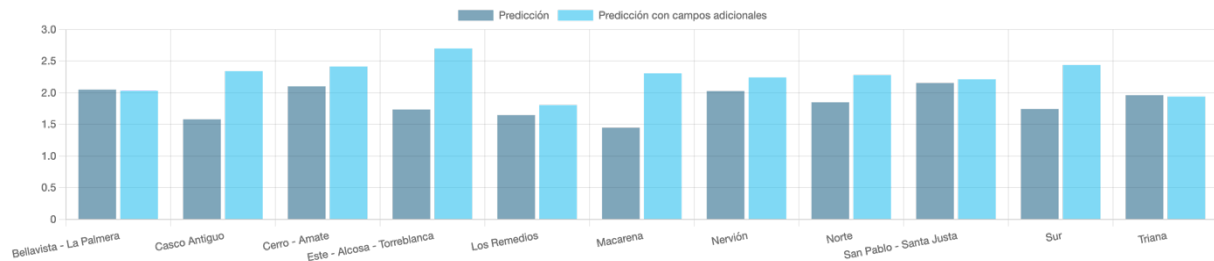
- Therefore, the wellbeing will be calculated as the sum of all columns that have been previously multiplied by the coefficient. An example of wellbeing with a random coefficient from 2015 to 2018 is presented in Figure 15.

| distritos | YEAR                  | Wellbeing | distritos | YEAR                  | Wellbeing | distritos | YEAR                  | Wellbeing | distritos | YEAR                  | Wellbeing |          |
|-----------|-----------------------|-----------|-----------|-----------------------|-----------|-----------|-----------------------|-----------|-----------|-----------------------|-----------|----------|
| 9         | BELLAVISTA-LA PALMERA | 2015      | 3.247853  | CERRO-AMATE           | 2016      | 2.418423  | NERVION               | 2017      | 2.432851  | SAN PABLO-SANTA JUSTA | 2018      | 1.986750 |
| 5         | TRIANA                | 2015      | 2.421800  | SAN PABLO-SANTA JUSTA | 2016      | 2.258636  | MACARENA-NORTE        | 2017      | 2.108742  | NERVION               | 2018      | 1.983555 |
| 4         | SUR                   | 2015      | 2.374561  | TRIANA                | 2016      | 2.103519  | SAN PABLO-SANTA JUSTA | 2017      | 2.047648  | TRIANA                | 2018      | 1.870476 |
| 3         | CERRO-AMATE           | 2015      | 2.345181  | ESTE                  | 2016      | 1.971437  | CASCO ANTIGUO         | 2017      | 1.972651  | MACARENA-NORTE        | 2018      | 1.792111 |
| 7         | SAN PABLO-SANTA JUSTA | 2015      | 2.331161  | LOS REMEDIOS          | 2016      | 1.953766  | BELLAVISTA-LA PALMERA | 2017      | 1.907864  | MACARENA              | 2018      | 1.777882 |
| 2         | NERVION               | 2015      | 2.327797  | CASCO ANTIGUO         | 2016      | 1.844854  | CERRO-AMATE           | 2017      | 1.868422  | CERRO-AMATE           | 2018      | 1.777646 |
| 6         | MACARENA-NORTE        | 2015      | 2.143142  | SUR                   | 2016      | 1.652235  | SUR                   | 2017      | 1.779018  | LOS REMEDIOS          | 2018      | 1.559152 |
| 8         | ESTE                  | 2015      | 1.947953  | BELLAVISTA-LA PALMERA | 2016      | 1.635680  | ESTE                  | 2017      | 1.685382  | BELLAVISTA-LA PALMERA | 2018      | 1.411626 |
| 10        | LOS REMEDIOS          | 2015      | 1.884126  | NERVION               | 2016      | 1.367414  | MACARENA              | 2017      | 1.491164  | ESTE                  | 2018      | 1.341311 |
| 1         | MACARENA              | 2015      | 1.566865  | MACARENA-NORTE        | 2016      | 1.358915  | TRIANA                | 2017      | 1.456162  | CASCO ANTIGUO         | 2018      | 1.297203 |
| 0         | CASCO ANTIGUO         | 2015      | 1.211274  | MACARENA              | 2016      | 0.961728  | LOS REMEDIOS          | 2017      | 1.196412  | SUR                   | 2018      | 1.174056 |

2. Figure 7. Well-being examples from 2015 to 2018.

## ANNEX XI. ML ANALYSIS BY MUNICIPAL MANAGERS

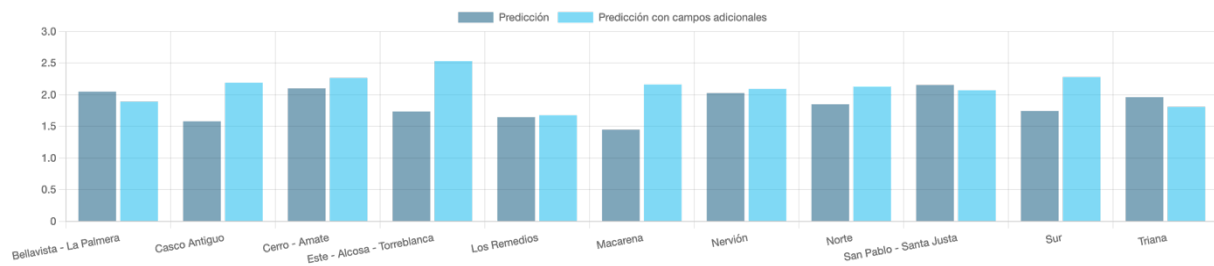
### Vehicles\_2021 (Environmental data)



### Resultados de la Regresión Lineal Multivariante

| Distrito                    | Predicción de Puntuación de Bienestar | Predicción de Puntuación de Bienestar con campos adicionales |
|-----------------------------|---------------------------------------|--|
| Bellavista - La Palmera     | 2,0508                                | 2,0425   |
| Casco Antiguo               | 1,5815                                | 2,3525   |
| Cerro - Amate               | 2,1030                                | 2,4261   |
| Este - Alcosa - Torreblanca | 1,7363                                | 2,7114   |
| Los Remedios                | 1,6484                                | 1,8112   |
| Macarena                    | 1,4494                                | 2,3119   |
| Nervión                     | 2,0277                                | 2,2471   |
| Norte                       | 1,8502                                | 2,2879   |
| San Pablo - Santa Justa     | 2,1559                                | 2,2263   |
| Sur                         | 1,7452                                | 2,4419   |
| Triana                      | 1,9630                                | 1,9464   |

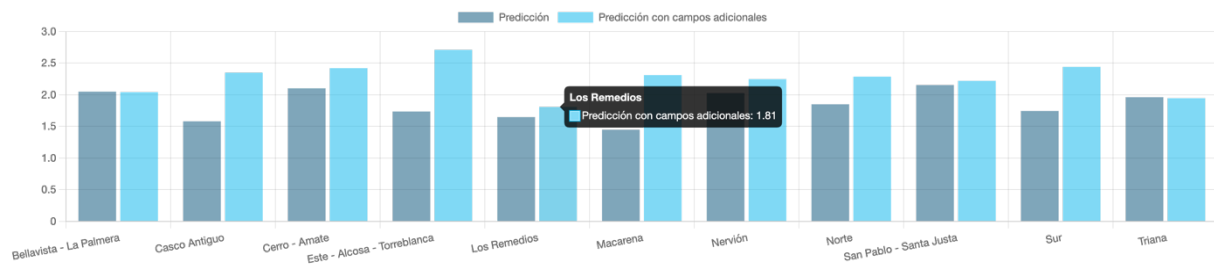
## Average Income\_ 2021



## Resultados de la Regresión Lineal Multivariante

| Distrito                    | Predicción de Puntuación de Bienestar | Predicción de Puntuación de Bienestar con campos adicionales |
|-----------------------------|---------------------------------------|--|
| Bellavista - La Palmera     | 2,0509                                | 1,8935   |
| Casco Antiguo               | 1,5815                                | 2,1915   |
| Cerro - Amate               | 2,1024                                | 2,2676   |
| Este - Alcosa - Torreblanca | 1,7365                                | 2,5330   |
| Los Remedios                | 1,6473                                | 1,6777   |
| Macarena                    | 1,4499                                | 2,1635   |
| Nervión                     | 2,0279                                | 2,0936   |
| Norte                       | 1,8510                                | 2,1298   |
| San Pablo - Santa Justa     | 2,1562                                | 2,0718   |
| Sur                         | 1,7450                                | 2,2810   |
| Triana                      | 1,9632                                | 1,8111   |

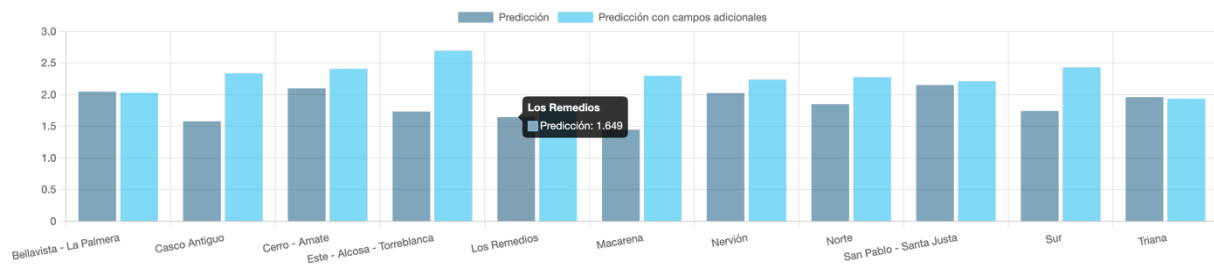
## Organic separate collection\_2021



### Resultados de la Regresión Lineal Multivariante

| Distrito                    | Predicción de Puntuación de Bienestar | Predicción de Puntuación de Bienestar con campos adicionales |
|-----------------------------|---------------------------------------|--|
| Bellavista - La Palmera     | 2,0506                                | 2,0426   |
| Casco Antiguo               | 1,5815                                | 2,3514   |
| Cerro - Amate               | 2,1031                                | 2,4218   |
| Este - Alcosa - Torreblanca | 1,7366                                | 2,7113   |
| Los Remedios                | 1,6484                                | 1,8096   |
| Macarena                    | 1,4491                                | 2,3119   |
| Nervión                     | 2,0279                                | 2,2477   |
| Norte                       | 1,8508                                | 2,2875   |
| San Pablo - Santa Justa     | 2,1556                                | 2,2202   |
| Sur                         | 1,7450                                | 2,4415   |
| Triana                      | 1,9627                                | 1,9466   |

## Housing rentals\_2021



### Resultados de la Regresión Lineal Multivariante

| Distrito                    | Predicción de Puntuación de Bienestar | Predicción de Puntuación de Bienestar con campos adicionales |
|-----------------------------|---------------------------------------|--|
| Bellavista - La Palmera     | 2,0508                                | 2,0339   |
| Casco Antiguo               | 1,5815                                | 2,3415   |
| Cerro - Amate               | 2,1024                                | 2,4111   |
| Este - Alcosa - Torreblanca | 1,7363                                | 2,6962   |
| Los Remedios                | 1,6487                                | 1,8072   |
| Macarena                    | 1,4496                                | 2,3016   |
| Nervión                     | 2,0279                                | 2,2395   |
| Norte                       | 1,8519                                | 2,2781   |
| San Pablo - Santa Justa     | 2,1548                                | 2,2141   |
| Sur                         | 1,7450                                | 2,4328   |
| Triana                      | 1,9635                                | 1,9391   |

# CITYLOOPS

CityLoops is an EU-funded project focusing on construction and demolition waste (CDW), including soil, and organic waste (OW), where seven European cities are piloting solutions to be more circular.

Høje-Taastrup and Roskilde (Denmark), Mikkeli (Finland), Apeldoorn (the Netherlands), Bodø (Norway), Porto (Portugal) and Seville (Spain) are the seven cities implementing a series of demonstration actions on CDW and soil, and OW, and developing and testing over 30 new tools and processes.

Alongside these, a sector-wide circularity assessment and an urban circularity assessment are to be carried out in each of the cities. The former, to optimise the demonstration activities, whereas the latter to enable cities to effectively integrate circularity into planning and decision making. Another two key aspects of CityLoops are stakeholder engagement and circular procurement.

CityLoops started in October 2019 and will run until September 2023.



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