

# **Sustainable Urbanizing Landscape Development (SULD) decision support tool: quick-start guide**



**Aqua-Add Technical Report n<sup>o</sup>.06, prepared by:**

J. Rocha<sup>1</sup>

M. Saraiva<sup>1</sup>

P.C. Roebeling<sup>1</sup>

<sup>1</sup> CESAM, Department of Environment and Planning (DAO), University of Aveiro (UA), 3810-193 Aveiro, Portugal.

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**Aqua-Add project**

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# Executive summary

This report has been developed in the context of the international co-operation project Aqua-Add (Deploying the added value of water in local and regional development), aiming at the sharing of knowledge and experience between project partners as to better deploy the potential of 'water' (economically, socially and environmentally) in urbanised landscapes and to improve the implementation of water measures in local and regional spatial development. Aqua-Add not only collects, analyses, disseminates and promotes the specific functions, services and values of green/blue spaces, but also develops and applies a decision support tool that: i) demonstrates the (potential) social, environmental and economic impacts of different water management scenarios, and ii) facilitates the planning process and better informed decision making across stakeholders.

The Sustainable Urbanizing Landscape Development (SULD) decision support tool is developed and applied to eight Aqua Cases (Aveiro, Bremerhaven, Copenhagen, Debrecen, Eindhoven, Imperia, Lyon and Sofia), with input from partners that are knowledge institutions and based on the needs of the partners that are regional/local authorities. SULD is a hedonic pricing simulation model that allows assessing the impact of green/blue space and infrastructure projects on the location and density of residential development, population density and composition, household living space and real estate values.

This report provides a quick-start guide to the SULD web-based application (<http://suld.web.ua.pt/>), instructing the user in selecting, visualizing and analysing green/blue space and infrastructure project scenario simulations. An E-learning video, additional info and links are available on <http://aqua-add.web.ua.pt/SULD/index.htm>.

Based on the results from all Aqua Cases, the following four major tendencies regarding the establishment, re-introduction or re-qualification of green and blue spaces can be derived:

1. Cities become more compact as people are willing to accept smaller housing when living closer to an attractive area;
2. Population density increases as green and blue spaces attract more people;
3. Real estate values appreciate as people are willing to pay more when living closer to an attractive area; and
4. Demographic distribution patterns change as higher income households are attracted to these more attractive areas.

The value-added of green/blue space so depends on: i) quality and size of the intervention, ii) location of the intervention relative to existing residential areas, urban centres and environmental amenities, and iii) social classes attracted to the intervention area.

The SULD decision support tool and, in particular, the SULD web-based application (<http://suld.web.ua.pt/>), is not an aim in itself but the starting point of a process. It facilitates participatory planning and scenario development, creating confidence in and familiarity with the model and its outputs. Also, it enriches public discussion and adds transparency to the urban planning and decision-making processes. Consequently, it encourages stakeholders to reflect about their reality and future possibilities – effectively engaging them in the design of urban development plans where the value of water and green spaces may assume a forefront position.

# Acknowledgements

This report has been developed in the context of Aqua-Add (Deploying the added value of water in local and regional development), a 3-year co-operation project of 11 partners from 8 EU regions. The project aims to share knowledge and experience between the project partners, to better deploy the potential of 'water' (economically, socially and environmentally) in urbanised landscapes and to improve the implementation of water measures in local and regional spatial development. The project is co-financed by the European Regional Development Fund (ERDF) along with each of the 11 partners and made possible by the INTERREG IVC programme. The Interregional Cooperation Programme INTERREG IVC helps Regions of Europe work together to share experience and good practice in the areas of innovation, the knowledge economy, the environment and risk prevention.

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# 1. Introduction

European regions and cities face important water challenges, including water storage and discharge after rainfall events, water quality and the impact of summer droughts on water supply. To address these challenges, ‘water’ must become an integrated part of spatial policy development and implementation. There are, however, obstacles to achieving medium-long term water management goals: i) water issues compete with other public concerns, resulting in insufficient public and political support, ii) stakeholders in the public domain are often not aware of the added value that effective water management can bring to spatial development, and iii) efficient water management will avoid high costs in the long term and result in higher housing/real estate values.

The objective of the Aqua-Add project is to “better deploy the potential of ‘water’ (economically, socially and environmentally) in urbanised landscapes and to improve the implementation of water measures in local and regional spatial development”. To this end Aqua-Add builds on exchange of experiences and good practices, including soft testing on:

1. Stakeholder involvement;
2. The added value of green/blue space in urbanised landscapes;
3. Practical and successful business models for ‘water-projects’.

Aqua-Add not only collects, analyses, disseminates and promotes the specific functions, services and values of green/blue spaces, but also develops and applies a decision support tool that: i) demonstrates the (potential) social, environmental and economic impacts of different water management scenarios, and ii) facilitates the planning process and better informed decision making across stakeholders. The Sustainable Urbanizing Landscape Development (SULD) decision support tool is developed and applied to eight Aqua Cases<sup>1</sup>, with input from partners that are knowledge institutions and based on the needs of the partners that are regional/local authorities.

SULD is a hedonic pricing simulation model that allows us to assess the impact of location-specific green/blue space and infrastructure projects on the location and density of residential development, population density and composition, household living space and real estate values (see Aqua-Add Technical Report nº.03). SULD provides information that is normally not available to stakeholders in the urban planning process and, hence, aids local authorities and stakeholders in sustainable land use and planning.

This report provides a quick-start guide to the SULD web-based application (<http://suld.web.ua.pt/>), instructing the user in selecting, visualizing and analysing green/blue space and infrastructure project scenario simulations. An E-learning video, additional info and links are available on <http://aqua-add.web.ua.pt/SULD/index.htm>. We wish you a good learning experience with the SULD web-based demonstration version.

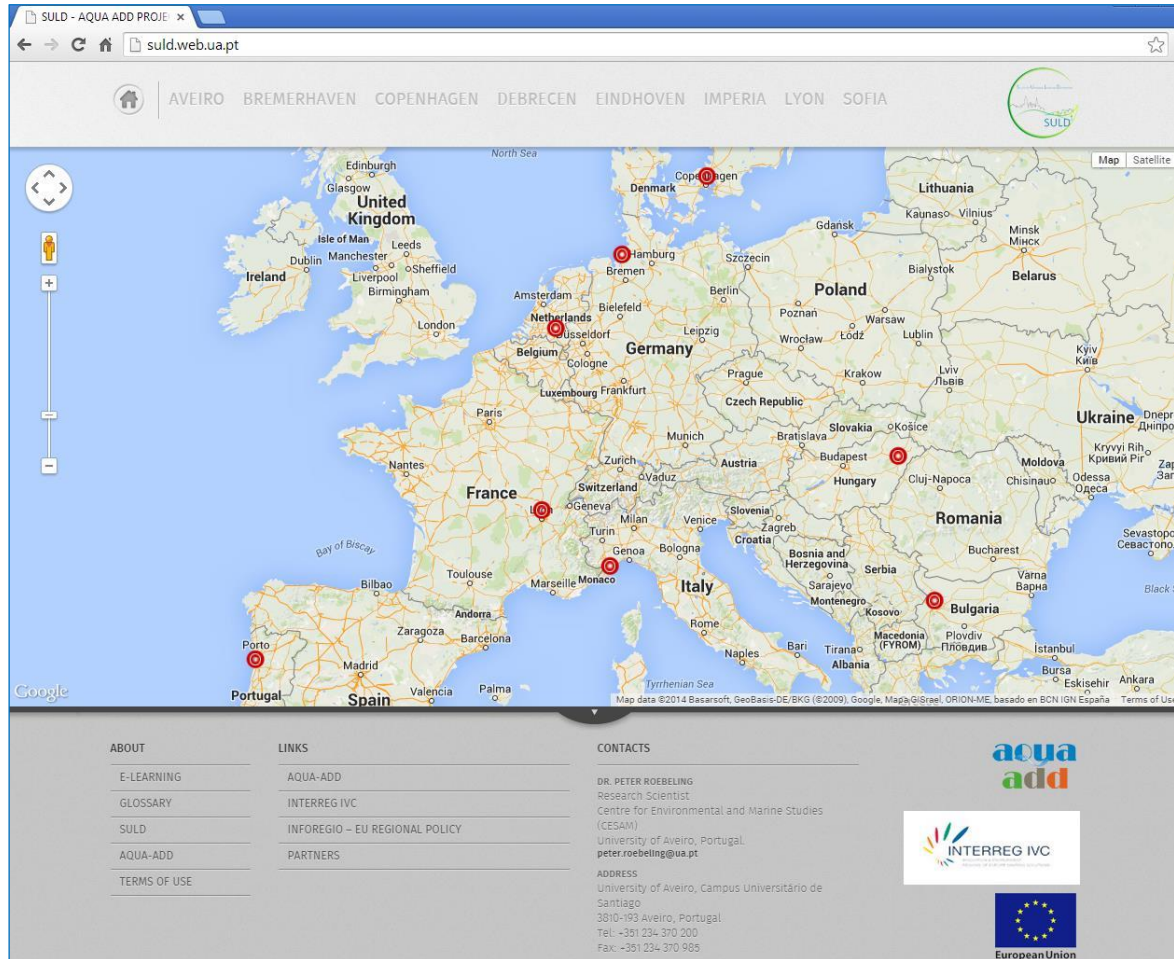
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<sup>1</sup> Aqua Cases include Aveiro (Portugal; PT), Bremerhaven (Germany; DE), Copenhagen (Denmark; DK), Debrecen (Hungary; HU), Eindhoven (Netherlands; NL), Imperia (Italy; IT), Lyon (France; FR) and Sofia (Bulgaria; BU).

## 2. Quick-start guide

In the SULD web-based demonstration version (Figure 1) you will be able to select from a range of projects and analyse the consequences for specific cities and regions in Europe, namely Aveiro, Bremerhaven, Copenhagen, Debrecen, Eindhoven, Imperia, Lyon and Sofia.

Figure 1 Homepage SULD web-based demonstration version

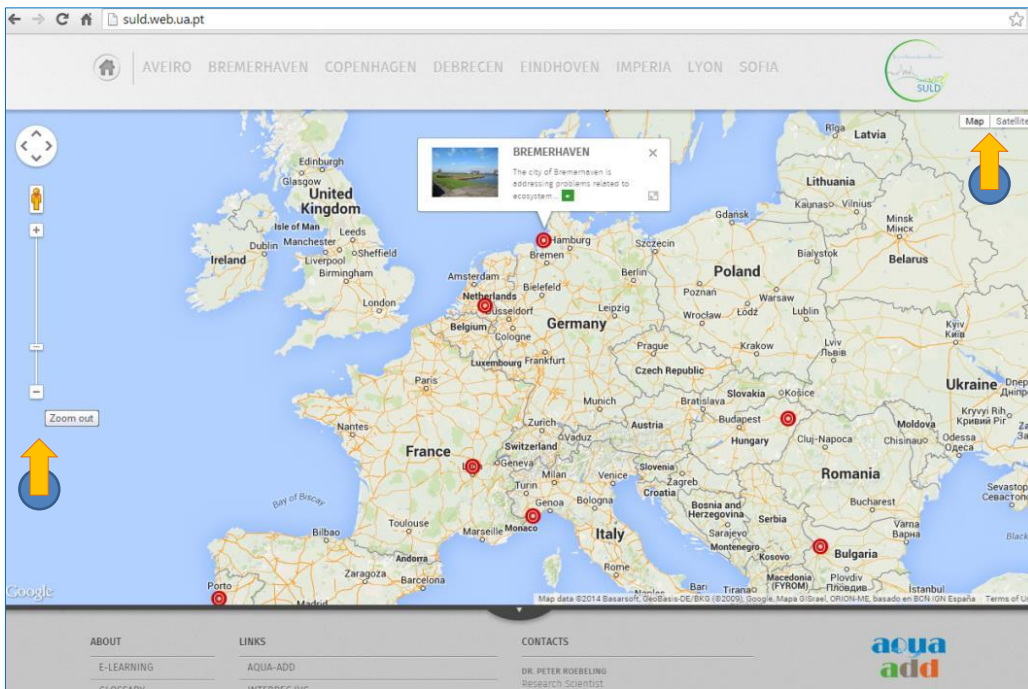


The home menu allows you to select which city you would like to analyse, using either the top menu or directly on the map of Europe. This is a Google-maps based application and, therefore, all navigation tools and functionalities are available, such as zoom in and zoom out or the choice between map, satellite and street view (Figure 2).

As you move your mouse over a city, a dialog box appears containing information about each city's study area (see Figure 2). You can then select the city of your preference.

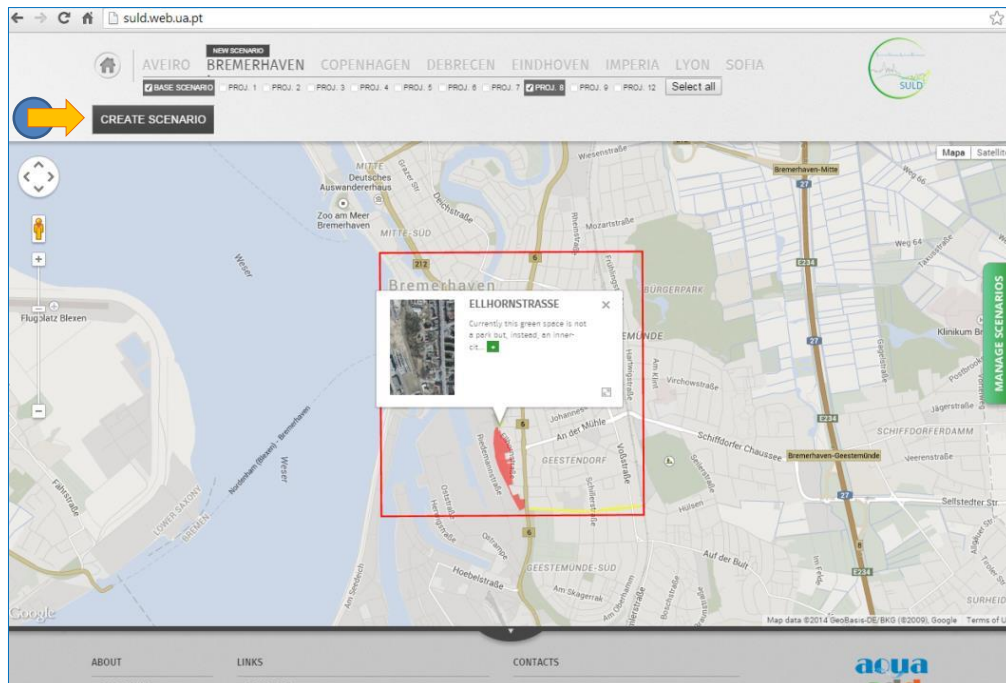


**Figure 2 SULD Google-maps based application**



In this case, Bremerhaven will be selected. Bremerhaven’s study area is defined by the red square, and the yellow polygons signal the possible project areas (Figure 3). Again, by moving the pointer over the project areas, either on the map or on the menu above, you can learn more about each project before making your selection.

**Figure 3 Bremerhaven’s study area**

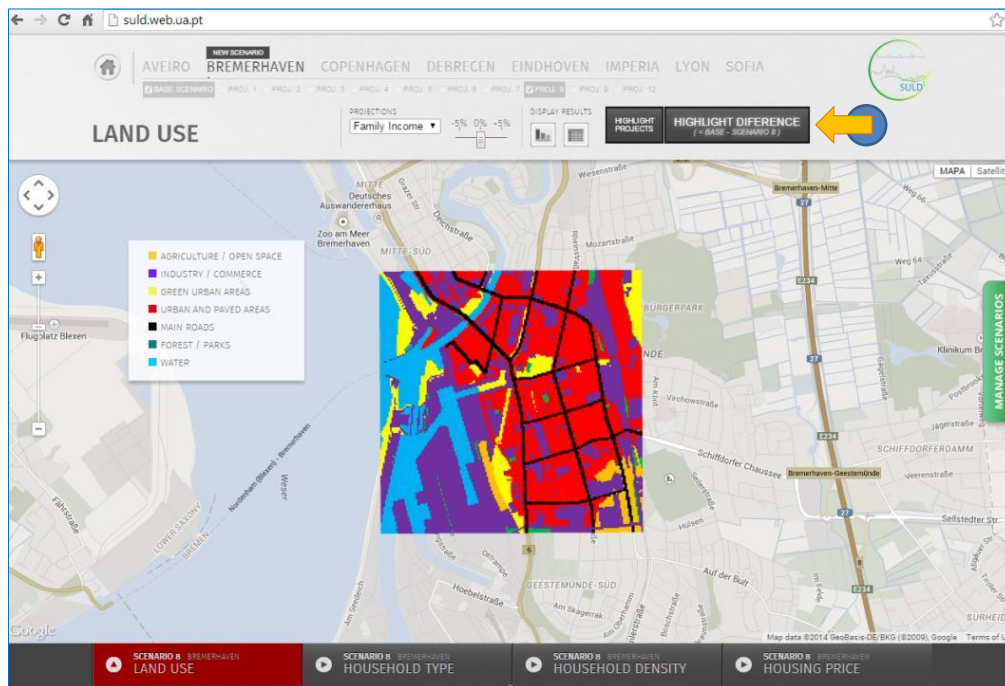


You are able to select more than one project, although not all potential combinations are valid. In that case, an error message will be displayed. Once you have selected the project you wish to analyse – Project 8 for example – just press ‘Create Scenario’ (Figure 3).



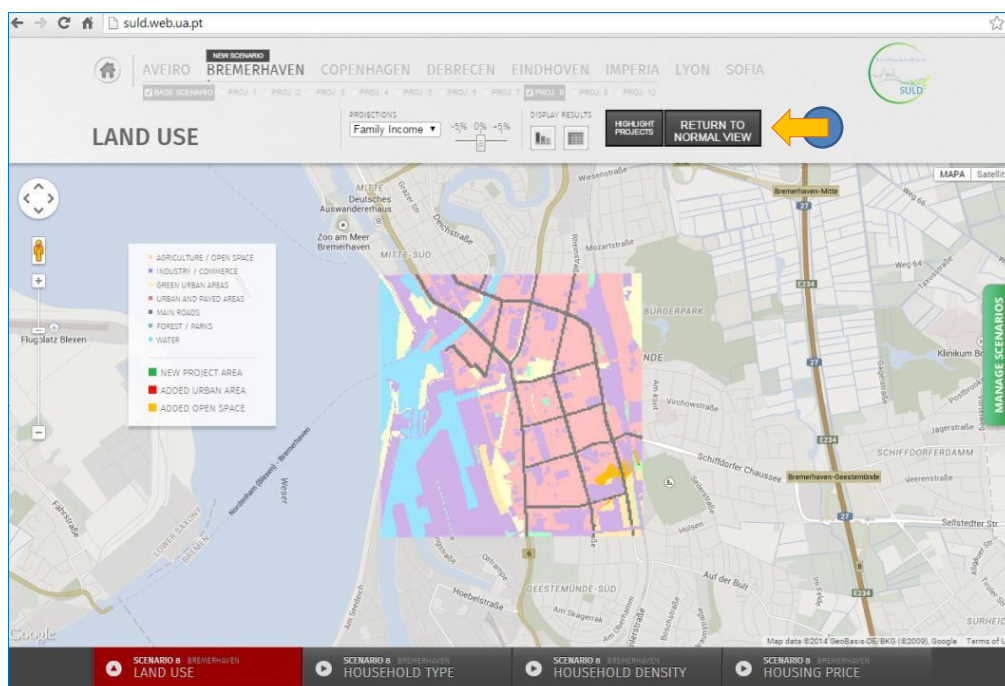
Scenario results for project 8 are now displayed, starting with the Land use map (Figure 4).

**Figure 4** Default screen displaying scenario results



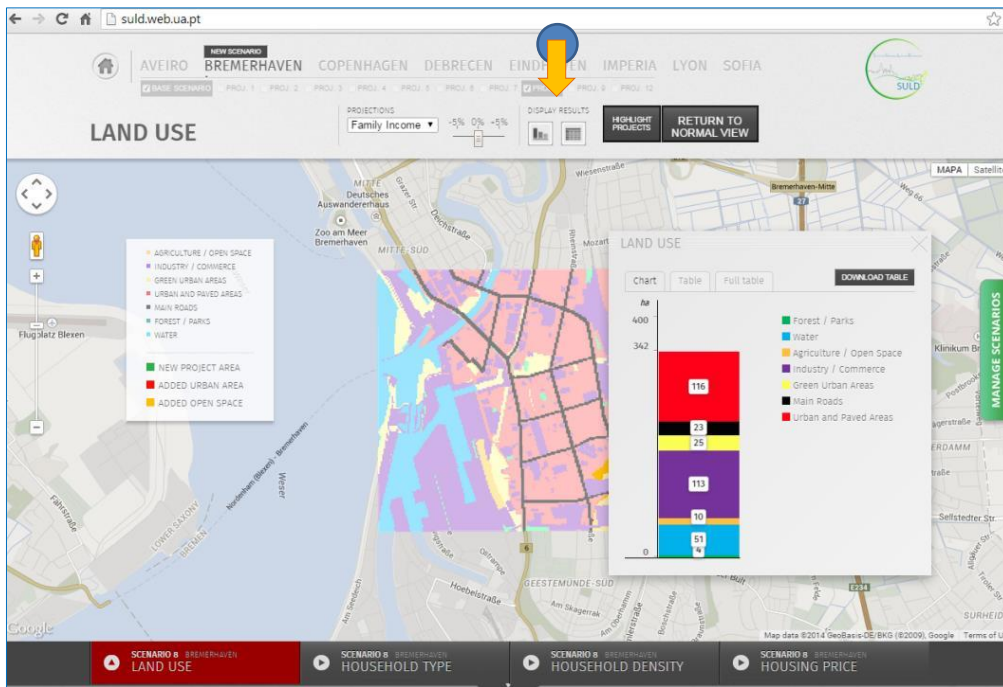
Because the differences may be hard to spot, you can press 'Highlight difference' to see what has changed as compared to the current situation (Figure 4 and 5). In this case, we see a contraction of the urban residential area on the South of the study area.

**Figure 5** Land use difference map (Highlight difference)



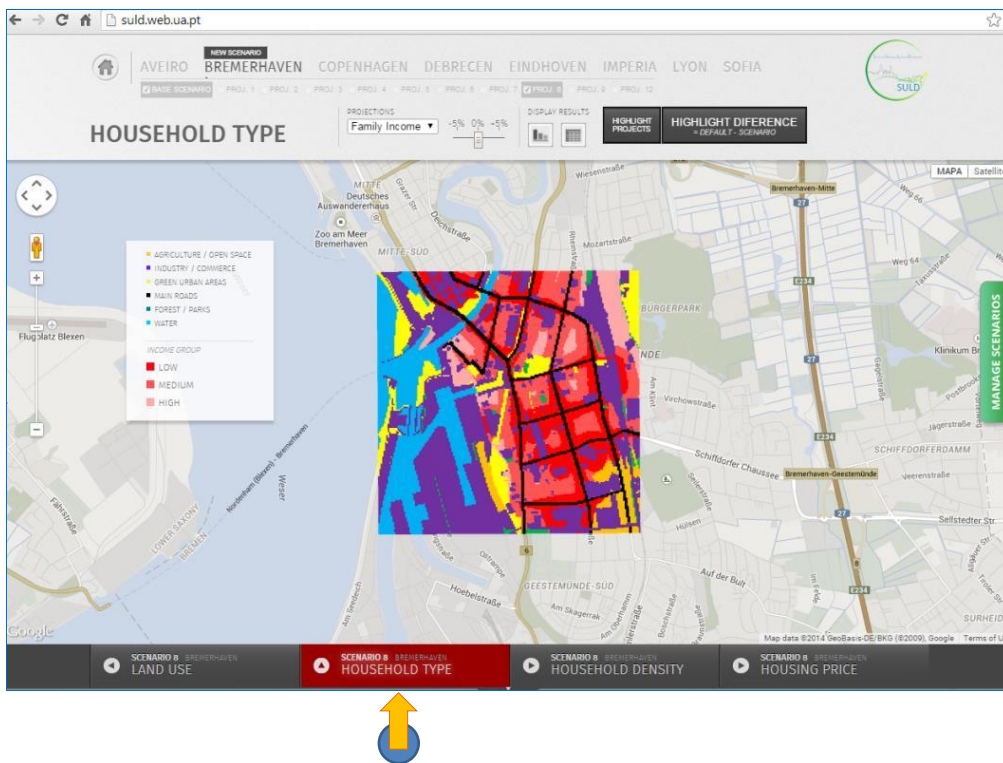
You can also analyse the results in a table or in a graph, by pressing the respective icons under 'Display Results' (Figure 6). Note that you can also switch within the dialogue box and that the full table is available for download.

Figure 6 Scenario results in graph format



Exactly the same procedure applies to the other variables available for this scenario: Household type, Household density and Housing price, which can be changed in the menu-bar below the map (Figure 7).

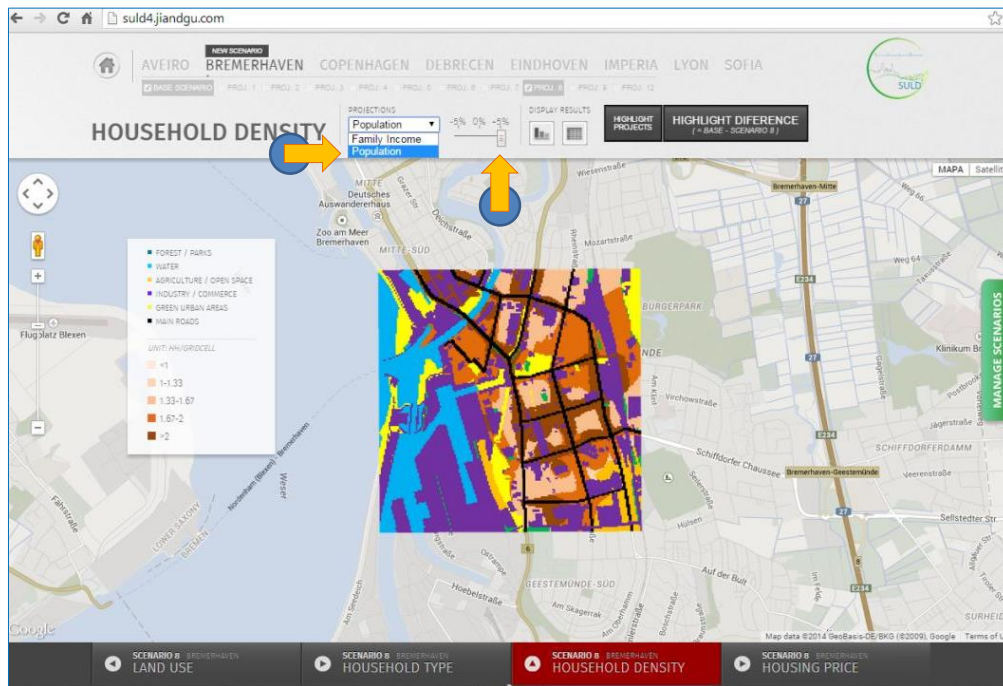
Figure 7 Scenario results for Household type





Further you can use the 'Projections' tool to change either the population or the family income in the study area (Figure 8). By moving the bar to the right, for example, you can see the same scenario, but with a 5% increase in population.

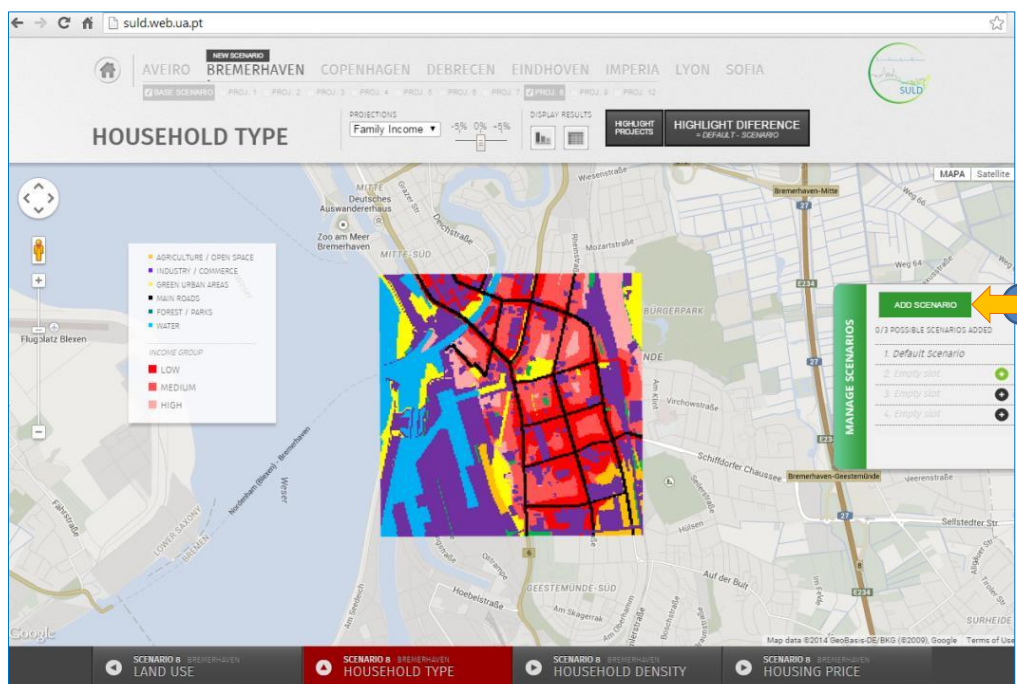
**Figure 8 Using the Projections tool**



As a result all variables, difference maps, tables and graphs change accordingly. You can explore them at you will or else simply return to the 0% situation.

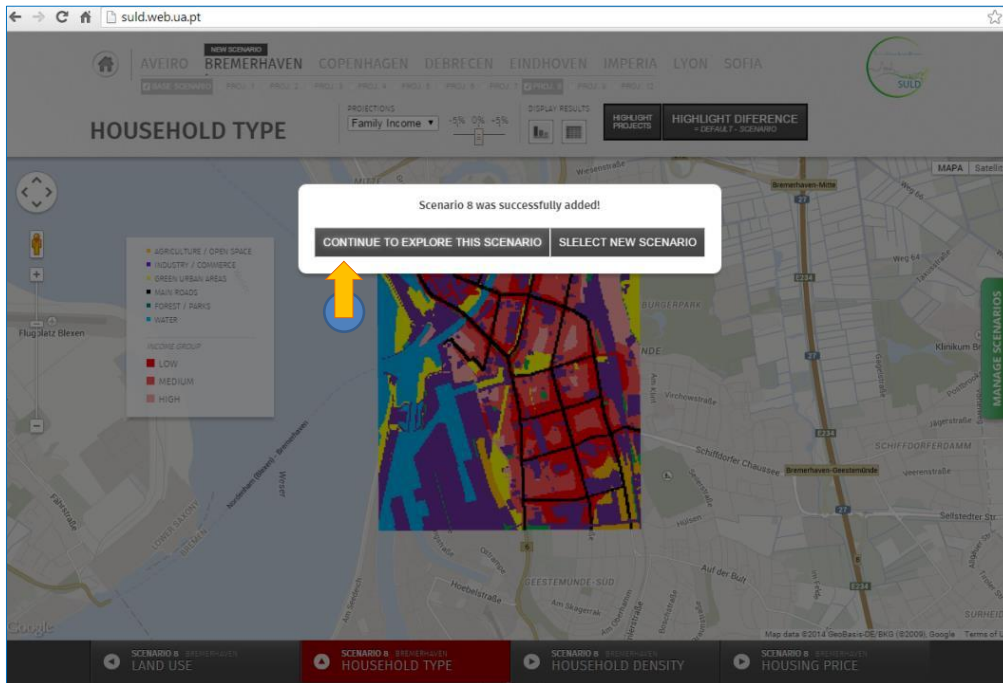
If you wish to compare a scenario, either to the current situation or to another scenario you create later, use the 'Manage Scenarios' menu on the right. Here you can add or delete scenarios as well as go to the compare page (Figure 9).

**Figure 9 Adding a scenario**



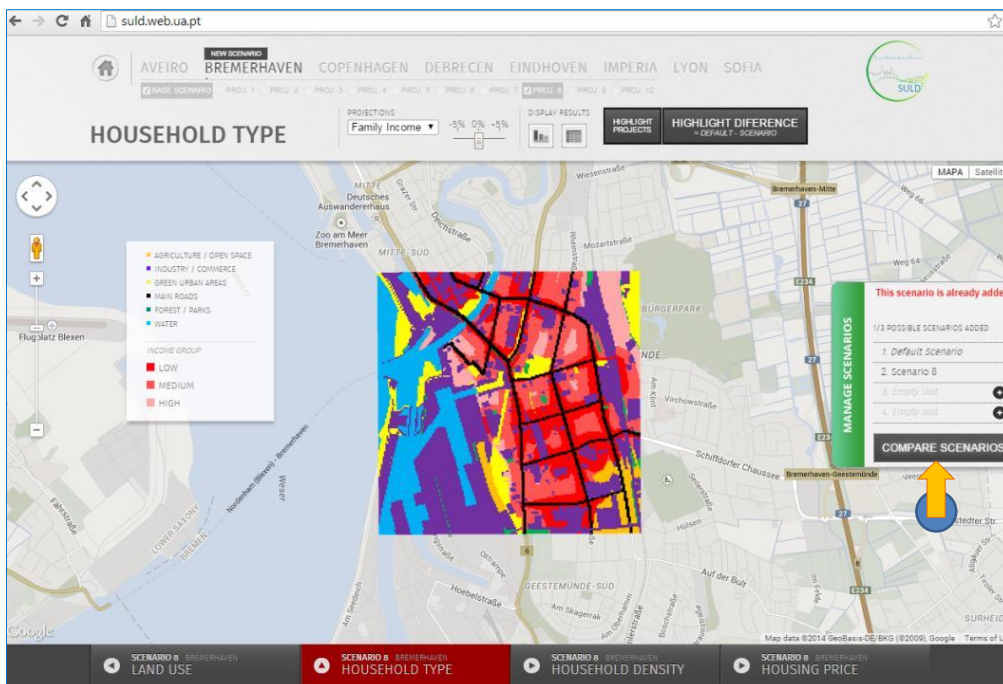
As you can see the base scenario is in the list by default. To add to the list the scenario you just created, simply press 'Add Scenario'. You will have a choice of continuing to see this scenario or else go back to the city page to create another scenario (Figure 10). We will stay in this scenario for now.

**Figure 10 Warning to continue to explore or select new scenario**



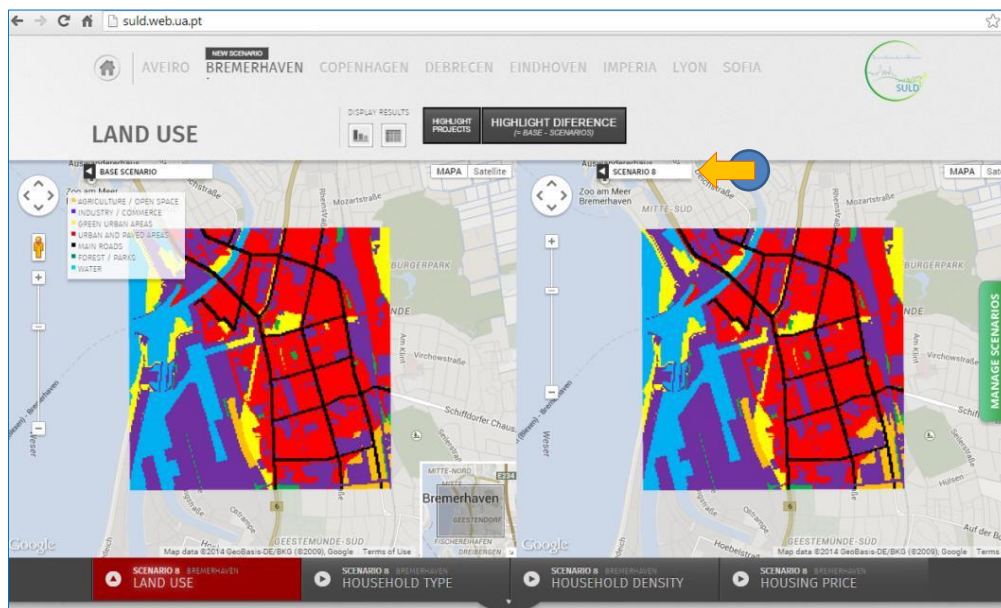
If you now go to the 'Manage Scenarios' menu you can see that Scenario 8 has been added to the list and that the 'Compare Scenarios' button is available (Figure 11). Let's press it.

**Figure 11 Compare scenarios**



The scenarios are displayed side by side, to a maximum of four, being that the first is always the base scenario (Figure 12).

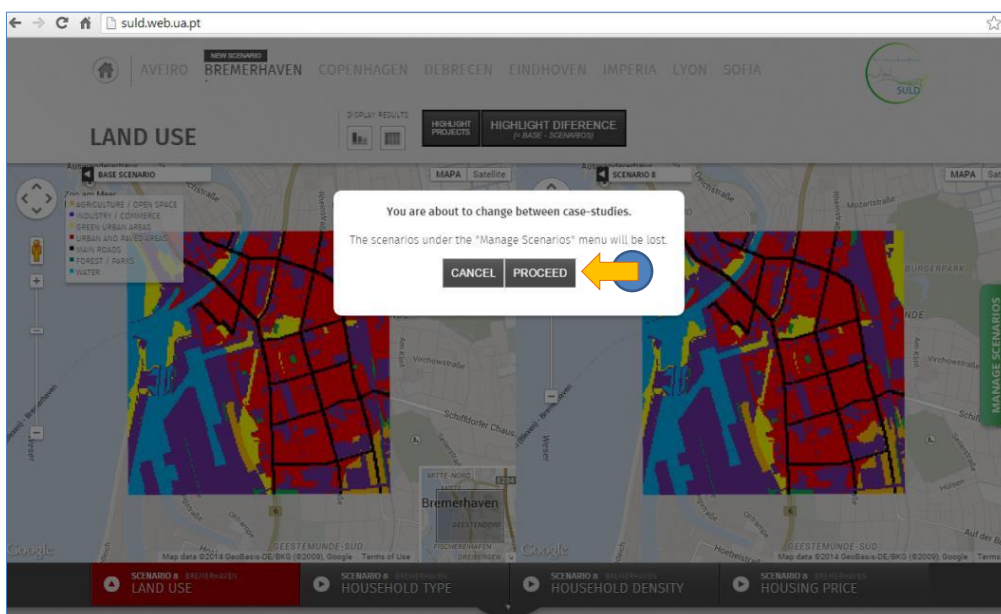
**Figure 12 Comparing scenarios side by side**



The same functionalities as before are available: you can change the variables and you can visualize the difference maps, tables and graphs, which will display the results for all the scenarios being compared. Also, if you change the view in one window, than all windows will update accordingly. When you are done comparing, you can always go back to the single scenario view by pressing the Scenario name.

In the 'Manage Scenario' menu you can also delete a scenario or simply press to add a new one. Remember, you can only have a maximum of four scenarios in the list. You can always return to the initial city page by pressing the city name above, but remember that you will lose the created scenario if you have not added it to the list. If you change to another city, all information will be lost, as the error message will specify (Figure 13).

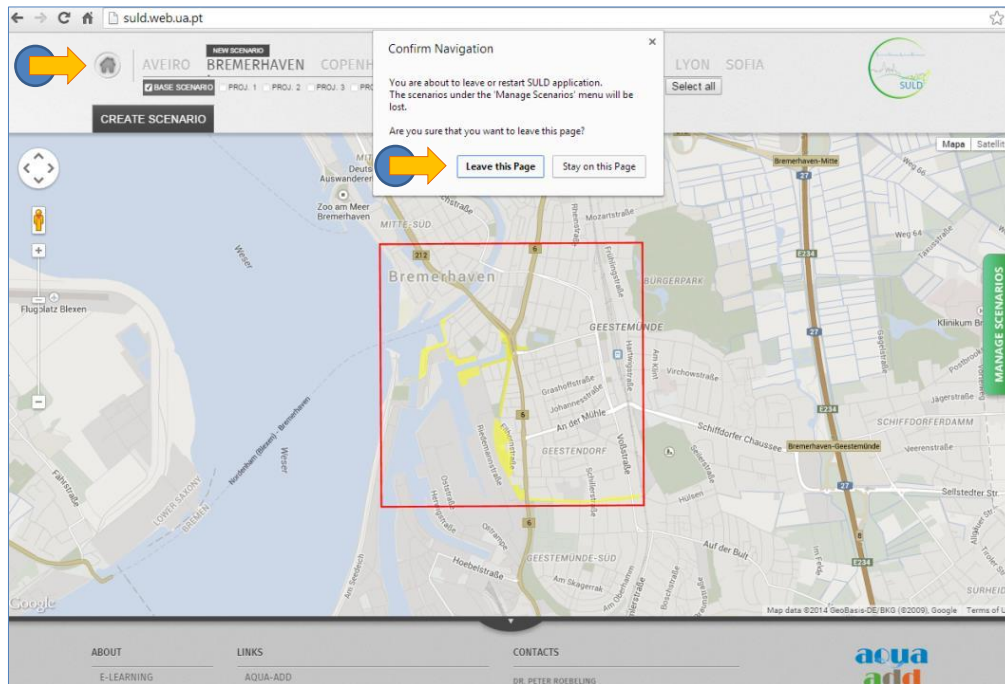
**Figure 13 Changing to a different city**





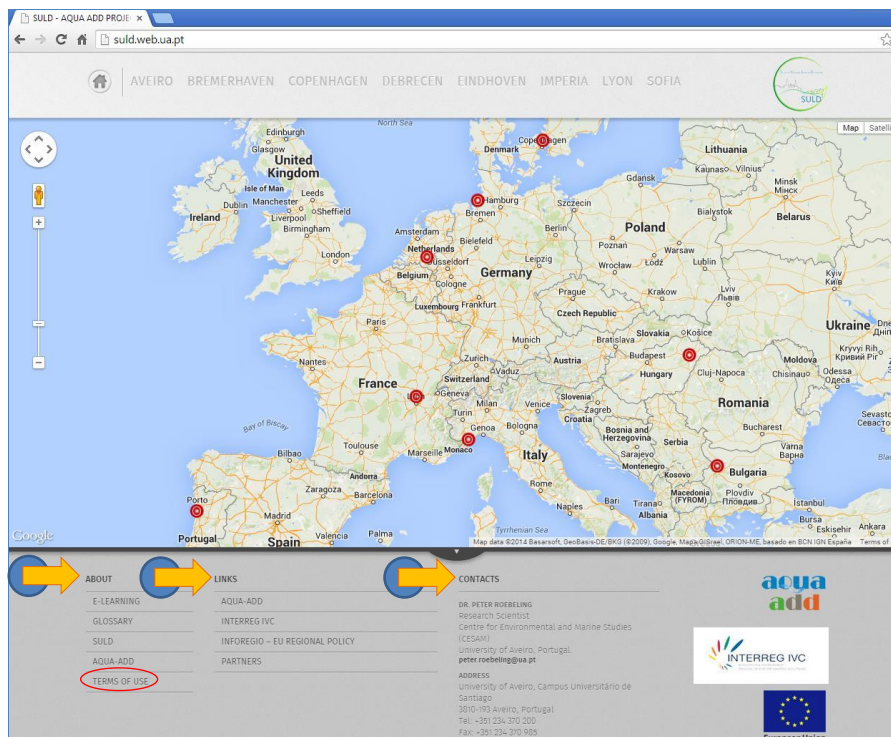
You can always start over, pressing the home button (Figure 14).

**Figure 14** Pressing the home button



In the lower menu, you can learn more about the project and see a list of important links (see Figure 15).

**Figure 15** About, Links and Contacts in the lower menu



We hope you have a good learning experience in exploring the SULD web-based demonstration version. Please note the terms-of-use before using any information or materials available on this and associated sites (see red oval in Figure 15). Feel free to contact us via e-mail if you have any questions about SULD, the website or about the project.

### 3. Conclusions

Testing the SULD decision support tool in these eight cities (Aveiro, Bremerhaven, Copenhagen, Debrecen, Eindhoven, Imperia, Lyon and Sofia), we were able to uncover four major tendencies regarding the establishment, re-introduction or re-qualification of green and blue spaces.



Note, however, that the value-added of green and blue space depends on: i) the quality and size of the intervention, ii) the location of the intervention relative to existing residential areas, urban centres and environmental amenities, and iii) the social classes attracted to the intervention area.

Hence, the SULD decision support tool & web-based application (<http://suld.web.ua.pt/>) is not an aim in itself but the starting point of a process. It facilitates participatory planning and scenario development, creating confidence in and familiarity with the model and its outputs. Also, it enriches public discussion and adds transparency to the urban planning and decision-making processes. Consequently, it encourages stakeholders to reflect about their reality and future possibilities – effectively engaging them in the design of urban development plans where the value of water and green spaces may assume a forefront position.



## Reports in this series

- Roebeling, P.C., Teotónio, C. and Alves, H., 2012. Inventory of needs and approach for development and piloting Decision Support Tool. Aqua-Add project, Aqua-Add Technical Report nº.01, Centre for Environmental and Marine Studies (CESAM), Department of Environment and Planning (DAO), University of Aveiro (UA), Aveiro, Portugal. 21pp.
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- Roebeling, P.C., Teotónio, C., Alves, H. and Saraiva, M., 2014. Sustainable Urbanizing Landscape Development (SULD) decision support tool: report on frontrunner Aqua Cases. Aqua-Add project, Aqua-Add Technical Report nº.03, Centre for Environmental and Marine Studies (CESAM), Department of Environment and Planning (DAO), University of Aveiro (UA), Aveiro, Portugal. 33pp.
- Roebeling, P.C., Saraiva, M., Gnecco, I., Palla, A., Teotónio, C., Alves, H., Rocha, J., Fidélis, T. and Martins, F., 2014. Sustainable Urbanizing Landscape Development (SULD) decision support tool: report on other Aqua Cases. Aqua-Add project, Aqua-Add Technical Report nº.04, Centre for Environmental and Marine Studies (CESAM), Department of Environment and Planning (DAO), University of Aveiro (UA), Aveiro, Portugal. 56pp.
- Roebeling, P.C and Saraiva, M., 2014. Sustainable Urbanizing Landscape Development (SULD) decision support tool: follow-up plan. Aqua-Add project, Aqua-Add Technical Report nº.05, Centre for Environmental and Marine Studies (CESAM), Department of Environment and Planning (DAO), University of Aveiro (UA), Aveiro, Portugal. 17pp.
- Rocha, J., Saraiva, M. and Roebeling, P.C., 2014. Sustainable Urbanizing Landscape Development (SULD) decision support tool: quick-start guide. Aqua-Add project, Aqua-Add Technical Report nº.06, Centre for Environmental and Marine Studies (CESAM), Department of Environment and Planning (DAO), University of Aveiro (UA), Aveiro, Portugal. 11pp.