

RECONNECT DSS TOOL

USER MANUAL



InfoSet
Version: 1.0
Date: 09/ 10/2019

Contents table

Contents table	2
About Reconnect DSS tool	2
Installation	3
Correlation Analysis	5
DSS Tool	6
Load Data	9
Important Files.....	11

About Reconnect DSS tool

Reconnect DSS tool is a system developed from InfoSet Ltd for the decision support of RECONNECT (Interreg project). The overall objective of the project is to improve the capacity of local management authorities by promoting efficient management of natural resources through the regional approach. The specific objectives include the following: 1. Enrich the current management toolbox with instruments based on the genetic and functional biodiversity; 2. Identify and map the key marine habitats and evaluate the services they provide by socio-economic, cultural and legal approaches; 3. Engage citizens in environmental monitoring and conservation activities and involve stakeholders to boost potential for blue growth; 4. Develop a platform for the data storage and analysis of results based on cutting edge information technologies; 5. Establishment of a Decision Supporting System to enhance the MPAs management on a scientific basis.

The Decision Supporting System specifically support the user by analyzing data from various sources and presenting them in the appropriate graphical representations in order to show useful insights and assist the decision of the MPAs management.

The following manual contains basic functions of the application that will help any user to install, maintain and use the system appropriately.

Installation

The installation instructions include installation of the program on a windows 10 station/server:

Requirements:

1. Python

Install Python 3 (3.7 at the time of this manual is drafted) from <https://www.python.org/downloads/windows/> with option to Add Python to Path

2. PIP

Download get-pip.py from <https://bootstrap.pypa.io/get-pip.py> Then, run from the command prompt:

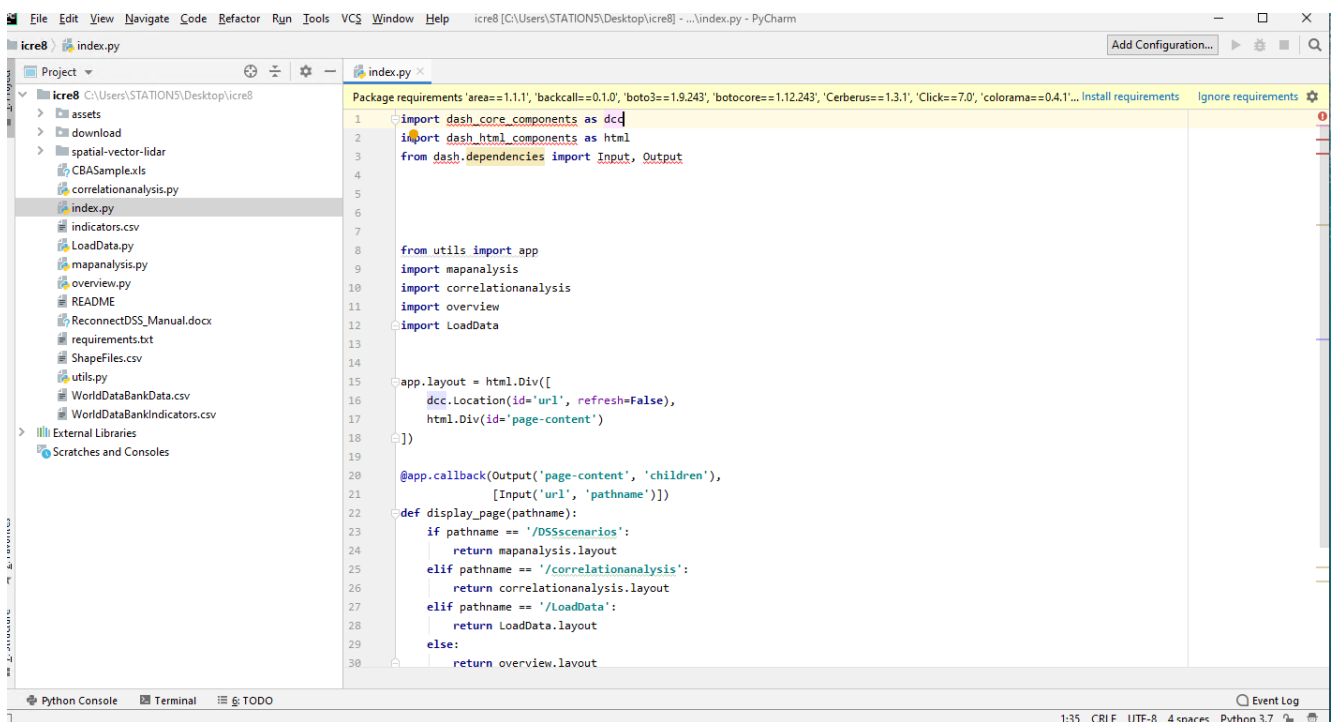
```
python get-pip.py
```

3. PyCharm

Download and install the PyCharm community version from <https://www.jetbrains.com/pycharm/>

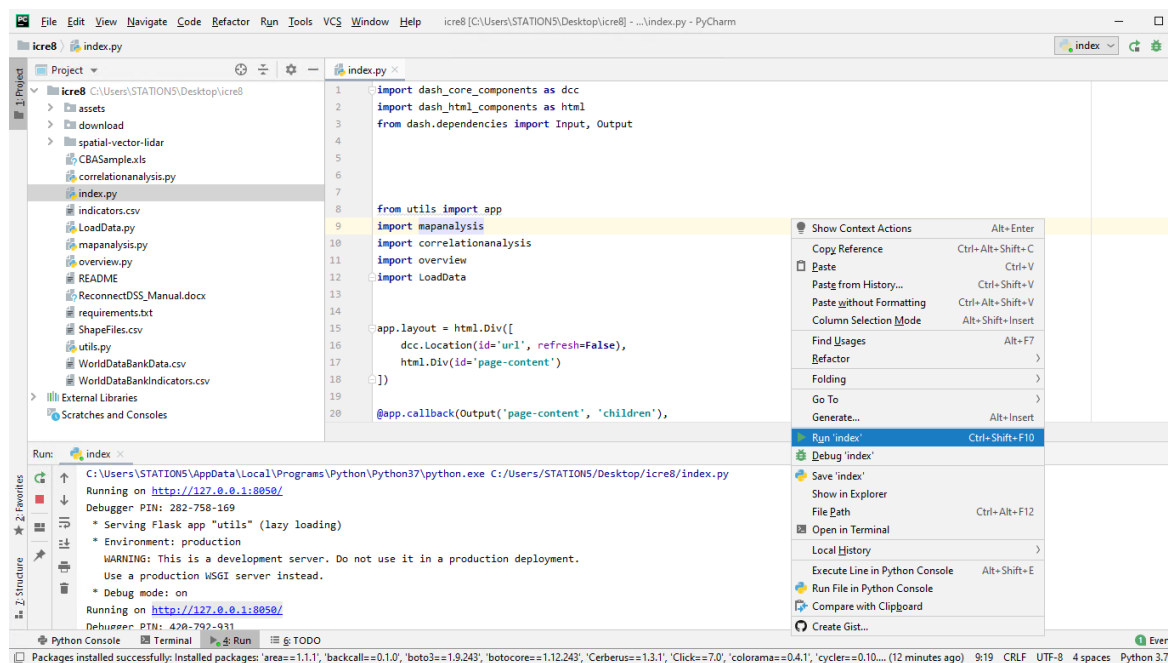
Installation of development environment

Unzip all project files in a directory of your choice. Open PyCharm and open the folder as a Pycharm community project. After continuing on the first time with the default settings, the system will anotify that some packages are missing and will ask to install them. On the yellow line select to Install the requirements.

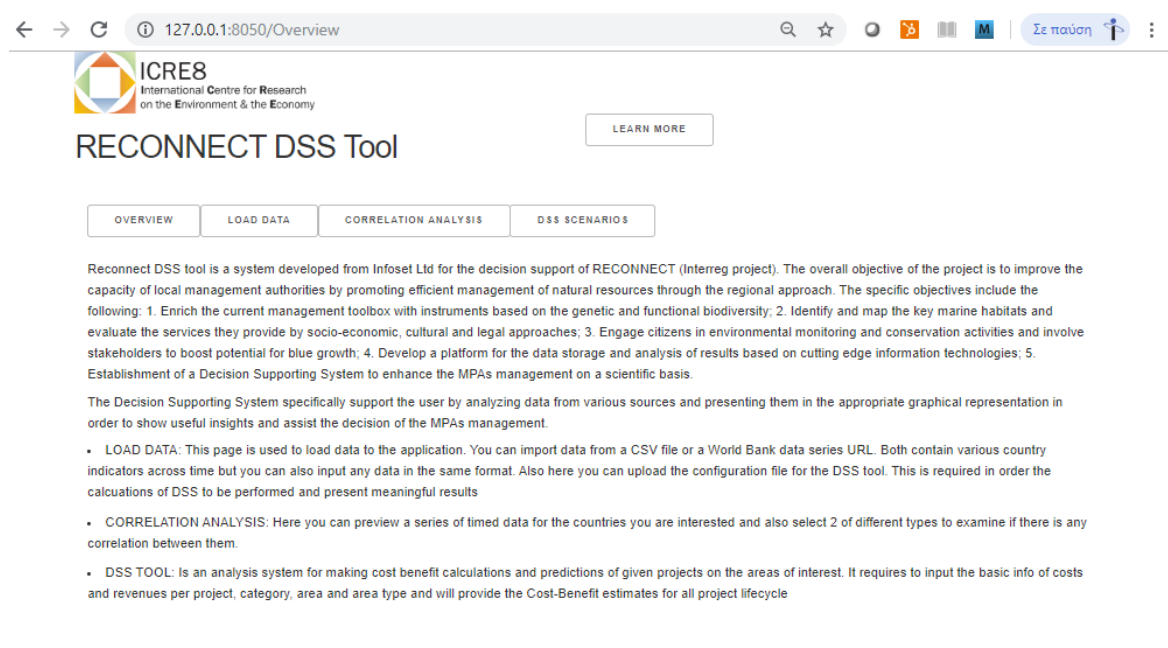


Running the project

After the packages are installed open index.py from the panel on the left and then right click and Run index.py.

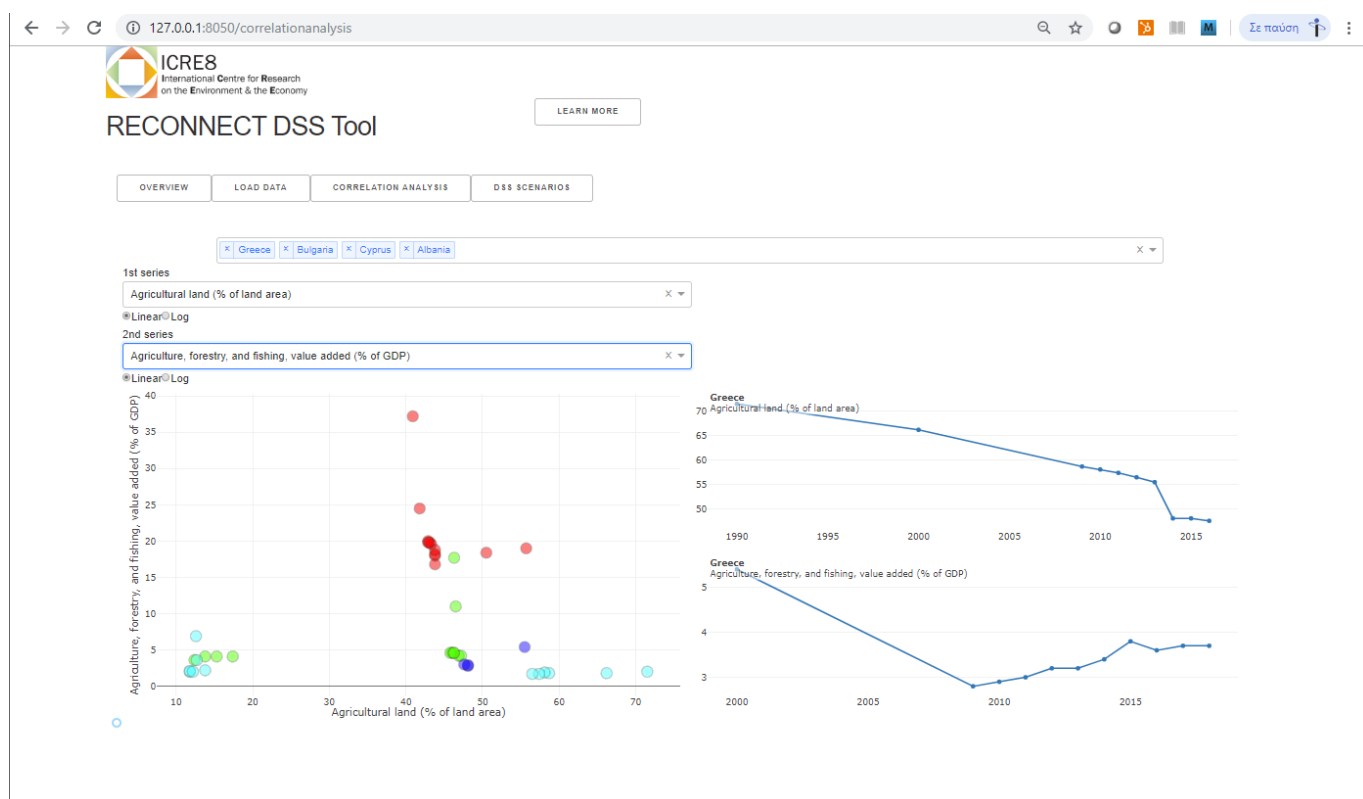


The system compiles the program and a link “<http://127.0.0.1:8050/>” appears in the 4:Run panel below. By clicking on it we can view the application on a web browser. The application contains 4 menu buttons that are explained in the next sections



Correlation Analysis

In this section we can preview a series of timed data for the countries we are interesting (Bulgaria, Cyprus, Albania) and also examine for 2 different types if there is any correlation between them. To do that we select 1 series from the first drop down and another one from the second drop down. We then see the line representation of both graphs for Greece or other country that is included and also a correlation plot is shown revealing any correlation if exists for these 2 series. The series contain mainly World Databank indicators, but we can also process custom series we can input in the system (Load Data section). Also, we can filter the data by selecting the countries on the top dropdown menu. Each country has a color representation on the correlation graph so we can easily identify differences between countries for the specific metrics. (Greece:blue, Bulgaria:Green, Albania:red, Cyprus:light blue)

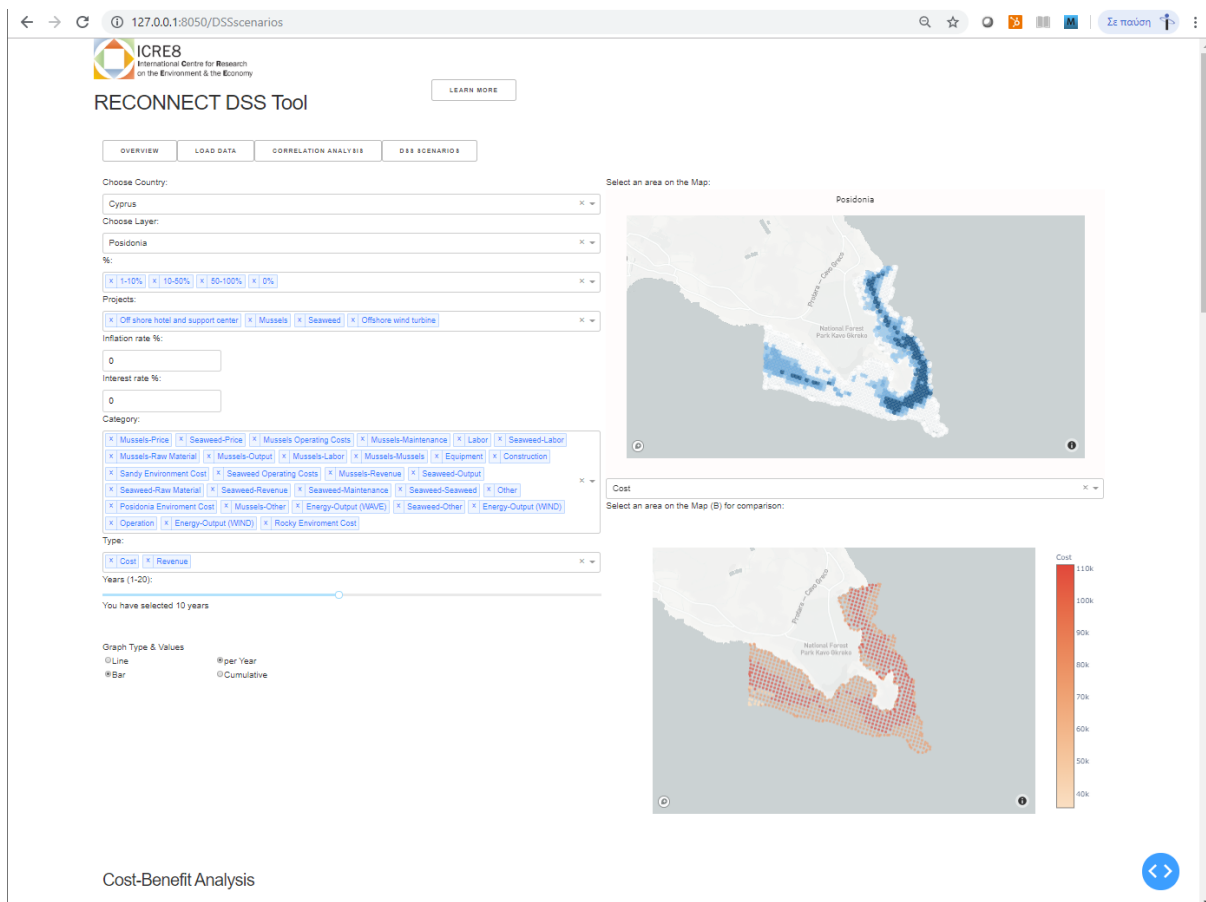


DSS Tool

The DSS tool is an analysis system for making cost benefit calculations and predictions of a given projects on the areas of interest. It requires to input the basic info of costs and revenues per project, category, area and area type and will provide the Cost-Benefit estimates for all project lifecycle. The source data are imported in the system by a preconfigured excel file allowing to set any type and category of cost and revenue so the system can provide accurate estimations based on the selected area of the project.

When we open the page we see filter fields on the left and 2 maps on the right for the area of interest. The first map shows one of the three MPAs layers, Posidonia, Rocky and Sandy and by choosing one in the dropdown at the left we can plot any off them. The color represents the percentage of the area, so i.e. a 50-100 Posidonia will be dark blue while a 0-10 Rocky when we choose the Rocky layer will be light grey.

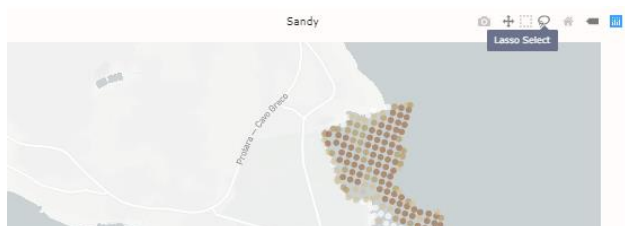
The second map contain the first calculations of the DSS made for the cost and revenues associated with the type of areas exist in the territory. The costliest an area is the highest tone of color it has, so a dark orange point will cost more than a lighter one for the defined projects. If we turn to the Revenues map with the dropdown above we see the same calculation on the map points for the revenues.



This first calculation elaborates all data on the excel file, however If we want to filter it per specific project or category we can do so with the filters on the left. We can select:

- The area and Percentages we are interested to examine
- Inflation and Interest rate. This is taken into consideration for the cumulative calculations we will see later. If we leave them 0 they are ignored
- Project: Initially all projects are calculated as aggregated sums, normally we will be interesting for one specific project so we can deselect the rest
- Category of cost and revenue: Initially all are taken into consideration and we can remove those we are not interesting to involve in the calculations
- Type of calculation: System calculate both costs and revenues by default, we can ignore any of them if we wish.
- Years: By default the system take all years defined into consideration, but we can limit the calculations for the period we want.
- Graph Types and Values: We can select between Line/Bar charts and per year/Cumulative calculations to be presented.

Finally we can select the area for the project on the first map by hower over it and clicking on the 'lasso select' or 'box select' button. If we will to select 2 areas and compare the results, we can do so by selecting an area in the second map. The selected area in sqr. meters is calculated and shown in both cases under the maps.

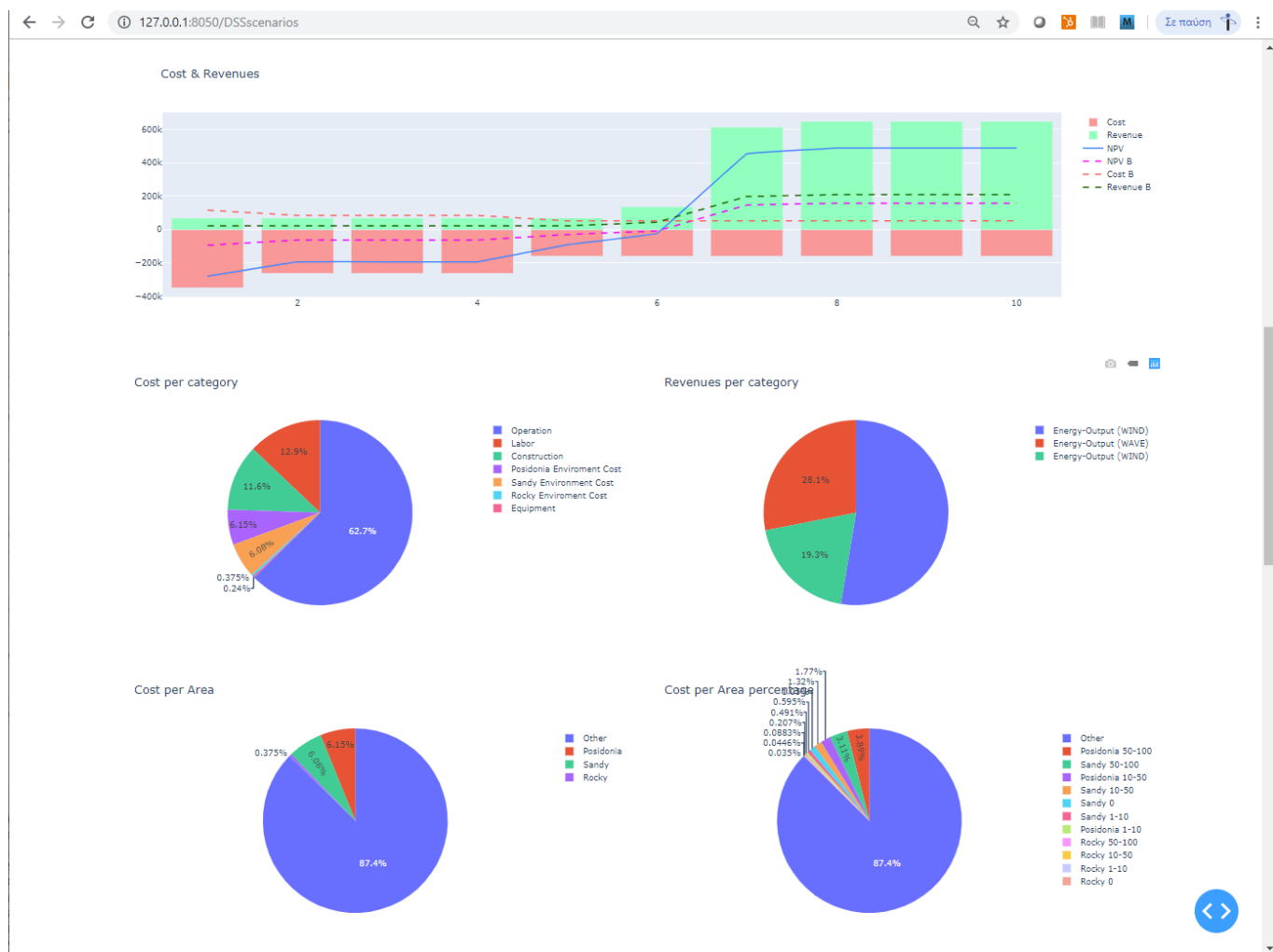


After selecting the areas, all the calculations of the DSS are performed and the results are shown below.

The first graph represents the Cost-Benefit analysis for the selected period. The calculations are based on all previous parameters, the input data of the excel and the selected area.

So green are the revenues, red the costs and blue are the Net Presense Values (yearly or cumulative) shown across the period of interet. Also, if a second area is selected the same metrics are shown in the graph for comparison with dashed lines and indited as 'B' in the legend. The pie charts used below contain always the first selected area's calculations.

The Pie charts present Costs and Revenues per category and the Costs and Area and per Area percentage.



If we choose to alter any of the input parameters the calculations are redone automatically and new graphs are shown. In that way we can test easily any scenario of a future project on the area and also choose the most beneficial area for it though intuitive comparisons of different proposals.

In the bottom area of the page two informative grids are presenting, the first containing the selected areas and types aggregated sums and the data of the excel file used for the calculations.

Load Data

This page is used to load data to the application of the tool. We can import data from a CSV file or a World Bank data series URL. Both contain various country indicators across time but we can input any data in the same format.

- a) To import a csv file we download the sample (SampleWD.xls) and we copy paste the data without altering the first row which contain the column names. With that the system recognize the data and can use it for the correlation analysis. Then we upload or drag&drop the file to the page.

- b) In the same way we can copy past a World bank url to the next field and give a custom name to the series. This will import the data from the Databank and we will be able to analyze it in the Correlation analysis page. The url must be taken from the “DataBank” page of the World Data Bank as is shown in the next picture.

	2012	2013	2014	2015	2016	2017	2018
Albania	89.5	95.4	97.6	97.8	97.7	97.8	97.4
Bulgaria	97.2	95.3	94.0	92.0	89.5
Cyprus	98.2	97.5	97.1	97.8
Greece	97.7	97.5	96.5	97.3	97.9	98.2	..

Source: World Development Indicators. Click on a metadata icon for original source information to be used for citation.

- c) Finally we can upload the configuration excel for the DSS tool. The system can work with only one file at a time and any upload will overwrite the previous one. To input data in the excel we can modify the template from the link provided in the page. (download/CBASample.xls) The new file must overwrite the previous in the same directory.

Project	Category	Area	AreaType	Y1	Y2	Y3	Y4	Y5
Enter Project Names in blue				Enter cost/revenue category				
Enter Type of Area				Enter area that cost/revenue depends, 'all' if is same for each area, leave blank if cost is independent to area				
Enter cost/revenue category				Enter cost/revenues unit for 1st and consequetes years				
INVESTMENT COSTS				1	2	3	4	
Offshore wind turbine								
	Equipment			5000	0	0	0	
	Construction		all	250	250	250	250	
	Labor		all	300	300	300	300	
	Operation		all	1000	600	600	600	
	Posidonia Enviroment Cost	Posidonia	0	0	0	0	0	
	Posidonia Enviroment Cost	Posidonia	1-10	33	33	33	33	
	Posidonia Enviroment Cost	Posidonia	10-50	80	80	80	80	
	Posidonia Enviroment Cost	Posidonia	50-100	150	150	150	150	
	Rocky Enviroment Cost	Rocky	0	1	1	1	1	
	Rocky Enviroment Cost	Rocky	1-10	3	3	3	3	
	Rocky Enviroment Cost	Rocky	10-50	4	4	4	4	
	Rocky Enviroment Cost	Rocky	50-100	8	8	8	8	
	Sandy Environment Cost	Sandy	0	30	30	30	30	
	Sandy Environment Cost	Sandy	1-10	40	40	40	40	
	Sandy Environment Cost	Sandy	10-50	60	60	60	60	
	Sandy Environment Cost	Sandy	50-100	120	120	120	120	
Mussels								
	Equipment							
	Construction							
	Labor							
	Other							
Seaweed								
	Equipment							
	Construction							
	Labor							
	Other							
Off shore hotel and support center								
	Equipment							
	Construction							
	Labor							
	Other							
REVENUES				1	2	3	4	
Offshore wind turbine								
	Energy-Output (WIND)	Rocky	all	1000	1000	1000	1000	
	Energy-Output (WIND)	Sandy	all	0	0	0	0	

When adding data to the excel is advised to alter only the white and blue cells, not the yellow&red ones. The file provides the cost & benefit breakdowns of various projects we want to examine and it is completed as below:

- 1) Projects: We input the project name in the first column both in Costs and Revenues areas. Any row completed below that and till the next project is considered linked with that project.
- 2) Cost/Revenue categories: We input the various categories of costs or revenues in the 2nd column of the rows in the Investment Costs and Revenue areas respectively. I.e. for costs it could be Equipment, construction, labor, Posidonia environment, Rocky Environment, Sandy etc.

- 3) In the 3rd column we input Posidonia, Rocky, Sandy (exact words) if the cost/rev category is occurred only for this specific area type. If the cost is not associated with the area category we leave it blank.
- 4) In the 4th column we input with which type of percentage the cost is linked (and only that) from the values **0, 1-10,10-50,50-100** or **'all'** if it is independent from the percentage. In that way the cost/revenue is calculated multiplying the number of selected areas (of specific type and percentage or all selected) with that unit cost/rev. If we leave it blank then the cost/rev of the category is **independent** from the selected area and is calculated as a fixed amount.
- 5) In the columns Y1→Y20 we can input the estimated yearly cost of every category for the period we want to examine.

In order for the system to perform correct calculation the MPA management has to decide carefully what part of the cost is associated with each area, what with specific percentage of an area and what with the combination of them. An area can have more than one types, i.e. Posidonia 10-50 and Sandy 50-100, so if we define costs/revenues for both categories the total will be calculated by the sum of them and also adding any other cost/rev defined as 'all'. Although the process may be complex allows to un the most accurate models of costs and revenues for a specific area examined for a specific project. Also within the excel file we can freely define any number of costs/revenues to take into consideration, as the DSS models will aggregate and simplify all the given information into meaningful and easy to use graphs and charts.

Important Files

In the root directory of the program these files can be configured without programming experience to support future needs (i.e. more countries, maps etc)

- **ShapeFiles.csv**: A list of the map shapefiles to be read. Here we define the directory of each after we put the files in /spatial-vector-lidar directory
- **WorldDataBankIndicators.csv**: A list of the indicators the system has preconfigured. We can manually alter this file to add or remove indicators we are not interested.
- **WorldDataBankData.csv** : This is the cache file of the indicators. The data are kept here after first read of the system, so it isn't required to read it online every time it runs. If we delete this file all data will be refreshed from the sources.
- **Download/CBASample.xls** : The DSS configuration file (upload it or replace it in the same folder/name to update the configuration)
- **Download/CBASampleInitial.xls** : A backup of the initial DSS configuration file
- **Download/SampleWD.csv**: A sample of csv to use for uploading custom time series to the system

The code of the project is also available from Git:

<https://github.com/infosetGR/icre8-reconnect>