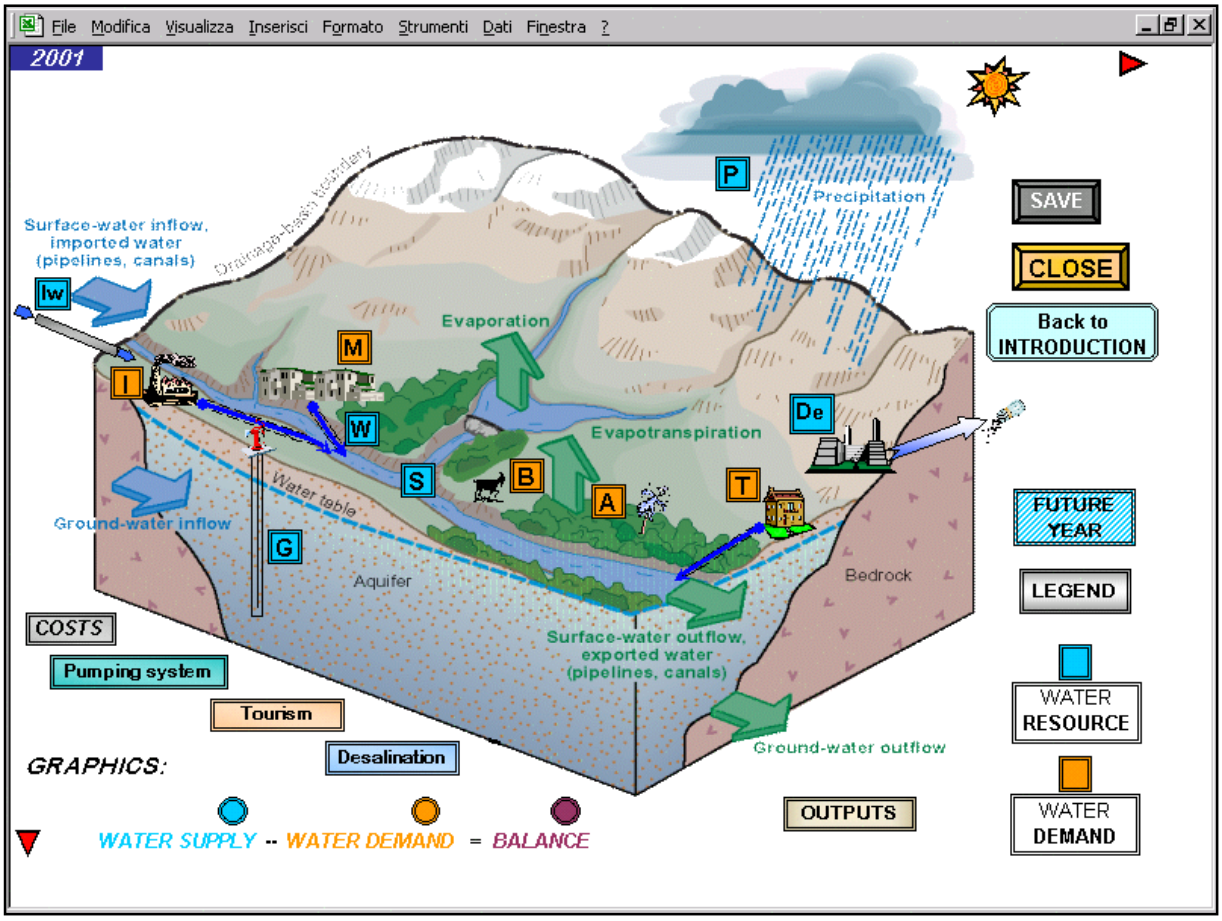
MedWater Policy

Policy Initiative to Overcome Water Competition between the Vital Economic Sectors of Agriculture and Tourism in the Mediterranean

EC Contract No. ICA3 – CT2000 – 30002



Deliverable for WP5

MedWater Model User Manual

June 2003

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1. Introduction to MedWater Model

Policy and decision makers involved in natural resources management are increasingly confronted with questions concerning water management: in particular water scarcity and a more and more severe competition between tourism and agriculture sector in arid and semiarid regions are serious obstacles to the development of the concerning regions. They may find this tool useful to determine future directions in water policy. For example, if decision makers aim at a certain increase of tourist sector in the future year, what are the paths to take to achieve this goal: croplands decrease, irrigation efficiency and water efficient technologies increase, desalinated water production, wastewater treatment, etc.? What is the appropriate mix of policy measures? The last objective of the proposed MedWater model is to allow users to analyse the water situation through an integrated approach, as well as visualize the results of own decisions in quantitative/qualitative way by numerical outputs and graphics.

The MedWater model, in fact, determines a water balance of a region in both present and future years, comparing the outputs of the water resources to outputs of the water demands. Present year is used as a base year for testing the available data and then for calculating the water balance in future year. The MedWater model gives the user ample opportunity to modify assumptions to the regional context and to test different future scenarios. Of course the MedWater model does not aspire to give precise and difficult predictions but rather analyses “what–if” questions. For example, it helps analysing and answering questions such as:

If municipal demand will increase of 50 litres per day per capita in the future, what does this mean in terms of balance and what will be the consequence for other sectors like tourism?

Is it possible “natural” water resources will compensate for increase in water demand in the future year?

And, if you have negative answer, is it possible imported water, treated wastewater and/or desalinated water will compensate for increase in water demand?

Moreover, if tourist demand will increase in the future year, what does this mean for irrigation policy and water supply in general?

The user can insert the required data and can modify all major variables and directly monitor the effects of these changes on water demand and on water supply. This feature makes the program a very suitable tool for scenarios testing and sensitivity analysis.

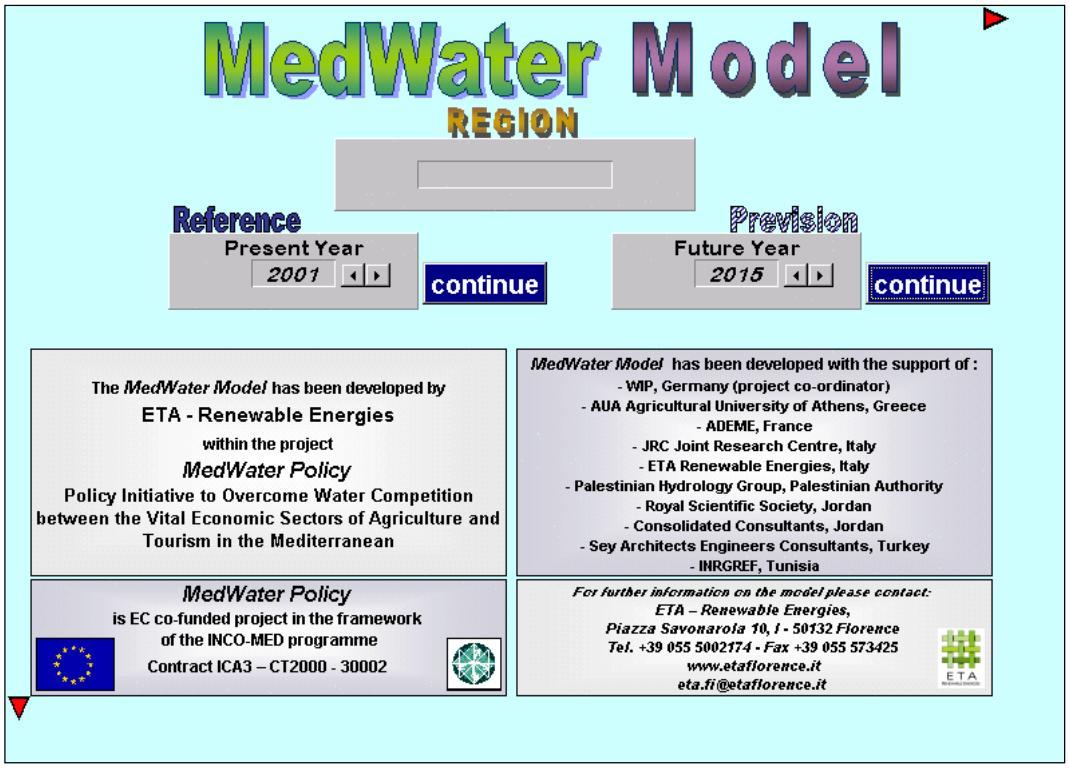
The analysis carried out by means of the MedWater model is of course strongly dependent on the “quality” of the inserted data; above all for the calculation of the groundwater and surface water resources available in the region an accurate estimation carried out with analytical instruments is necessary.

2. Guidelines to get started

The model consists of 5 Excel files: a file, named **BASIN.xls**, is a graphic interface file for the user, while the others are calculation files.
You have to follow these guidelines to run the model:

- first of all extract all files (5 Excel files) from zip file “Model” in a single folder (e.g., you can named it “Model”) on your hard disk;
- after that, open the folder, in this case named “Model”;
- then double click on the file named **BASIN.xls** to open it;
- to allow file opening, click Activate Macros button: the other Excel file are opened automatically;
- finally, click Yes four times for automatic links for each file that is opened automatically.

First you will find the following introduction page.



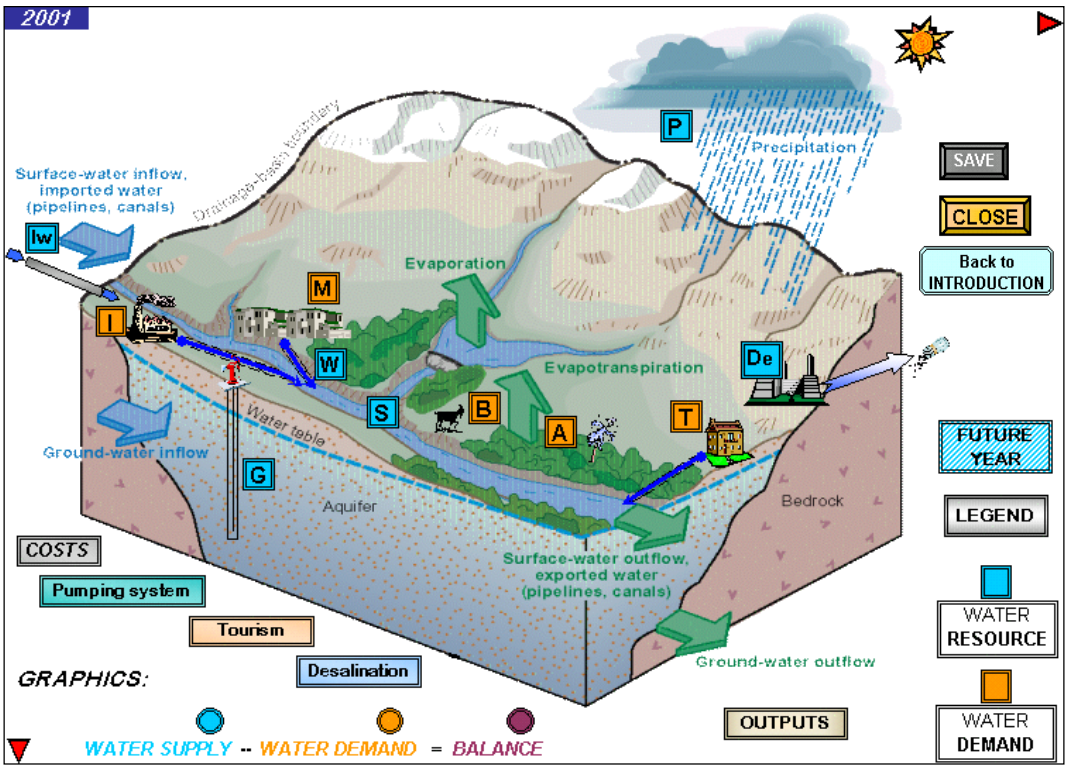
Advice: depending on your screen size and display configurations the full page might not fit on your screen, or only fill half of your screen. Zoom in or out by selecting “zoom…” in the view menu and select the appropriate percentage, so as to view two red triangles: a triangle is at the top of the screen (on the right), while the other is at the bottom of the screen (on the left).

3. Moving around in the worksheets

In the introduction page, write the name of the region into consideration in the dialogue window and then click "**OK**" (otherwise click "**Exit**").
Now choose the reference year with the **spin button** : by clicking the right arrow the value goes up, by clicking the left arrow the value goes down; simultaneously tables and graphics are modified according to changed value.
Then use the spin buttons to insert the required data. If spin buttons are not present near the cells, insert the required data by using your keyboard and then press the "enter" key.
After choosing the present year, press the next "**continue**" continue button.
You have to do the same for the prevision year.

3.1. Present year

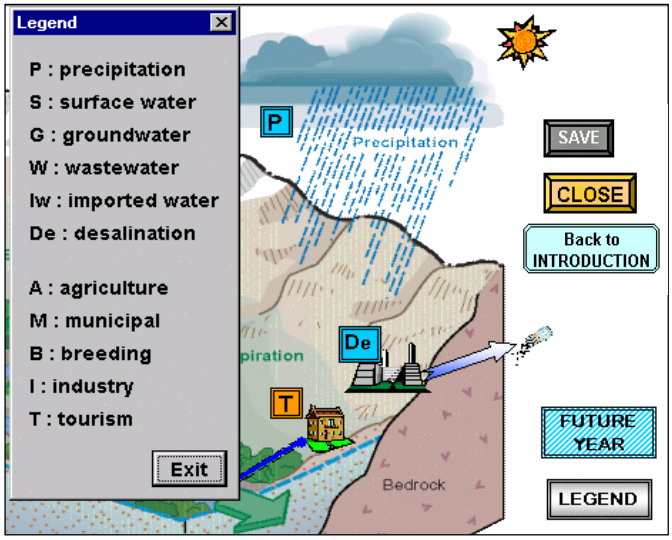
After choosing the future year, press the next "**continue**" button and another view will open (see following image).



This image represents schematically the region to be analysed in the present year. In this image two red triangles have to be visible. By clicking the buttons with the letters, you reach the cells of the corresponding sub–modules (these cells are connected to some

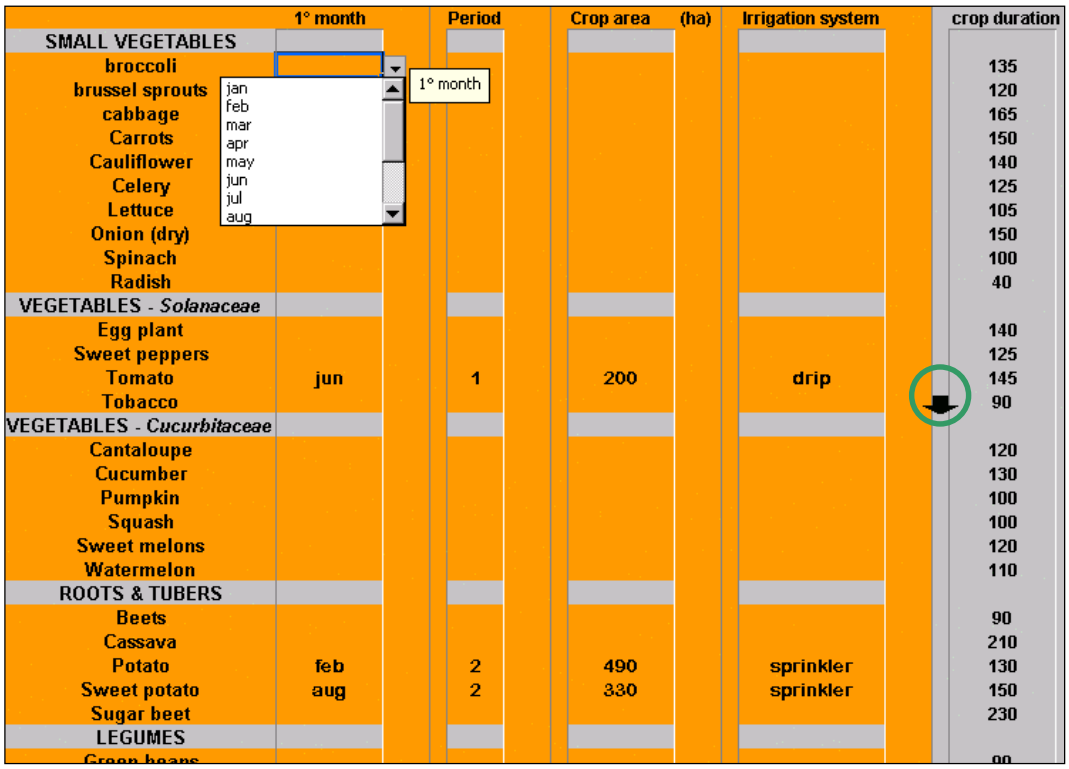
already opened Excel files: the other Excel files are required for various calculations, which have to be developed to obtain the sought results).
Even if you don't have any input data for some sub–modules, you can click all buttons to see the required kind of information.
The blue buttons represent WATER RESOURCES (that provide the SUPPLIES), while the orange buttons represent WATER DEMANDS.

If you press the "**legend**" LEGEND button, a legend window with the letters of the blue and orange buttons and their meaning is visualized (see following image).
Press "**Exit**" to close this window.



3.1.1. Demand sub–module

When you click the "**A**" A button, a corresponding following view on agriculture needs will open.



For each kind of crop present in the region, you have to enter the month, in which the related crop is planted, or, for example with trees or perennial vegetables, the month, in which the corresponding harvest is made; the period of the month; total area of the crop into consideration; the irrigation system mainly used.

Some cells can be filled in by using a special menu with a list of possible items (e.g. month or irrigation system).

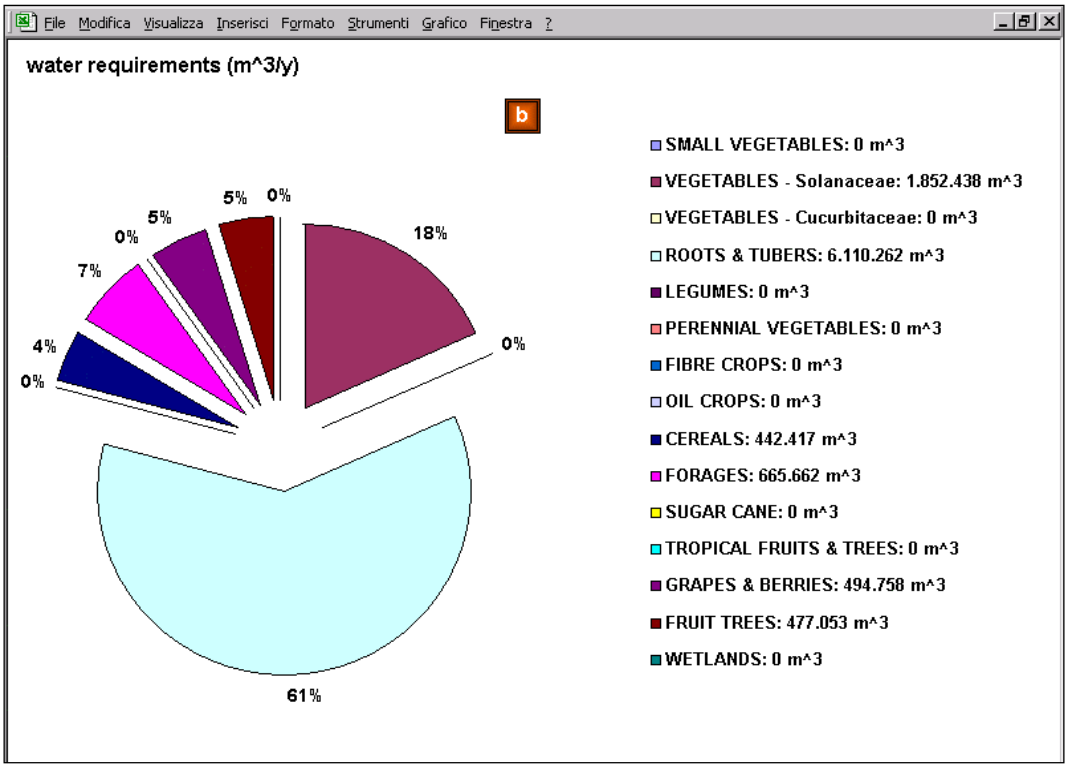
Many cells can be filled in by using the spin button placed on the right of the same cells.

On the right of the screen there is a column with the “crop duration”, in days, which is necessary to calculate total crop water requirement.

By the arrows on the right of the screen (circled in green in the preceding image) you can move up or down through this view. At the bottom of the view there are three buttons.

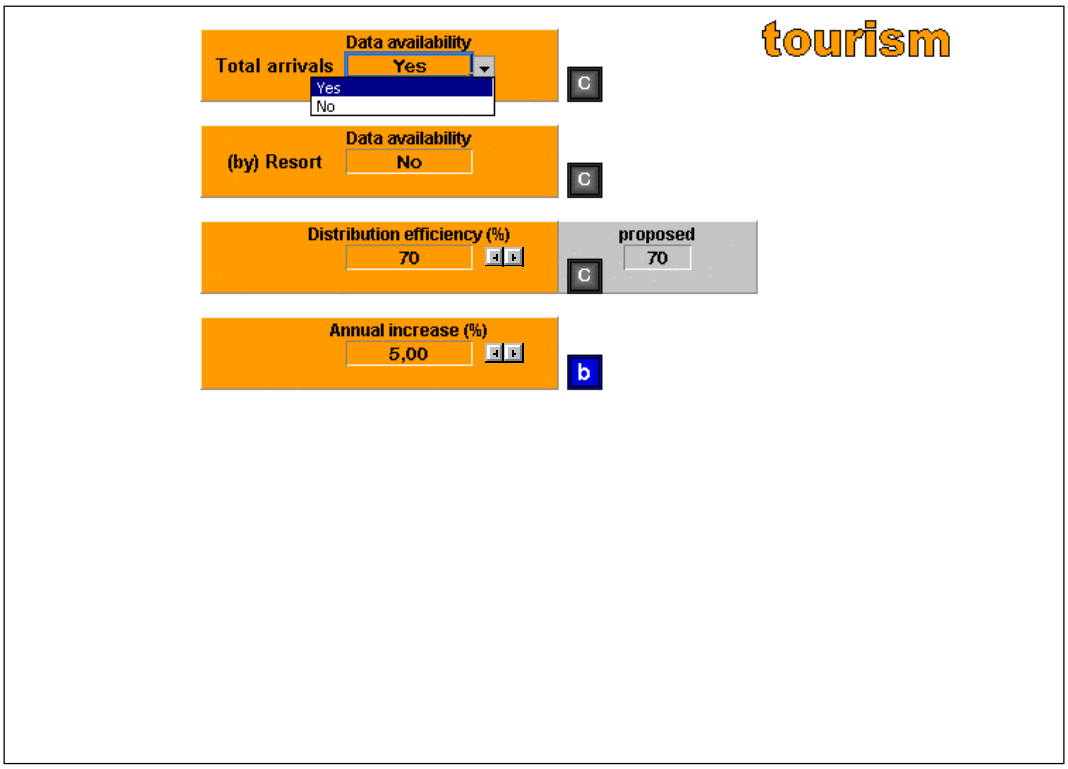
If you press the “**irrigation efficiency**” button, you can change the efficiency value of different kinds of irrigation. You have to press the “**C**” C button to come back.

If you press the “**irrigation graphic**” button, you can visualize water requirements percentages and total annual values of different crop families (see following image). You have to press the “**b**” b button to come back.



If you press the "**C**" button, you change view.
Now you have to insert geographical and meteorological data of the region.
If you have to enter the monthly data, fill in the cells from JAN to DEC and then click next "**C**" button. If the required data are not available, do not enter any number and then click next "**C**" button or, if there is, the next J "**J**" button, that allows to come back directly to the initial area image.
At the end of the meteorological input data you have to press the "**b**" b button to come back to the initial area image.

When you click the "**T**" button, a corresponding following view on tourism needs will open.



According to data availability, fill in the first cell with “Yes” or “No” by using a special menu with a list of possible items (in this case, only “Yes” or “No”) and then press the “**C**” button to continue.
If you fill in the first cell with “Yes”, you have to enter the monthly data, according to kind of available data.
If you fill in the first cell with “No”, you go to the second cell. In this case, you have to put “Yes” in the second cell and then you have to enter the monthly data, according to kind of available data.
Attention: if you fill in both cells with “Yes” or if you fill in both cells with “No”, a message, visualized under the same cells, informs that only one cell have to be “Yes”.
On the right of some input data cells there are grey cells with an indicative suggested value, e.g. based on Western European countries or connected with the other demand sub–modules.
By clicking the “**C**” button, you can reach last cell of this sub–module. After filling in this cell, click the “**b**” button to come back to the initial area image.

When you click the “**M**” button, a corresponding view on municipal needs will open.
If the required data are available, for each cell you have to enter the input data and then you have to click the “**C**” button anyway.

On the right of some input data cells there are cells with an indicative suggested value, e.g. based on Western European countries or connected with the other demand sub–modules.
At the end of the municipal input data, click the "**b**" button to come back to the initial area image.

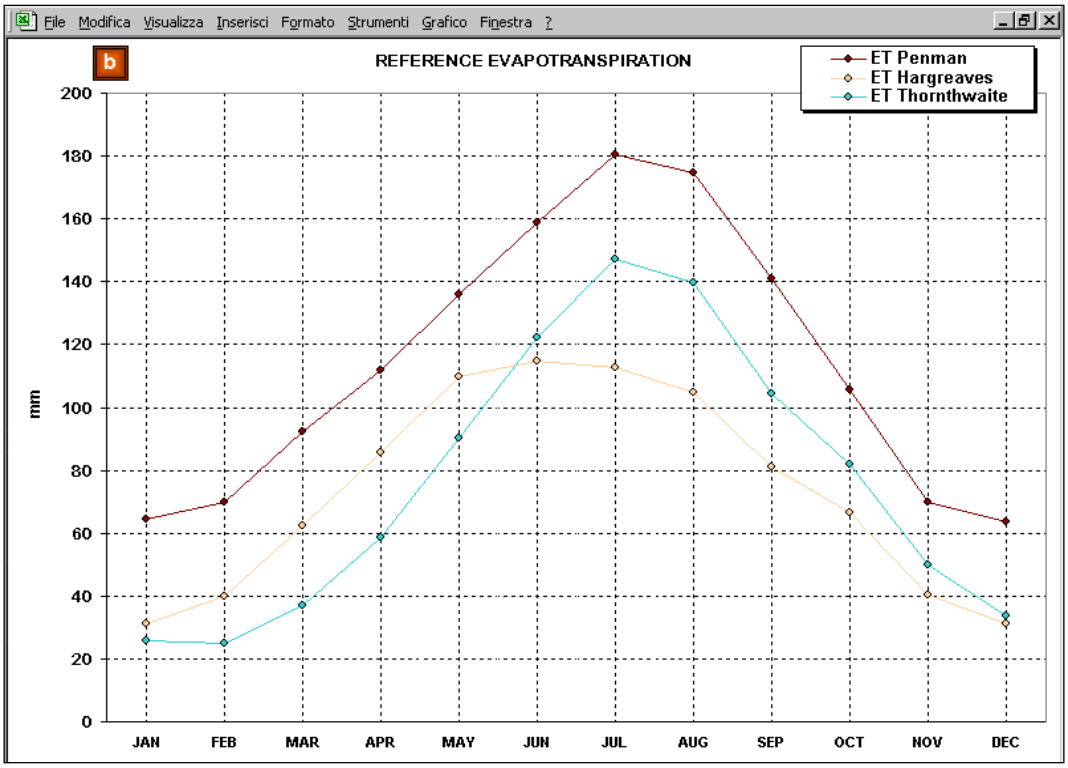
When you click the "**B**" button, a corresponding view on breeding needs will open.
If the required data are available, for each cell you have to enter the input data and then you have to click the "**C**" button anyway.
On the right of some input data cells there are cells with an indicative suggested value, e.g. based on Western European countries or connected with the other demand sub–modules.
For each kind of cattle–breeding there is a graphic visualizes total monthly demand of breeding sector at the bottom of the view.
If you don't have any input data to fill in the following cells, click the next "**J**" button to come directly to the initial area image.
At the end of the breeding input data, click the "**b**" button to come back to the initial area image.

When you click the "**I**" button, a corresponding view on industry needs will open.
If the required data are available, for each cell you have to enter the input data and then you have to click the "**C**" button anyway.
On the right of some input data cells there are cells with an indicative suggested value, e.g. based on Western European countries or connected with the other demand sub–modules.
At the end of the industry input data, click the "**b**" button to come back to the initial area image.

3.1.2. Supply sub–module

When you click the "**P**"  button, a corresponding view on precipitation resources will open.
At the beginning you have to enter monthly precipitation input data, from JAN to DEC.
At the end of monthly precipitation input data, you have to press the "**C**" button to continue.
Now, according to data availability, fill in the first cell with "Yes" or "No" by using a special menu with a list of possible items (in this case, only "Yes" or "No") and then press the "**C**" button to continue.
If you fill in the first cell with "Yes", you have to enter a required necessary value and then you have to press the "**C**" button to continue.

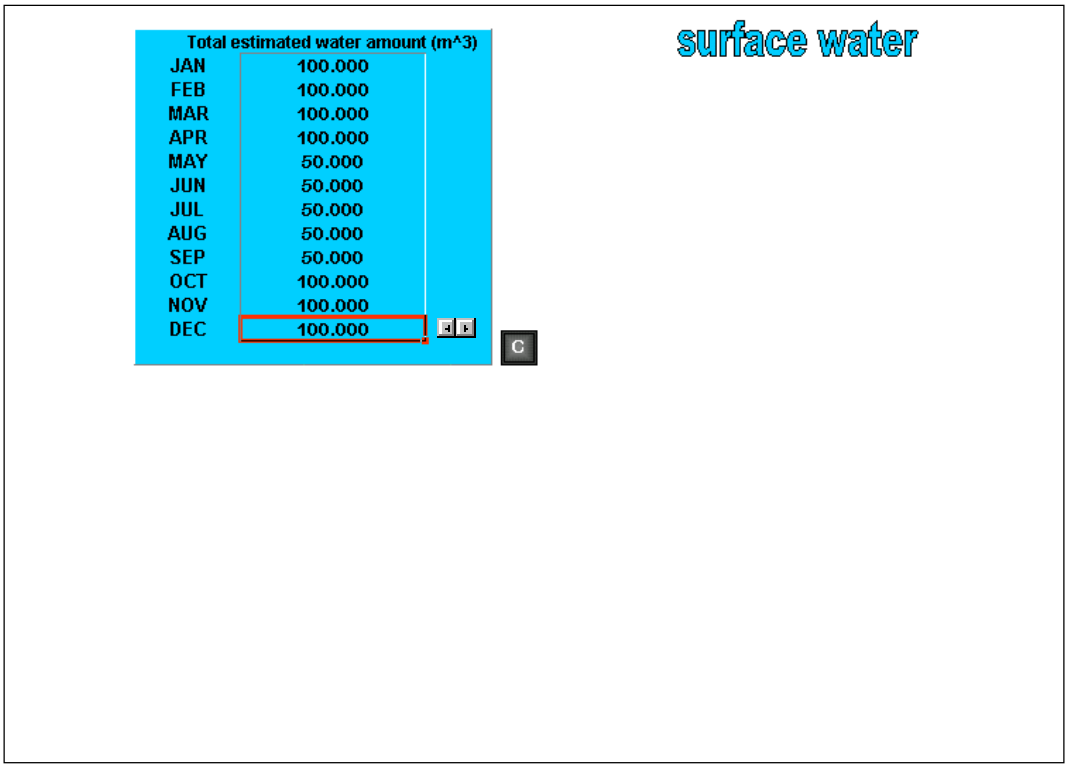
If you fill in the first cell with “No”, you go to the second cell. In this case, you have to put “Yes” in the second cell and then there is not any required value.
In both cases, after the second cell click the “**C**” button to continue.
Attention: if you fill in both cells with “Yes” or if you fill in both cells with “No”, a message, visualized under the same cells, informs that only one cell have to be “Yes”.
If you press the “**evapotranspiration graphic**” button, you can visualize monthly evapotranspiration values according to different calculation methodologies (see following image). You have to press the “**b**” button to come back.



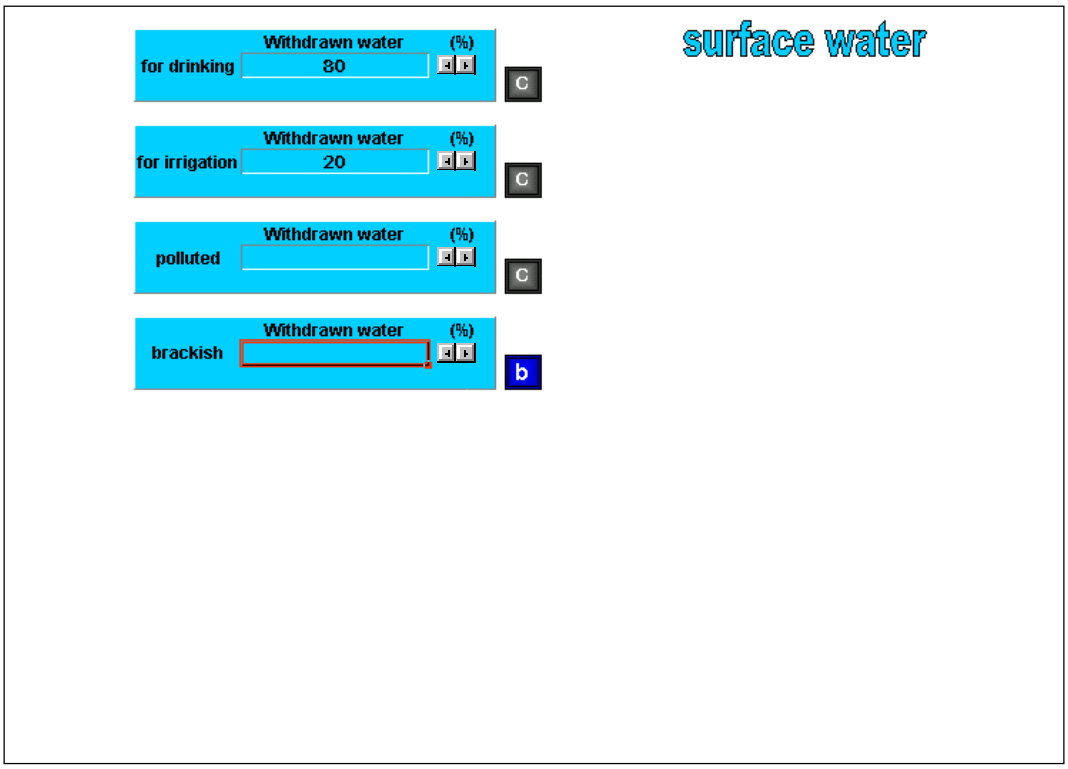
Now, according to data availability and experiments on site, fill in the first, second and third cell with “Yes” or “No” by using a special menu with a list of possible items (in this case, only “Yes” or “No”) and then press the “**C**” button to continue.
Attention: if you fill in two or all cells with “Yes” or if you fill in all cells with “No”, a message, visualized under the same cells, informs that only one cell have to be “Yes”.
Three messages on the left of the screen and the evapotranspiration graphic suggest the suitable choice.
At the end of this view, you have to press the “**b**” button to come back to the initial area image.

Advice: **WET season** is represented by the following six months: *October, November, December, January, February, March*, and **DRY season** is represented by the following six months: *April, May, June, July, August, September* .

When you click the "**S**" button, a corresponding view on surface water resources will open. At the beginning, according to the input data availability, fill in this cell with "Yes" or "No" by using a special menu with a list of possible items (in this case, only "Yes" or "No") and then press the "**continue**" continue button to continue (see following image).



If you fill in the cell with "Yes", you have to enter different kinds of monthly input data, from JAN to DEC. By clicking the "**C**" button, you can continue.
Alternatively, when monthly input data are not available, you have to fill in the cell with "No". In this case only seasonal values (**WET season** -six months- and **DRY season** -six months-) are required.
In both cases, after clicking the last "**C**" button, percentages of water utilization are required (see following image).

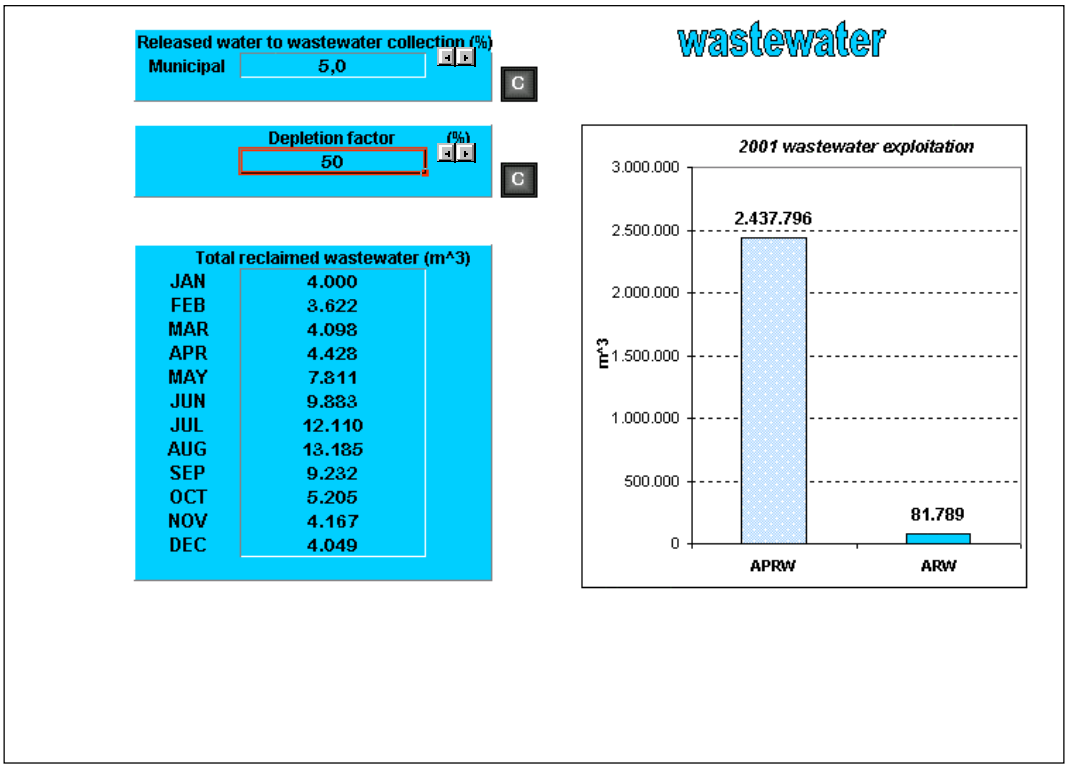


Attention: the sum of all four percentages of different kinds of water utilization have to be 100. If the sum is higher than 100, a message, visualized under the same cells, informs that "some values are too high". So you have to change some percentage values. By clicking the "**C**" button, you move through the cells and, by clicking the "**b**" button, you come back to the initial area image.

When you click the "**G**" button, a corresponding view on groundwater resources will open.
At the beginning, according to the input data availability, fill in this cell with "Yes" or "No" by using a special menu with a list of possible items (in this case, only "Yes" or "No") and then press the "**continue**" button to continue.
If you fill in the cell with "Yes", you have to enter different kinds of monthly input data, from JAN to DEC. By clicking the "**C**" button, you can continue.
Alternatively, when monthly input data are not available, you have to fill in the cell with "No". In this case only seasonal values (**WET season** -six months- and **DRY season** -six months-) are required. In both cases, after clicking last the "**C**" button, percentages of water utilization are required.
Attention: the sum of all four percentages of different kinds of water utilization have to be 100. If the sum is higher than 100, a message, visualized under the same cells, informs that "some values are too high". So you have to change some percentage values. By clicking the "**C**" button, you move through the cells and, by clicking the "**b**" button you come back to the initial area image.

When you click the "**Iw**" button, a corresponding view on imported water resources will open.
At the beginning, according to the input data availability, fill in this cell with "Yes" or "No" by using a special menu with a list of possible items (in this case, only "Yes" or "No") and then press the "**continue**" button to continue.
If you fill in the cell with "Yes", you have to enter monthly input data, from JAN to DEC. After clicking the "**C**" button, percentages of water utilization are required.
Alternatively, when monthly input data are not available, you have to fill in the cell with "No". In this case only seasonal values (**WET season** -six months- and **DRY season** -six months-) are required. After clicking the second "**C**" button, percentages of water utilization are required.
Attention: the sum of all four percentages of different kinds of water utilization have to be 100. If the sum is higher than 100, a message, visualized under the same cells, informs that "some values are too high". So you have to change some percentage values. By clicking the "**C**" button, you move through the cells and, by clicking the "**b**" button you come back to the initial area image.

When you click the "**W**" button, a corresponding view on wastewater resources will open.
At the beginning press the "**continue**" button to continue (see following image).



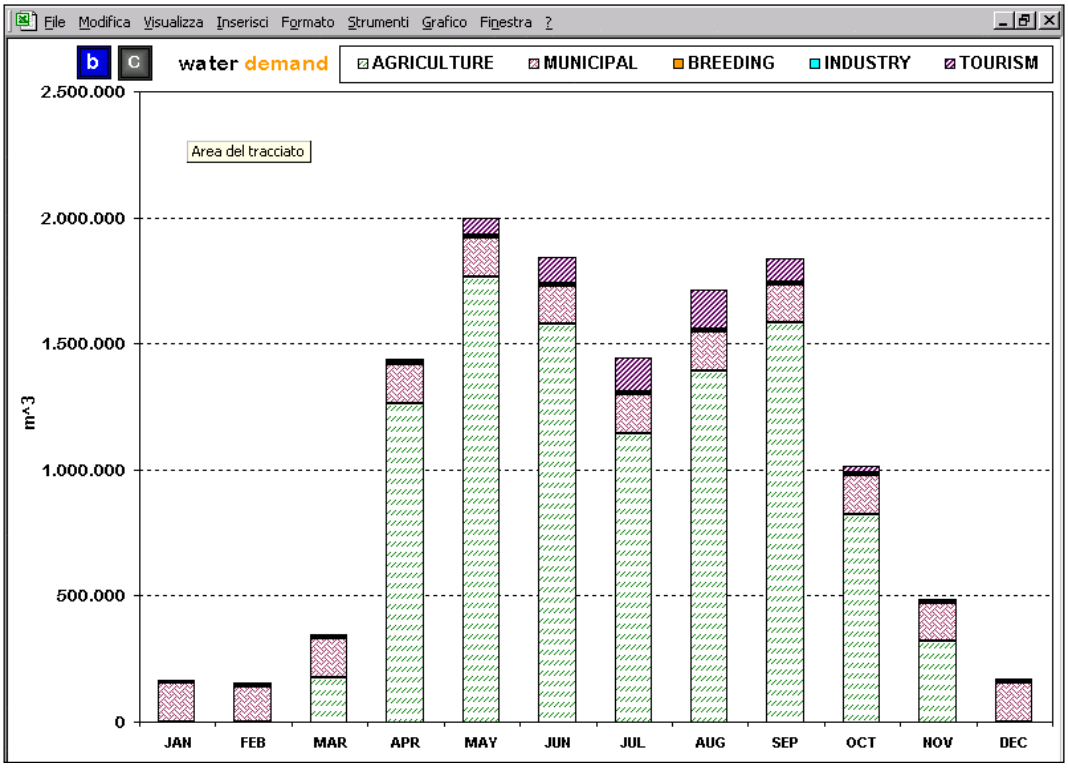
After that, percentages of wastewater treatment by the municipal, tourism and industry sectors are required. For each sector there are a monthly data table and a corresponding graphic visualizes total annual reclaimed wastewater in the same view.
If the required data are available, for each cell you have to enter the input data and then you have to click the "**C**" button anyway.
After clicking the second "**C**" button of the industry sector, percentages of water utilization are required (in this case only for drinking and for irrigation). Irrigation water percentage is automatically calculated and so there is not the "**C**" button.
Attention: the sum of two percentages of different kinds of water utilization have to be 100. So the water percentage for drinking can't be lower than 0 and can't be higher than 100.
After filling in the drinking water cell, you have to click the "**b**" button to come back to the initial area image.

When you click the "**De**" button, a corresponding view on desalination water resources will open.
At the beginning press the "**continue**" button to continue.
After that, write the name of the site, that is the location of the desalination plant, in the dialogue window and then click "**OK**" (otherwise click "**Exit**").
Then there are some cells that can be filled in by using a special menu with a list of possible items (technology and raw water). By clicking the "**C**" button, you can continue.
When you have to enter the monthly data, fill in the cells from JAN to DEC and then click the next "**C**" button. You can use five different plants to enter input data. If you don't have any input data to fill in the following cells, click the next "**J**" button to come directly to percentages of water utilization.
At the end of fifth plant input data, after clicking the last "**C**" button, percentages of water utilization are required (in this case only for drinking and for irrigation). Irrigation water percentage is automatically calculated and so there is not the "**C**" button.
Attention: the sum of two percentages of different kinds of water utilization have to be 100. So the water percentage for drinking can't be lower than 0 and can't be higher than 100.
After filling in the drinking water cell, you have to click the "**b**" button to come back to the initial area image.

3.1.3. Outputs

By clicking the circles  placed at the bottom of the initial present view, it is

possible to visualize the summarizing monthly graphics of the water supplies, of the water demands (see following image) and of the total balance.



For each graphic, if you click the "**b**" button you come back the to initial area image, while if you click the "**C**" button you can visualize another graphic. This is a graphic with the total monthly water demand and with the total monthly water supply in present and future years.
By clicking the "**b Present**" button, you come back to the initial area image.
But, by clicking the "**b Future**" button, you go to the area image for the prevision year.

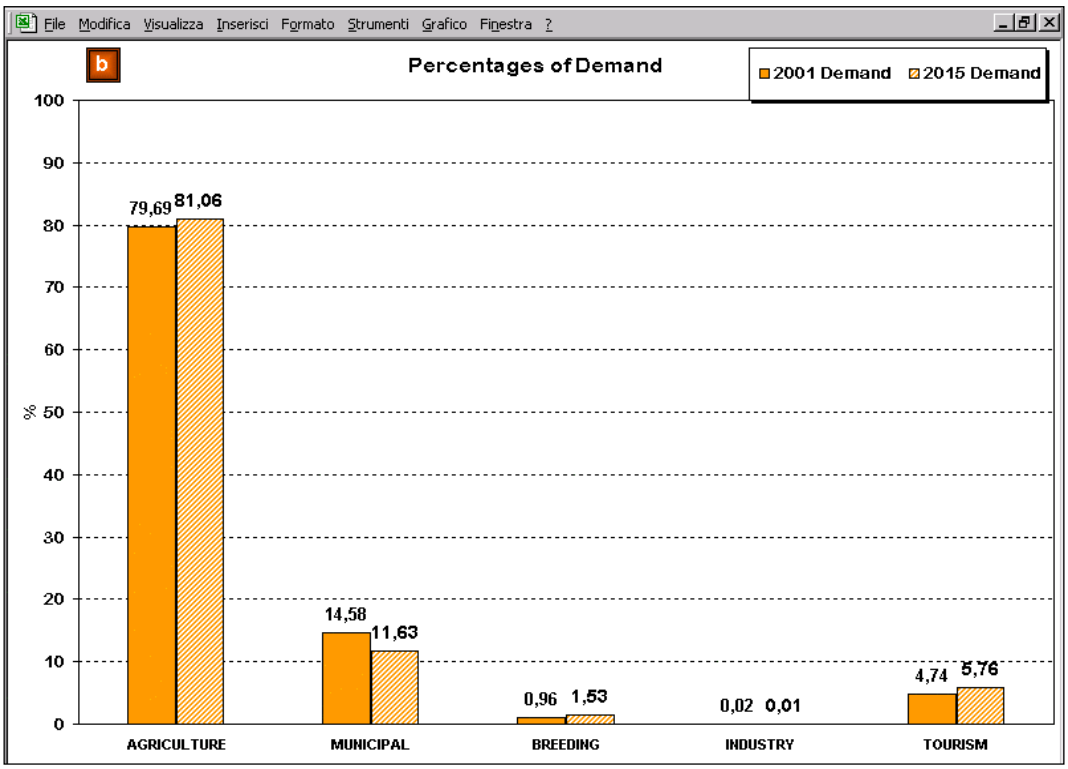
At the bottom of the present area image and of the future area image there is the same "**outputs**" OUTPUTS button.
If you click there, you can visualize a summarizing table (see following image) with the final results of the water demand and the water supply by **WET** and **DRY seasons** in present and future years.

naxos	2001		2015			VARIATION		
	WET season	DRY season	WET season	DRY season	unit	WET	DRY	
DEMAND								
agriculture	1.318.751	8.723.840	1.850.966	15.218.965	m^3	40,4	74,5	%
municipal	916.370	921.405	1.221.351	1.228.062	m^3	33,3	33,3	%
municipal (*access* =100%)	923.195	928.268	1.221.351	1.228.062	m^3	32,3	32,3	%
breeding	60.320	60.651	160.445	161.326	m^3	166,0	166,0	%
breeding (*access* =100%)	60.320	60.651	160.445	161.326	m^3	166,0	166,0	%
industry	1.300	1.307	1.494	1.503	m^3	14,9	14,9	%
tourism	37.186	560.229	75.563	1.138.404	m^3	103,2	103,2	%
TOTAL	2.333.927	10.267.432	3.309.819	17.748.260	m^3	41,8	72,9	%
SUPPLY								
surface water	100.000	650.000	300.000	1.950.000	m^3	200,0	200,0	%
groundwater	2.200.000	9.600.000	2.200.000	9.600.000	m^3	0,0	0,0	%
treated wastewater	25.140	56.649	536.901	1.219.803	m^3	2.035,6	2.053,3	%
desalination	0	0	0	0	m^3	-	-	%
import	0	0	0	0	m^3	-	-	%
TOTAL	2.325.140	10.306.649	3.036.901	12.769.803	m^3	30,6	23,9	%
SUPPLY - DEMAND	-8.786	39.217	-272.919	-4.978.457	m^3			

Demand Graphic Supply Graphic c

By clicking the "**Demand Graphic**" or the "**Supply Graphic**" button, a corresponding graphic will open (see following image).

This kind of graphic displays the percentages of the water demand and of the water supply for each corresponding sector. To come back to the initial outputs table, press the "**b**" button.



Now, by clicking the "**C**" button, you can visualize another summarizing table with different kinds of final results of the water demand and the water supply by **WET** and **DRY seasons** in present and future years. You have to press the "**b**" button to come back to the first table.

If you click the "**b Present**" 

button, you come back to the initial area image.

But if you click the "**b** 

Future" button, you go to the area image for the prevision year.

On the right of the present area image and of the future area image there are the same "**save**", "**close**" and "**back to introduction**" buttons.

If you click the "**save**" button, you save your input data and all your work until that moment.

If you click the "**close**" button, you close all Excel files without saving your work until that moment.

Attention: you have to press in any case the "**close**" button, when you want to close all Excel files.

If you click the "**back to introduction**" button, you can come back to the introduction page.

By clicking the "**costs**" button, a corresponding view on present and future costs of water and energy will open.

If the required data are available, for each cell you have to enter the input data and then you have to click the "**C**" button anyway.

At the end of the costs input data, click the "**b**" button to come back to the initial area image.

By clicking the "**Pumping system**" button, a corresponding view on a rough estimation of costs of pumping water will open.

If the required data are available, for each cell you have to enter the input data and then you have to click the "**C**" button anyway.

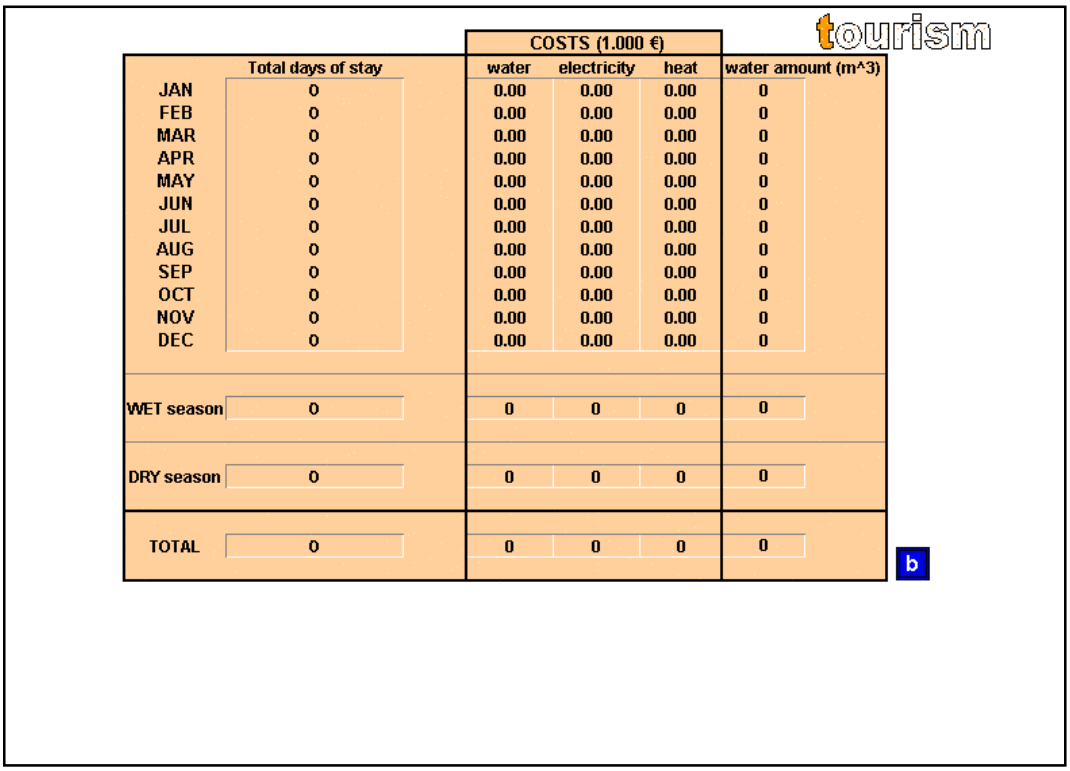
At the end of the pumping water input data there are some cells with the present final outputs about pumping water costs and energy (in euros and in kWh). Then click the "**b**" button to come back to the initial area image.

By clicking the "**Tourism**" button, a corresponding view on present and future energy consumption and costs of the tourism sector will open.

If the required data are available, for each cell you have to enter the input data and then you have to click the "**C**" button anyway.

At the end of the tourism costs input data there is a summarizing table (see following image) with the present final outputs about tourism water and energy costs and water

consumption (monthly, seasonal and annual). Then click the "**b**" button to come back to the initial area image.

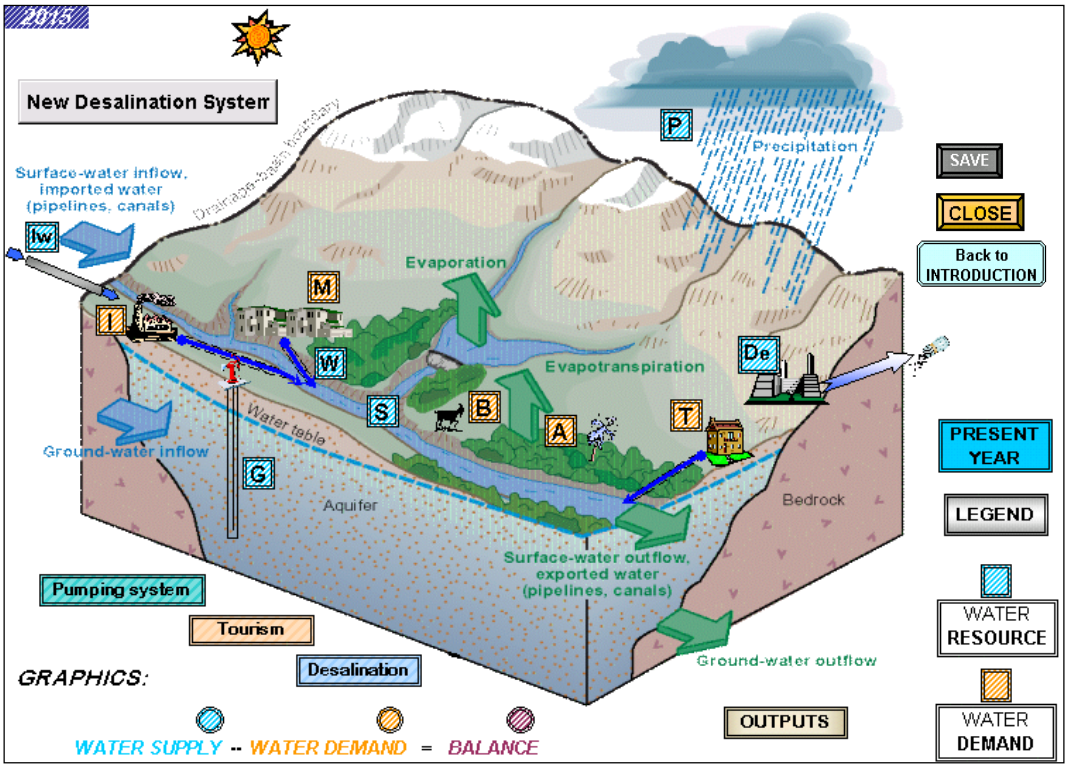


By clicking the "**Desalination**" button, a corresponding view on energy consumption and costs of desalination water resources will open.

There is a summarizing table with the present final outputs about total energy consumption and total energy costs of the desalination water sector (monthly, seasonal and annual). Then click the "**b**" button to come back to the initial area image.

3.2. Future year

By clicking the "**future year**" button in present year image, the prevision year view will open (see following image).



In this view the image represents schematically the area to be analysed at the future year.
By clicking the buttons with the letters, the cells of the corresponding sub–modules are reached.
Even if you don't have any input data for some sub–modules, you can click all buttons to see the required kind of information.
The blue striped buttons represent WATER RESOURCES (that provide the SUPPLIES), while the orange striped buttons represent WATER DEMANDS.
If you press the "**legend**" button, a legend window with the letters of the blue and orange striped buttons and their meaning is visualized.
Press "**Exit**" to close this window.

3.2.1. Demand sub–module

When you click the "**A**"  striped button, a corresponding view on agriculture needs will open.

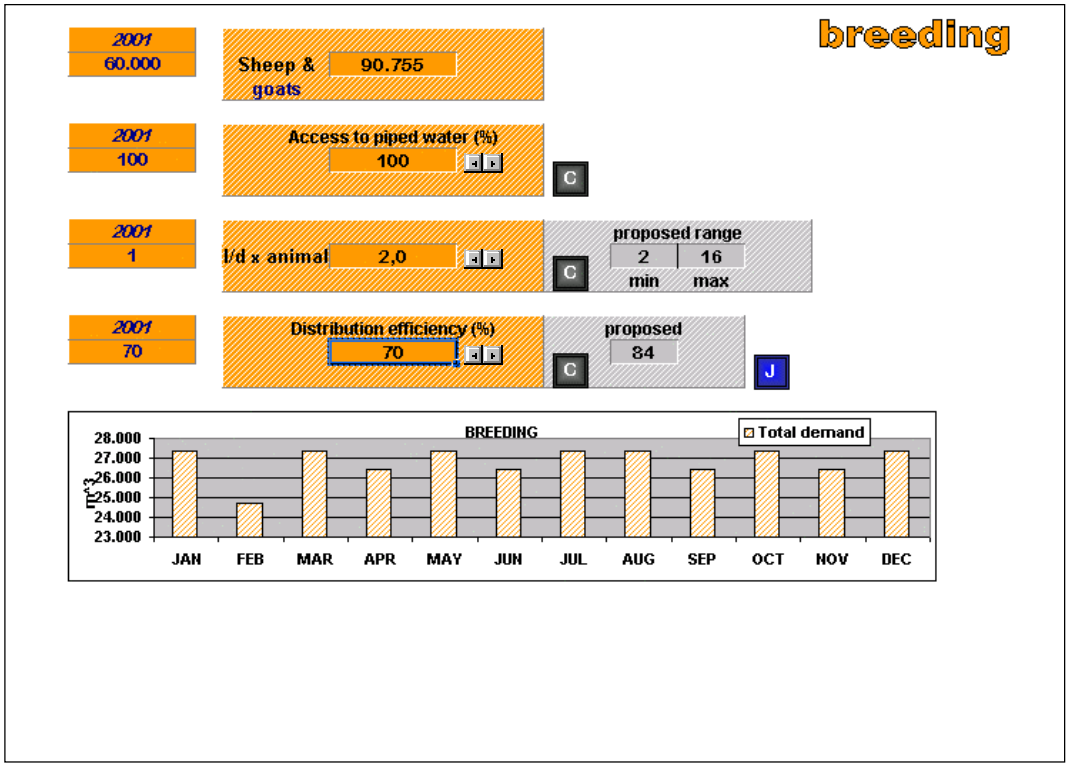
For each kind of crop present in the region, you have to enter the month, in which the related crop is planted, or, for example with trees or perennial vegetables, the month, in which the corresponding harvest is made; the period of the month; total area of the crop into consideration; the irrigation system mainly used.
Some cells can be filled in by using a special menu with a list of possible items (e.g. month or irrigation system).
Many cells can be filled in by using the spin button placed on the right of the same cells.
By the arrows on the right of the screen you can move up or down through this view.
At the bottom of the view there are three buttons.
If you press the "**irrigation efficiency**" button, you can change the efficiency value of different kinds of irrigation. You have to press the "**C**" button to come back.
If you press the "**irrigation graphic**" button, you can visualize water requirements percentages and total annual values of different crop families. You have to press the "**b**" button to come back.
If you press the "**C**" button, you change view.
Now you have to insert annual imagined temperature data of the region.
Two cells at the top of the screen show the corresponding annual present values.
After filling in the first cell, you have to press the "**C**" button to come to the second cell.
Then, after filling in the second cell, you have to press the "**b**" button to come back to the prevision area image.
Other geographical and meteorological input data are the same of the present year.

When you click the "**T**" striped button, a corresponding view on tourism needs will open.
The cells on the left of the screen show the corresponding present values.
On the right of some input data cells there are cells with an indicative suggested value, e.g. based on Western European countries or connected with the other demand sub–modules.
After filling in the first cell with imagined future value, you have to press the "**C**" button to come to the second cell.
Then, after filling in the second cell with imagined future value, you have to press the "**b**" button to come back to the prevision area image.

When you click the "**M**" striped button, a corresponding view on municipal needs will open.
The cells on the left of the screen show the corresponding present values.
On the right of some input data cells there are cells with an indicative suggested value, e.g. based on Western European countries or connected with the other demand sub–modules.
If the required data are available, for each cell you have to enter the imagined future input data and then you have to click the "**C**" button anyway.

At the end of the municipal imagined future input data, click the "**b**" button to come back to the prevision area image.

When you click the "**B**" striped button, a corresponding following view on breeding needs will open.



The cells on the left of the screen show the corresponding present values.
On the right of some input data cells there are cells with an indicative suggested value, e.g. based on Western European countries or connected with the other demand sub–modules.
For each kind of cattle–breeding there is a graphic visualizes the total monthly demand of the breeding sector at the bottom of the view.
If the required data are available, for each cell you have to enter the imagined future input data and then you have to click the "**C**" button anyway.
If you don't have any imagined future input data to fill in the following cells, click the next "**J**" button to come directly to the prevision area image.
At the end of the breeding imagined future input data, click the "**b**" button to come back to the prevision area image.

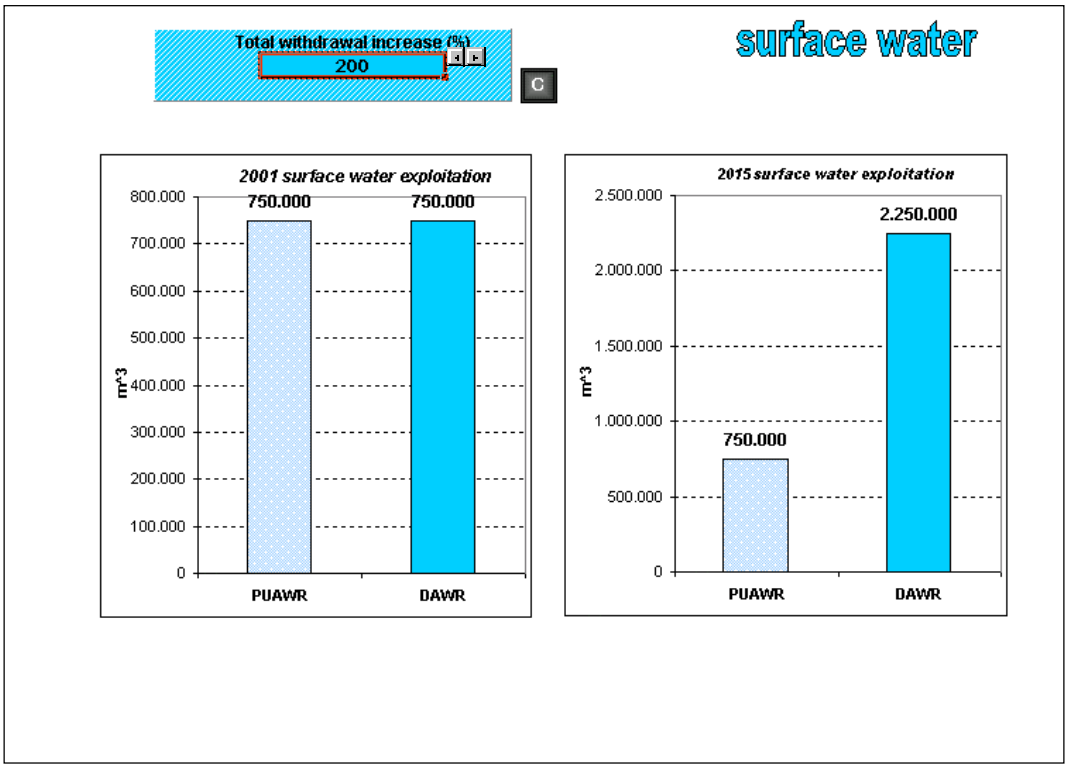
When you click the "**I**" striped button, a corresponding view on industry needs will open.
The cells on the left of the screen show the corresponding present values.

On the right of some input data cells there are cells with an indicative suggested value, e.g. based on Western European countries or connected with the other demand sub–modules.
If the required data are available, for each cell you have to enter the imagined future input data and then you have to click the "**C**" button anyway.
At the end of the industry imagined future input data, click the "**b**" button to come back to the prevision area image.

3.2.2. Supply sub–module

When you click the "**P**"  striped button, a corresponding view on precipitation resources will open.
The cell at the top of the screen shows the corresponding annual present value.
After filling in the cell, you have to press the "**b**" button to come back to the prevision area image.
Other precipitation and evapotranspiration input data are the same of the present year.

When you click the "**S**" striped button, a corresponding following view on surface water resources will open.



Annual total withdrawal increase percentage is required.
In the same view, there are two graphics visualize total annual surface water exploitation in the present and in the future years.
After clicking the "**C**" button, percentages of water utilization are required.
The cells on the left of the screen show the corresponding present values.
Attention: the sum of all four percentages of different kinds of water utilization have to be 100. If the sum is higher than 100, a message, visualized under the same cells, informs that "some values are too high". So you have to change some percentage values. By clicking the "**C**" button, you move through the cells and, by clicking the "**b**" button, you come back to the prevision area image.

When you click the "**G**" striped button, a corresponding view on groundwater resources will open.
Annual total withdrawal increase percentage is required.
In the same view, there are two graphics visualize total annual groundwater exploitation in the present and in the future years.
After clicking the "**C**" button, percentages of water utilization are required.
The cells on the left of the screen show the corresponding present values.
Attention: the sum of all four percentages of different kinds of water utilization have to be 100. If the sum is higher than 100, a message, visualized under the same cells, informs that "some values are too high". So you have to change some percentage values. By clicking the "**C**" button, you move through the cells and, by clicking the "**b**" button, you come back to the prevision area image.

When you click the "**Iw**" striped button, a corresponding view on imported water resources will open.
Annual total imported amount increase percentage is required.
On the right of the screen, there is a graphic visualizes total annual imported water in the present and in the future years.
After clicking the "**C**" button, percentages of water utilization are required.
The cells on the left of the screen show the corresponding present values.
Attention: the sum of all four percentages of different kinds of water utilization have to be 100. If the sum is higher than 100, a message, visualized under the same cells, informs that "some values are too high". So you have to change some percentage values. By clicking the "**C**" button, you move through the cells and, by clicking the "**b**" button, you come back to the prevision area image.

When you click the "**W**" striped button, a corresponding view on wastewater resources will open.

Future percentages of wastewater treatment by the municipal, tourism and industry sectors are required. For each sector there are a monthly data table and corresponding graphic visualizes total annual reclaimed wastewater in the same view.
The cells on the left of the screen show the corresponding present values.
If the required data are available, for each cell you have to enter input data and then you have to click the "**C**" button anyway.
After clicking the second "**C**" button of the industry sector, percentages of water utilization are required (in this case only for drinking and for irrigation). Irrigation water percentage is automatically calculated and so there is not the "**C**" button.
The cells on the left of the screen show the corresponding present values.
Attention: the sum of two percentages of different kinds of water utilization have to be 100. So water percentage for drinking can't be lower than 0 and can't be higher than 100.
After filling in the drinking water cell, you have to click the "**b**" button to come back to the prevision area image.

When you click the "**De**" striped button, a corresponding view on desalination water resources will open, only if there are the present input data of this sub–module.
After filling in total production increase cell, you have to press the next "**C**" button.
If there are not the present input data of the second desalination plant, automatically percentages of water utilization are required (in this case only for drinking and for irrigation). Irrigation water percentage is automatically calculated and so there is not the "**C**" button.
The cells on the left of the screen show the corresponding present values.
Attention: the sum of two percentages of different kinds of water utilization have to be 100. So water percentage for drinking can't be lower than 0 and can't be higher than 100.
After filling in the drinking water cell, you have to click the "**b**" button to come back to the prevision area image.

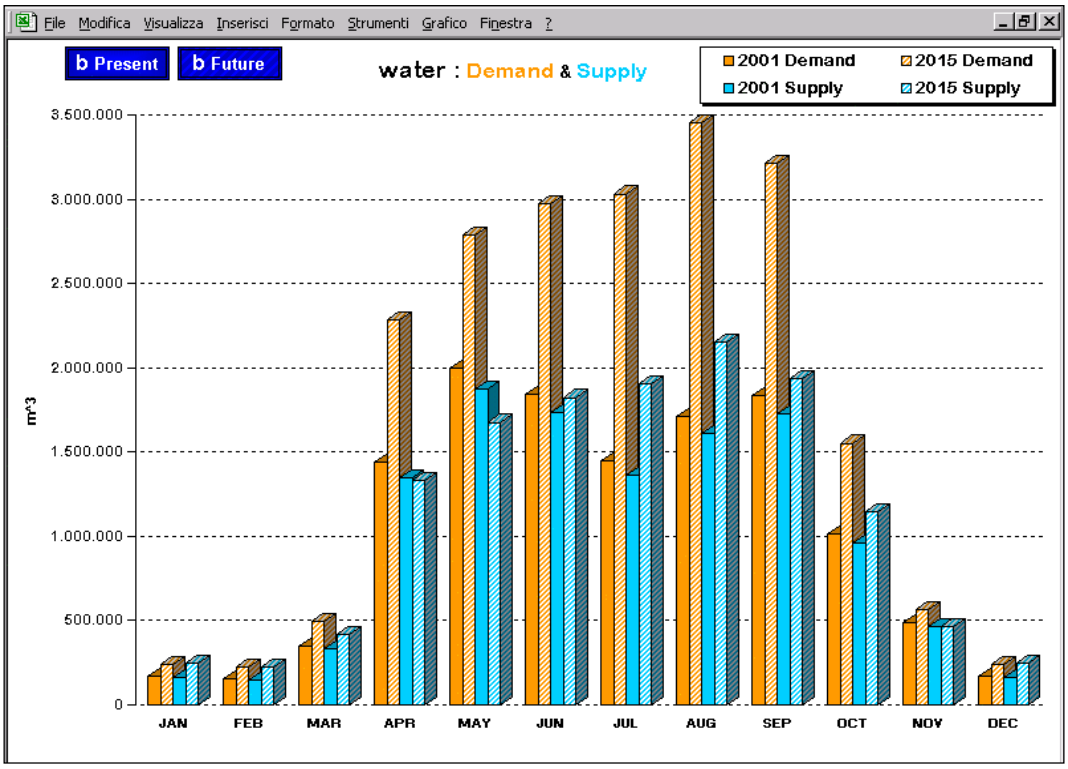
When you click the "**New Desalination System**" 

button, a corresponding view on desalination water resources will open.
At the beginning write the name of the site, that will be the location of the new desalination plant, in the dialogue window and then click "**OK**" (otherwise click "**Exit**").
Then there are some cells that can be filled in by using a special menu with a list of possible items (technology and raw water). By clicking the "**C**" button, you can continue.
When you have to enter the monthly data, fill in the cells from JAN to DEC and then click the next "**C**" button. You can use four different new plants to enter input data. If you don't have any input data to fill in the following cells, click the next "**J**" button to come directly to percentages of water utilization.

At the end of the fourth plant input data, after clicking the last "**C**" button, percentages of water utilization are required (in this case only for drinking and for irrigation). Irrigation water percentage is automatically calculated and so there is not the "**C**" button.
The cells on the left of the screen show the corresponding present values.
Attention: the sum of two percentages of different kinds of water utilization have to be 100. So water percentage for drinking can't be lower than 0 and can't be higher than 100.
After filling in the drinking water cell, you have to click the "**b**" button to come back to the prevision area image.

3.2.3. Outputs

By clicking the striped circles placed at the bottom of the future view, it is possible to visualize the summarizing monthly graphics of the water supplies, of the water demands and of the total balance.
For each graphic, if you click the "**b**" button you come back to the future area image, while if you click the "**C**" button you can visualize another graphic (see following image). This is a graphic with total monthly water demand and with total monthly water supply in the present and the future years.



By clicking the “**b Future**” button, you come back to the prevision area image.
But, by clicking the “**b Present**” button, you go to the area image for the reference year.

By clicking the “**Pumping system**” button, a corresponding view on a rough estimation of future costs of pumping water will open.
If the required data are available, for each cell you have to enter input data and then you have to click the “**C**” button anyway.
At the end of the pumping water input data there are some cells with the future final outputs about pumping water costs and energy (in euros and in kWh). Then click the “**b**” button to come back to the prevision area image.

By clicking the “**Tourism**” button, a corresponding view on future energy consumption and future costs of the tourism sector will open.
There is a summarizing table with the future final outputs about tourism water and energy costs and water consumption (monthly, seasonal and annual). Then click the “**b**” button to come back to the prevision area image.

By clicking the “**Desalination**” button, a corresponding view on future energy consumption and future costs of desalination water resources will open.
There is a summarizing table with the future final outputs about total energy consumption and total energy costs of the desalination water sector (monthly, seasonal and annual). Then click the “**b**” button to come back to the prevision area image.

By clicking the “**present year**” button in the future year image, the reference year view will open.

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