Help document

DBToolkit version 0.3

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1. Introduction

The DBToolkit0.3.accdb database is an application that tries to provide a simple solution in the Access database, for a not specialized potential user in this kind of applications. The main objective is to interactively generate reports that can be useful to implement possible solutions to the current situation of potential users in the area of water reuse or to access examples available in AQUARES that may be related to the above said situation.

For this, a relational database has been implemented in the Access Database Management System (DBMS) that allows to relate the different contents studied in AQUARES, and a window-type environment to generate a report of the user's situation by answering four questions. The database is implemented under this technology due to its advantages over other technologies:

• The application can be used with a simple download of the file, running it locally on their own PC. This way, the user has the possibility of generating various reports, which can be kept for reuse, without the need for any type of installation.

• Its development allows the use of the most widely used DBMS in the world. Furthermore, it can be run on any PC that has Access or its free runtime installed.

• The conceptual scheme designed will allow us to scale the AQUARES interactive database to an application on a multi-user web server, with the advantage of being able to store the reports created by various users and thus be able to generate usage statistics, identify general needs of the users, etc.

In Figure 1 the conceptual design of the database is represented. It is made up of 16 entities or related tables. Seven tables (in orange color) correspond to index tables with the default information that will be

incorporated into the final report. In this way, the user will create new information in the report creation form, being stored in the five tables (in blue color in Figure 1). From this information, responses are directly related to the first four index tables; These tables are related to the rest of the index tables from intermediate tables related all to all (in green color). In this way, it is possible to generate the resulting report in an automated way according to the questions answered by the user.
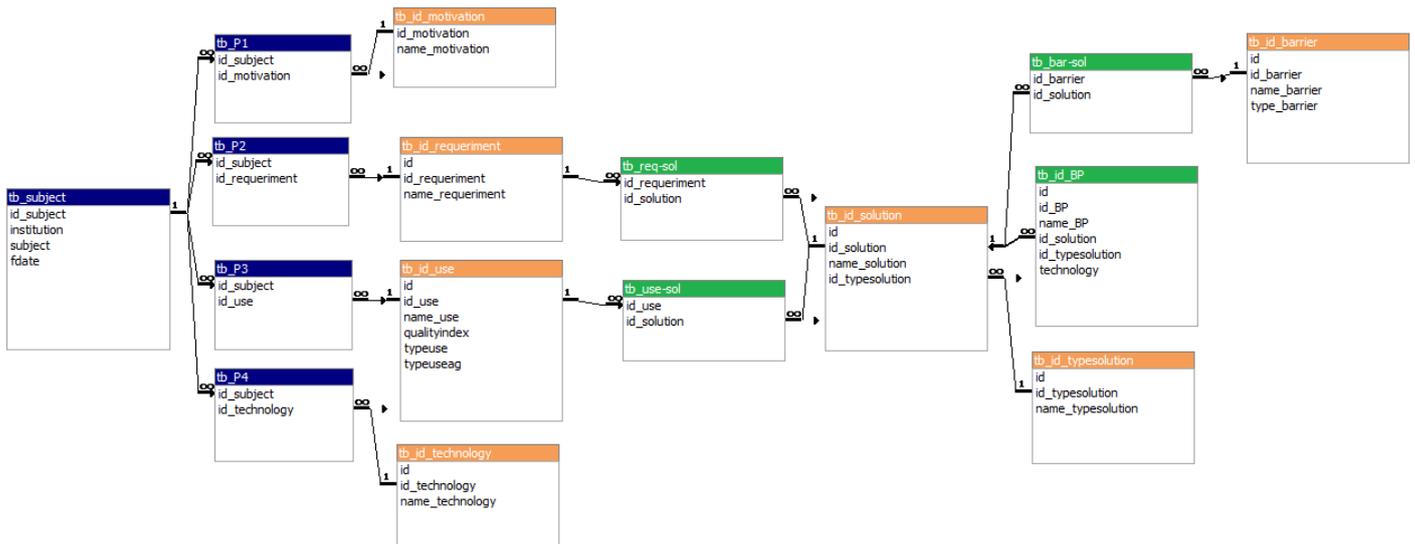

Figure 1. Conceptual design of the database. Definition of entities (tables), variables contained in them (columns) and the relationships between them.

2. Help manual

2.1. System Requirements

It is necessary to have 64 bits Access 2007 or above. However, a 32-bit version is also included for users who do not have a 64-bit Operating System (DBToolkit0.3_32bits). Otherwise, the Access runtime can be used, available on the Microsoft page:

- 64bits:

    https://c2rsetup.officeapps.live.com/c2r/download.aspx?ProductreleaseID=AccessRuntimeRet
    ail&language=en-us&platform=x64

- 32bits:

    https://c2rsetup.officeapps.live.com/c2r/download.aspx?ProductreleaseID=AccessRuntimeRet
    ail&language=en-us&platform=x86

Although it is not a mandatory requirement, it is also advisable to install the "Adobe Acrobta pdf Reader" program, because the application allows the resulting report to be exported to this type of file.

In the latest versions of Windows 10, it might appear a security warning (Figure 2) the first time the file is run, due to the level of security in the execution of programs of the Operating System. In these cases, for its correct operation, you must click on the "Open" button.
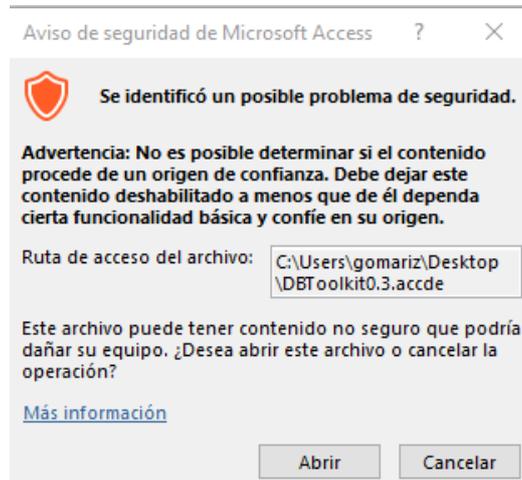

Figure 2. Windows 10 sample security warning.

2.2.   Use of the Interactive AQUARES Database tool

When clicking on the file, the application will start with the main window (Figure 3). The "Add record" button 🔲 allows to generate a new report (subsection 2.2.1) by the completion of the User general information and answering four questions through the options available in the dropdown menu. To access the list view and the reports already generated, just click the "Access to created records" 🔲 button. (subsection 2.2.2).
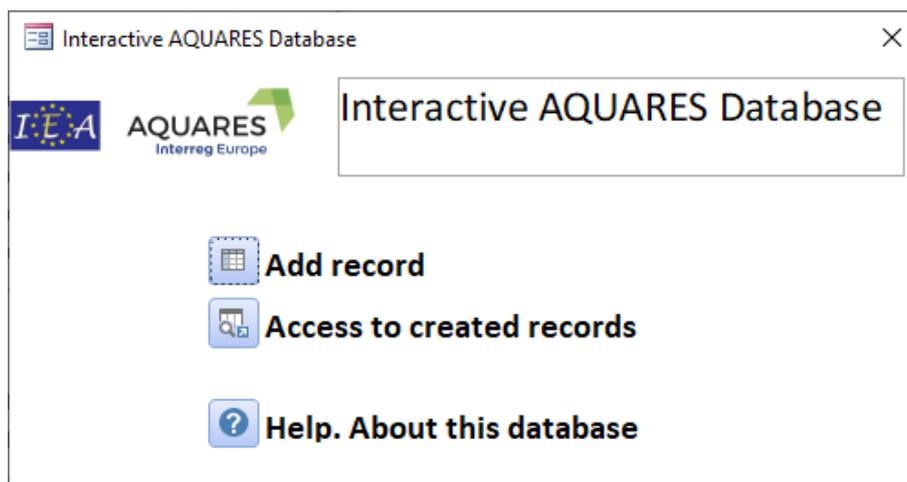

Figure 3. Main login form.

2.2.1. Add record

When clicking on the button 🏛 a new record introduction form starts (Figure 4), whose main objective is to create a new report associated with a specific user and date. The functionalities of the workspaces are as follows:
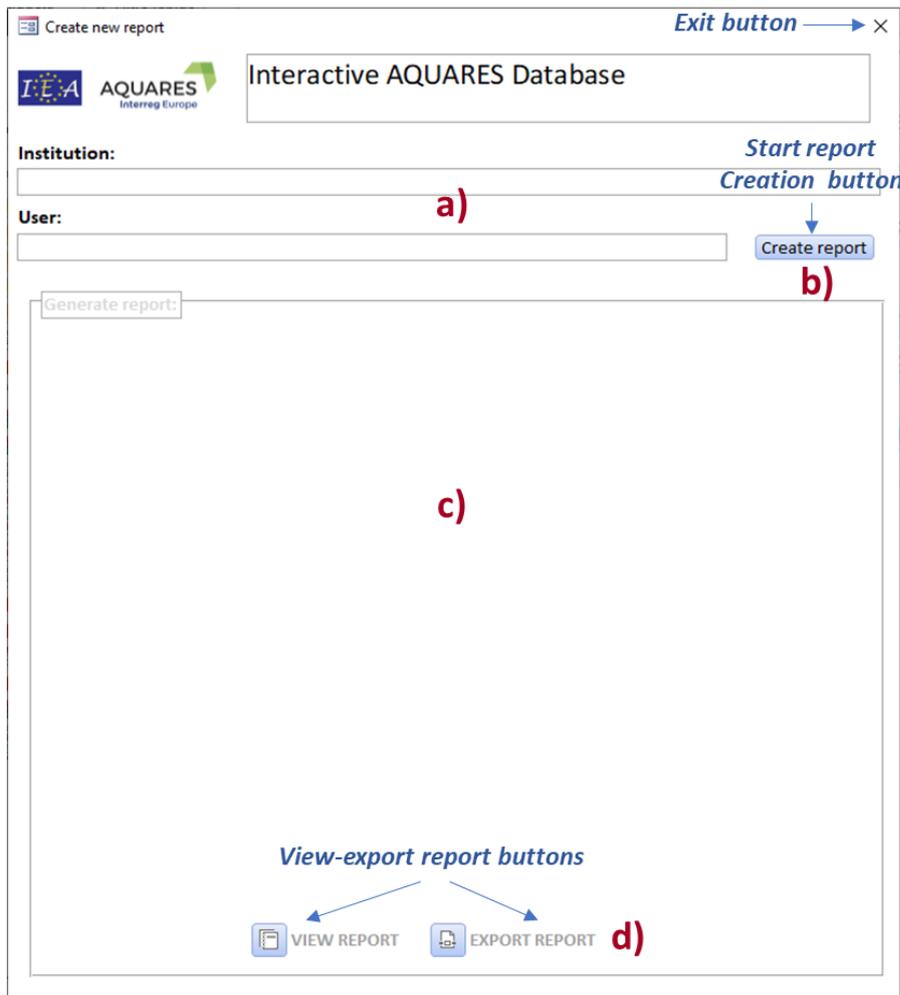

Figure 4. New report creation form.

a) General data of the new record: Information regarding the institution and user that is going to create the report.

b) The button to generate the new report `Create report` : It starts the process of filling in the questionnaire subform (c)) by the user. For that, the "Institution" and "User" text boxes must be previously filled in.

c) Completion space: This space is enabled when clicking on the button to create a new report (Figure 5). Its objective is to allow the user to easily answer the four questions that will

automatically generate the report. For that purpose, the user can select from the drop-down text boxes available with default settings. Multiple answers can be provided in each question, by clicking on the "new record" drop-down button (see details Figure 5). In this example, the first question has been filled with two answers and the second one is being filled in. In the second question, a vertical scroll of navigation can be observed, which appears when more than three answers are given to the question. To add a new answer, the user must select "New record" and click on the drop-down button. The application also permits the elimination of an answer. For that, the record to delete must be selected first, and then the DELETE keyboard button is to be clicked, which is on the left side of the mouse (see Figure 6).
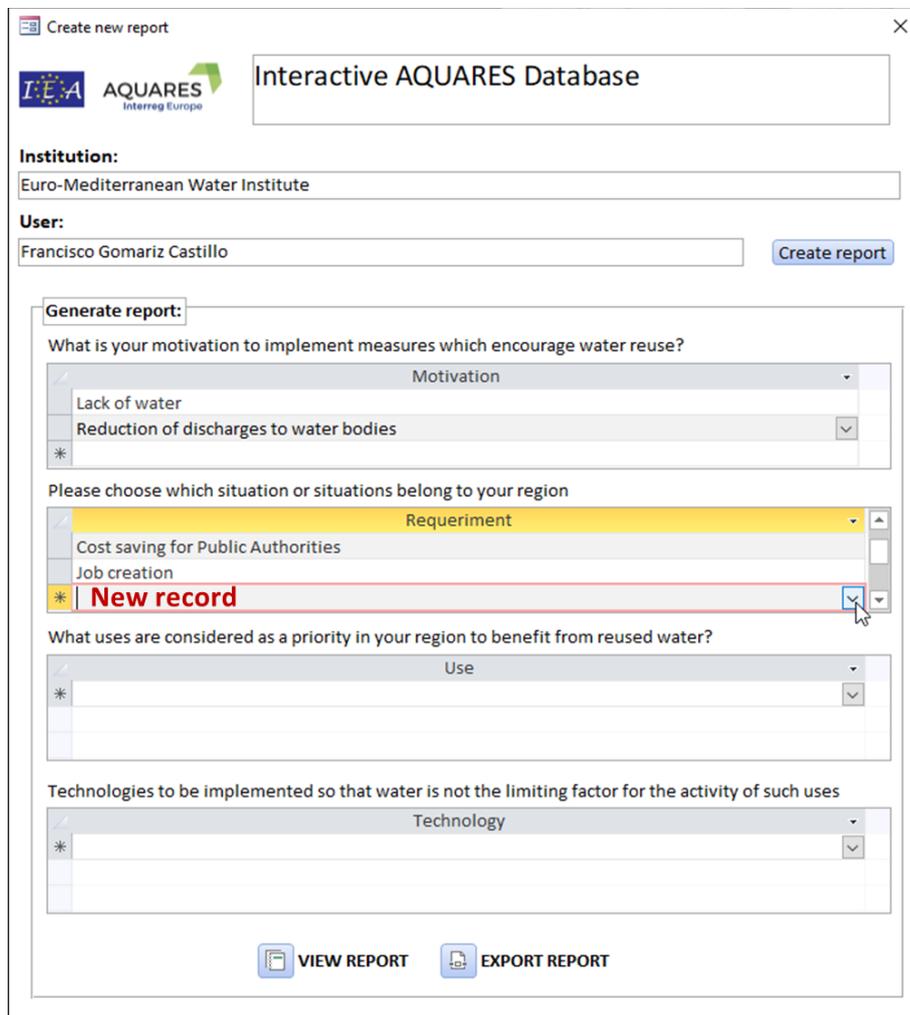

Figure 5: "Create report".

Please choose which situation or situations belong to your region

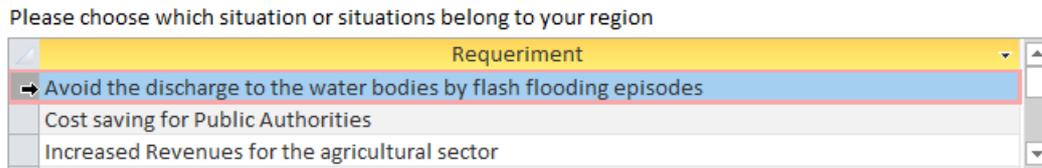| Requeriment |
| --- |
| ➡ Avoid the discharge to the water bodies by flash flooding episodes |
| Cost saving for Public Authorities |
| Increased Revenues for the agricultural sector |

Figure 6. Example of record deletion in question 2. In this example, the first record has been selected.

d) The buttons to generate the report (see subsection 2.2.3), which will be activated next to the space for filling in; (it allows a preview and export in pdf format):

- The button "View report" : Generates the report in a continuous form as a preview.
- The button "Export report" : Exports and displays the report in a pdf format. The report will be created by default in the directory where the application is located.

2.2.2. Access to created records

The main dashboard button 'Access to created records' opens a window to select and/or manage the reports already created in the 'Add record' window. An example of the record selection window is shown in Figure 6. The space "Active report tab" represents each of the reports generated. It presents information regarding the active report (Number, Date, Institution, and Subject) and the button "Delete report" . As observed in the "Navigation bar" there are two examples of reports available (the second of which is active), allowing the user to scroll through all the available reports. Once the report is active, the user can export the report by clicking the 'View-export report' button.
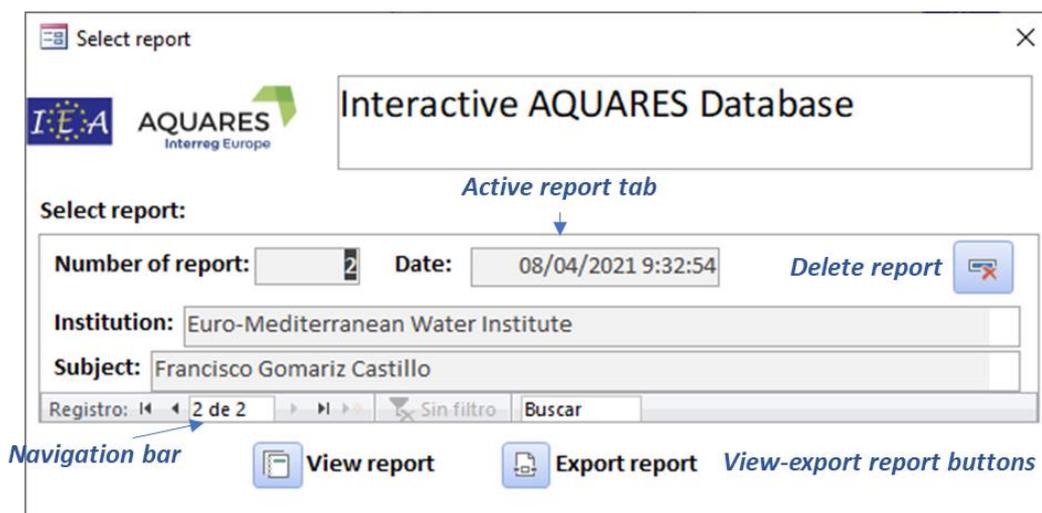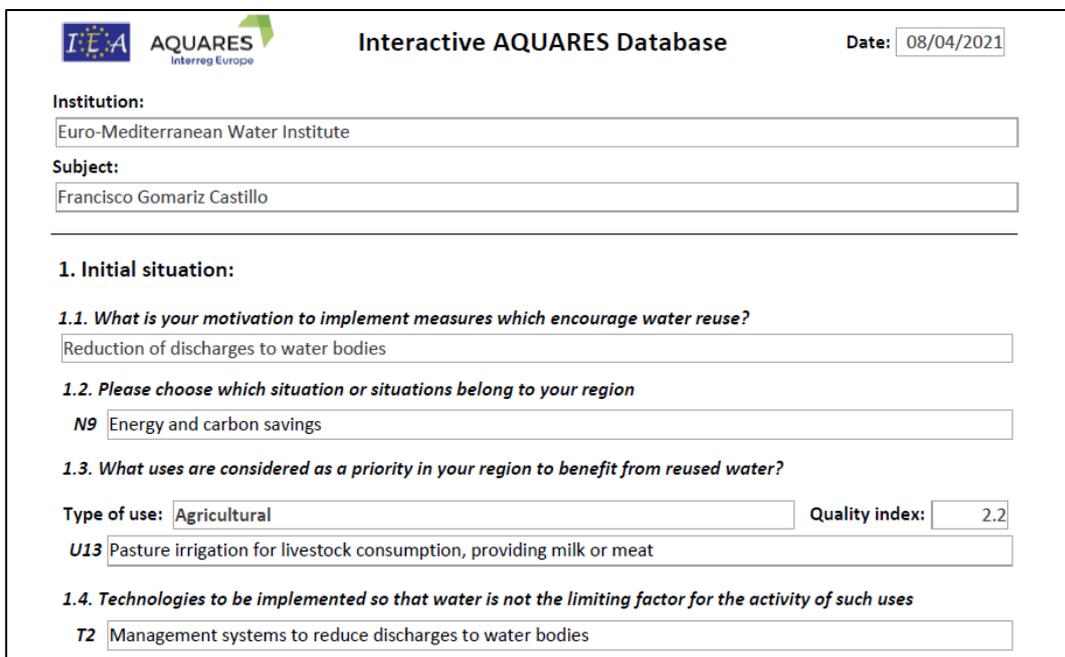
Figure 7. Select report window. The text in blue refers to the components available in it.

2.2.3. Generated report

The report generated by the application has been structured in four main sections:

1. **Initial solution** (first page) (Figure 8): This section summarizes the user responses to the four questions posed, including the internal code of the selected records. For the selected uses, the "Quality Index" is included, which reflects the quality code for the reuse of water defined in the Royal Decree 1620/2007 from Official State Bulletin (BOE) nº 294, 2007 ([BOE-A-2007-21092](#)). This Index serves as a reference to access 'Annex I.A.: Quality criteria for water reuse depending on its usage', whereby the required quality values are specified.

Figure 8. Initial situation: Details of the first section of the report.

2. **Solution proposal to implement based on the initial or current situation** (Figure 9): From the report's second page on, some possible solutions are listed to be implemented depending on the initial situation selected and the uses considered imperative.

3. **Examples included in AQUARES related to the proposed solutions** (Figure 10): It includes examples of AQUARES projects (clicking on its name, access to its main page is provided) which may be of the user's interest.

4. **Main barriers for the implementation of such measures** (Figure 11)**:** The report generated includes possible barriers that may exist to implement the proposed solutions.

5. **Financial solutions for Water Reuse** (Figure 12)**:** This section includes general access to the document made in the framework of AQUARES on possible solutions.

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2. According to the initial situation, the solutions under study to implement in your region would be:

2.1. Based on current situation

N9	Energy and carbon savings

Possible solutions:

S7	Governance and policies to overcome the sector barriers
S7D	Policies aimed at reducing energy consumption in water filtration
S2	Management systems to reduce water discharges to the water badies
S2C	Collecting systems of grey water and stormwater to be treated and allocated to other urban uses
S3	Technological solutions to automate processes in the water reuse cycle
S3C	Administrative measures to control the polluting contribution to the process
S3B	Other impovements of the treatment process
S3A	Use of telemetry for a real-time control of the process
S4	Water treatment technologies
S4G	The MBR technology consists in providing a high quality wastewater treatment with low surplus sludge production
S4F	AMBR is an aerobic wastewater treatment solution, which combines aeration with membrane bioreactor technology. It provides high quality wastewater treatment with low surplus sludge production
S4M	Biogas production to reduce energy consumption
S4L	Pure anaerobic treatment

2.2. Based on priority uses

U13	Pasture irrigation for livestock consumption, providing milk or meat

Possible solutions:

S5	Non-common uses found in the project
S5A	Indirect water reuse use

Figure 9. Second section's details: Possible solutions to implement depending on the initial situation.

Figure 10. Third section's details: Examples included in the AQUARES project associated with the S2C solution.

Figure 11. Fourth section's details: Possible barriers to implementing the identified measures.

Figure 12. Fifth section's details: Financial solutions for Water Reuse.