ADAPTATION TO CLIMATE CHANGE IN THE NILE DELTA THROUGH INTEGRATED COASTAL ZONE MANAGEMENT PROJECT

INTEGRATED COASTAL ZONE MANAGEMENT IN THE NORTHERN COAST OF EGYPT – A SCOPING STUDY –

DELIVERABLE 3:

GIS SYSTEM DESIGN REPORT

NOVEMBER 2016

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FOREWORD

This is the third of the seven deliverables of the study entitled Integrated Coastal Zone Management in Egypt- a Scoping Study, according to the contract signed by the Environmental Hydraulic Institute Foundation "IH Cantabria" and the Adaptation to Climate Change in the Nile Delta through Integrated Coastal Zone Management Project (ACCNDP), on 14th July 2016.

This report provides a description of the ICZM GeoPortal (or Geoviewer): its structure, functionalities and hardware and software requirements. The first version of this document was submitted on 18th November. Comments on this document were kindly submitted to IHCantabria on 19th November.

The Consultant (IH Cantabria and Environics) was fortunate in receiving full cooperation from ACCNDP.

Santander, 15th December 2016.

Raúl Medina Santamaría.

Project Manager

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1. GEOPORTAL SECTIONS

The GeoPortal will be divided into 5 sections: Introduction, Environment, Socioeconomic, Physical Impacts and Coastal Management Sections.

Except for the Introduction page, all sections will have a similar structure: on the left side the user will see a Description, below it he can interact with the Layer Tree, and finally on the right side is the Map to visualize the layers.

1.1. Introduction section

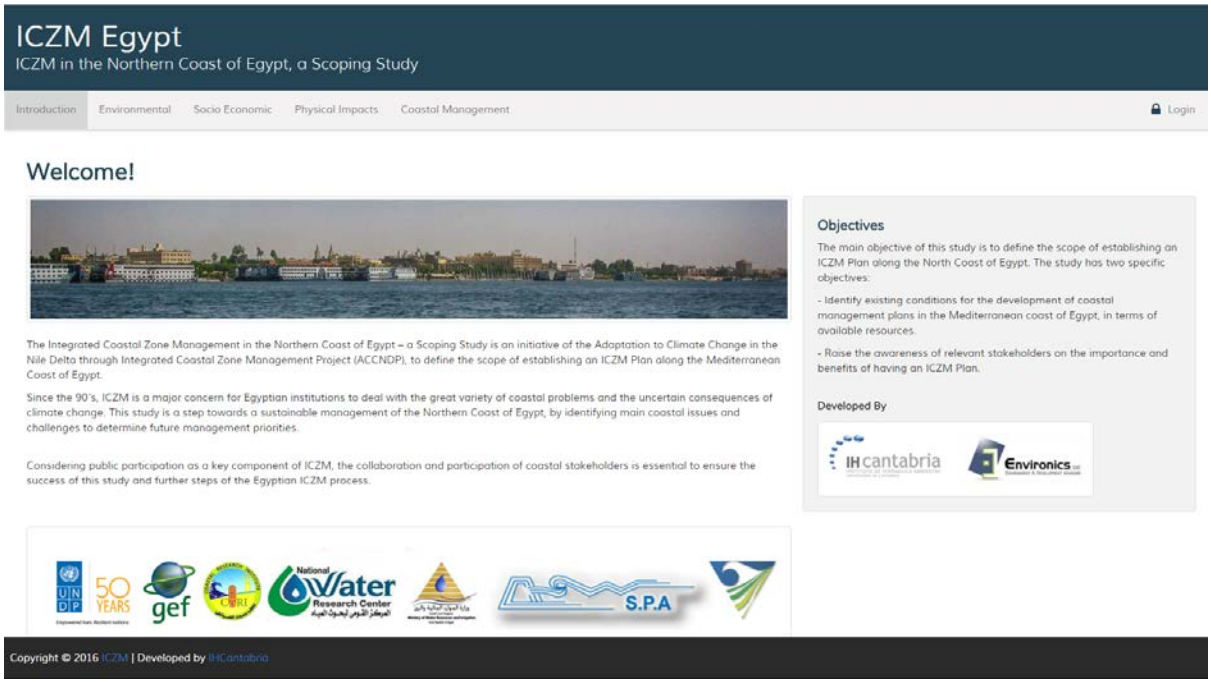

Fig 1. Welcome page

The Geoportal will have a home section where end users will be able to read a welcome message, the objective of the ICZM Project, institutions involved and an easy to access menu to the four main sections of the GeoPortal.

1.2. Environmental section

The Environmental layers will be structured into 5 categories: Morphology, Hydrology, Ecology, Drivers and Coastal Process.

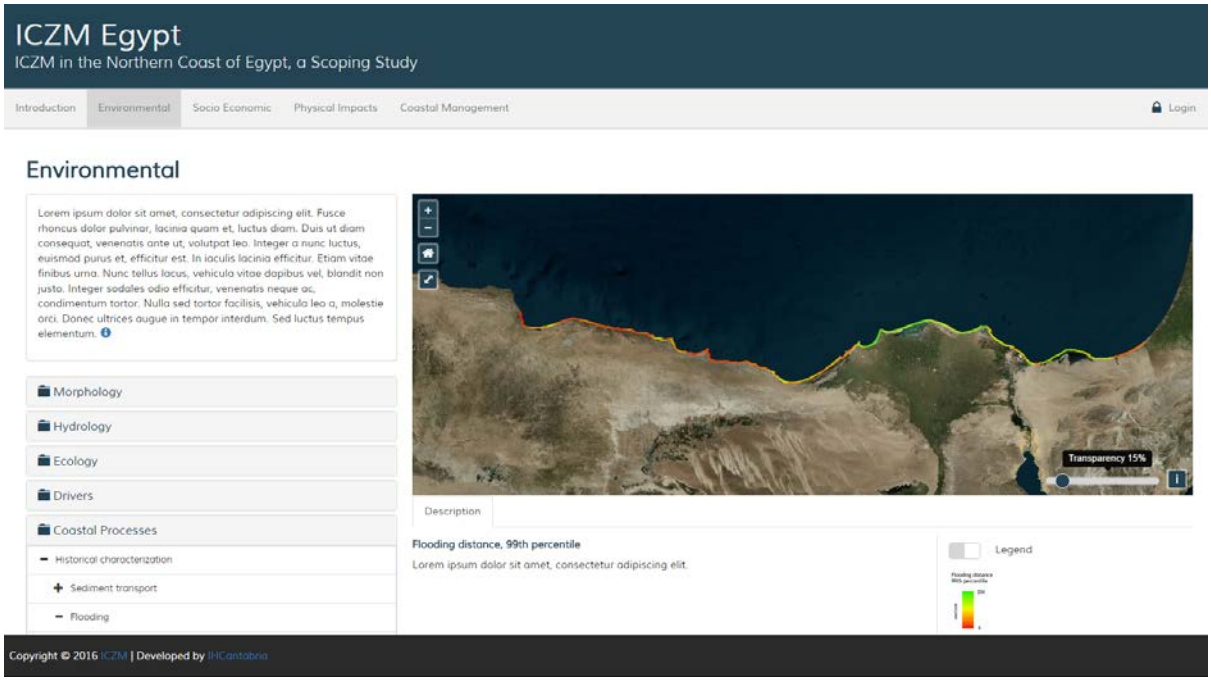

Fig 2. Environmental layer tree displayed

The main available elements for the user inside this section will be:

1. Morphology
    a. Beach typology
    b. Coastal typology
2. Hydrology
    a. Water bodies
    b. Waterways
3. Ecology
    a. Protected areas
    b. Proposed protected areas
    c. Potential seagrass distribution
    d. Turtle nesting sites
4. Drivers
    a. Historical Characterization
    b. Near term characterization
    c. Long term characterization
5. Coastal Processes
    a. Historical characterization
    b. Near term characterization
    c. Long term characterization

1.3. Socio Economic section

The Socio Economic layers will be structured into 4 categories: Land Use, Boundaries, Urban, and Transportation.

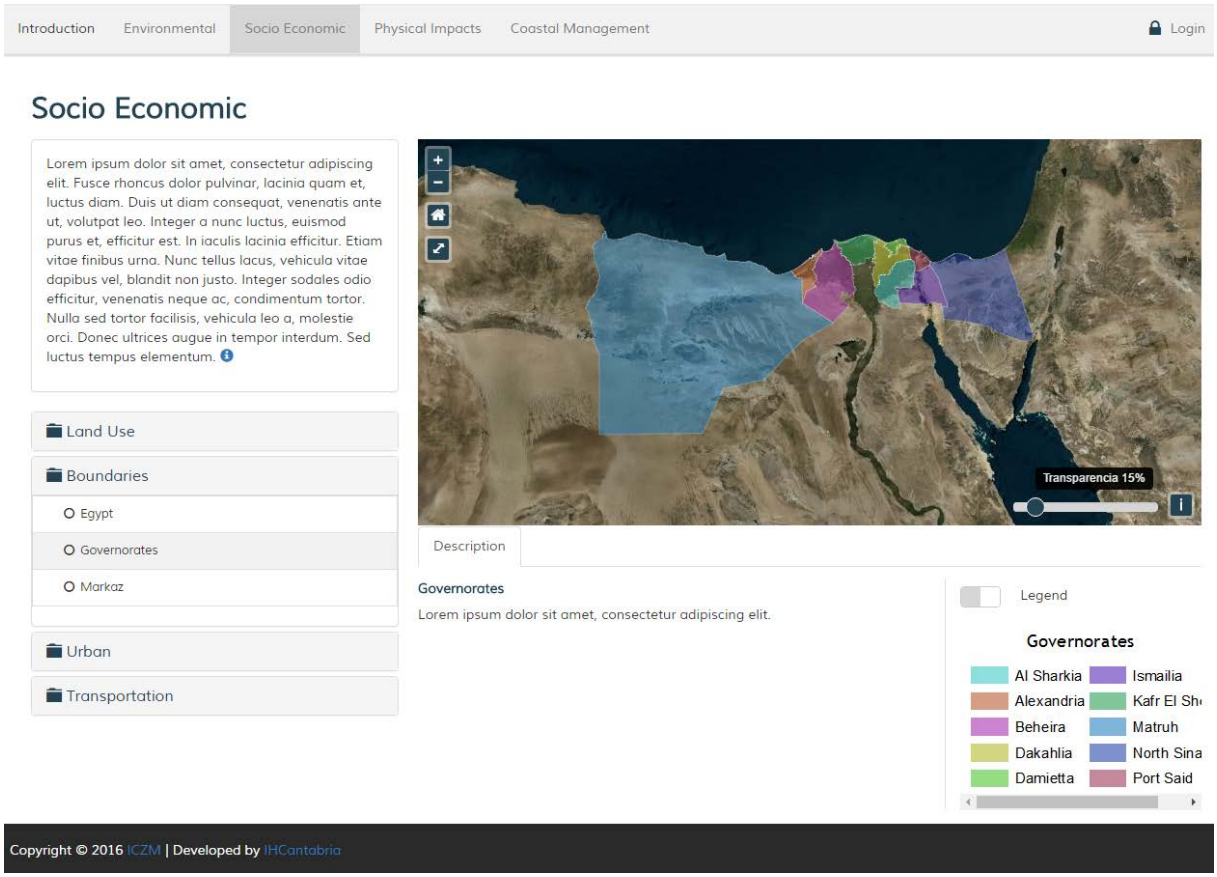

Fig 3. Socio Economic section

Related to the socio economic matters, at least these blocks will be available for the user:

1. Land Use
    a. Resorts
    b. Agriculture
    c. Industry
    d. Harbors
    e. Aquaculture
    f. Potential tourism areas
2. Boundaries
    a. Egypt

   b. Governorates
   c. Markaz
3. Urban
   a. Cities
   b. Towns
   c. Villages
4. Transportation
   a. Airports
   b. Railway
   c. Roads

1.4. Physical Impacts Section

The Physical Impacts layers contains a group of layers which can be compared in Present, Near, and in Long term.

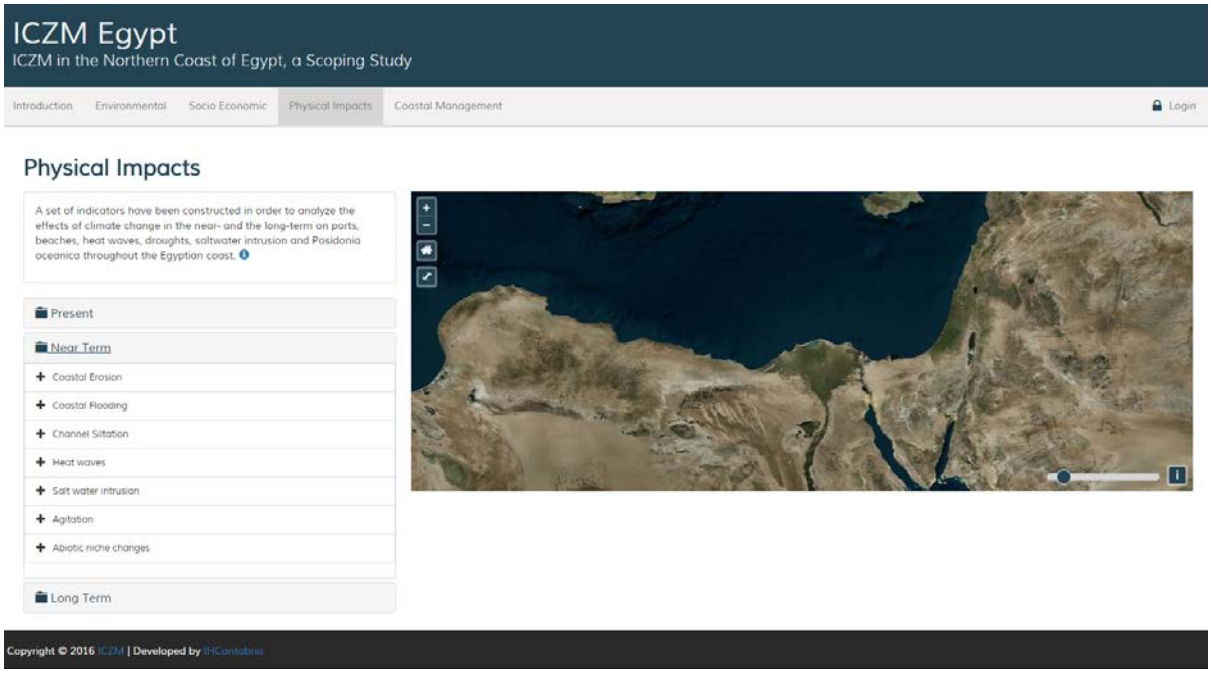

Fig 4. Physical Impacts section

On this section the user will be able to display at least these layers:

1. Present
   a. Coastal Erosion Indicator
   b. Coastal Flooding Indicator

   c. Channel Siltation Indicator
   d. Consecutive dry days index
   e. Strong stress heat wave frequency index in summer
   f. Saltwater intrusion index
   g. Overtopping-based operability index
   h. Posidonia oceanica index based on probability of occurrence
2. Near term
   a. Coastal Erosion Indicator
   b. Coastal Flooding Indicator
   c. Channel Siltation Indicator
   d. Strong stress heat wave (SHW) frequency index in summer
   e. Saltwater intrusion index under RCP8.5
   f. Overtopping-based operability index under RCP8.5
   g. Posidonia oceanica index based on probability of occurrence under RCP8.5 (2040-2070)
3. Long term
   a. Coastal Erosion Indicator (2070)
   b. Coastal Flooding Indicator (2070)
   c. Channel Siltation Indicator (2070)
   d. Consecutive dry days index under RCP8.5 (2081-2100)
   e. Strong stress heat wave (SHW) frequency index in summer (2045-2064)
   f. Saltwater intrusion index under RCP8.5 (2046-2065)
   g. Overtopping-based operability index under RCP8.5 by 2050
   h. Posidonia oceanica index based on probability of occurrence under RCP8.5 (2070-2100)

1.5. Coastal Management

The Coastal Management layers will be structured into 3 categories: Key Issues, Existing Projects, and Coastal Units.

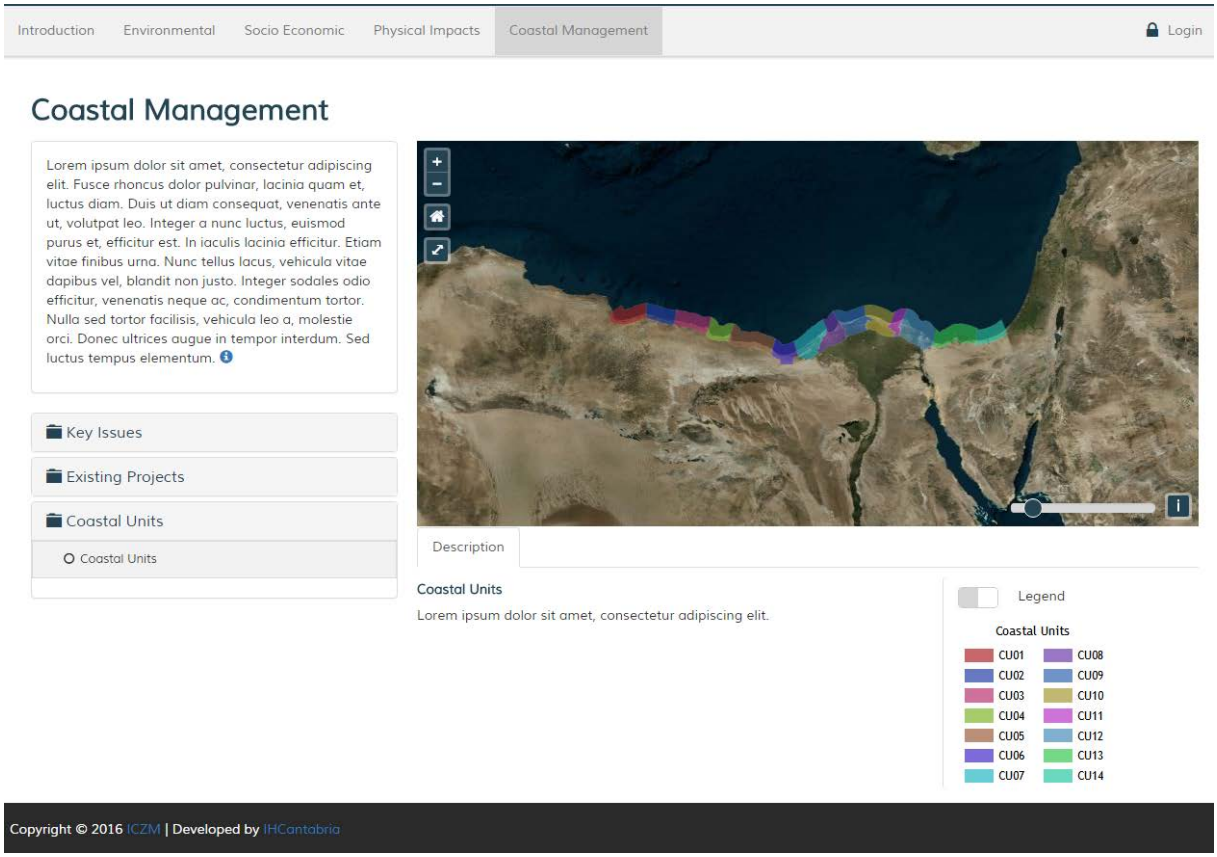

Fig 5. Coastal Management

On this section the user will be able to display at least these layers:

1. Key Issues
    a. Present key issues
    b. Near term key issues
    c. Long term key issues
2. Existing projects
    a. Existing projects
3. Coastal Units
    a. Coastal Units

2. GEOPORTAL FUNCTIONALITIES

The GeoPortal's interface will allow the user to interact with the map and the catalog. To do so, the UI is divided in 3 interaction sections: Map, Layer Tree, and Layer Info.

To limit and manage the different user's permission levels, there is also a Login page.

2.1. Login

Through the Login page, the users with special permissions can enter their credentials to access all the information without restrictions.

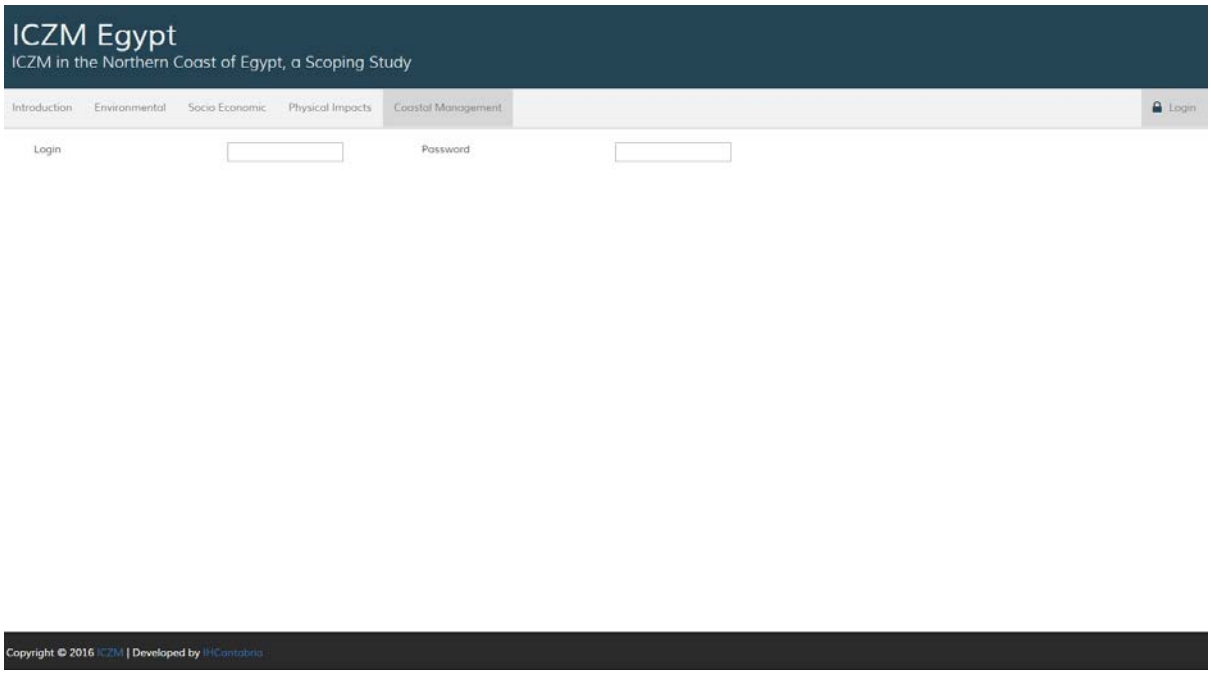

Fig 6. Login form

2.2. Layer tree

On the left side, holding all the layer's catalog, is located the Layer Tree. Navigating through the tree, users can expand different blocks and sections to find the desired layer. To activate and visualize them on the map, the users just have to click over their name.

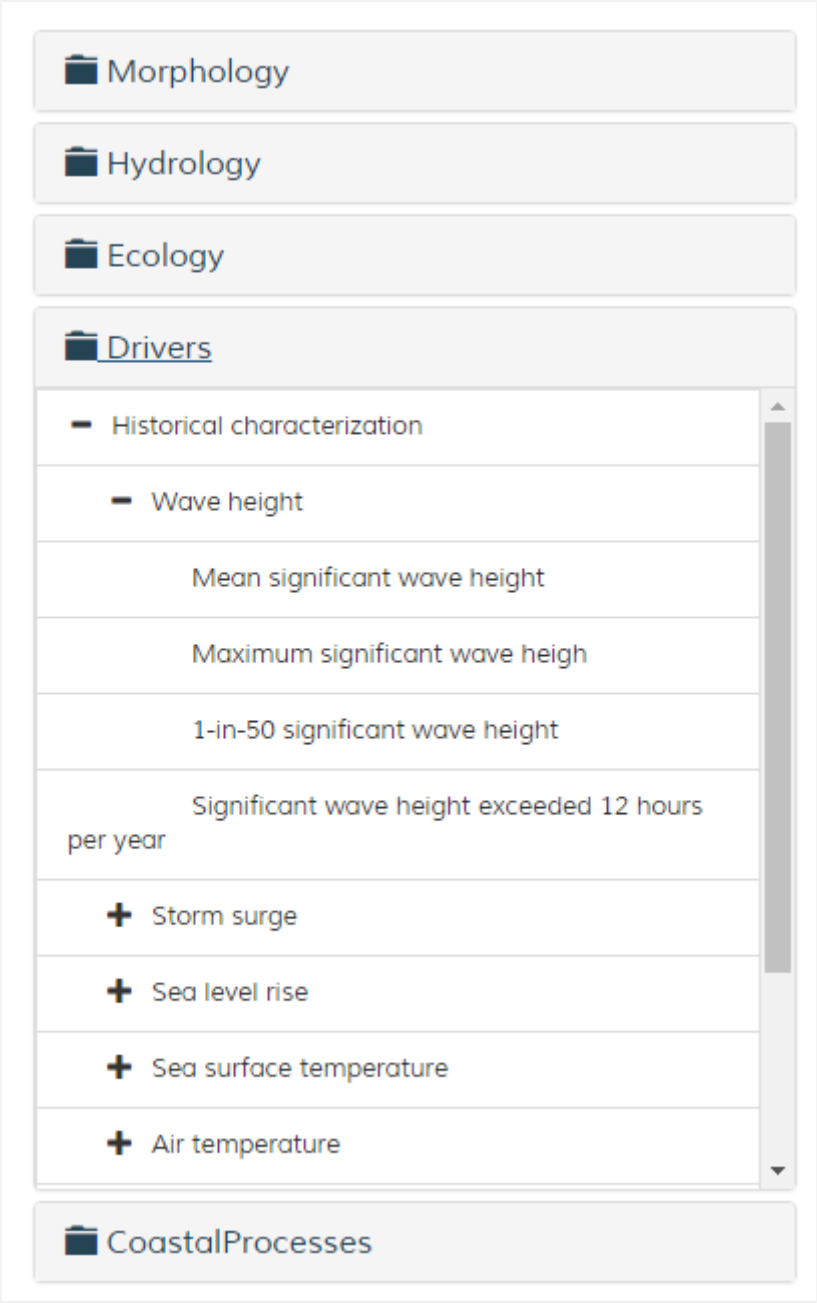

Fig 7. Layer Tree view

2.3. Description

There will be two places to hold useful information for the user about data layers. On the left side of the map there is a general description of the section, and under the map there will be specific information about the active layer. There will be also a small slider to activate/deactivate the legend.

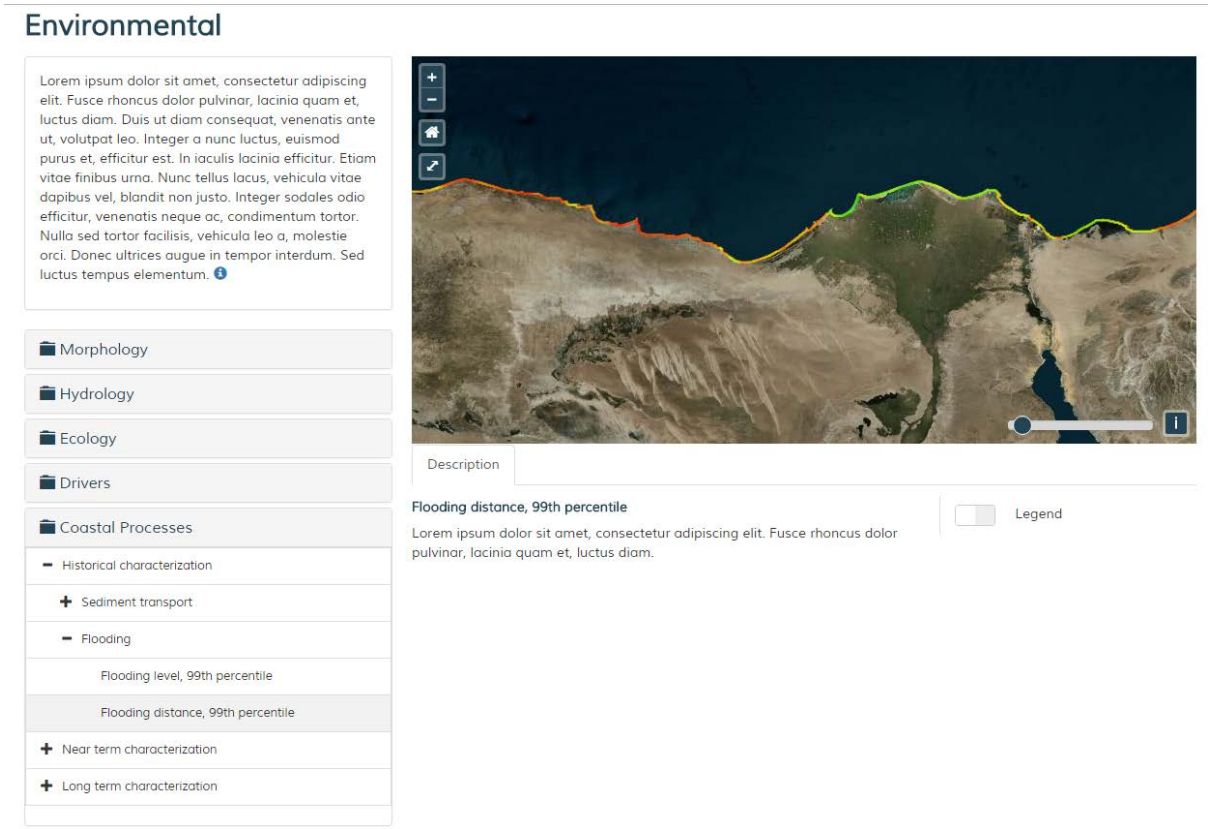

Fig 8. Description of section and layer

2.4. Mapping functionalities

The map is where all the spatial info is going to be displayed. It's an easy to use interface with some basic functionalities implemented to improve the user experience.

2.4.1. Zoom in & Zoom out

On the top-left corner the user can find the zoom controls. Clicking on them the user will zoom in and out the map. Alternatively, the user can make a specific zoom to an area with Caps + Left Click. Also, a scale bar will be displayed on the bottom-left side of the map.

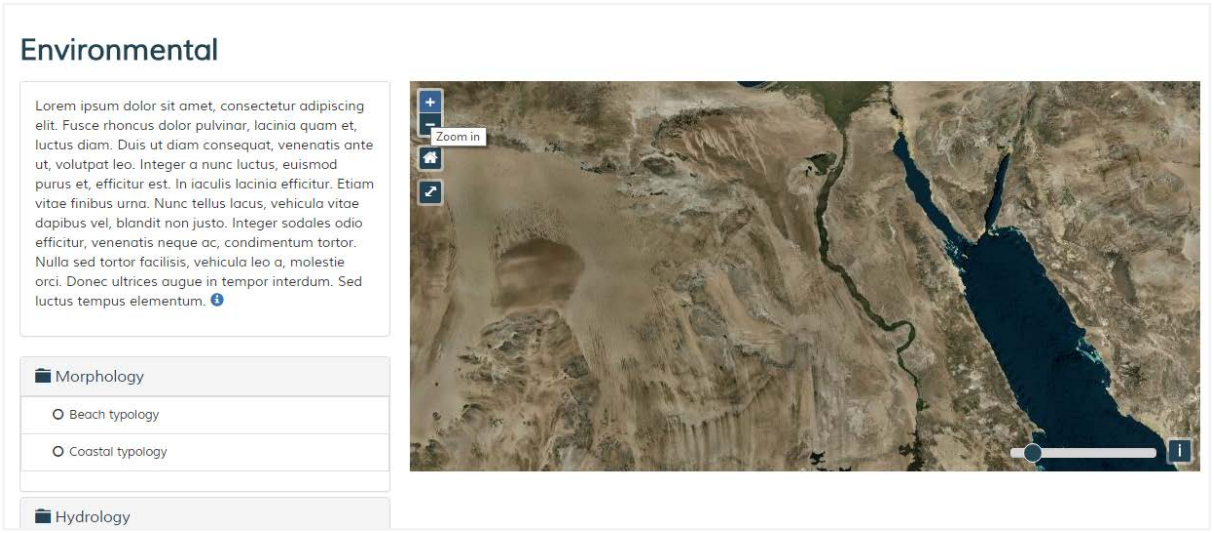

Fig 9. Zoom controls

2.4.2. Home

The *Home* control is under the zoom's controls and it will bring the map view to the initial extent.

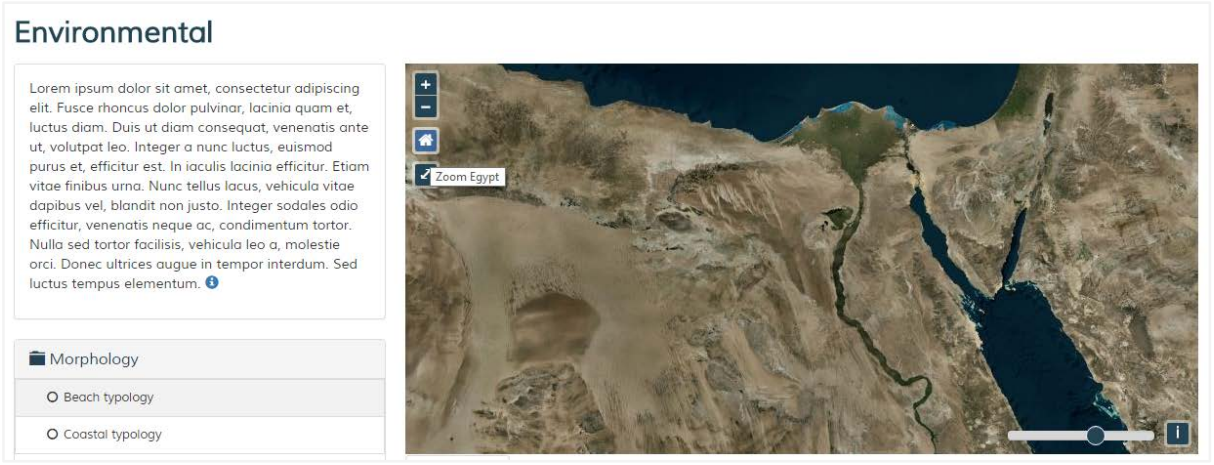

Fig 10. Home control

2.4.3. Identify

This is a special feature only available when the Coastal Units layer is active. Within this layer, the user will be able to click over the elements to open a popup with extended info. The popup will also have a download link to specific reports.

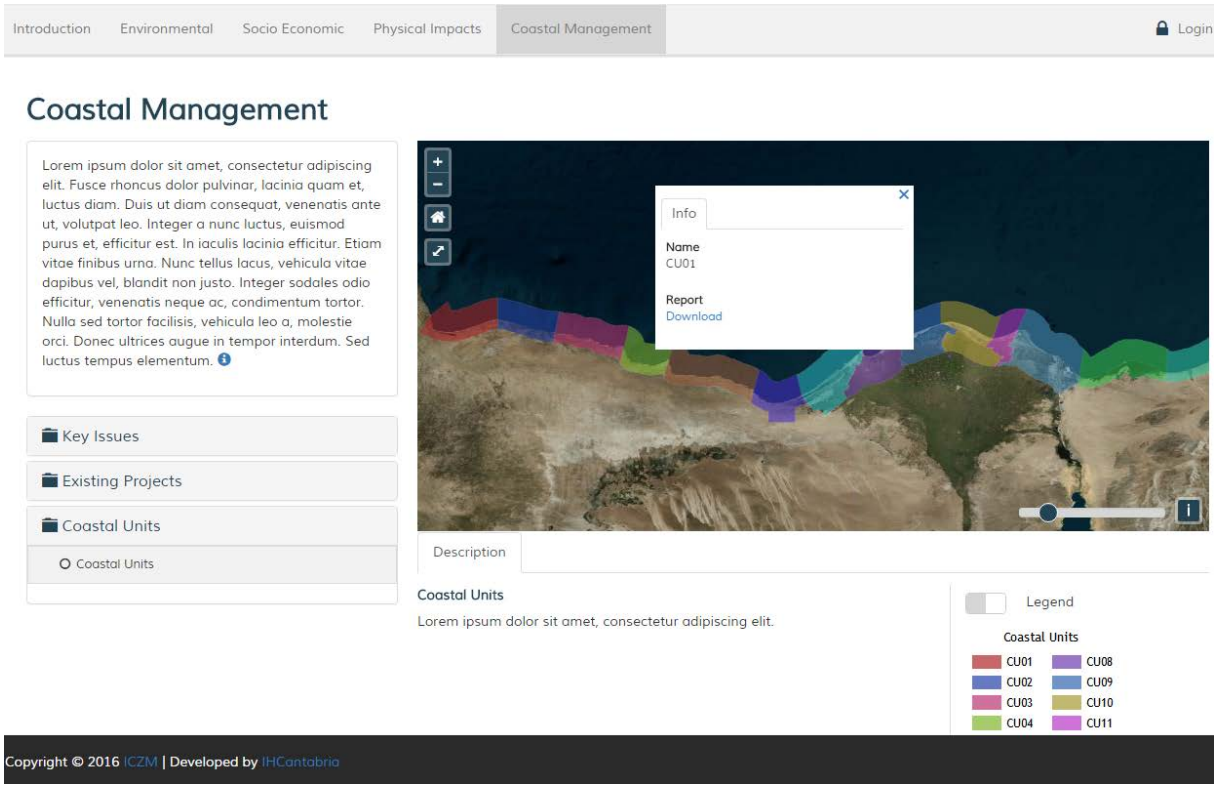

Fig 11. Identify over Coastal Units

2.4.4. Full screen

The *Full Screen* control, located under Home, will open the map in full screen mode, hiding the rest of the page. To close and return to the normal mode just click over the control again.

Fig 12. Full screen map example

2.4.5. Transparency

This control is on the bottom-right corner of the map. It allows the user to define the desired transparency for the active layer, from 0% (completely dull) to 100% (completely transparent).

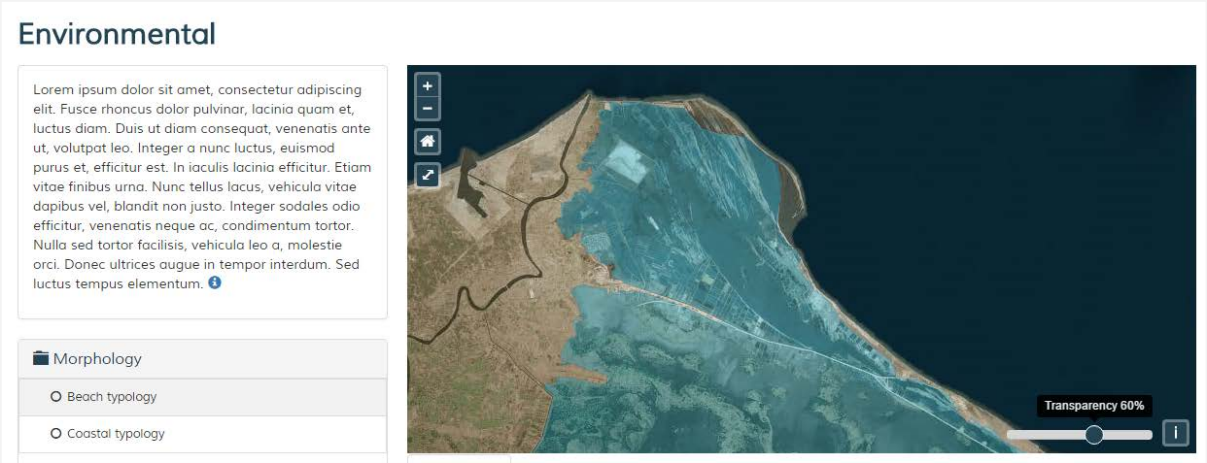

Fig 13. Layer transparency control

3. HARDWARE AND SOFTWARE REQUIREMENTS

The minimum requirements to implement the ICZM GeoPortal are summarized in the following tables:

3.1. Software

The minimum required software for the server that will host the Geoportal application is listed.

Software	Version	Language
Operating system Windows	2012R2	EN
IIS	IIs8	EN
.NET Framework	4.5	EN

Table1. Software requirements.

3.2. Hardware

The minimum required software for the server that will host the Geoportal application is listed.

Item		Notes
CPU	1.4 Ghz	or higher
Cores	1	or higher
RAM	2 GB	or higher
Type	64 Bit	-
Volume	c:\ 32 GB	Operating system
Network	Gigabit(10/100/1000 baseT)Ethernet adapter	Lan connectivity

Table 2. Hardware minimum requirements.

3.3. User requirements

Minimum system requirements for user application. The application is compatible with the following operating system and browsers.

Browsers:

- Google Chrome (recommended)
- Mozilla Firefox
- Windows only: Internet explorer, Microsoft Edge

Other browsers may work, but you might not be able to use all the available features.

Computer operating systems:

- Windows: Windows 7 and up
- Linux: Results will vary depending on OS distribution, driver support and desktop environment.

ANNEX: ABBREVIATIONS TABLE

ICZM	Integrated Coastal Zone Management
GIS	Geographic Information System
SHW	Strong Stress Heat Wave
UI	User Interface
IIS	Internet Information Services
OS	Operating System

Table 3. Abbreviations