

Land Utilization Rating Application (LURA)

User's Guide

2021 v2.0

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Introduction

The World Bank is finalizing a comprehensive set of global coal mine closure good practice technical standards that will enable the transition from “physical closure” to a more “sustainable” closure in the context of achieving a “Just Transition for All”. The good practice technical standards outline activities, regulatory implications, and policy issues that need to be addressed during planning, execution and post closure of a coal mine sites.

The World Bank encourages and supports the use of tools to assess, evaluate, and classify resources which are at risk of losing value if the threat of environmental degradation and community safety are not addressed. Moreover, this approach recognizes the interconnected nature of the issues that confront operating companies at the time of mine closure and underscores the need for mine operators to develop a comprehensive resource management plan early in mine operation and periodically through closure and repurposing.

A tool (LURA) has been designed with risk-based, spatial planning capabilities and is aligned with new global standards for coal mine closure. This ensures that guidance / advice on planning and preparation for coal mine closure is aligned with a regulatory approach in which technical standards used to close a mine address legacy risks from surface and underground mine operations.

For surface or underground coal mine operations different biological, physical, chemical, socioeconomic and financial conditions are evaluated that may affect the closed mine or broader area during closure or many years after closure (post closure legacies). The aim is to characterize mine land for legacies, but at the same time consider possible repurposing scenarios and evaluate future repurposing potential in order to create a sustained development during mine closure operations.

A dedicated cloud based, simple to use **Land Utilization Rating Application (LURA)** has been developed in order to support stakeholders, organization or entities involved with post mine land transition management. This document provides the User’s Manual for LURA usage.

Accessing the Application

The application is accessed from any device such as a PC, laptop, tablet or smart phone if an internet connection is available. The application is available on <https://wb.geosysta.com/> using any modern web browser. Users are greeted with the screen in Figure 1 will appear.

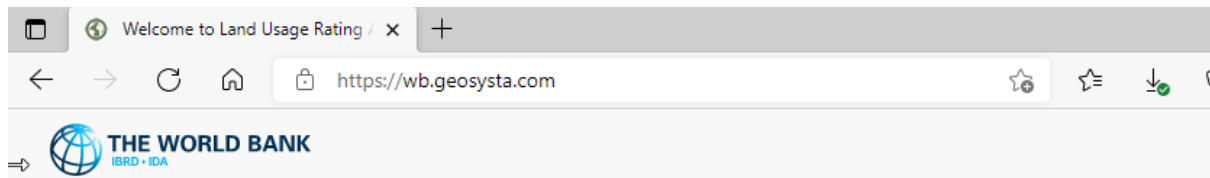


Figure 1: LURA welcome screen

When users click on “Log in” a form will appear as the one presented in Figure 2 in which users will be prompted to enter their username (e-mail) and password in order to get access to the application.

A screenshot of the login form for the LURA application. The browser's address bar shows "https://wb.geosysta.com/account/login/". The page header includes the World Bank logo. The main heading is "Log in to Geosysta LURA". The form consists of two input fields: "e-mail" with the value "c.steiakakis@geosysta.com" and "Password" with masked characters ".....". Below the password field is a blue "Sign In" button. Underneath the button, there is a checkbox labeled "Remember me" and a link "I have forgotten my password".

Figure 2: Log in form.

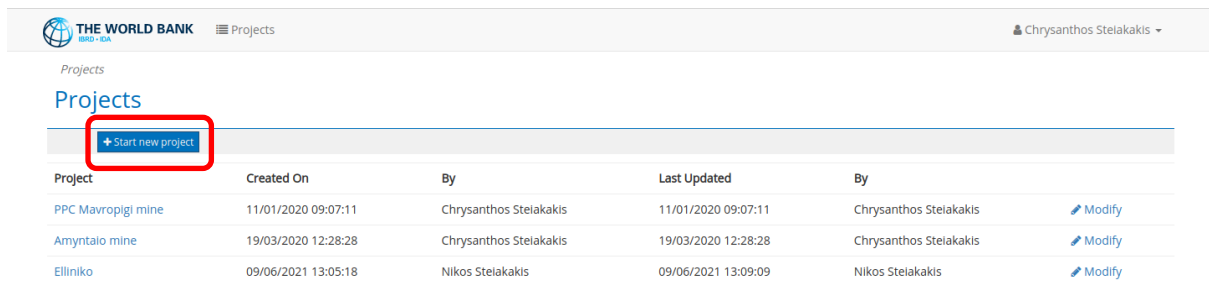
In order to get logged in, the user needs to have an account preapproved and created by the WB or the organization that is using LURA.

If a user has forgotten their password, they can click on the *“I have forgotten my password”* option under the sign in form and an e-mail will be send that will enable the user to change their password and log in again.

Starting a New Project

To start rating a mine area the user first needs to create a new project or use an existing one. The way to create a new rating project is the following:

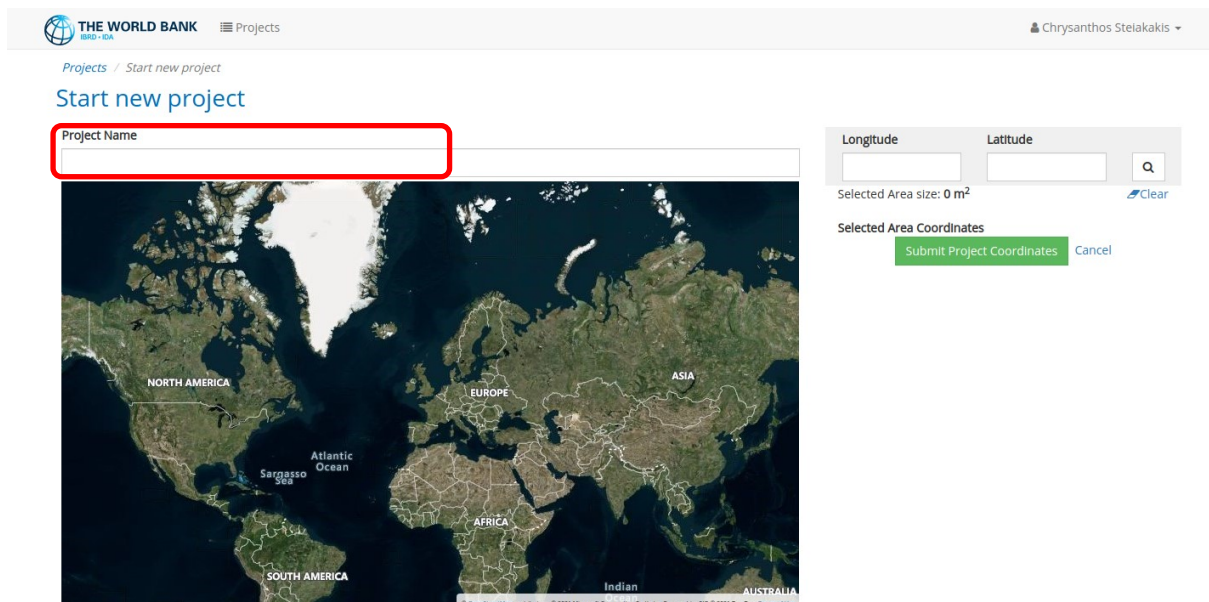
After logging in, the *Projects page* will be displayed (Figure 3), where the user can select an existing project or create a new one by clicking **“Start new project”** on the top left corner.



Project	Created On	By	Last Updated	By	
PPC Mavropigi mine	11/01/2020 09:07:11	Chrysanthos Steiakakis	11/01/2020 09:07:11	Chrysanthos Steiakakis	Modify
Amyntalo mine	19/03/2020 12:28:28	Chrysanthos Steiakakis	19/03/2020 12:28:28	Chrysanthos Steiakakis	Modify
Elliniko	09/06/2021 13:05:18	Nikos Steiakakis	09/06/2021 13:09:09	Nikos Steiakakis	Modify

Figure 3: List of projects

When the users selects **“start new project”** the page shown in Figure 4 is displayed. In this top left corner of the page the user needs to type the new **“Project Name”** in the text box above the map.



Project Name

Longitude Latitude

Selected Area size: 0 m² Clear

Selected Area Coordinates

Submit Project Coordinates Cancel

Figure 4: New project page

To find a mine land location the user can either insert coordinates in WGS system or select the location from the world map (Figure 5). Using the mouse wheel, users can zoom in or out on the map. To navigate in the map, users can click and hold the left mouse button to pan the viewable area.

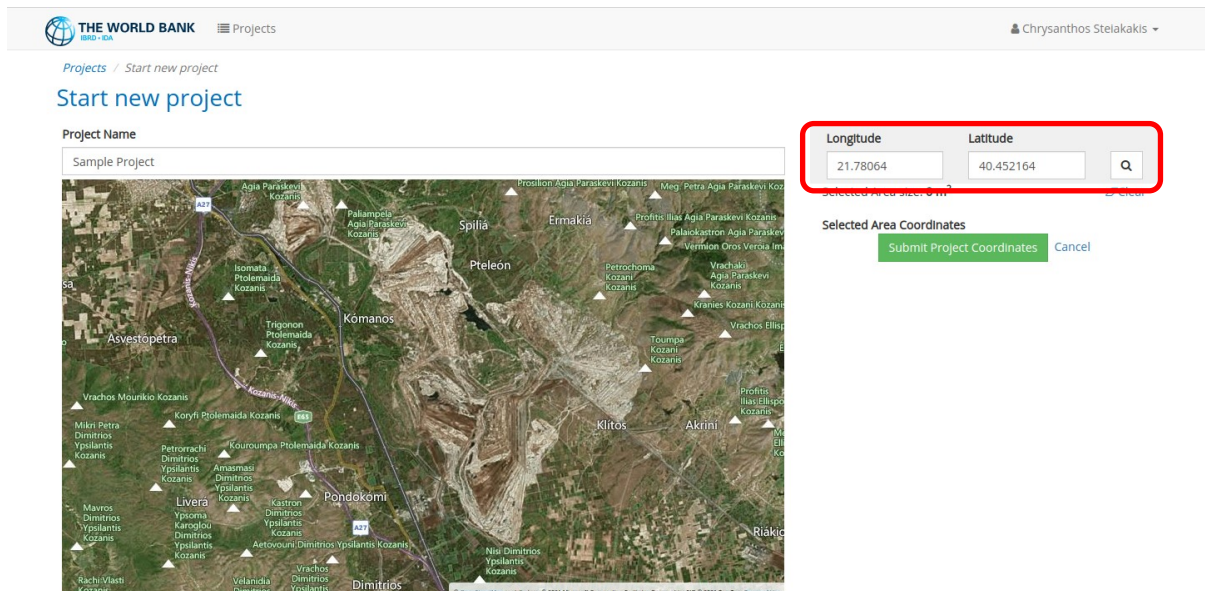


Figure 5: New project by coordinates

Selecting the Project Area

Using the mouse, the user can then select the area to be rated. The first node can be created by **clicking** the left mouse button **once**. Subsequent clicks on left mouse button in other locations form a polygon (polyline) that encloses the study area change. As the user clicks the left mouse button and the polygon is created the already selected area is highlighted and the coordinates of each nodal point are displayed on the right side of the screen. When the selected area is finished the **submit button** at the bottom of the page should be clicked (Figure 6). A selection can be discarded by clicking on **cancel**. A new project can be started from the “**Start new project**” menu.

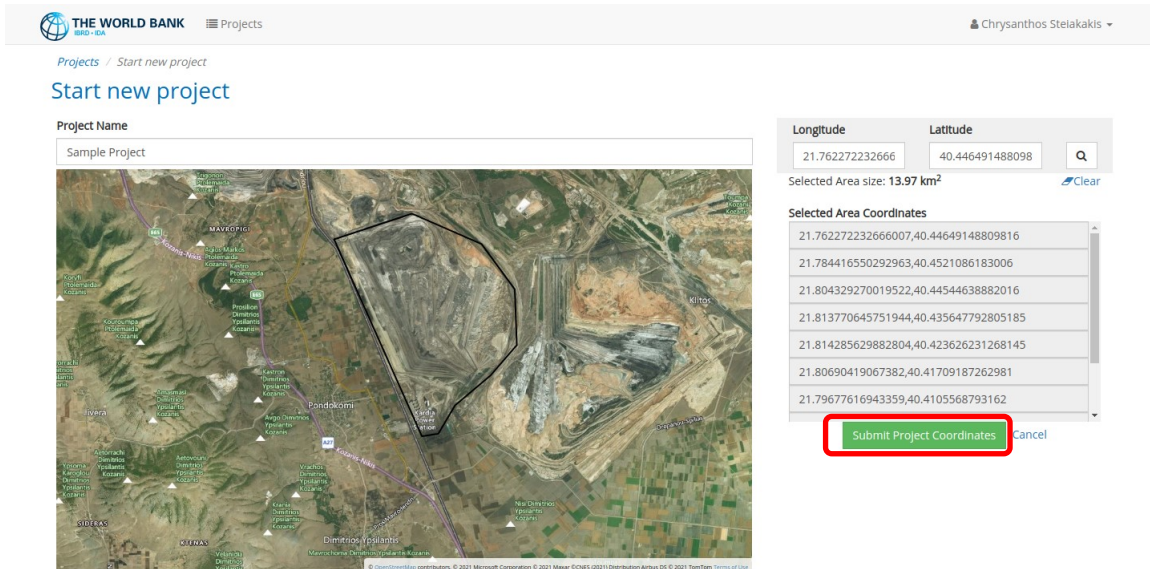


Figure 6: Submitting project coordinates

The user can complete the polygon selection, either by **double clicking** on the map, or by **clicking on the starting point** of the selected polygon. The user can then **modify and enhance** the edges and lines of the polygon by placing the mouse pointer anywhere in the polygonal line and a new blue node will appear. Once the new node appears, clicking on left mouse button will create the node and allow the user to move it around. To discard the selected area and start the polygon creation again the user should click on **clear** from the right side of your form (Figure 7).

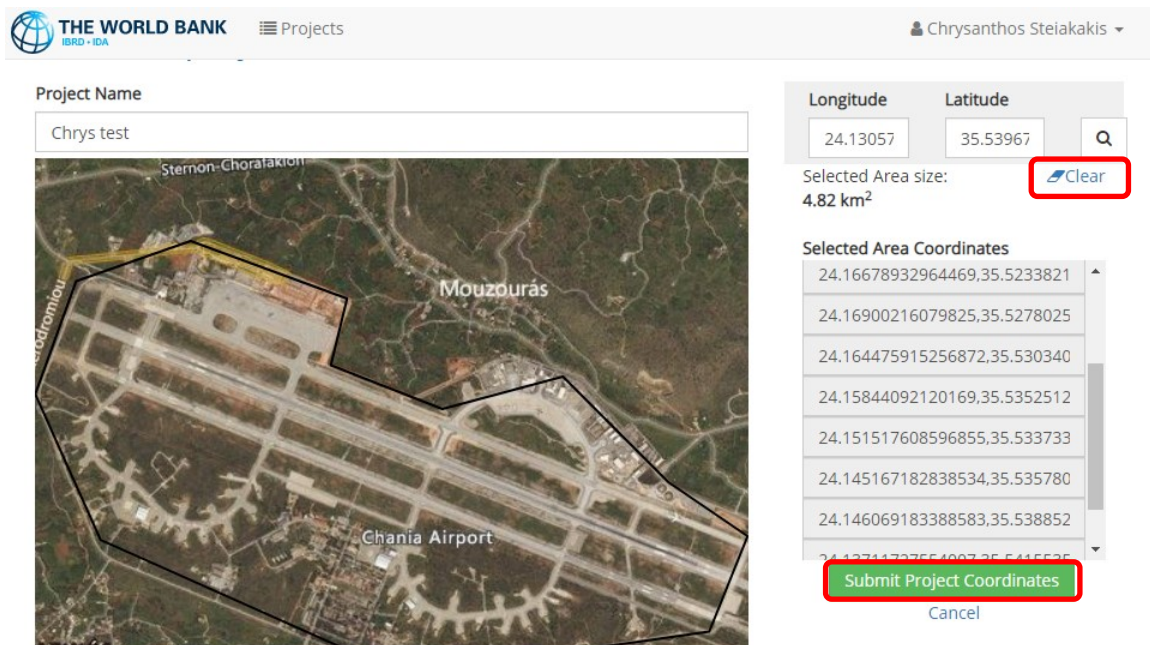


Figure 7: Clearing the polygon

When the polygon/area selection is completed, the user should click on **submit** and then they will be redirected to another page where the user can **define the cell size** and create the rating grid. A default

value of 0.5x0.5km is shown (Figure 8). The user can select a different cell size and click on “**Set Cell Size on Grid**” to preview the change on the map.

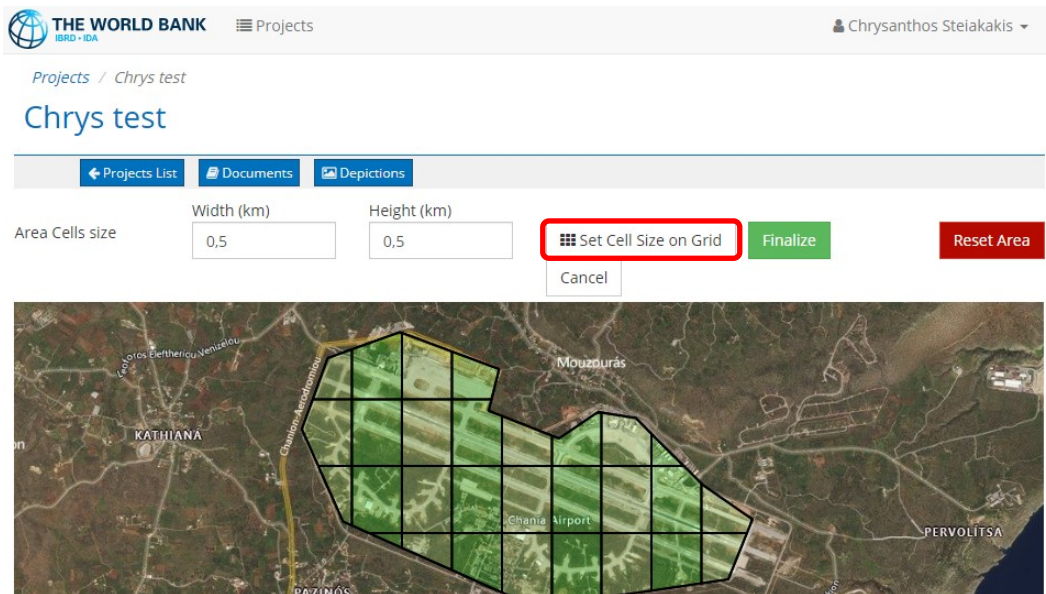


Figure 8: Sample project grid

Clicking on **Reset Area** (Figure 8) will clear the selection and allows the user start the selection again from scratch. In other words, this function will remove any selection from the map and will allow the user to make a new selection of the area to be rated. If the user unintentionally clicks on **Reset Area** they can click on the **back button** of the browser and go back to the original selection.

A user needs to enter a cell size preference and click on “**Finalize**” to complete the map selection (Figure 8). Blue buttons available at the top of the form (Figure 9) allow the user to check whether documents or any other Depictions (such as maps or drawings) have been assigned to an existing project. This feature is helpful for existing projects when a user or multiple users have assigned different information to the project. Such information could be a topographical map, an underground room and pillar map, a hydrogeological map etc.

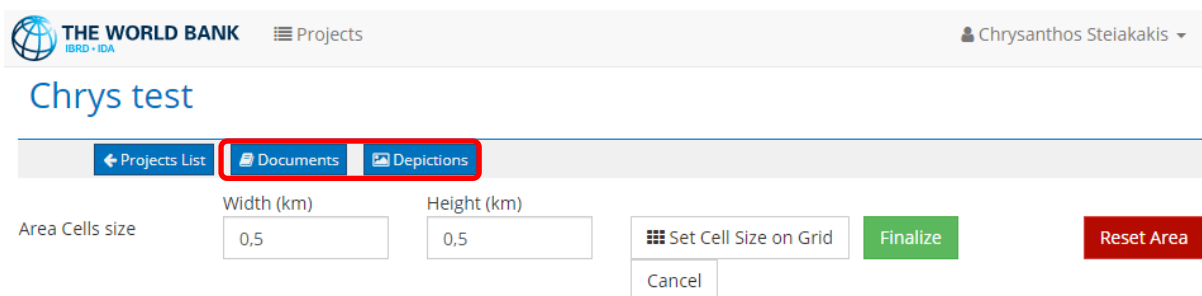
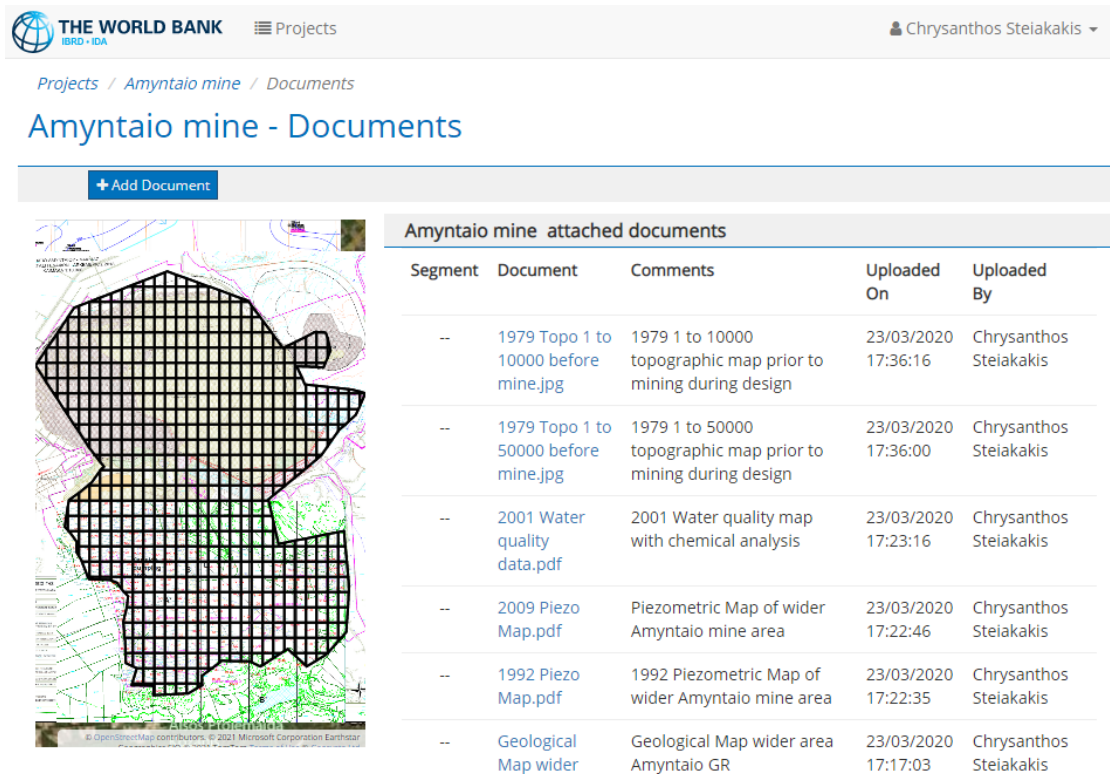


Figure 9: Accessing documents and depictions

For an existing project, clicking on **Documents**, will open a new page in which the selected area is shown as well as a list of the different documents that have been uploaded. In addition, a description is provided under “comments”, and the date/time of when the documents were uploaded as well as the name of the person that uploaded the documents (Figure 11).



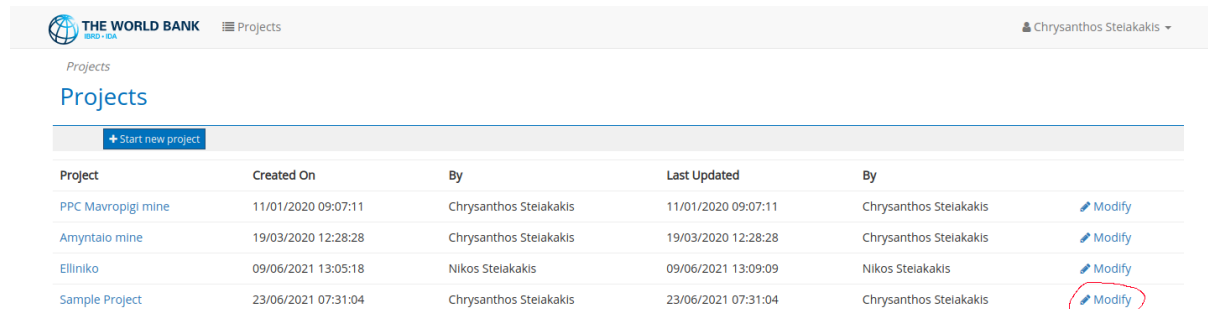
The screenshot shows the 'Amyntaio mine - Documents' page. On the left is a map of the mine area with a grid overlay. On the right is a table titled 'Amyntaio mine attached documents'.

Segment	Document	Comments	Uploaded On	Uploaded By
--	1979 Topo 1 to 10000 before mine.jpg	1979 1 to 10000 topographic map prior to mining during design	23/03/2020 17:36:16	Chrysanthos Steiakakis
--	1979 Topo 1 to 50000 before mine.jpg	1979 1 to 50000 topographic map prior to mining during design	23/03/2020 17:36:00	Chrysanthos Steiakakis
--	2001 Water quality data.pdf	2001 Water quality map with chemical analysis	23/03/2020 17:23:16	Chrysanthos Steiakakis
--	2009 Piezo Map.pdf	Piezometric Map of wider Amyntaio mine area	23/03/2020 17:22:46	Chrysanthos Steiakakis
--	1992 Piezo Map.pdf	1992 Piezometric Map of wider Amyntaio mine area	23/03/2020 17:22:35	Chrysanthos Steiakakis
--	Geological Map wider	Geological Map wider area Amyntaio GR	23/03/2020 17:17:03	Chrysanthos Steiakakis

Figure 10: Information on documents attached to a project

Extending the Project Area

An already selected project area can be easily extended, with one or more additional area selections that might not even be adjacent to the original selection. To accomplish this, the user can click on **“Modify”** on the Projects list page (Figure 11).



The screenshot shows the 'Projects' list page. The table below lists several projects, with the 'Modify' button for the 'Sample Project' circled in red.

Project	Created On	By	Last Updated	By	
PPC Mavropigi mine	11/01/2020 09:07:11	Chrysanthos Steiakakis	11/01/2020 09:07:11	Chrysanthos Steiakakis	Modify
Amyntaio mine	19/03/2020 12:28:28	Chrysanthos Steiakakis	19/03/2020 12:28:28	Chrysanthos Steiakakis	Modify
Elliniko	09/06/2021 13:05:18	Nikos Steiakakis	09/06/2021 13:09:09	Nikos Steiakakis	Modify
Sample Project	23/06/2021 07:31:04	Chrysanthos Steiakakis	23/06/2021 07:31:04	Chrysanthos Steiakakis	Modify

Figure 11: List of projects

Clicking on **“Modify”** will show the project area modification page. Clicking on **“Extend Project Area”** will allow a user to select an additional area on the map (Figure 12).

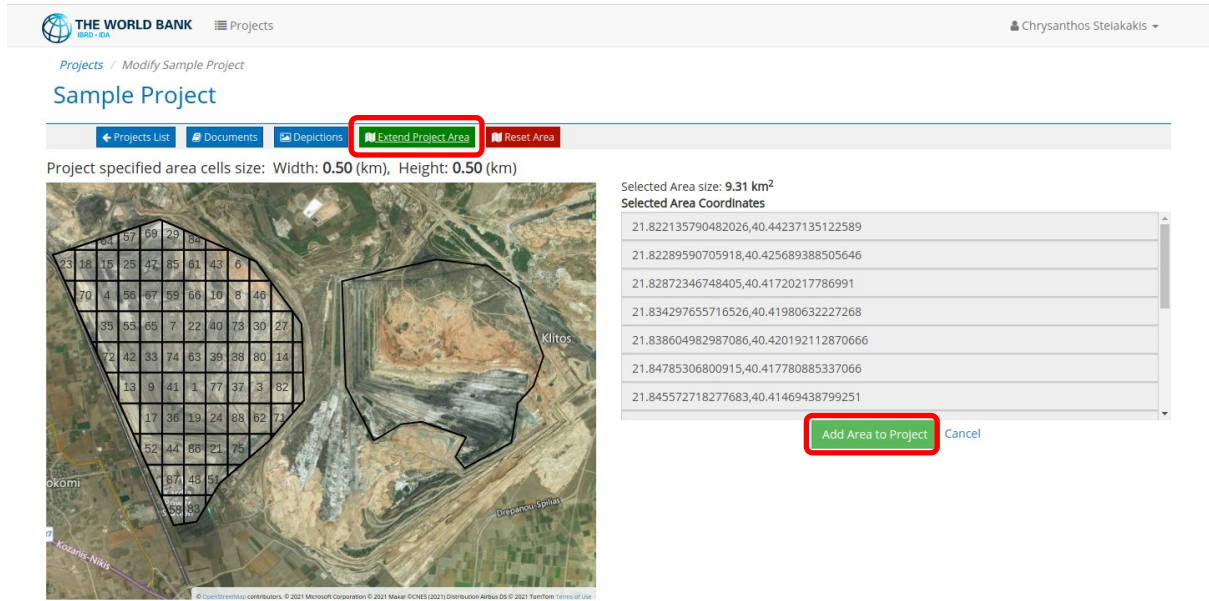


Figure 12: Extending a project area

Following the same procedure as when creating a new project, the user can complete the new polygon area and then confirm the selection by clicking on the “**Add area to project**” button.

With this feature a user can add additional land areas for rating on the same project as these lands become available or additional information becomes available for lands that were previously not included in the given project. For example, an underground coal mine has been rated and then additional maps or information become available for areas that have been mined but had not been known during the initial rating.

All areas of a given project should use the same grid cell size (Figure 13). The program does **not allow** the **use of a different grid cell size for different areas of the same project**. The cell size used when the original selection was created will be used for all additional area selection added to the project. However, note that various area grid cells can be **subdivided** to smaller sections if necessary.

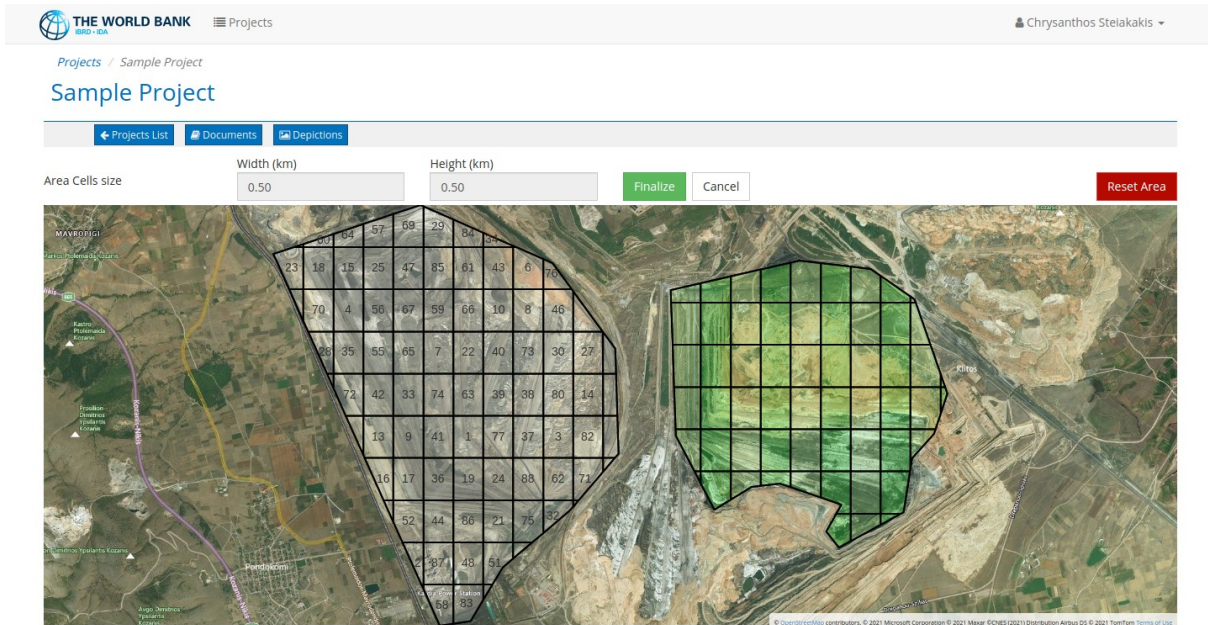


Figure 13: All areas of a specific project should have the same grid cell size

Subdividing Area Cells to Smaller Sections

Clicking on “**Modify**” on the projects list page (Figure 11), the user is once again presented with the project area modification page. By clicking on any grid cell on the area selection map, the size and coordinates of the cell will be displayed (Figure 14).

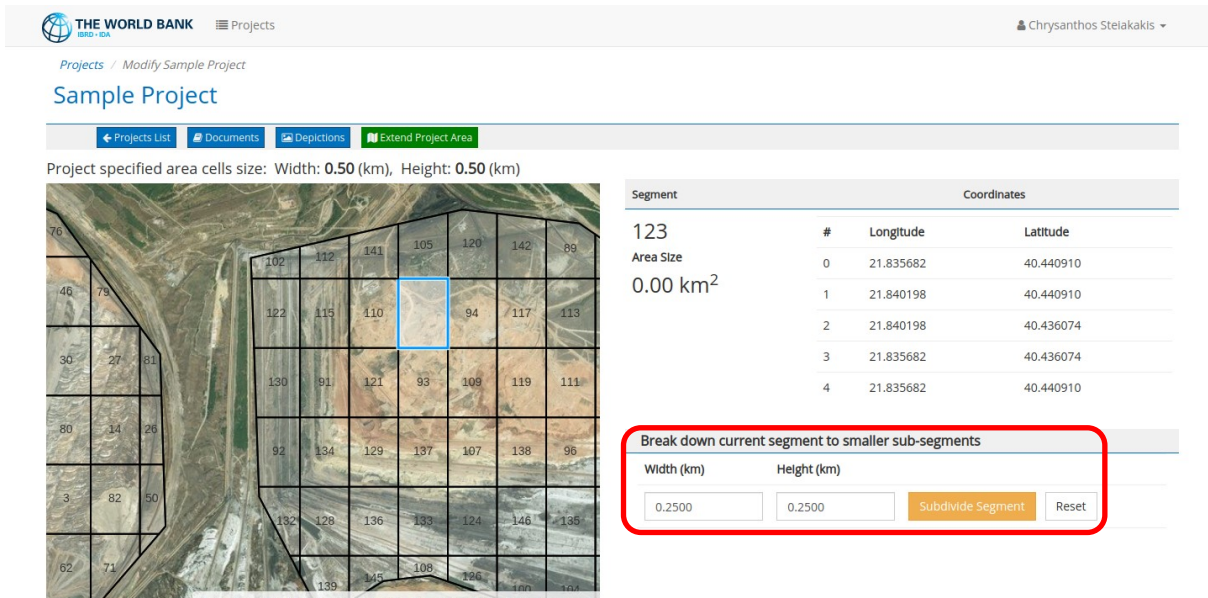


Figure 14: Displaying the size and coordinates of a cell

The user can then set the width and height of the sub-segments to break down the specific cell. Clicking on “**Subdivide**” this will present a preview of the newly created sub-cells of the particular area segment (Figure 15).

Project specified area cells size: Width: 0.50 (km), Height: 0.50 (km)

Segment	Coordinates		
	#	Longitude	Latitude
123	0	21.835682	40.440910
Area Size	1	21.840198	40.440910
0.00 km ²	2	21.840198	40.436074
	3	21.835682	40.436074
	4	21.835682	40.440910

Break down current segment to smaller sub-segments

Width (km) Height (km) **Subdivide Segment**

Apply Change

Figure 15: Subdividing cells

If different size needs to be applied, the values in the width and height input boxes can be changed and the “**Subdivide**” button should be clicked again.

By clicking on “**Apply Change**” the specific area segment will be permanently divided to the smaller segments selected.

On the right side of the screen (Figure 15), the cell information such as its ID number, its area size and its corner coordinates in the WGS system is displayed.

Rating the Project Area

When the selected area and grid are finalized, the rating process can start. By clicking on the project name on the project list page (Figure 11) the user will be redirected to the project ratings page (Figure 16). To start a new rating, the user should click on **“Start new rating”** at the upper left corner of the project ratings page (Figure 16).

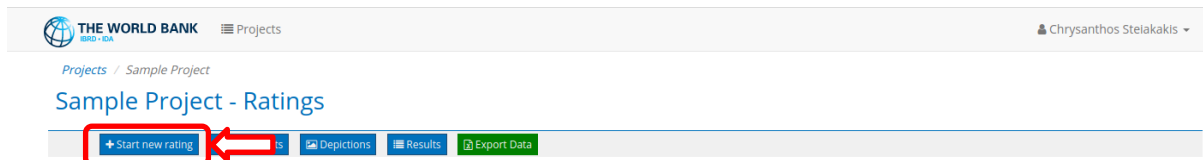


Figure 16: Project ratings

A new page is then opened which depicts the selected and subdivided area or areas of the project. A selected area could be either an open pit lignite mine (Above ground) or an underground coal mine (Below ground). When a selected area has both types of mines, an open pit mine that has become an underground mine or a combination of open pit and underground mines, then dual rating is possible. In this case the user needs to start a new rating by clicking on **“Start new rating”**, select the type of mine (above or below ground) and execute the rating. To execute a different type of mine rating the user needs to click on **“Start new rating”** again (for the same project) and select a different type of mine.

Furthermore, multiple ratings for the same type of mine can be performed by different users. For example, in an existing project which was a surface lignite mine that was created and rated by User XXX, a different user can click on **“Start new rating”** and start a completely new rating of the area. A different user can rate an area either with the same or a different type of mine. In the end, a list of different ratings is provided for the same project as can be seen in Figure 17.

For the selected project, the user can see how many ratings have been performed by inspecting the left column (Figure 17), the description of each rating, the mine type that was rated, when the rating started, by whom and when it was last updated. Also, a report can be extracted per rating by clicking on the Show button at the far-right side of the list.

Sample Project - Ratings

#	Comments	Mine Type	Started On	Started By	Last Updated	Updated by	Status	Report
1	Surface Area Evaluation	Above Ground	23/06/2021 08:04:40	Chrysanthos Steiakakis	23/06/2021 08:08:22	Chrysanthos Steiakakis	1	Show
2	Subsurface Area Evaluation	Below Ground	23/06/2021 08:05:07	Chrysanthos Steiakakis	23/06/2021 08:05:07	Chrysanthos Steiakakis	1	Show

Figure 17: Sample project ratings

When a new rating is started, the user needs to add a descriptive title to identify the rating, as well as select the Mine Type for the rating, i.e. whether it is an “Above Ground” mine type or “Below Ground” (Figure 18).

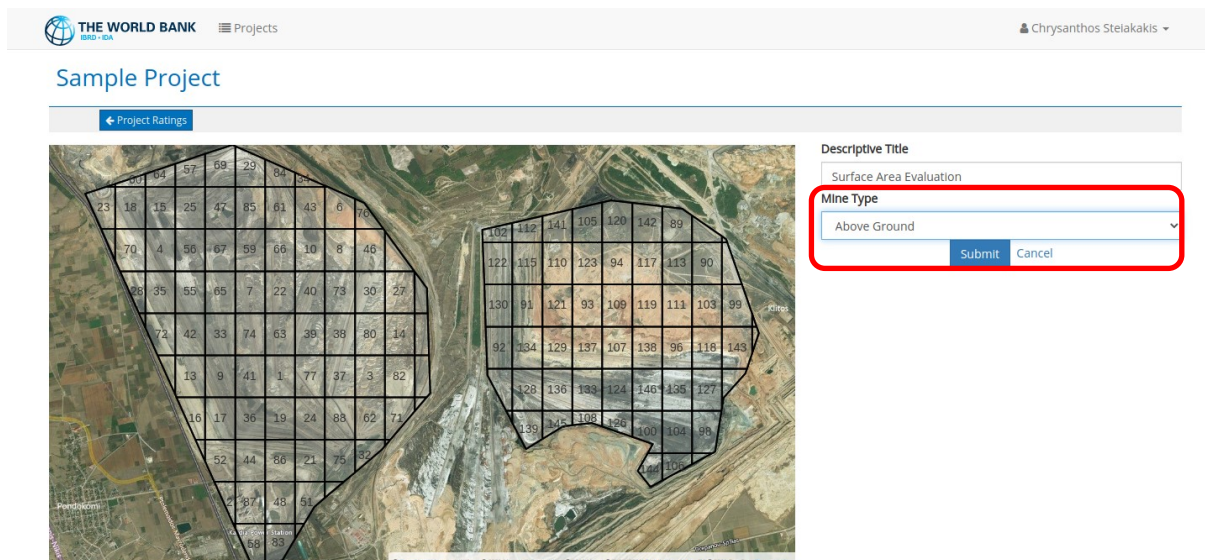


Figure 18: Selecting the type of mining

After the Descriptive Title and the Mine Type are entered, for example “Surface Area Evaluation” and “Above Ground” the user should click on **submit**. The project ratings page will then be loaded (**Error! Reference source not found.**).

This page (**Error! Reference source not found.**) will display all rating records either completed or partly completed. The user can also generate a report of previous ratings by clicking on the “Show” button on the right side of any rating item. To start rating on a new project or to continue rating a previous project just click on the rating title on the left. The application will navigate to the actual rating page (Figure 19).

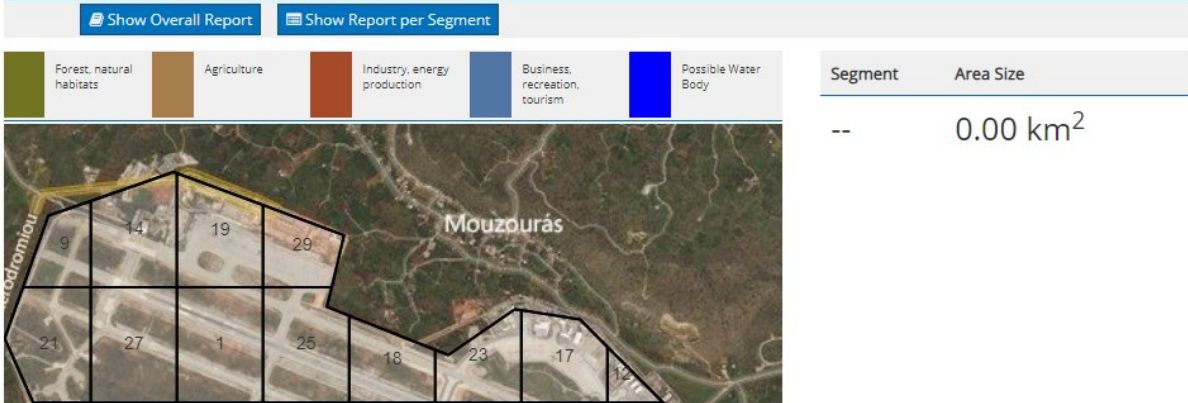


Figure 19: Project rating

This page (Figure 19) shows a map of the selected and subdivided area and the satellite image below the grid. Each segment of the grid has a unique number that defines it. To start rating the user can begin from segment number 1 or they can choose any segment on the map. Figure 20 shows the rating process for segment number 110. Note that on the top of the map the different available land uses are presented. After each segment of the grid has been rated, a color will appear that will denote which land use is determined by the application to be optimal.

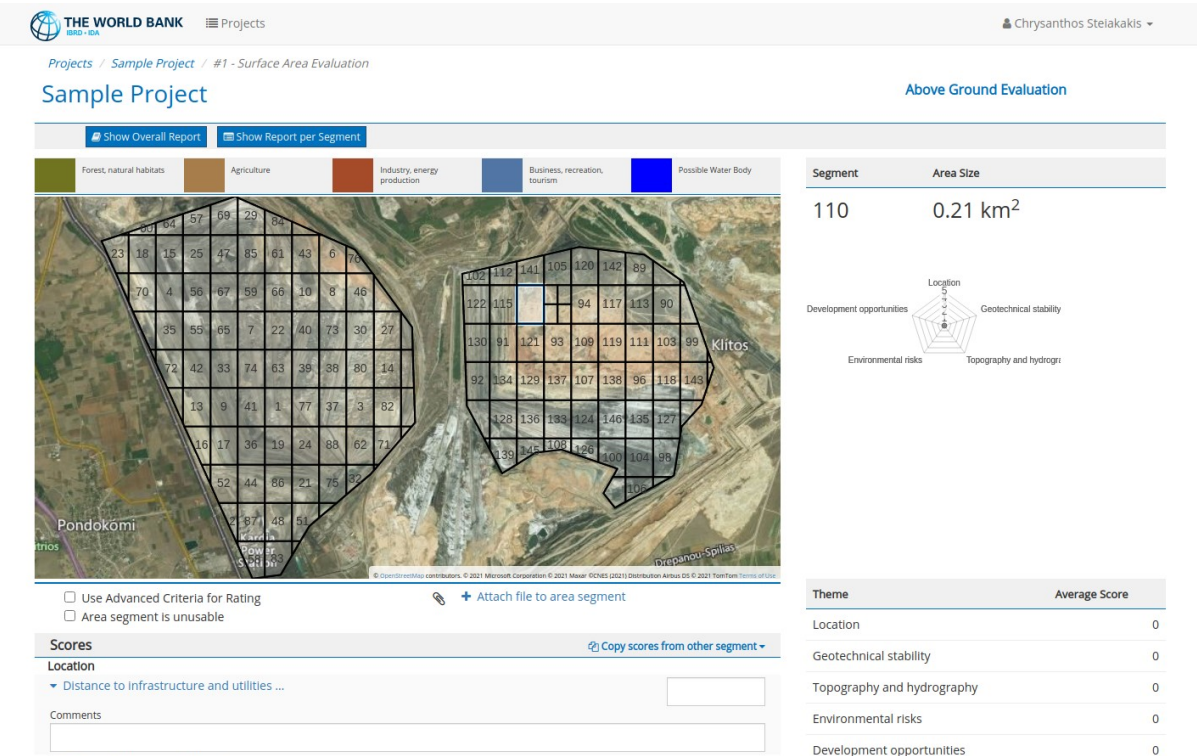


Figure 20: Rating a random cell

As soon as the user clicks on a cell grid with the mouse pointer, the appropriate scoring categories are displayed (Figure 21 and Figure 22). The scoring categories displayed depend on the **selected Mine Type**, which is shown at the top right side of the screen. The user can then assign score values to each category. The rating themes for both above ground and below ground mine types follow the same logic. Irrespective of the mine type, (above ground or below ground), all of the five themes shown in Figure 21 and Figure 22 should be rated.

1. Location:

Above ground	Below ground
Location ▼ Distance to infrastructure and utilities ... <input type="text"/> Comments ▼ Distance to human settlements ... <input type="text"/> Comments	Location ▼ Proximity to infrastructure and utilities ... <input type="text"/> Comments ▼ Proximity to human settlements ... <input type="text"/> Comments

2. Geotechnical stability:

Above ground	Below ground
Geotechnical stability ▼ Expected residual ground settlement ... <input type="text"/> Comments ▼ Slope stability – seismic risks ... <input type="text"/> Comments ▼ Impact of groundwater rebound (applies especially to interior dumps) ... <input type="text"/> Comments	Geotechnical stability ▼ Continuous spatial movement (subsidence) ... <input type="text"/> Comments ▼ Discontinuous movements (sinkholes), ... <input type="text"/> Comments ▼ Hanging wall collapse ... <input type="text"/> Comments ▼ Shaft failure ... <input type="text"/> Comments

3. Topography and hydrography:

Above ground	Below ground
Topography and hydrography ▼ Surface gradient and relief ... <input type="text"/> Comments ▼ Surface drainage ... <input type="text"/> Comments ▼ Hydrological risks – extreme precipitation events and flooding ... <input type="text"/> Comments	Topography and hydrography ▼ Saturated low lands ... <input type="text"/> Comments ▼ Hydrological risks – Sudden flooding conditions ... <input type="text"/> Comments

Figure 21: Rating criteria 1-3

4. Environmental risks:

Above ground

Environmental risks

Contamination of dumped materials ...

Comments

Current / manifest environmental impacts of ongoing Lignite production (which could continue for 30 more years): dust, emissions, noise, vibrations. ...

Comments

Proximity to operating TPPs, including after potential repurposing, lignite bunkers, fly ash stockpiles ...

Comments

Below ground

Environmental risks

Acid Mine Drainage (AMD) and other toxic chemicals ...

Comments

Abandoned Mine Methane (AMM) ...

Comments

Spontaneous combustion and underground fires ...

Comments

Proximity to operating TPPs, mine shafts, bunkers, fly ash stockpiles ...

Comments

5. Development opportunities:

Above ground

Development opportunities

Added land value due to its development potential ...

Comments

Below ground

Development opportunities

Ownership ...

Comments

Permitting conditions ...

Comments

Reclamation status ...

Comments

Funding availability ...

Comments

Figure 22: Rating criter 4-5

Figure 23 presents the rating screen for an above ground mine type.

Projects

Chrysanthos Steiakakis

Use Advanced Criteria for Rating
 Area segment is unusable

Scores	Copy scores from other segment
Location	
Distance to infrastructure and utilities ...	[]
Comments	
Distance to human settlements ...	[]
Comments	
Geotechnical stability	
Expected residual ground settlement ...	[]
Comments	
Slope stability - seismic risks ...	[]
Comments	
Impact of groundwater rebound (applies especially to interior dumps) ...	[]
Comments	
Topography and hydrography	
Surface gradient and relief ...	[]
Comments	
Surface drainage ...	[]
Comments	

Theme	Average Score
Location	0
Geotechnical stability	0
Topography and hydrography	0
Environmental risks	0
Development opportunities	0
Land Use Segment Rating	
Forest, natural habitats	--
Agriculture	--
Industry, energy production	--
Business, recreation, tourism	--
Possible Water Body	--
Coordinates	
lng: 21.802912570048, lat: 40.427938468834 lng: 21.807428163089, lat: 40.427938468834 lng: 21.807428163089, lat: 40.423104438942 lng: 21.802912570048, lat: 40.423104438942 lng: 21.802912570048, lat: 40.427938468834	

Figure 23: Rating for surface mines (above ground)

When rating an area or a cell, the segment (cell) number is displayed (i.e. 118) and the cell is highlighted (Figure 24). The user can zoom in or out of the study area map. The user can upload a different map for each study area, for example a topographic map or any other map. Under the selected cell the topographic map provided by the mine is overlain on top of the satellite image. On the right of the screen the segment number is displayed together with the area size and also the spider graph of the rating for this segment.

The screenshot shows a web application interface for land use segmentation and rating. At the top, there is a navigation bar with 'THE WORLD BANK' logo, 'Projects', 'Administration', and the user name 'Chrysanthos Steiakakis'. Below the navigation bar, there are buttons for 'Show Overall Report' and 'Show Report per Segment', and a 'Recalculate Segment Scores' button. The main area is divided into two sections: a map and a data panel.

The map section shows a satellite image with a grid of cells. The cells are numbered, and cell 118 is highlighted in blue. The legend below the map includes the following categories: Forest, natural habitats (green), Agriculture (brown), Industry, energy production (orange), Business, recreation, tourism (blue), and Possible Water Body (dark blue). There are also checkboxes for 'Use Advanced Criteria for Rating' and 'Area segment is unusable', and an 'Attach file to area segment' button.

The data panel on the right shows the following information for segment 118:

Segment	Area Size
118	0.07 km ²

Below this information is a spider graph showing the rating for segment 118 across five themes: Location, Geotechnical stability, Topography and hydrography, Environmental risks, and Development opportunities. The scores for these themes are:

Theme	Average Score
Location	2.50
Geotechnical stability	3.33
Topography and hydrography	3.00

At the bottom of the data panel, there is a 'Scores' section with a dropdown menu for 'Location' and a text input field with the value '2.00'.

Figure 24: Highlighting the cell selected for rating

Underneath the map, right above the criteria scoring list, the user can select to use “Advanced Criteria for Rating” (by checking the appropriate checkbox), or consider the cell unusable by checking the “Area segment is unusable” checkbox. If the “Area segment is unusable” checkbox is checked a drop-down box appears in which different predefined land uses are assigned which can be given to the selected segment (Figure 25). For example, these land uses can include prohibited areas for any development due to archeological findings. The “unusable” segment is assigned a different color due to the predefined land use and is excluded from the rating procedure.

THE WORLD BANK
 Projects / Chrys test / #1 - Airport open pit mine
 Chrys test Above Ground Evaluation

Show Overall Report Show Report per Segment Recalculate Segment Scores

Forest, natural habitats Agriculture Industry, energy production Business, recreation, tourism Possible Water Body

Segment 14 Area Size 0.2 km²

Development opportunities Location Geotechnical stability Environmental risks Topography and hydrography

Theme	Average Score
Location	0
Geotechnical stability	0
Topography and hydrography	0
Environmental risks	0

Use Advanced Criteria for Rating
 Area segment is unusable Unusable
 Unusable
 Forest areas
 TPP - Buildings
 Lake (max +540m)
 Archaeological interest areas
 Aromatic cultivation area
 Vineyard cultivation area
 Landslide area
 Forest authority areas
 PV permission request

Attach file to area segment

Figure 25: Reasons for rendering a cell “unusable”

If none of these two special cases are selected, rating can be completed by utilizing the normal “simplified” criteria. When an area is rated based on a theme, a rating value can either be entered directly in the right-hand side score box, or selected by clicking on the blue text corresponding to the appropriate rating information (Figure 26). Also, a comment regarding the rationale or the information behind the rating can be included under the rating values.

For example, when rating for the “Geotechnical Stability” theme for an above ground mine and the “expected residual ground settlement...” is evaluated for a waste fill, the user can use the predefined criteria such as the overburden height, the time of placement and the equipment used for placement. In this situation the user has the following information about the waste fill: “The area has overburden between 50 and 70m and the waste material was placed 12 years ago, by a stacker”. This information places the rating between 2.00 and 3.00 so the user can manually enter “2.5” in the right box besides the criterion. This example is shown in Figure 26.

Geotechnical stability

Expected residual ground settlement ...

overburden H>120m, placement time <5y, Fill Area >10km ² , Stacker placed 1.00	overburden 70<H<120m, placement time 5<T<10y, Fill Area 5<A<10km ² , Stacker placed 2.00	overburden 30<H<70m, placement time 10<T<20y, Fill Area 1,5<A<5km ² , Heavy dumper 3.00	overburden 15<H<30m, placement time 20<T<40y, Fill Area 0,5<A<1,5km ² , Ligth dumper - truck 4.00	overburden H<15m, placement time T<40y, Fill Area A<0,5km ² , Compacted 5.00
--	--	---	---	--

Comments

The area has overburden between 50 and 70m and the waste material was placed 12 years ago, by a stacker

Slope stability - seismic risks ...

Comments

Impact of groundwater rebound (applies especially to interior dumps) ...

Figure 26: Rating for a specific theme

By clicking on the rating number under the appropriate criterion, the corresponding value will be entered as the rating for this criterion. The numerical value can be adjusted either by clicking and inserting a value from the keyboard or by using the up and down arrows. For example, if a score between 2 and 3 is needed, then the value of 2 can be selected and then adjusted to 2.5 which corresponds to a rating between 2 and 3.

Once the rating of a cell is completed and rating values have been assigned to all criteria, the rating should be saved by clicking the **save** button at the bottom of the screen (Figure 27). Once the rating values are saved, the rating will appear on the spider graph. Also the average score for the different criteria is shown at the left bottom of the screen together with the assigned typology for the cell (Figure 28). The user can then click on "OK" at the bottom of the screen and can continue rating of a different cell.

Development opportunities

Added land value due to its development potential ...

Negligible 1.00	Low 2.00	Moderate 3.00	Substantial 4.00	High 5.00
--------------------	-------------	------------------	---------------------	--------------

Comments

Figure 27: Completing the rating process

Legend:

- Forest, natural habitats
- Agriculture
- Industry, energy production
- Business, recreation, tourism
- Possible Water Body

Segment: 91, Area Size: 0.21 km²

Themes and Average Scores:

Theme	Average Score
Location	1.00
Geotechnical stability	1.67
Topography and hydrography	1.67
Environmental risks	2.67
Development opportunities	1.00

Land Use Segment Rating:

Forest, natural habitats	7.00
Agriculture	19.00
Industry, energy production	26.00

Scores section:

Copy scores from other segment

Figure 28: Displaying the rating of a cell

Once rating of a cell is completed, the application will access the next cell by identified numerical order. At any time the user can select a different cell. If most of the ratings of the cell that will be rated next are similar to the ratings of a previously rated cell, then the scores previously assigned can be copied to the current cell by clicking on **“copy scores from other segments”**. A drop-down menu will then appear so that the user can enter the cell number from which to copy the rating (Figure 29).

Copy scores from other segment

Copy Criteria Score values from segment: 1

Location:

- Distance to infrastructure and utilities ...: 3
- Distance to human settlements ...: 4

Figure 29: Copying ratings from previously rated cells

The copied rating can either be accepted or partially adjusted. The user needs to click on **save** at the bottom of the screen to complete the rating. In fact the information of any cell can be copied in to a different cell. The cell to be rated needs to be selected first. Clicking on “**copy scores from other segments**” will allow the users to select the number of the segment that the rating values should be copied from.

Attaching Extra Documentation and Information

During the cell rating process the user may upload a file which has been used the rating decision, e.g. a borehole report, an environmental report, a photograph or any other file that includes additional information, and attach it to the cell being rated. This file is stored for that cell only and can be reviewed in a later stage and/or can be seen by other Raters who may be rating the same project. To attach a document to a cell click on “**Attach file to area segment**” which is located below the map and above the “Copy scores from other segments”. In the form that appears (Figure 30) the user can select the file through the browse button and can also add comments regarding the uploaded file.

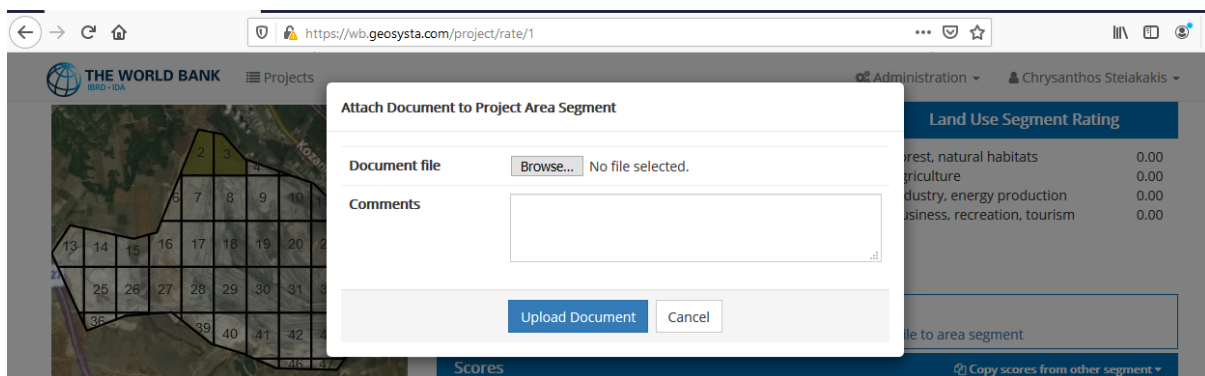


Figure 30: Attaching documentation to a project area segment (cell)

Rating Results and Reporting

As soon as the rating of the selected area is completed the colored typology map is displaying on the screen together with the pentagram for the selected cell. The user can then review any cell and modify the rating to new values (Figure 31).

PPC Mavropigi mine

Above Ground Evaluation

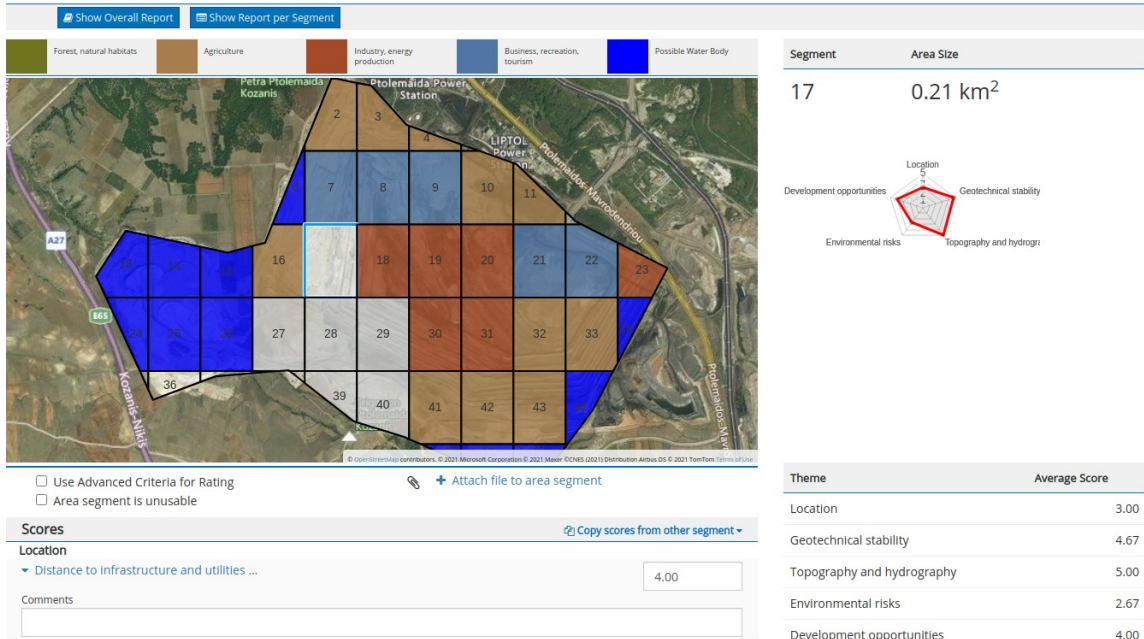


Figure 31: Completed rating

When the rating process is completed, click the “Show Overall Report” button at the top left of the screen (Figure 32).

The final outcome of the rating will then be displayed including the map with the different assigned typologies (Figure 33).

PPC Mavropigi mine

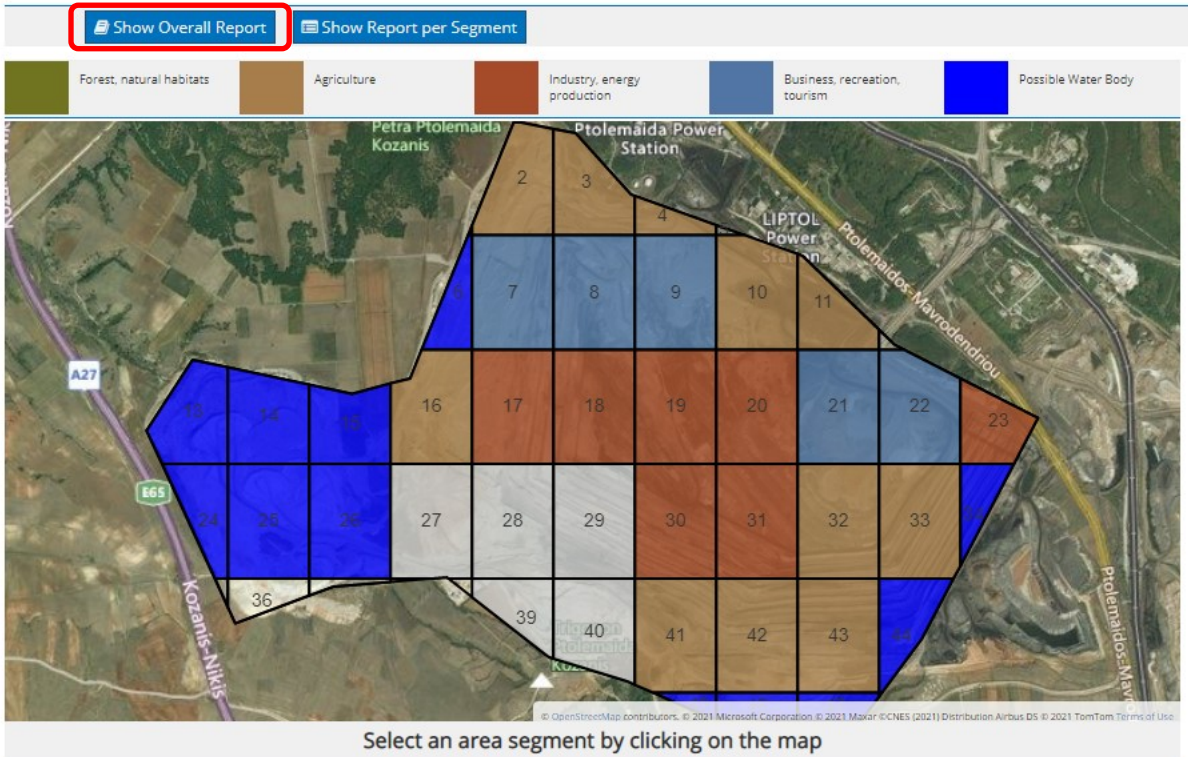


Figure 32: Overall report

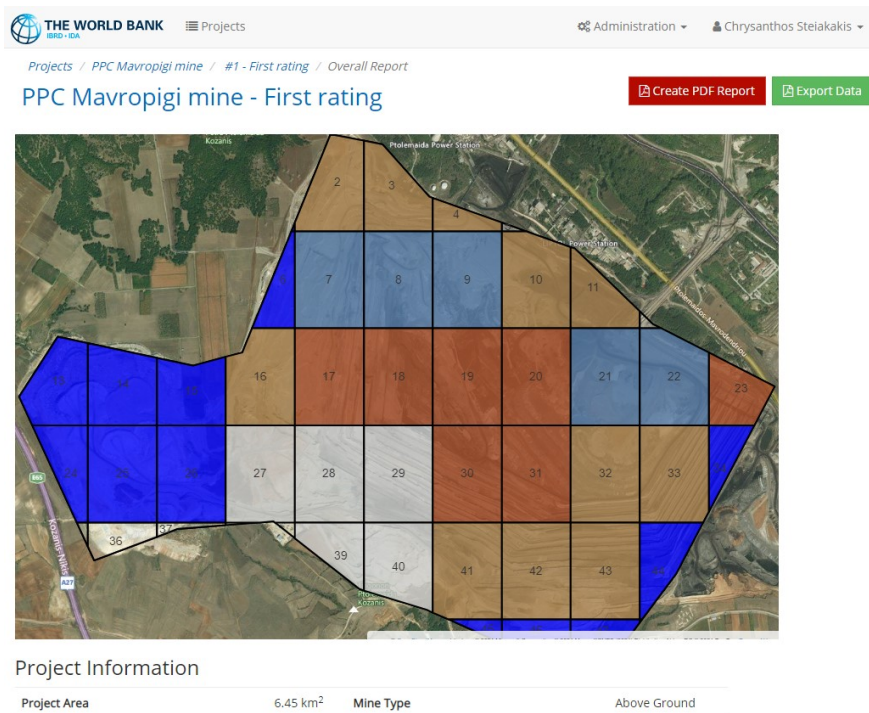


Figure 33: Final rating outcome

Under the map the project information is displayed including the total area that was selected for rating, the number of segments and the segment dimensions (Figure 34).



Project Information

Project Area	6.45 km ²	Mine Type	Above Ground
Total Area Segments	48		
Segment Width	0.50 km	Segment Height	0.50 km

Usage Statistics

Utilization	Total Segments	Total Area Size	%
Industry, energy production	7	0.94km ²	14.58
Business, recreation, tourism	5	0.67km ²	10.42
Forest, natural habitats	0	0.00km ²	0.00
Agriculture	11	1.48km ²	22.92
Possible Water Body	13	1.75km ²	27.08
Total	36	4.84km²	75.00

Unusable Category	Total Segments	Total Area Size	%
Unusable	5	0.67km ²	10.42
Total	5	0.67km²	10.42

Figure 34: Project rating outcome and statistics

The different typologies are then presented, including the number of cells with the same typology assigned and the percent of the total area that each typology covers (Figure 34)

Finally, a short one-page project report can be created by clicking the “Create PDF Report” button at the upper right corner of the screen ().

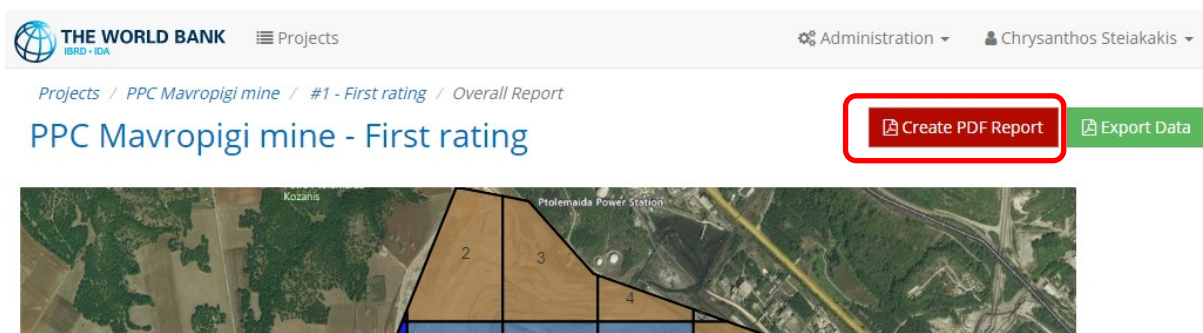


Figure 35: Creating a PDF report

After the rating and reporting have completed the user may select to edit the existing rating or create a new rating project that pertains to the same or a different area in the same or different location / country.

When more than one rating have been completed for a specific project, an overview of each rating's outcomes can be displayed by clicking on the "Results" button in the Project Ratings Page (Figure 36).

The screenshot shows the 'Sample Project - Ratings' page. At the top, there is a navigation bar with 'THE WORLD BANK' logo, 'Projects' menu, 'Administration' dropdown, and user 'Chrysanthos Steiakakis'. Below the navigation bar, the page title is 'Sample Project - Ratings'. A horizontal menu contains buttons for '+ Start new rating', 'Documents', 'Depictions', 'Results' (highlighted with a red box), and 'Export Data'. Below the menu is a table with the following data:

#	Comments	Mine Type	Started On	Started By	Last Updated	Updated by	Status	Report
1	Surface Area Evaluation	Above Ground	23/06/2021 08:04:40	Chrysanthos Steiakakis	23/06/2021 08:08:22	Chrysanthos Steiakakis	1	Show Delete
2	Subsurface Area Evaluation	Below Ground	23/06/2021 08:05:07	Chrysanthos Steiakakis	23/06/2021 08:05:07	Chrysanthos Steiakakis	1	Show Delete

Figure 36: Overview of project ratings

This will show the utilization category percentages derived for each rating conducted, as well as some basic information about the rating, such as the user that created it, the time of last update and the Mine Type (Figure 37).

Sample Project - Ratings

Create Combined Evaluation

1 - Surface Area Evaluation

Started By: Chrysanthos Steiakakis

Last Updated: 23/06/2021

Mine Type: Above Ground

Utilization Results

Industry, energy production	0.00 %
Business, recreation, tourism	0.00 %
Forest, natural habitats	1.34 %
Agriculture	0.00 %
Possible Water Body	0.00 %

2 - Subsurface Area Evaluation

Started By: Chrysanthos Steiakakis

Last Updated: 23/06/2021

Mine Type: Below Ground

Utilization Results

Agriculture	0.00 %
Possible Water Body	0.00 %
Industry, energy production	0.00 %
Business, recreation, tourism	0.00 %
Forest, natural habitats	0.00 %

Figure 37: Summary of multiple ratings for the same project

Combined Evaluations

In the results overview, the user can generate combined evaluations that will use the data from a selection of the various existing ratings conducted. By clicking on “**Create Combined Evaluation**” they will be presented with a set of controls to assign a **title and description** for the combined evaluation as well as “**checkbox**” selections to choose which of the ratings will be considered. By default, all project ratings are selected. At least two ratings should be selected for the evaluation (Figure 38).

The screenshot shows the 'Sample Project - Ratings' page. At the top, there is a navigation bar with 'THE WORLD BANK' logo, 'Projects' menu, 'Administration' dropdown, and user 'Chrysanthos Steiakakis'. Below the navigation, the breadcrumb is 'Projects / Sample Project / Rating Results'. The main heading is 'Sample Project - Ratings'. A green button with a plus icon and the text 'Create Combined Evaluation' is highlighted with a red box. Below this is a form titled 'Create new Combined Evaluation' with a checked checkbox 'Select All Evaluations', input fields for 'Title' and 'Comments', and 'Submit' and 'Cancel' buttons. Below the form are two evaluation cards. The first card is for '1 - Surface Area Evaluation', started by Chrysanthos Steiakakis on 23/06/2021, with a mine type of 'Above Ground'. Its utilization results table is as follows:

Utilization Results	
Industry, energy production	0.00 %
Business, recreation, tourism	0.00 %
Forest, natural habitats	1.34 %
Agriculture	0.00 %
Possible Water Body	0.00 %

The second card is for '2 - Subsurface Area Evaluation', also started by Chrysanthos Steiakakis on 23/06/2021, with a mine type of 'Below Ground'. Its utilization results table is as follows:

Utilization Results	
Agriculture	0.00 %
Possible Water Body	0.00 %
Industry, energy production	0.00 %
Business, recreation, tourism	0.00 %
Forest, natural habitats	0.00 %

Figure 38: Creating combined evaluations

Once all the required inputs are provided, the user can click on “**Submit**” (Figure 38) and the combined evaluation will be generated. The “combined evaluation” compares every segment of the project that has a different typology regardless if it is an above or below ground rating and returns the typology with the lowest rating. For example, if five (5) ratings have been made for an area (and a segment), and three (3) ratings have produced an agricultural use and the other two (2) ratings have produced a residential development, the typology with the lowest value is assigned in the combined evaluation which for this case is agriculture. It must be pointed out that even if a large majority of ratings have selected a typology of high value, even one with low value, will be the dominant one.

Once the evaluation is completed the user will be presented with a view where a map of the evaluation results is displayed. By clicking on each cell, the user will be presented with the information regarding the values that were derived by each rating and the overall result based on the evaluation (Figure 39).

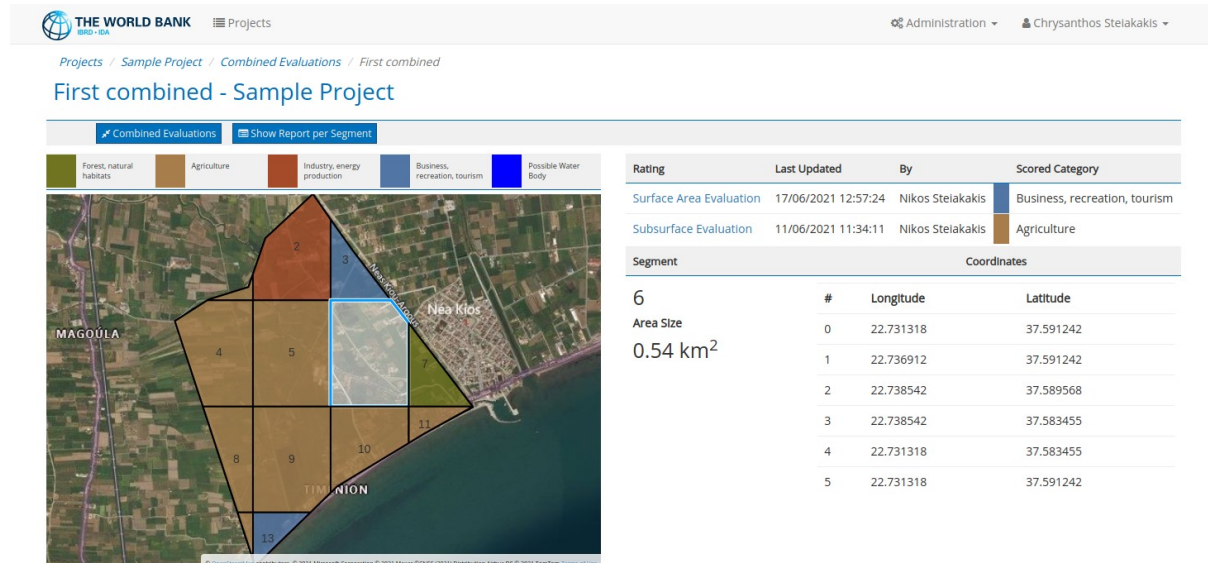


Figure 39: Presenting combined evaluations

The user can also click on “**Show Report per Segment**” to display a list of all area segments and their corresponding evaluation results as shown in Figure 40.

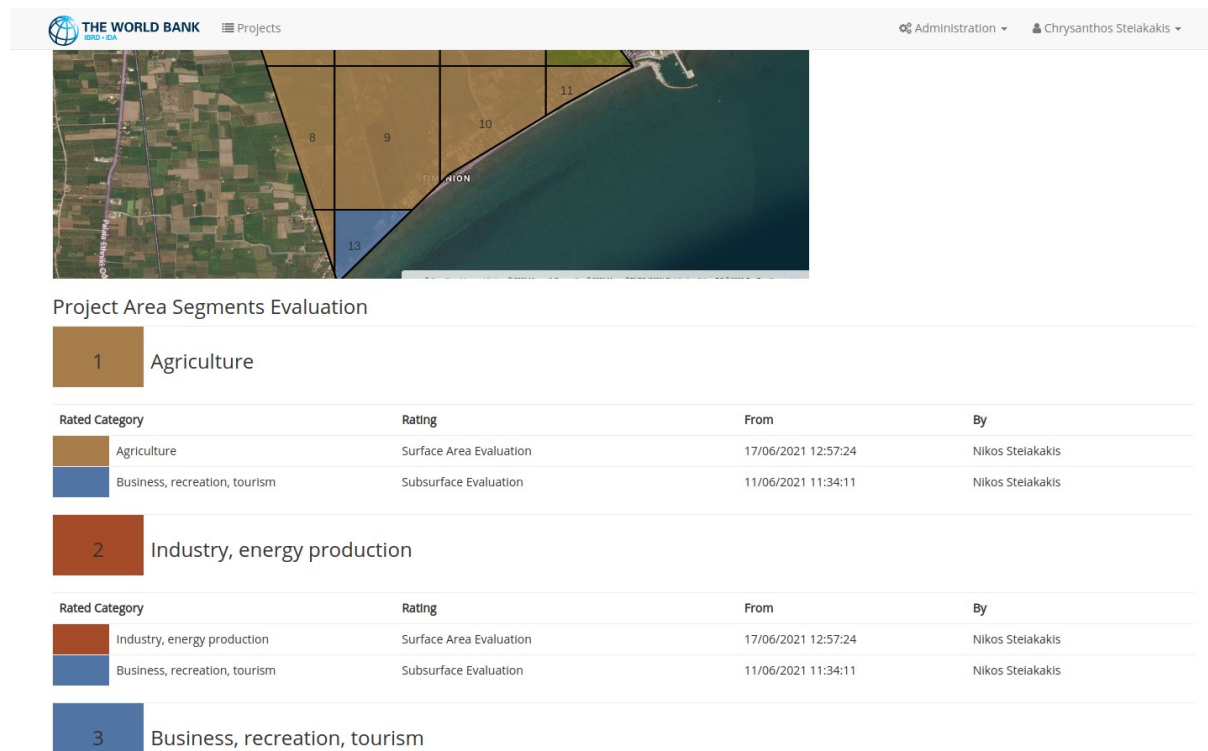


Figure 40: Combined evaluation ratings for a specific cell

The user can also create a PDF version of this report page by clicking on “**Create PDF Report**” at the top right hand side of the page. The user can access all combined evaluations for a particular project by clicking on “**Combined Evaluations**” at the top options list in the Project Ratings page (Figure 41).

Projects / Sample Project

Sample Project - Ratings

#	Comments	Mine Type	Started On	Started By	Last Updated	Updated by	Status	Report
1	Surface Area Evaluation	Above Ground	11/06/2021 11:18:28	Nikos Stelakakis	17/06/2021 12:57:24	Nikos Steiakakis	1	Show Delete
2	Subsurface Evaluation	Below Ground	11/06/2021 11:34:11	Nikos Stelakakis	11/06/2021 11:34:11	Nikos Steiakakis	1	Show Delete

Figure 41: Combined evaluation options

Enhancing Project Views

Uploading Extra Depictions

The user can add extra layers to the project area map views. In the project rating views, click on “Depictions” (Figure 42)

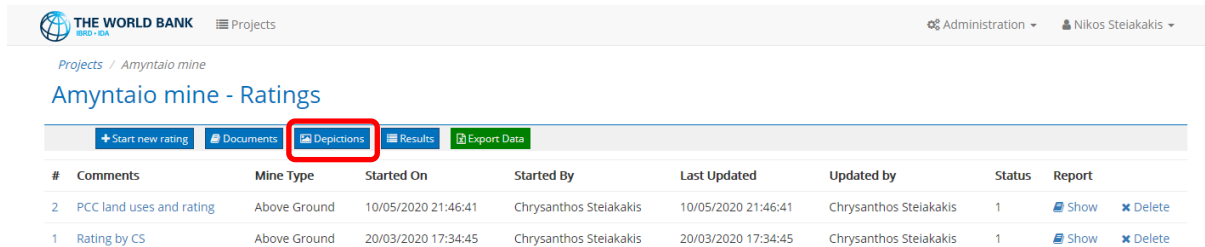


Figure 42: Depictions

This action will navigate the user to the “Depictions” upload page (Figure 43).

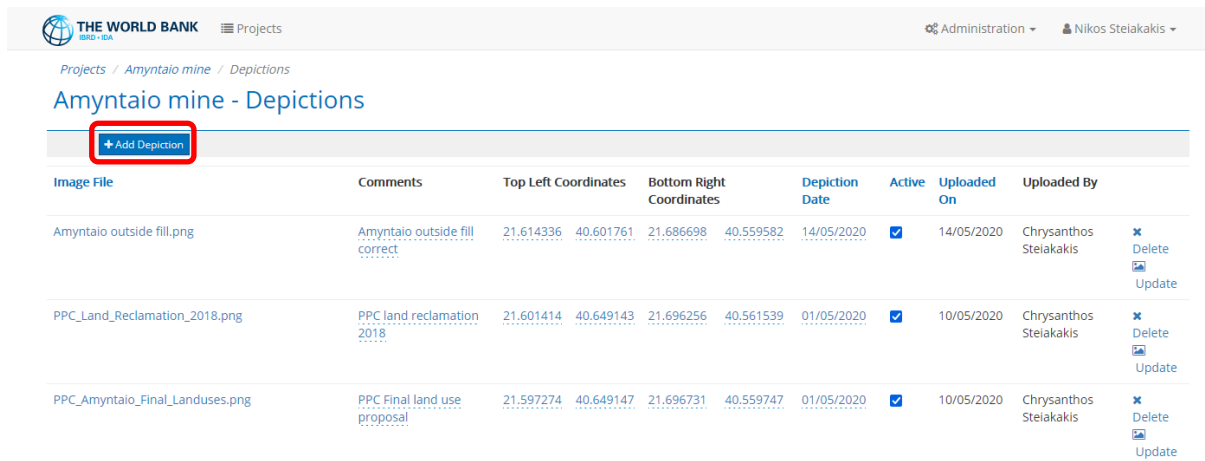


Figure 43: Depictions upload page

By clicking on “Add Depiction” the depiction upload form will be displayed. There the user can choose to upload any geolocated image that needs to be displayed as an overlay on the project area maps (Figure 44).

Projects / Amyntaio mine / Depictions / Upload

Amyntaio mine - Add Depiction

Upload File Information

Depiction file No file selected.

Depiction Date

Top Left Coordinates Lng Lat

Bottom Right Coordinates Lng Lat

Comments

Figure 44: Adding a project depiction

The user must provide the top left and bottom right coordinates in WGS84 (GPS) format. This will enable the application to display the image on the proper position on the map. Multiple images or maps can be uploaded for an area. These images include topographic maps, hydrogeological maps, water elevation contours, natural habitat areas, contaminated sites, restricted areas, etc. These can be used during rating for the user to be able to address the information per segment more easily.

Changing Depiction Views During Ratings

The depictions uploaded will be displayed as layers over the actual map but below the project area grid as shown in Figure 45.

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Projects

Projects / Amyntaio mine / #1 - Rating by CS

Amyntaio mine

Show Overall Report Show Report per Segment

Forest, natural habitats Agriculture Industry, energy production Business, recreation, tourism Possible Water Body

Select Depiction Overlays

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Select an area segment by clicking on the map

Figure 45: Depiction overlays

Uploaded depictions can be deactivated or re-activated from the “**Depictions**” list page (Figure 46).

Image File	Comments	Top Left Coordinates	Bottom Right Coordinates	Depiction Date	Active	Uploaded On	Uploaded By
Amyntaio outside fill.png	Amyntaio outside fill correct	21.614336 40.601761	21.686698 40.559582	14/05/2020	<input checked="" type="checkbox"/>	14/05/2020	Chrysanthos Steiakakis

Figure 46: Activating and de-activating depictions

Depictions marked as active will be displayed on the map, while non-active depictions will not. While conducting actual ratings and evaluations, the user can easily toggle the visibility of each active depiction directly via the map. The option “**Select Depiction Overlays**” will be displayed on top of the map. When the user clicks on it, a list of the active depictions will be displayed (Figure 47).

The screenshot shows a web interface for managing map overlays. At the top, there are two buttons: "Show Overall Report" and "Show Report per Segment". Below these are five category filters: "Forest, natural habitats", "Agriculture", "Industry, energy production", "Business, recreation, tourism", and "Possible Water Body". A red box highlights the "Select Depiction Overlays" button. Below this, a modal window is open, displaying a list of active depictions. The list has columns for "Show", "Info", "File", and "Depiction Date". The items in the list are:

- Piezometric map September 2016 PPC (File: Hydro.png, Date: 20/03/2020)
- Topo Amyntaio 2020 (File: Ορυχεία Αμυνταίου - Λακκιάς Πρόσφατη Στάθμη_Φεβρουάριος 2020.png, Date: 01/02/2020)
- PPC Final land use proposal (File: PPC_Amyntaio_Final_Landuses.png, Date: 01/05/2020)
- PPC land reclamation 2018 (File: PPC_Land_Reclamation_2018.png, Date: 01/05/2020)
- Amyntaio outside fill correct (File: Amyntaio outside fill.png, Date: 14/05/2020)

 A "Close" button is visible at the bottom of the modal. At the bottom of the screenshot, there is a text prompt: "Select an area segment by clicking on the map".

Figure 47: Selecting depiction overlays

The user can select to display only a subset, or even none of the available depictions. This will automatically hide any depictions that are not selected. This, however, does not change the status of a depiction being “Active” as in the previous step. This means that if other users are conducting ratings, they will be able to see the depictions and perhaps even choose a different subset of depictions without affecting one another.

Application Administration

Advanced users with the **assigned privileges** also have access to the “**Administration**” section of the application where they can modify most of the predefined inputs for the system. If a user has been assigned administrative privileges the user will be able to see an “**Administration**” link on the top right of the page (Figure 48).

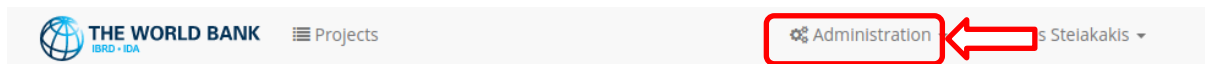


Figure 48: Administration option

When the “**Administration**” link (at the upper right part of the screen next to the user name) is invoked, the drop-down menu shown in Figure 49 is displayed.

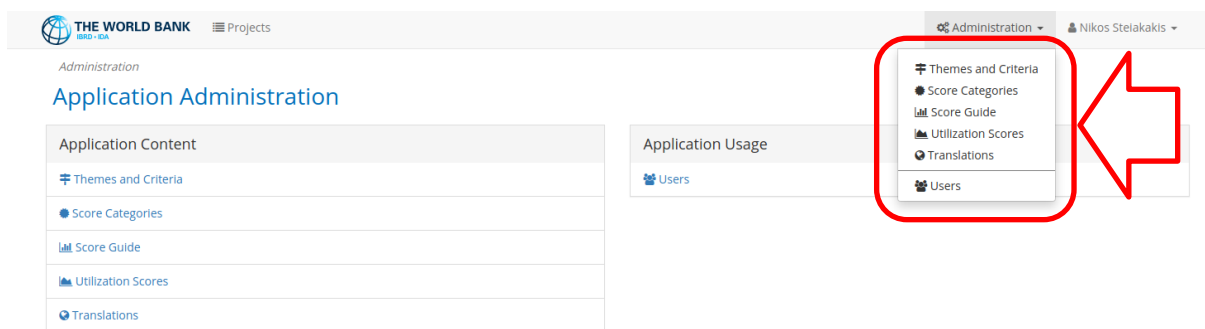


Figure 49: Administration menu

Using the drop-down menu the user can select the respective administrative section.

Themes and Criteria

If the first option, i.e. “**Themes and Criteria**”, is selected, the descriptions for themes and criteria can be edited.

THE WORLD BANK | Projects | Administration | Nikos Steiakakis

Administration / Themes and Criteria

Themes and criteria

Showing Criteria for mine type: Above Ground

Location

Criteria	Favorable for...	Unfavorable for...
Distance to infrastructure and utilities	Any industrial process that depends on delivery and shipping of goods or materials by road, and requires / produces significant amounts of energy and water, and solid and liquid waste.	Recreational areas, research parks and other non-industrial uses may be negatively impacted by proximity to infrastructure.
Distance to human settlements	Recreational, business / research facilities would profit from closeness.	Industrial activities creating noise, emissions, odors and other risks / impacts should be isolated from settlements.

Geotechnical stability

Criteria	Favorable for...	Unfavorable for...
Expected residual ground settlement	Almost irrelevant for agriculture and forests, recreation and tourism.	Can be extremely important for large scale structures with high loads and low tolerances esp. for differential settlement.
Slope stability – seismic risks	Potential risk for any utilization scenario.	Can be actively hazardous for community health and safety, and infrastructure near the slopes of OD. Relevant for almost any use scenario; seismic risks need to be factored into ground stability assessments
Impact of groundwater rebound (applies especially to interior dumps)	Almost irrelevant for agriculture and forests, recreation and tourism; can have positive biodiversity impacts due to creation of lakes, ponds and wetlands with high ecological value.	Can be very relevant and have negative impacts for large scale structures with high loads and low tolerances esp. for differential settlement. Potential agricultural and recreational issues due to water percolating through fly ash layers with elevated heavy metals content in OD

Figure 50: Administration of themes and criteria

The “**Mine Type**” drop-down list at the top left (Figure 50) controls the criteria group that a user can edit. For example, the criteria shown in Figure 50 correspond to the criteria for surface mines or “above ground” mine types.

By clicking on the each criterion, the user can navigate to the corresponding edit page for that criterion (Figure 51).

THE WORLD BANK | Projects | Administration | Nikos Steiakakis

Administration / Themes and Criteria / Edit Criterion [Distance to infrastructure and utilities]

Location

Distance to infrastructure and utilities

Favorable for

Any industrial process that depends on delivery and shipping of goods or materials by road, and requires / produces significant amounts of energy and water, and solid and liquid waste.

Unfavorable for

Recreational areas, research parks and other non-industrial uses may be negatively impacted by proximity to infrastructure.

Overrides Generic Score

Advanced Criteria

Parent Criterion:

Fill. Set.:

Fill. Stab.:

Cut. Stab.:

Figure 51: Editing the “distance to infrastructure and utilities” criterion

The edit page (Figure 51) allows the user to edit the description text and also format the text. At the bottom of the page, there are options to edit “Advanced Criteria” such as the criteria pertaining to slope stability.

Score Categories

If the “Score Categories” option is selected from the “Administration” drop-down menu, the user is allowed to modify the description and/or color of each Category (Figure 52). To accomplish that, the user should click the left mouse button on the blue colored text, and/or on the color icon that corresponds to each Category (Figure 52).

The screenshot shows a web application interface for managing categories. At the top, there is a header with 'THE WORLD BANK' logo, 'Projects' menu, 'Administration' dropdown, and user name 'Nikos Stelakakis'. Below the header, the breadcrumb 'Administration / Score Categories' is visible, followed by the title 'Category Attributes'.

There are two main panels: 'Score Categories' and 'Unusable Categories'.

Score Categories Table:

Category	Color	Comments	Override	Override Score	Priority
Forest, natural habitats		----	<input type="checkbox"/>	--	1
Agriculture		----	<input type="checkbox"/>	--	2
Industry, energy production		----	<input type="checkbox"/>	--	3
Business, recreation, tourism		----	<input type="checkbox"/>	--	4
Possible Water Body		Special category	<input checked="" type="checkbox"/>	1.00	5

Unusable Categories List:

- [Unusable](#)
- [Forest areas](#)
- [TPP - Buildings](#)
- [Lake \(max +540m\)](#)
- [Archaeological Interest areas](#)
- [Aromatic cultivation area](#)
- [Vineyard cultivation area](#)
- [Landslide area](#)
- [Forest authority areas](#)
- [PV permission request](#)

At the bottom of the 'Unusable Categories' panel, there is a button labeled '+ Add Unusable Category'.

Figure 52: Editing category descriptions

The user can also edit the Unusable Categories and change the respective color. The software allows the creation of more than one unusable category, since these categories may not be known beforehand. The same or different colors can be assigned to different “Unusable Categories” that will eventually be displayed on the main map. The number of main categories cannot be increased or decreased because they are directly linked to the rating capability of the application.

Score Guide

If the “**Score Guide**” option is selected from the “**Administration**” drop-down menu (Figure 49), the user is allowed to edit or modify the rating criteria scale. For example, by clicking on the “**Edit**” button on the right the value “>2.500m” can be changed to a different value, for example 5,000m (Figure 53).

THE WORLD BANK
IBRD - IFC

Projects

Administration

Nikos Steiakakis

Administration / Score Guide

Score Guide

Showing Criteria for mine type:

Below Ground

Location

Proximity to infrastructure and utilities

1.00	> 2,500 m	Edit
2.00	1,000 - 2,500 m	Edit
3.00	500 - 1,000 m	Edit
4.00	250 - 500 m	Edit
5.00	0 - 250 m	Edit

Proximity to human settlements

1.00	> 10 km	Edit
2.00	10 - 5 km	Edit
3.00	5 - 2 km	Edit
4.00	2 - 1 km	Edit
5.00	0 - 1 km	Edit

Geotechnical stability

Continuous spatial movement (subsidence)

1.00	Caving method, massive coal horlv, flat dipping, shallow with weak overburden strength, multiple level operations	Edit
------	---	------

Figure 53: Editing the score guide

Utilization Scores

If the “**Utilization Scores**” option is selected from the “**Administration**” drop-down menu (Figure 49), the user is allowed to edit or modify the weighting coefficients for each criterion (Figure 54).

Administration / Utilization Scores

Typical Land Repurposing Profiles

Showing Criteria for mine type:

Location

Criteria	Forest, natural habitats	Agriculture	Industry, energy production	Business, recreation, tourism	Possible Water Body
Distance to infrastructure and utilities	1.00	1.00	4.00	5.00	1.00
Distance to human settlements	1.00	3.00	2.00	5.00	1.00

Geotechnical stability

Criteria	Forest, natural habitats	Agriculture	Industry, energy production	Business, recreation, tourism	Possible Water Body
Expected residual ground settlement	1.00	3.00	4.00	4.00	1.00
Slope stability – seismic risks	1.00	1.00	5.00	5.00	1.00
Impact of groundwater rebound (applies especially to interior dumps)	1.00	2.00	5.00	3.00	1.00
Fill settlement / stability	1.00	3.00	4.00	4.00	1.00
Settlement only	1.00	3.00	4.00	4.00	1.00
Fill Stability only	1.00	1.00	5.00	5.00	1.00
Cut / longwall stability	1.00	2.00	5.00	5.00	1.00

Topography and hydrography

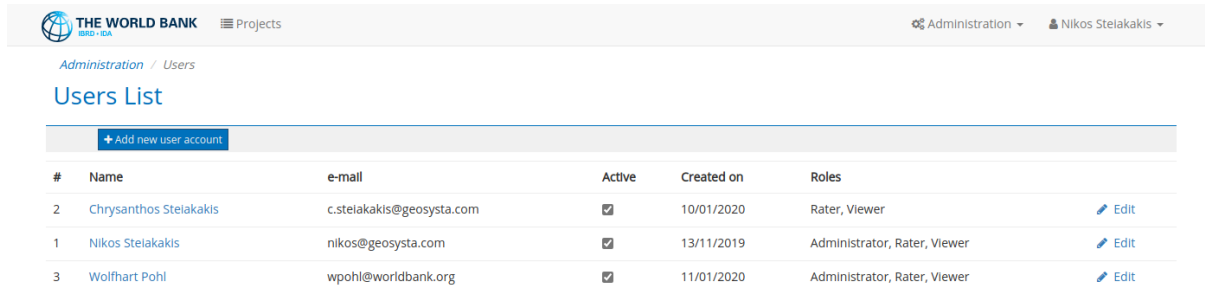
Criteria	Forest, natural habitats	Agriculture	Industry, energy production	Business, recreation, tourism	Possible Water Body
----------	--------------------------	-------------	-----------------------------	-------------------------------	---------------------

Figure 54: Editing the weighting factors for each criterion

The scores defined in this form (Figure 54) will be used for the calculation of the Land Usage Categories scoring based on the input provided by the users in each rating category. Users updating the utilization scores must be very thorough as this table enables the application to derive the proper utilization category of an area based on the rating value inputs. If, for example, any criteria have been assigned with inapplicable values (e.g. all 1s or all 5s) the results of ratings will be confusing and meaningless.

Users

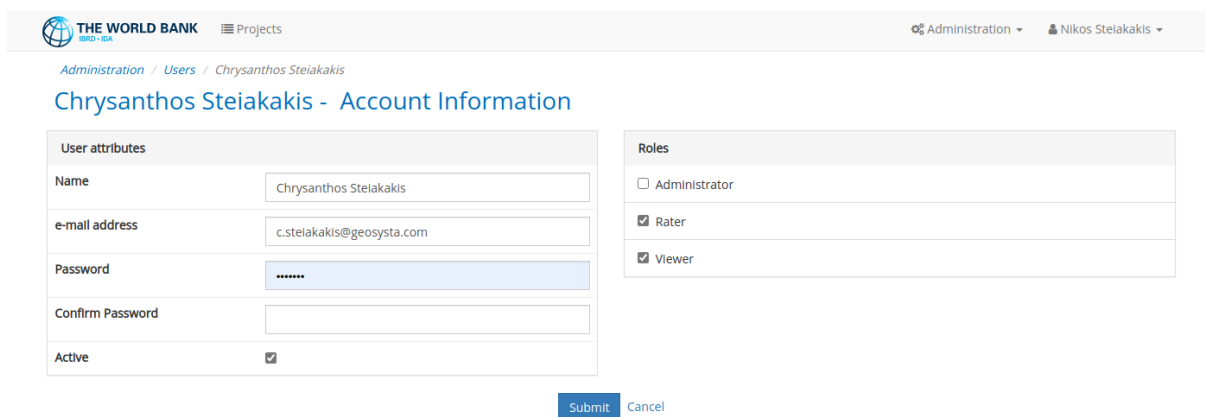
If the “Users” option is selected from the “Administration” drop-down menu (Figure 49), the user (administrator) is allowed to register new users that can log in and use this application (Figure 55) or edit the account information of existing users.



#	Name	e-mail	Active	Created on	Roles	
2	Chrysanthos Steiakakis	c.steiakakis@geosysta.com	<input checked="" type="checkbox"/>	10/01/2020	Rater, Viewer	Edit
1	Nikos Steiakakis	nikos@geosysta.com	<input checked="" type="checkbox"/>	13/11/2019	Administrator, Rater, Viewer	Edit
3	Wolfhart Pohl	wpohl@worldbank.org	<input checked="" type="checkbox"/>	11/01/2020	Administrator, Rater, Viewer	Edit

Figure 55: Editing the list of users

A user can be edited by clicking on the edit button on the right side (Figure 55). The user account information can be edited through the form shown in Figure 56.



User attributes		Roles
Name	<input type="text" value="Chrysanthos Steiakakis"/>	<input type="checkbox"/> Administrator
e-mail address	<input type="text" value="c.steiakakis@geosysta.com"/>	<input checked="" type="checkbox"/> Rater
Password	<input type="password" value="*****"/>	<input checked="" type="checkbox"/> Viewer
Confirm Password	<input type="text"/>	
Active	<input checked="" type="checkbox"/>	

Figure 56: User account information

The name, email, password and the corresponding user authorization, i.e. “Administrator”, “Rater” or “Viewer”, can be modified (Figure 56). If an “Administrator” role is assigned to a user, that user has full access to the application, while a “Viewer” role allows just viewing of the map and the final rating.

Translations

LURA provides functionality to translate most of the texts shown in descriptions and titles of the various entities (Figure 57).

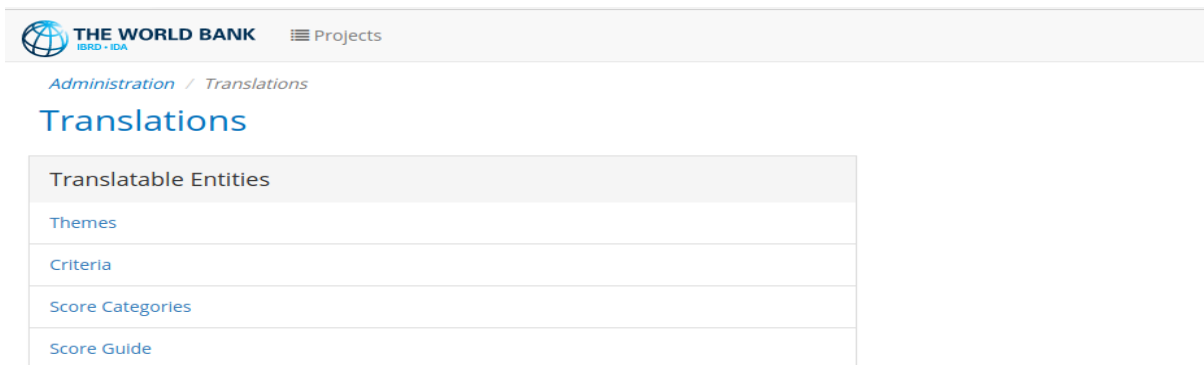


Figure 57: Text translation

Users with administrative privileges can update the available translations for each of the supported entities. The user is presented with the English texts in read-only form and the translations provided in an editable section (Figure 58).

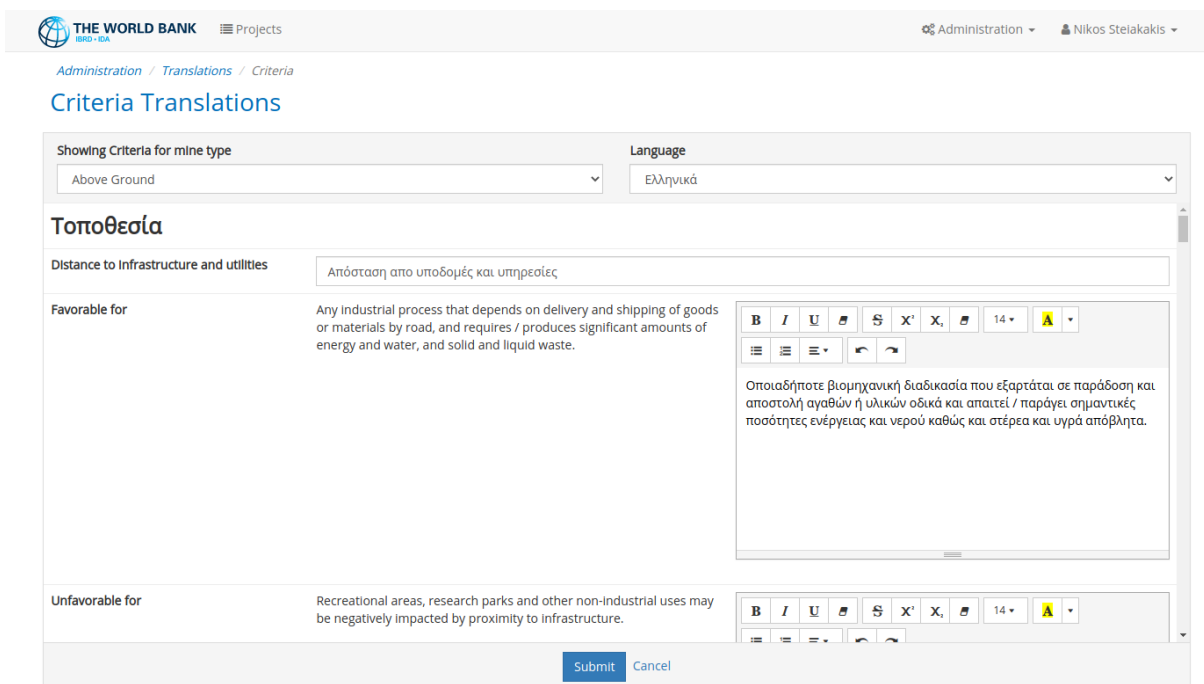
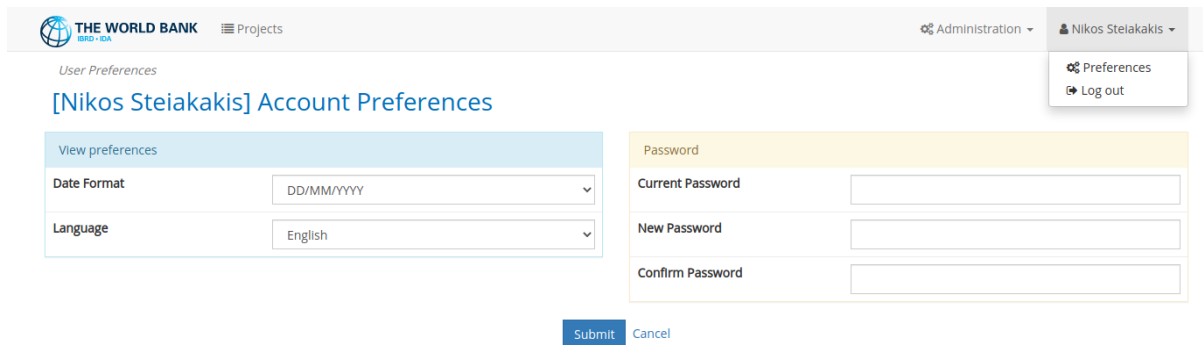


Figure 58: Translation form for each entity

User Preferences

Users can modify their password by selecting the “**Preferences**” option from the drop-down menu when clicking on their username at the top right-hand corner of the screen (Figure 59).



The screenshot shows the 'User Preferences' page for Nikos Stelakakis. The page is titled '[Nikos Steiakakis] Account Preferences'. It features two main sections: 'View preferences' and 'Password'. The 'View preferences' section includes a 'Date Format' dropdown set to 'DD/MM/YYYY' and a 'Language' dropdown set to 'English'. The 'Password' section includes three input fields: 'Current Password', 'New Password', and 'Confirm Password'. At the bottom of the page, there are 'Submit' and 'Cancel' buttons. The top navigation bar includes the World Bank logo, 'Projects', 'Administration', and the user's name 'Nikos Stelakakis' with a dropdown menu containing 'Preferences' and 'Log out'.

Figure 59: User preferences

On this page users can change their password if they want to. Furthermore, they are able to change the date format to be used on date displays in the application (dd/mm/yyyy or mm/dd/yyyy) as well as the language of choice for displaying descriptions and other text.

Users can choose only from the list of supported languages. English is assigned as the default language.