Manual for the ARVI tool

ARVI[1] is a tool that provides a multi-criteria approach for the impact significance assessment of environmental impacts. This manual aims to give guidance for the practical use of the tool. For the guidance related to the actual impact assessment methods see the links below.

In this document, "ARVI" refers to the main Excel file of ARVI. From this file, it is possible to produce separate assessment forms for the experts to fill in. These are also Excel files, and in this document, they are called "ARVI assessment forms" or just "assessment forms".

1.   Introduction

1.1   Assessment process

The use of the ARVI software (or tool – these terms are used interchangeably) starts with defining the problem and its elements. This phase includes defining at least the alternatives and the impacts to be assessed. For the impact significance assessment, ARVI uses by default the assessment criteria developed in the IMPERIA project, but the criteria can be changed. ARVI also makes it possible to assess imprecision and uncertainty.

The definition phase should be carried out carefully, as all the assessments are based on it. For example, if the assessment criteria are changed afterwards, the assessments may have to be carried out again with these new criteria. Nevertheless, after the definition of the alternatives and the impacts to be assessed, one can start the actual impact significance assessment.

There are two possible approaches for inputting the impacts significance assessments into the software:

a. **The project manager creates separate assessment forms for each expert carrying out the assessments.** Then, each expert has his/her own Excel assessment form, in which he/she fills in the assessment of the impact significance and its components, related uncertainties, imprecision and possible mitigation and cumulative effects, as well as reasoning for all of these. The project manager loads the data from these assessment forms to ARVI with its load option.

b. **The project manager puts the ARVI Excel file to the shared network location**. The expert fills in the assessment information directly to the worksheets of ARVI. In this option, all the experts use the same Excel file, and thus, only one of them can edit it at a time.

In the IMPERIA pilot projects, the both approaches have been tested. Using the separate assessment forms is likely to be easier, if the experts are not very familiar with ARVI. However, some experts are used to use shared files, in which case using only the main ARVI file may be more convenient. If the choice is not clear, we recommend using option a. However, regardless of the choice of the option, all the assessment data are eventually collected into the worksheets of ARVI. From this file, one can create various kinds of results tables and figures including both conventional summary tables used in EIA reports as well as some new kinds of tables and figures. All these can be directly copied, for example, to the EIA report.

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[1] Name ARVI comes the Finnish word "arviointi", which means assessment

ARVI contains many different worksheets for the different phases or tasks of the project. When starting a new project, the use of ARVI proceeds in the same order as the worksheets are ordered. The worksheets are divided into five themes, under which there can be subthemes, and the worksheets are numbered accordingly 1, 2.1, 2.2, and so on.

The worksheets in the main ARVI file:

Phase of the process	Worksheets
Defining the basic information of the project	1. Project
Defining the elements of the assessment	2.1. Alternatives & impacts 2.2. Criteria for significance 2.3. Criteria for uncertainties
Impact significance assessments	3.1. Significance table 3.2. Reasoning for significance 3.3. Uncertainties table 3.4. Reasoning for uncertainties
Producing the result tables and figures	4. Results
Identification of the impact assessments needing special attention (optional)	5. Reference values

The impact significance assessment data are gathered to the table on the worksheet **3.1 Significance table**. The basic principle is that each alternative has its own table on this worksheet.

The reasoning for the assessments is gathered on the next worksheet **3.2 Reasoning for the significance**. The related uncertainties and their reasoning are gathered similarly on the worksheets 3.3 and 3.4.

The results tables and figures can be produced on the worksheet **4 Results**. On this worksheet, one can select which kind of a tables or figures he/she wants to create.

1.2 Supported Excel versions

ARVI supports Excel versions 2010 and later on Windows platform. ARVI has been programmed with 32-bit Excel versions 2010 and 2013 on Windows platform.

Unfortunately, ARVI does not work with the Excel for Mac. Although the Excel for Mac versions have support for the VBA programming technology used in ARVI, this technology is not adequately compatible with the technique used in the Windows version.

1.3 Allowing the Macros

ARVI asks for allowing the Macros on the first time of the use. The use of ARVI requires using macros, because many of its functionalities are implemented with them.

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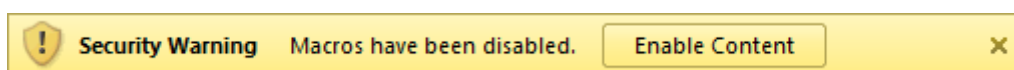
ARVI uses the programming functionalities of Excel, which are implemented with Visual Basic for Applications technique (VBA). The protection feature of Excel requires to explicitly give a permission to run a program written with this technique. This permission is only asked once when first time opening ARVI. The aim of this confirmation is to protect the user, as the programming features of Excel can also be used for harmful purposes.

2. Defining the project information

The use of ARVI is started by writing the name of the project and the contact information of the project manager on the first worksheet **1 Project.** The aim is to provide the basic information about the project for other people opening the file and also for keeping record of the projects for archiving purposes.

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3.   Defining the alternatives

The alternatives are first defined in a separate pop-up window, which appears by pressing the **Add or delete alternatives** button. After this they can be edited directly in the Excel worksheet. In ARVI, the addition and deletion of the rows in the worksheets must **always** be carried out in these separate pop-up windows. This is because all the different data worksheets use the same structure, and otherwise the changes are not updated to the other worksheets. In other respects, working with ARVI can be carried out similarly as normally working with Excel worksheets.

The alternatives are defined in the worksheet **2.1 Alternatives & impacts**.

Alternatives under Assessment

Project alternative	Further specification	Caption Bar Color
ALT 1	Wind farm	
ALT 1	Power line	
ALT 2	Wind farm	
ALT 2	Power line	

Update worksheets	Add or delete alternatives

3.1   Add or delete alternatives

Adding or deleting alternatives must always be carried out in a separate pop-up window. This is opened by clicking **Add or delete alternatives** button.

Alternatives under Assessment

Project alternative	Further specification
ALT 1	Wind farm
ALT 1	Power line
ALT 2	Wind farm
ALT 2	Power line

Move: ▲ ▼

Create new	Edit	Delete	OK
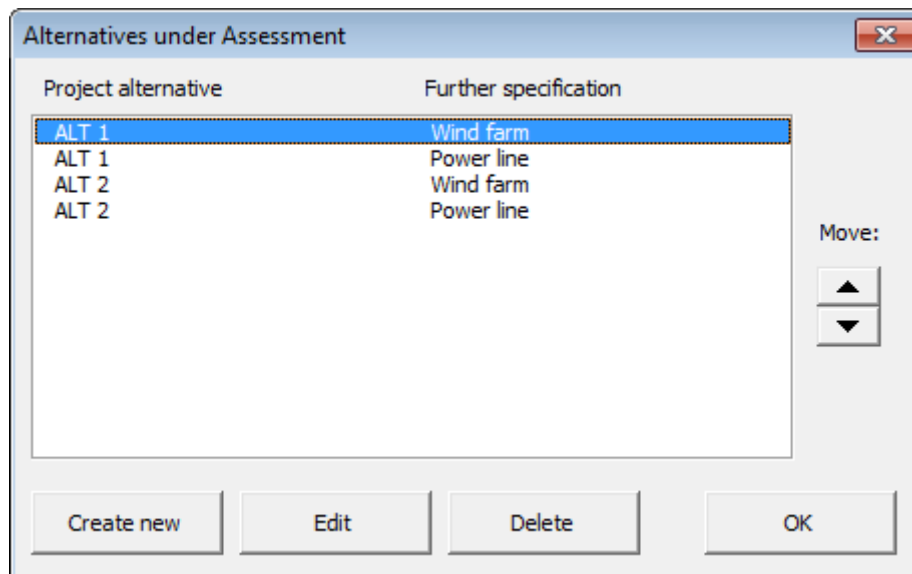
Note!

The changes made in this pop-up window take effect instantly in the other worksheets, too. If you, for example, delete an alternative, you also delete all the assessment data under this alternative.

Note!

In ARVI, the addition and deletion of the rows in the worksheets must **always** be carried out in the separate pop-up windows for adding/deleting alternatives/impacts. **The rows must not be deleted or added from the Excel menu.** This is because all the different data

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worksheets use the same structure, and otherwise the changes are not updated to the other worksheets.

However, if you have accidentally added rows by using "Insert row" function in the Excel menu, the situation can be probably corrected as follows. First, save the ARVI file with the different name and close it. After this, open this file again, and click **Update worksheets** button. If everything seems to be ok, then no harm has probably been done. If there is some "mess" appeared between the tables in worksheets, you can remove these, and perform again the closing and opening of the file.

3.2   Further specification

Usually, one only makes one significance table for each alternative. In this case, there is no need to fill in anything on the space for further specification. However, if one wants to fill in several impact assessment tables for the same alternative, one can use this space to specify these. This can be a case, if one wants to separately assess the impacts of each alternative, for example, for:

- construction and operation time of the project,
- close and distant impact area,
- different locations of the project
- different actions under each alternative
- expert assessment and stakeholder group assessment.

3.3   Color of the title

Color of the title is used to identify the different alternatives. The chosen colors are shown in the titles of data tables of different alternatives on worksheets 3.1 – 3.4. The color is set by choosing a suitable **fill in color** for this cell from the Excel menu.

3.4   Updating changes to the worksheets

The changes made in this worksheet are updated to the other worksheets by clicking **Update worksheets**. This updates the information changes made in this worksheet to all the tables in worksheets 3.1 – 3.4. One should, however, note that the changes made in the pop-up windows for adding/deleting alternatives/impact are updated automatically to the worksheets directly when closing the pop-up windows. Thus, clicking **Update worksheets** is only needed, when the changes made in the cells of this worksheet are wanted to be updated. Clicking **Update worksheets** always updates all the changes made in worksheets 2.1 – 2.3, thus, including all the alternatives and impacts as well as criteria for significance and uncertainties.

4. Defining the impacts to be assessed

In ARVI, the impacts to be assessed are also defined in the worksheet **2.1 Alternatives & impacts**, and they classified into impact categories. The impacts and their categories form a hierarchical structure, with an upper level for categories and a lower level for the impacts. This hierarchical structure can be viewed by clicking **Impact tree** button. One can ignore the classification by classifying all the impacts into the same category.

Categories and impacts can be modified in Excel worksheet, but similarly as on alternatives, the adding or deleting of them must always be carried out through a separate pop-up window, which can be opened by clicking **Add or delete impacts** button.


4.1 Add or delete impacts

Adding or deleting impacts must always be carried out in a separate pop-up window. This is opened by clicking **Add or delete impacts** button in worksheet 2.1.

Clicking opens a pop-up window showing the list of impact categories. In this **Impact categories** window, one can add or delete categories by clicking the respective **Create category** or **Delete category** button. The aim of categories is to help classifying the impacts, but if classification is not needed, all the impacts can be classified into the same category.
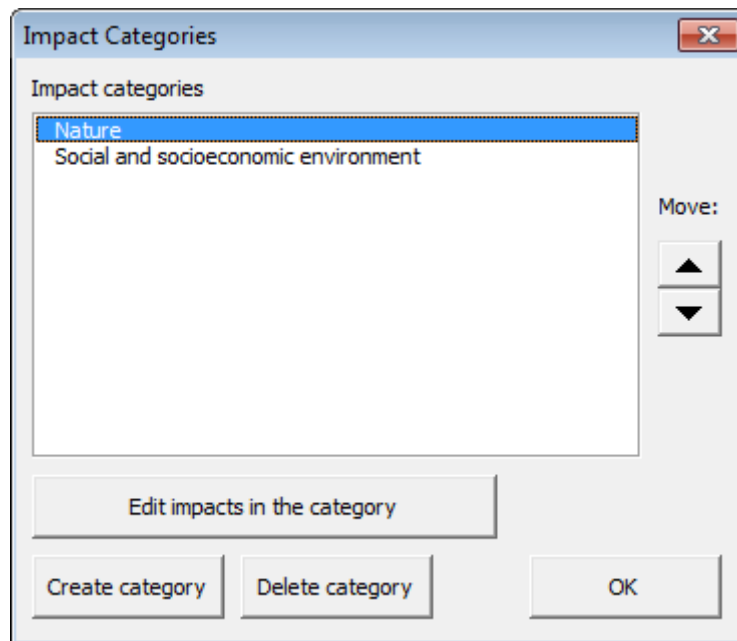
Note!

Deleting an impact category also deletes all the impacts as well as all the assessment data under it. Thus, one should be very careful when deleting impact categories.

Impact category name and the list of impacts under it can be edited by double-clicking the impact category name or by selecting the category and clicking **Edit impacts in the category button**. Both ways open up a new window named after the impact category name. In this window, there are functions for adding and deleting impacts in this category.
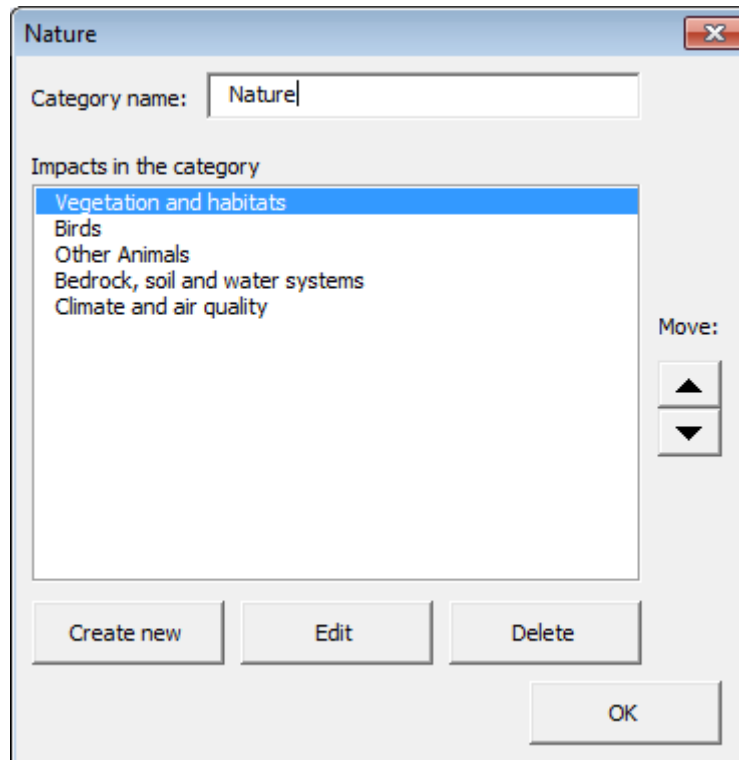
Again, deleting an impact also deletes all the impact assessment data under it, i.e. the corresponding rows on the tables in worksheets 3.1 – 3.4. Correspondingly, adding a new impact also adds new rows to these worksheets.

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4.2 Editing the impacts

When the impacts are defined in a pop-up window, they can be modified in the table on the worksheet. Again, the only restriction is that impacts must not be added or deleted by adding or deleting rows on the worksheets, but this has to be done in a separate pop-up window.

Impacts under Assessment

Category	Impact
Nature	Vegetation and habitats
	Birds
	Other Animals
	Bedrock, soil and water systems
	Climate and air quality
Social and socioeconomic environment	Land use
	Landscape and cultural heritage
	Traffic
	Noise

A hierarchical tree of the impacts can be viewed by clicking **Impact tree** button. The same tree can be created on the worksheet **4 Results** as a separate figure.

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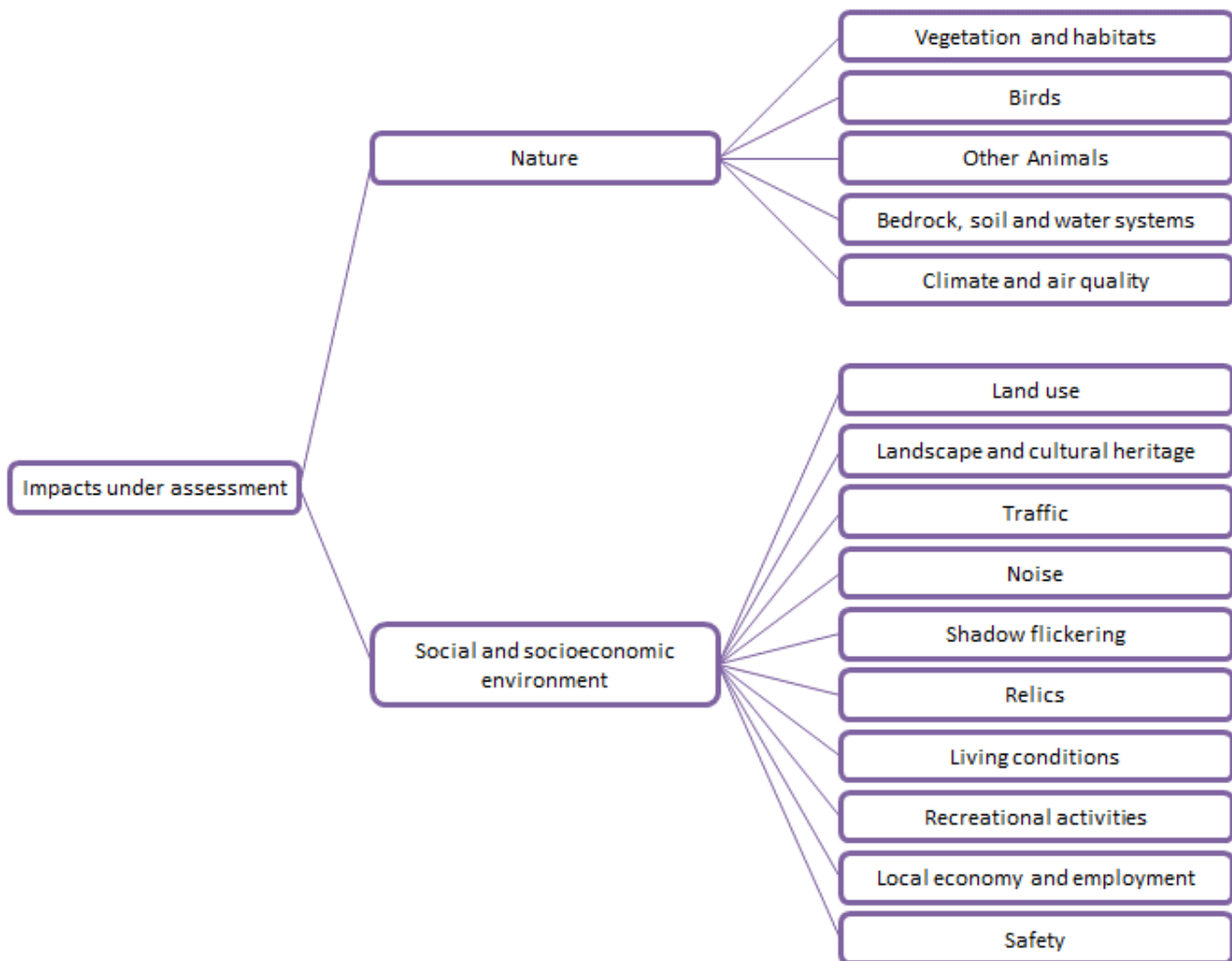
4.3   Updating the changes into the worksheets

The changes made in the impacts are updated into the other worksheets by clicking Update worksheets button. This also updates all the other information on worksheets 2.1 – 2.3. in the worksheets 3.1 – 3.4. Also here, the changes made in pop-up windows are updated to the other worksheets automatically, and thus, only the changes made directly in the worksheet need to be updated manually with **Update worksheets** button.

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5. Defining the criteria for impact significance

By default, the criteria for impact significance in ARVI are based on the impact significance assessment framework created in the IMPERIA project. In this framework, the impacts significance is based on the sensitivity of the target and the magnitude of the change caused by the project. Both these are characterized with three sub-criteria or dimensions. Each of these is assessed with a scale "Low", "Moderate", "High" and "Very high".

The criteria for impact significance assessment can be partly modified. The overall structure is fixed, but the names of the classes of the scales and names of the criteria and sub-criteria in the framework can be modified. In practice this can be done by editing the corresponding cells in the worksheet.

The criteria of impact significance are defined in worksheet **2.2 Criteria for significance**.

Characteristics of sensitivity		
Existing regulations and guidance	Societal value	Vulnerability for changes
Very high	Very high	Very high
High	High	High
Moderate	Moderate	Moderate
Low	Low	Low

Sensitivity
Very high
High
Moderate
Low

Significance
Very high +
High +
Moderate +
Low +
No impact
Low -
Moderate -
High -
Very high -

Characteristics of magnitude		
Intensity and direction	Spatial extent	Duration
Very high +	Very high	Very high
High +	High	High
Moderate +	Moderate	Moderate
Low +	Low	Low
No impact	None	None
Low -		
Moderate -		
High -		
Very high -		

Magnitude
Very high +
High +
Moderate +
Low +
No impact
Low -
Moderate -
High -
Very high -

Update worksheets

The ground or zero level of the scale is identified with a dash line. On sensitivity criteria, there is by default no zero level, but it can be added by writing the name of the level on corresponding cell. On magnitude criteria, the zero level is by default included.

5.1 Creating a criterion scale

The default criterion scale can be replaced by writing the names of the levels in a new scale in the corresponding cells in the worksheet.

The colors of the levels can be freely defined by choosing suitable fill colors for the cells from the corresponding Excel menu.

5.2   Modifying the name of the criteria

The names of the sub-criteria for sensitivity and magnitude can be modified by editing the corresponding cell in the worksheet. However, the names for significance, sensitivity and magnitude are fixed.

5.3   Error messages

ARVI sets some restrictions for the scales and its elements. For example, the scale cannot have blank values or same value twice. The scale for magnitude has to be symmetric for both ways. The tool will give an error message if some of these restrictions are violated. Under is an example of a scale with some missing values.

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Characteristics of magnitude		
Intensity and direction	Spatial extent	Duration
Very high +	Very high	Very high
High +		High
Moderate +		Moderate
Low +	Low	Low
No impact	None	None
Low -		
Moderate -		

ARVI checks the scale, when clicking **Update worksheets** button, and highlights the erroneous cells with a yellow color. The error message informs about the place of the missing value in the worksheet. The scale is accepted when appropriate values are inputted into the missing cells. The number of the values in the scales can be modified by leaving the suitable number of upper and lowermost cells blank. In this case, ARVI interprets these as scales of fewer elements instead of having missing cells.

Characteristics of magnitude		
Intensity and direction	Spatial extent	Duration
Very high +	Very high	Very high
High +	Missing value 3	High
Moderate +	Missing value 2	Moderate
Low +	Low	Low
No impact	None	None
Low -		
Moderate -		
Missing value -3		
Missing value -4		

5.4   Updating the changes into the worksheet

All the changes made into the scales and their names are updated into the worksheets only after clicking **Update worksheets** button in the lower part of this worksheet.

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6.　Defining criteria for uncertainties

The scales/criteria for assessing the related uncertainties are defined in the worksheet **2.3 Uncertainties**. In this worksheet, one can also define scales for imprecision related to the assessment and risks, as well as scales for assessing cumulative effects and mitigation possibilities.

Criteria for uncertainties

Scales and names for the criteria should be entered on the tables below.

Uncertainties and risks		
Uncertainty about the realization of the impact	**Imprecision in the assessment**	**Risks**
High uncertainty	High imprecision	High risks
Moderate uncertainty	Moderate imprecision	Moderate risks
Low uncertainty	Low imprecision	Low risks
No uncertainty	No imprecision	No risks

Cumulative effects	Mitigation	
Cumulative effects	**Mitigation and prevention possibilities**	**Impact significance after mitigation**
High cumulative effects	High mitigation possibilities	
Moderate cumulative effects	Moderate mitigation possibilities	
Low cumulative effects	Low mitigation possibilities	
No cumulative effects	No mitigation possibilities	

Update worksheets

All these scales/criteria are defined similarly as the criteria for significance. See section *5. Defining the criteria for impact significance* for more details.

Impact significance after the mitigation measures is assessed with the same scale as the impact significance itself. Thus, it is not possible to define the scale for this either and the place for the scale is colored gray.

7. Impact significance assessment

After defining the elements of the assessment in the previous phases, one can start the actual impact significance assessment. There are two options for collecting the assessment data from the experts carrying out the assessment:

a. **The project manager creates separate assessment forms for each expert carrying out the assessments.** Then, each expert has his/her own Excel form, in which he/she fills in the assessment about the impact significance and its components, about related uncertainties, imprecision and possible mitigation and cumulative effects, as well as reasoning for all of these. The project manager loads the data from the assessment forms to ARVI with the load option of ARVI.

b. **The project manager puts ARVI to the shared network location**. The expert fills in the assessment information directly to the worksheets of ARVI. In this option, all the experts use the same Excel file, and thus, only one of them can edit it at a time.

The creation of ARVI assessment forms is described in sections *9. Creation of ARVI assessment forms* and *10. Loading the assessment forms*. In this section, we describe how to deal with the impact assessment matrix in general without considering in which way the data has been inputted in it.

All the data from the impact significance assessment are collected on the worksheet **3.1 Significance table.** The basic principle is that each alternative has its own table on this worksheet.

7.1 Filling in the significance data

The values for the impact significance and its different characteristics are entered on the table in this worksheet.

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Assessment of impact significance

Create assessment forms for experts	Load assessment forms	Update table formatting	Table display options	Guideline for assessing significance	Autofill for the significance column

ALT 1 - Wind farm

Impact	Characteristics of sensitivity			SENSITIVITY	Characteristics of magnitude			MAGNITUDE	SIGNIFICANCE
	Existing regulations and guidance	Societal value	Vulnerability for changes		Intensity and direction	Spatial extent	Duration		
Vegetation and habitats									
Birds									
Other Animals									
Bedrock, soil and water systems	High	Low	Low	Low	Low -	Low	Moderate		
Climate and air quality								Very high +	
Land use								High +	
Landscape and cultural heritage								Moderate +	
Traffic								Low +	
Noise								No impact	
Shadow flickering								Low -	
Relics								Moderate -	
Living conditions								High -	
Recreational activities									
Local economy and employment									
Safety									

The values can be entered by writing them as a text or by selecting the appropriate value from the list that appears by clicking the small arrow besides the active cell. The opened list shows the possible values for this criterion that can be edited in worksheet 2.1. The Undo command of Excel does not work on this worksheet.

7.2   Filling in the reasoning

The reasoning for the assessment can be entered on worksheet **3.2 Reasoning for significance**.

Reasoning for impact significance

ALT 1 - Wind farm			
Impact	**Sensitivity**	**Magnitude**	**Significance**
Vegetation and habitats	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Pellentesque non nibh eget metus auctor dapibus vel nec libero.	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam tristique rutrum lacus, nec fringilla nisi malesuada vitae. Ut nunc ipsum.	Nam et blandit magna, id gravida lorem. Donec eu viverra risus, vel malesuada augue. Morbi a arcu pharetra, lacinia mauris.
Birds	Integer adipiscing blandit dolor, nec sodales turpis lacinia varius. Aenean pellentesque sapien eu massa pellentesque iaculis. Pellentesque eu nulla tincidunt.	Integer non quam venenatis, volutpat tellus et, vestibulum arcu. Donec est nisl, vulputate eget lectus ut, scelerisque commodo augue. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos.	Duis sollicitudin, risus vel lacinia tincidunt, ante risus rhoncus lacus, et imperdiet dolor lacus a urna. Vestibulum quis diam commodo, suscipit eros non, fringilla mauris.
Other Animals	Donec condimentum aliquet eros et ultricies. In hendrerit augue sed elit placerat, a tempus tellus lobortis. Nunc felis nisi, sodales vulputate nulla id, adipiscing malesuada enim.	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Fusce pellentesque diam blandit magna ullamcorper, eget bibendum neque ullamcorper. In massa.	Quisque nec felis eget orci euismod luctus non nec justo. Quisque sodales nisi libero. Vestibulum eu ante id velit tincidunt.
Bedrock, soil and water systems	In tincidunt auctor eros vitae feugiat. Vestibulum quis augue pellentesque, consequat velit dignissim, laoreet risus. Mauris vehicula eleifend semper.	Nulla posuere dignissim sem, quis dictum est tempor vitae. Mauris id massa id dolor egestas eleifend sit amet in ligula.	Curabitur elementum accumsan justo in fermentum. Nullam elementum nec est sed sagittis. Nullam fermentum orci et placerat interdum. Nam eleifend.
Climate and air quality	Maecenas pulvinar dolor non tellus molestie, quis tristique metus laoreet. Curabitur aliquam nulla sit amet tortor volutpat, a dignissim dolor tempus.	Nullam rhoncus rhoncus consectetur. Phasellus tellus sem, iaculis aliquet bibendum at, luctus at diam. Suspendisse tempor lacinia urna, vitae varius quam ultricies ac.	Cras dignissim justo sed scelerisque viverra. Pellentesque ligula orci, convallis quis magna non, varius aliquet odio.

When writing text in a cell, a new row within the cell can be started by pressing **Alt + Enter**.

## 7.3   Guidance for the impact significance assessment

The ARVI approach provides a suggestive guidance for assessing the impact significance on the

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basis of sensitivity and magnitude. In ARVI tool, this guidance can be opened by clicking **Guideline for assessing significance**.

One should note that the assessment should not rely on the suggestion alone, but is the judgment of the expert making the assessment. Thus, also the value for the significance can be entered manually. However, there is an option that fills in the values of significance automatically on the basis of sensitivity and magnitude (**Autofill for the significance column** button), but this option should be used with care.
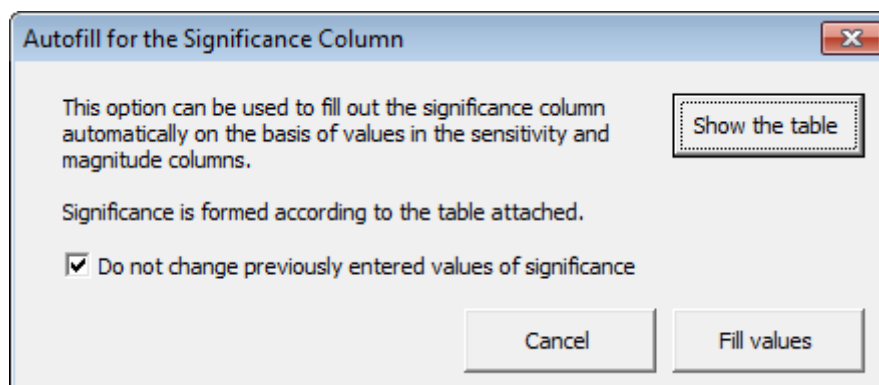

7.4   Updating the formats of the tables

The formats of the tables can become 'out-of-order', when copying the cell values to another cells.

One should not worry about this, as the formats can be updated to the original ones by clicking **Update table formatting** button.

> **Note!**
>
> There is no use to edit the formats of the tables on worksheets 3.1 – 3.4, as the ARVI tool updates the formats of these on the basis of definitions set up in worksheets 2.1 – 2.3. However, the formats on result tables can be changed.

The updating options of the tables can be adjusted by clicking **Table display options**. There one can put on the option which highlights those cells that deviate from the specific scale values redefined in worksheet 2.2. One can also put on the option that fixes the spelling of the entered values instantly, for example, by correcting the lower and upper scale letters. However, this check is carried out anyway when updating the formats of the tables. These same options are valid for worksheets 3.1 and 3.3.

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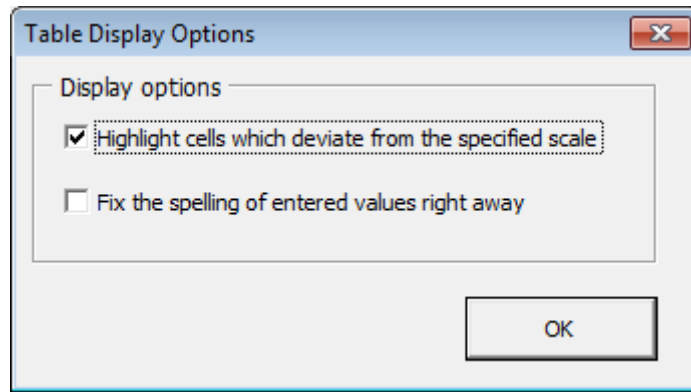
8.   Estimating the related uncertainties

All the related uncertainties, imprecision and risks related to the assessment are collected on the worksheet **3.3 Uncertainties**. Estimates about the cumulative effects and mitigation/prevention possibilities are also collected here.

Assessment of uncertainties

Create assessment forms for experts	Load assessment forms	Update table formatting	Table display options

ALT 1 - Wind farm

Impact	Uncertainties and risks			Cumulative effects	Mitigation	
	Uncertainty about the realization of the impact	Imprecision in the assessment	Risks	Cumulative effects	Mitigation and prevention possibilities	Impact significance after mitigation
Vegetation and habitats	Moderate uncertainty	Low imprecision	Moderate risks	Low cumulative effects	No mitigation possibilities	No impact
Birds	Moderate uncertainty	Low imprecision	Low risks	Low cumulative effects	Moderate mitigation possibilities	Moderate -
Other Animals	Moderate uncertainty	Moderate imprecision	Moderate risks	Low cumulative effects	Low mitigation possibilities	Low -
Bedrock, soil and water systems	Low uncertainty	Low imprecision	Low risks	Low cumulative effects	No mitigation possibilities	Low -
Climate and air quality	Low uncertainty	Low imprecision	Low risks	Moderate cumulative effects	Low mitigation possibilities	Low -
Land use	Low uncertainty	Low imprecision	Low risks	Moderate cumulative effects	Low mitigation possibilities	Low -
Landscape and cultural heritage	Low uncertainty	Low imprecision	Moderate risks	Low cumulative effects	Moderate mitigation possibilities	Low -
Traffic	Moderate uncertainty	Moderate imprecision	Moderate risks	Low cumulative effects	Low mitigation possibilities	Moderate -
Noise	Low uncertainty	Moderate imprecision	Moderate risks	No cumulative effects	Low mitigation possibilities	No impact
Shadow flickering	Low uncertainty	Moderate imprecision	Moderate risks	Low cumulative effects	Moderate mitigation possibilities	Moderate -
Relics	No uncertainty	Moderate imprecision	Moderate risks	Low cumulative effects	Low mitigation possibilities	Low -
Living conditions	Low uncertainty	Moderate imprecision	Low risks	Moderate cumulative effects	Moderate mitigation possibilities	Low -
Recreational activities	Moderate uncertainty	Moderate imprecision	No risks	Moderate cumulative effects	Low mitigation possibilities	Low -
Local economy and employment	No uncertainty	Low imprecision	Low risks	Moderate cumulative effects	Moderate mitigation possibilities	Moderate -
Safety	Low uncertainty	Moderate imprecision	No risks	Moderate cumulative effects	Moderate mitigation possibilities	Moderate -

The reasonings for all of the above are collected on worksheet **3.4 Reasoning for uncertainties**.

Reasoning for uncertainties

ALT 1 - Wind farm						
Impact	Uncertainty about the realization of the impact	Imprecision in the assessment	Risks	Cumulative effects	Mitigation and prevention possibilities	Impact significance after mitigation
Vegetation and habitats	Nam et blandit magna, id gravida lorem. Donec eu viverra risus, vel malesuada augue. Morbi a arcu pharetra, lacinia mauris.	Nulla posuere dignissim sem, quis dictum est tempor vitae. Mauris id massa id dolor egestas eleifend sit amet in ligula.	Suspendisse hendrerit dapibus magna a vehicula. Aenean ultricies nec leo ac gravida.	Donec et gravida nisi, eget convallis libero. Nullam faucibus lacus vel lectus semper porta.	Suspendisse hendrerit dapibus magna a vehicula. Aenean ultricies nec leo ac gravida.	Quisque imperdiet lacus sit amet sapien scelerisque fringilla.
Birds	Cras dignissim justo sed scelerisque viverra. Pellentesque ligula orci, convallis quis magna non, varius aliquet odio.	Nullam rhoncus rhoncus consectetur. Phasellus tellus sem, iaculis aliquet bibendum at, luctus at diam. Suspendisse tempor lacinia urna, vitae varius quam ultricies ac.	Maecenas pulvinar dolor non tellus molestie, quis tristique metus laoreet. Curabitur aliquam nulla sit amet tortor volutpat, a dignissim dolor tempus.	In tincidunt auctor eros vitae feugiat. Vestibulum quis augue pellentesque, consequat velit dignissim, laoreet risus. Mauris vehicula eleifend semper.	Ut pellentesque turpis massa, vitae pulvinar massa mattis vitae.	Donec et gravida nisi, eget convallis libero. Nullam faucibus lacus vel lectus semper porta.
Other Animals	Pellentesque condimentum sodales dui id convallis. Sed vitae ultricies urna, at sagittis urna.	Curabitur eu urna nec velit venenatis facilisis. Aliquam rhoncus, quam vel condimentum feugiat, velit turpis ornare eros, vel volutpat turpis eros vel libero	Donec scelerisque sodales turpis. Fusce ultrices odio sed odio dignissim gravida. Vestibulum mollis pellentesque quam malesuada congue.	Aenean in dapibus ligula. Vivamus dictum vestibulum porta. Nunc molestie dui quis odio dapibus, ac tincidunt risus vulputate. Etiam placerat a sem eu	Vestibulum non viverra risus, et ultricies nibh. Duis porttitor vel sem at sodales. Maecenas laoreet eleifend lobortis. Nullam quis commodo nibh.	Fusce eu dapibus neque. Mauris ipsum tellus, adipiscing eu enim nec, malesuada accumsan sem.

In practice, the functionalities on these two worksheet are similar as in worksheets **3.1 Significance table** and **3.2 Reasoning for significance**. For more details, see section *7. Impact significance assessment*.

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9.   Creation of ARVI assessment forms

ARVI provides functions for both creating the impact assessment forms and for loading information from these.

Usually, different impacts are assessed by different experts. Thus, for each impact ARVI creates an own assessment form file, which includes separate assessment forms for each alternatives. On this file, each alternative is on its own worksheet. These files can then be distributed to corresponding experts to fill in.

> **Note!**
>
> The assessment forms to be created of otherwise similar except that ARVI fills in the required background information about the impacts to be evaluated. This information is used to identify the data that is loaded from these assessment forms into ARVI, and thus, the forms are suggested to be created through this procedure.

Each form is used to assess only one impact, and there are separate worksheets for each alternative. Thus, each row in ARVI corresponds to one worksheet in the assessment form.

The assessment forms and the information on them are created so that they correspond to the definitions made in worksheets 2.1 – 2.3 of ARVI.

> **Note!**
>
> The definitions of the assessment should be made before creating the assessment forms. Otherwise the data on these forms may not be compatible with the significance table, when loading the information into ARVI.

Opening of the **Create assessment forms** window is done by clicking **Create assessment forms for experts** button on top-left part of the worksheet **3.1 Significance table** of ARVI.

Clicking of this button opens a wizard that helps creating the assessment forms.

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Next, the wizard asks whether the forms are created to all of the impacts or only for some of them.

Next, the wizard asks whether to create worksheets for all the alternatives or only some of them.

Finally, the wizard asks to which folder the forms are saved and the naming convention of the files. The field File naming convention provides a couple of predefined conventions for this.

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Create Assessment Forms - Step 4 / 5

Choose a location for saving the files

Files are created into the specified folder.

Select folder   C:\

File naming convention

(Running index) (Impact name)

Project name written on the forms

Test project

< Previous   Create files   Cancel

Finally, by clicking **Create files** the wizard creates the files and informs the user about the progress of the procedure.

Create Assessment Forms - Step 5 / 5

Finished creating assessment forms

Files were created into the specified folder.

Files will be created into the folder D:

Creating files...
    1 Vegetation and habitats.xlsx
    2 Birds.xlsx
    3 Other Animals.xlsx
    4 Bedrock, soil and water systems.xlsx
    5 Climate and air quality.xlsx
    6 Land use.xlsx
    7 Landscape and cultural heritage.xlsx
    8 Traffic.xlsx
    9 Noise.xlsx
    10 Shadow flickering.xlsx
    11 Relics.xlsx
    12 Living conditions.xlsx
    13 Recreational activities.xlsx
    14 Local economy and employment.xlsx
    15 Safety.xlsx

< Previous   Create files   Close

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10. Loading the assessment forms

ARVI provides a feature that makes it possible to automatically load the data from the assessment forms into ARVI.

The identification of the data to be read is based on the information that is defined in the top part of the assessment form. Thus, for example, the name of the worksheet or the Excel file, in which the assessment form is, does not affect to the reading. The data loading functionality requires information about the name of the impact name, the name of the alternative name, and the possible specification. This information has to exactly match the same fields in ARVI, in order to read the data.

Project:	Test project	Impact area:	Wind farm
Impact:	Vegetation and habitats	Evaluator:	
Alternative:	ALT 1	Date:	

When creating the assessment forms from ARVI, this required information is already written in the form, and should, thus, not be changed. However, assessment forms can be copied, for example, for assessing other impacts, and then this information should naturally be changes to correspond exactly to the information in ARVI.

The assessment form files are named after the impact to be assessed and the worksheets in these files after the alternatives. In this way, both these correspond to the information in the definition section of the form, even though the file or worksheet name information is not used for identification.

10.1 Loading the assessments from the forms

Loading of the assessments from the assessment forms to ARVI is carried out in two phases. In the first phase, one selects the files, from which the information is read. In the second phase, one selects whether to load information on all the worksheets in these files or only some of them. In other words, one first selects impacts and then alternatives to be loaded, as normally one file includes a separate worksheet for each alternative.

> **Note!**
>
> The information loaded from the assessment forms replaces the information in ARVI. However, the two-phased process makes it possible to check before loading what information is to be read.

The loading information from the assessment forms is started by clicking **Load assessment forms** button on top part of the worksheet **3.1 Significance table** of ARVI.

Clicking the button opens a wizard that helps the loading process. The wizard first shows a blank list, as no files have been selected. Thus, one has to first click **Select files**. When the files are selected, the wizard analyzes the worksheets of these files to check if the information on these can be loaded without errors. If there are no errors, the validation column shows **Validation OK**. Possible errors are discussed later on section *10.2. Possible error messages* when checking the forms. In this phase, the wizard creates copies of the forms to hidden workbooks, but if everything goes right, the user should not even notice this.
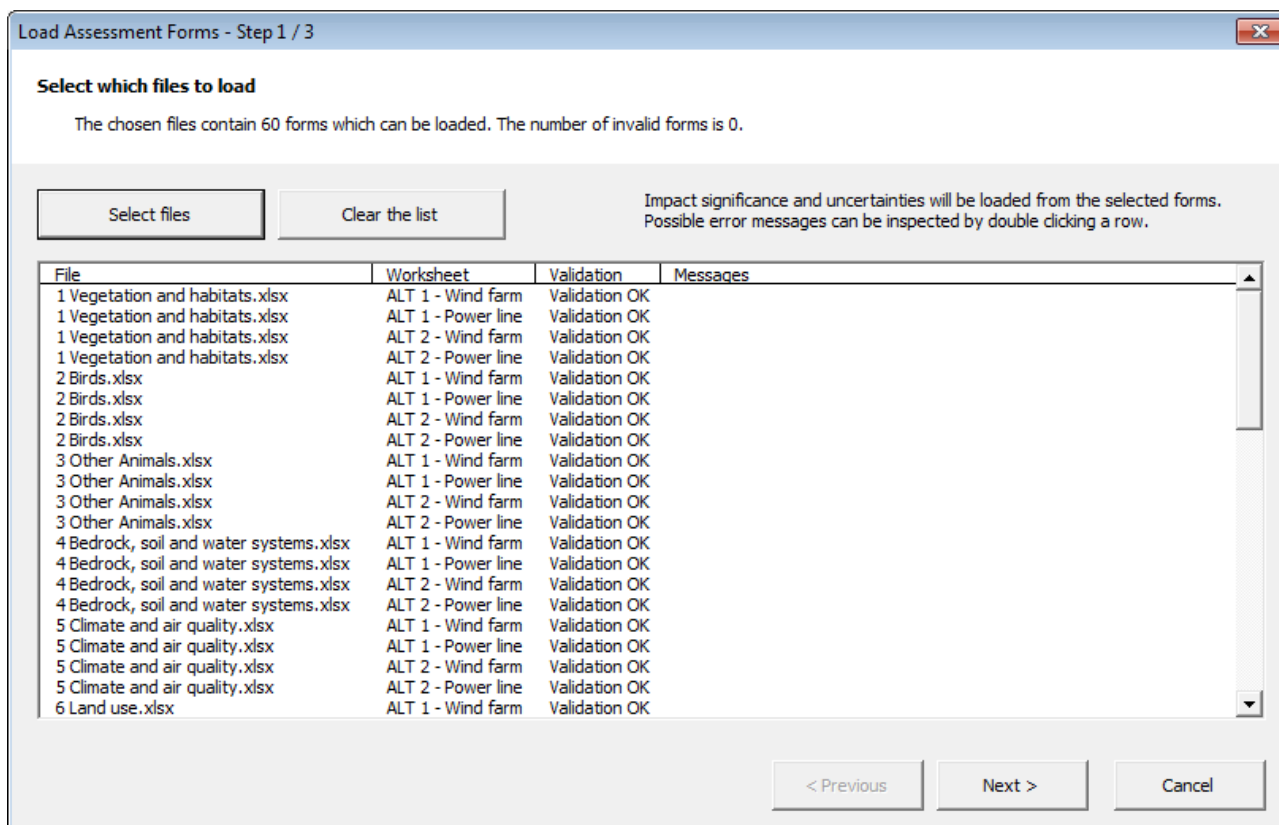
If the information is OK on this page of the wizard, one should click **Next** to move into the second phase. In this phase, it is possible to check the definition information on the assessment forms (three rightmost column on the picture below). The load function only checks these three fields when identifying the information to be read. To select which information is to be read, the user should check the checkbox on the corresponding rows to be read. Finally, one should click **Load forms** to perform the actual loading operation.
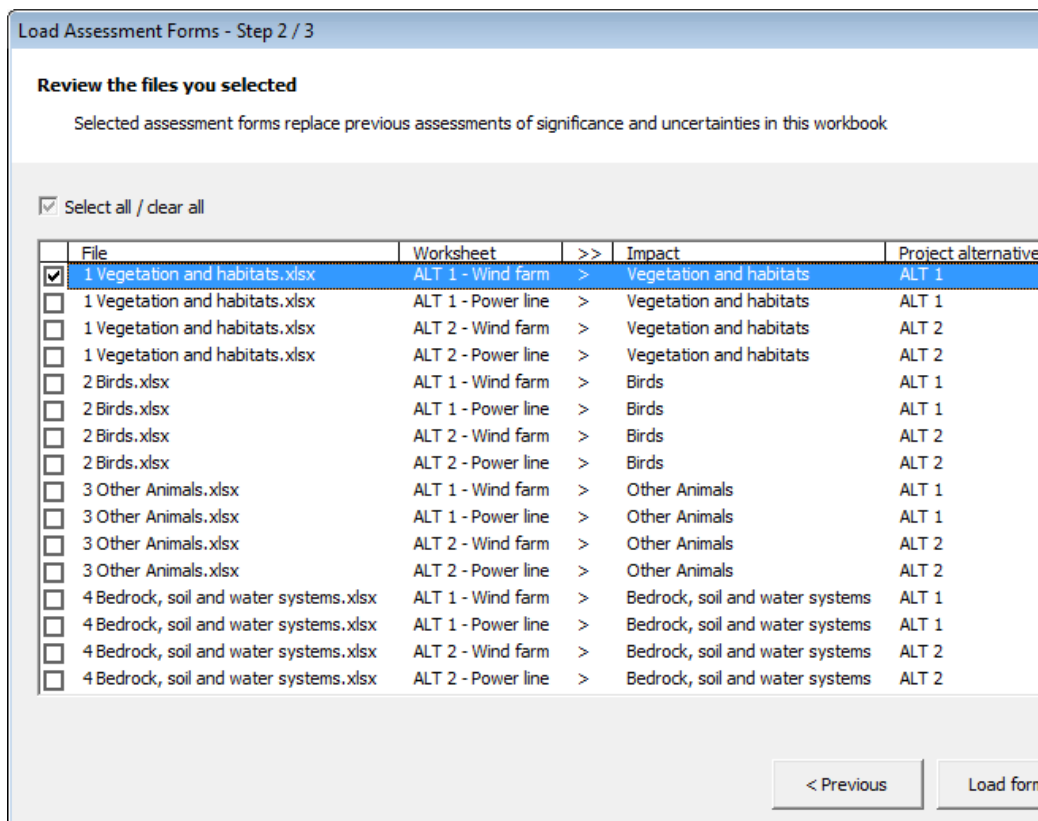
Next the wizard loads all the selected information and should the progress of the process. Because the forms were already checked earlier, there should not be problems in reading them. If there are no errors, the Loading column should show Loading OK.
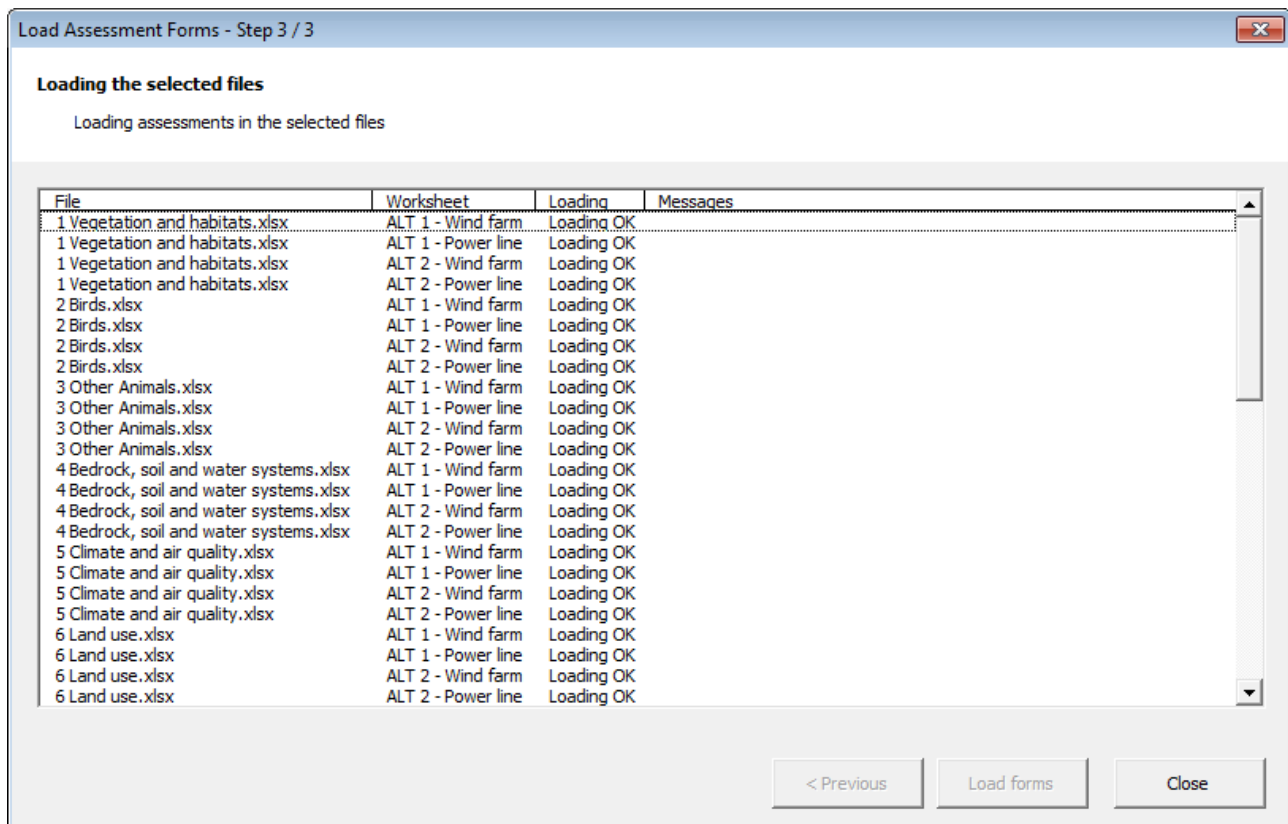
10.2 Possible error messages when checking the forms

ARVI checks the assessment forms before loading information from them. The aim is to inform about the possible errors before the loading, so that they can be fixed beforehand. Possible error messages include:

- **No such impact has been defined in the tool.** This means that in ARVI, there are no such impact that has been written in the impact definition field on the top part the assessment form. One reason can be that there is an error in the name of the impact.
- **No such alternative has been defined in the tool.** This means that in ARVI, there are no such alternative/specification combination that has been written in the alternative and specification fields on the top part the assessment form. One reason can be that the names have been written erroneously.
- **The criteria scale is not of the same size as the criteria scale in ARVI.** This means that the criteria scale visible in the assessment form has different number of classes than the criteria scale defined in ARVI. This can happen, for example, the criteria scale is updated after creating the assessment forms. Thus, if scales are updated, it is suggested to re-create also the assessment forms. One should note that the load checking only check that the number of the classes is the same but not the naming of the classes. Below is an example of a scale with 9 classes.
- **The value of the criterion is ambiguous: multiple values have been selected.** Then, the

person making the assessment has selected more than one value of some list of classes. One should not that selecting the class can be made by marking any character before it. Usually, one uses "X", but, for example, a space can also be used, which can cause problems, as it cannot be seen on the form.

	Significance	Reasoning:
	Very high + + + +	
	High + + +	
	Moderate + +	
	Low +	
	No impact	
	Low −	
X	Moderate − −	
X	High − − −	
	Very high − − − −	

The load wizard does not, however, check everything. Loading information also can be done even if the names do not exactly match with each other. Adding a new alternative does not prevent reading the forms either, but it is still suggested to re-create the forms in this situation. As a rule of thumb, it is suggested to not make any changes in the definitions of ARVI, while the assessment forms are on experts to be filled in.

In the following, there are yet some other different kinds of error messages that occur more rarely:

- **File could not be opened.** This file is probably not an Excel file. This error message can also occur, when this file is already open in some other window.
- **The file does not have any assessment forms.** Then, the file is an Excel file, but none of its worksheets is a readable assessment forms. ARVI recognized the worksheets as assessment forms, by checking columns AX and AY, which in a valid assessment form should include values for "FILE_TYPE" and "FORMAT_DATE". By default, these column are hidden.
- **There is a field missing from a form.** In the ARVI assessment forms, all the fields are named in order to identify the information to be loaded from the forms. The name of the field can be, for example, "H_IMPACT" or "SIGNIFICANCE_TEXT". If some of these identifiers are missing, the reading of the form is not possible. This error can also occur, if trying to read information from a form that was created with some earlier version of ARVI.

Below is an example of a file having four worksheets. The first worksheet produces three error messages and all the other worksheets one error message each. More information about these error messages can be obtained by double-clicking the corresponding row.

Double-clicking opens a new window with more detailed information.
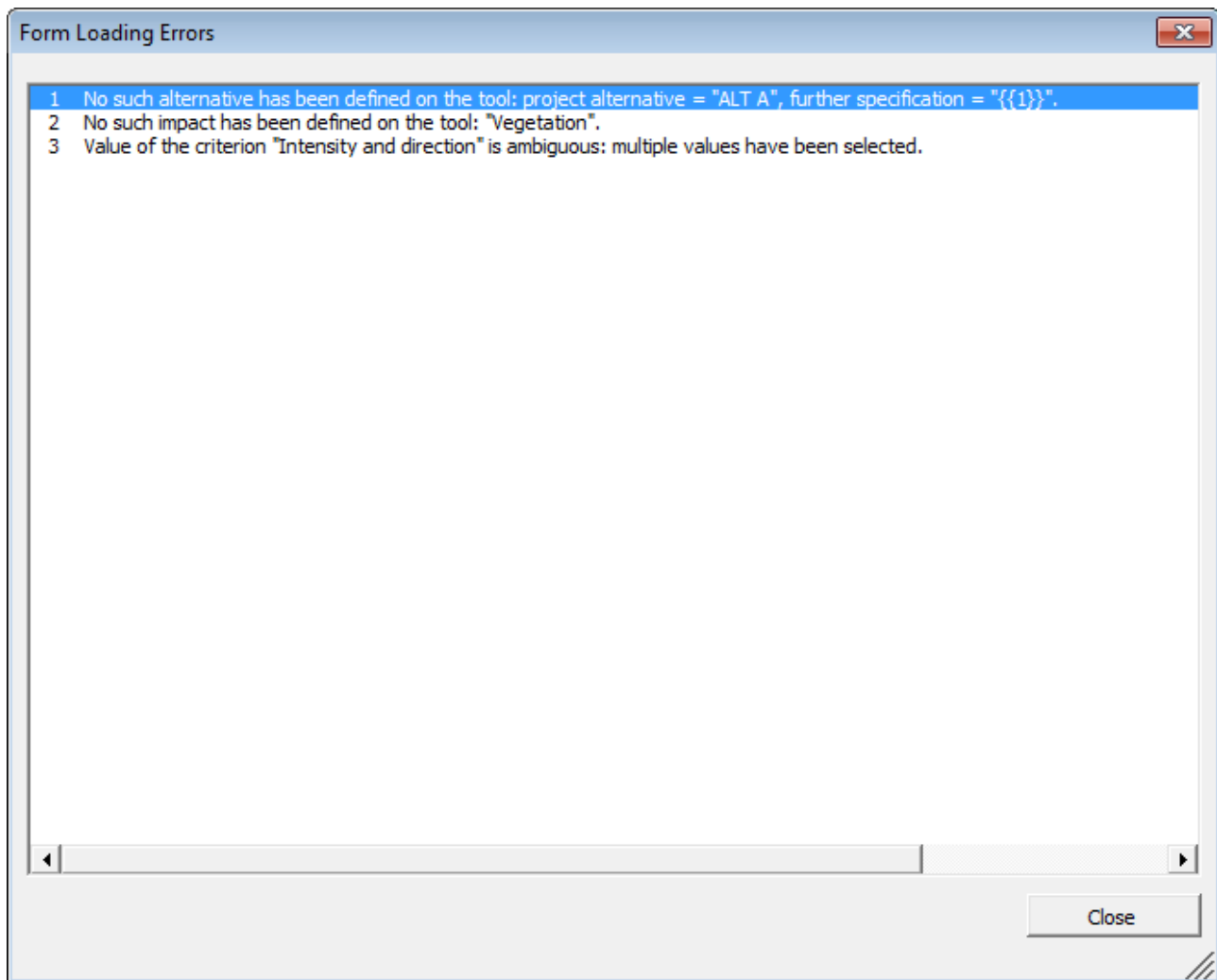
In this case, the first row shows that name of the alternative is wrong in this worksheet. It is "ALT A" in this assessment form, whereas in ARVI it is "ALT 1". Thus, one should not change the name of the alternative in the assessment form, unless it is also changed in ARVI. The second row shows that also the name of the impact is wrong. Here it is "Vegetation", whereas in ARVI it is "Vegetation and habitats". Thus, one should not change the name of the impact either. The third row shows that the significance value is ambiguous, as the user had selected two classes from the list.

11. Comparison of the alternatives

To illustrate the results, ARVI can produce various tables and figures, which can be copy-pasted into the EIA report. In practice, the creation happens on worksheet **4 Results,** by first selecting the table or figure to be created from the list, and by clicking **Update**. Depending on the table or figure, it is created instantly or after filling in a dialog where some specifying options are asked.
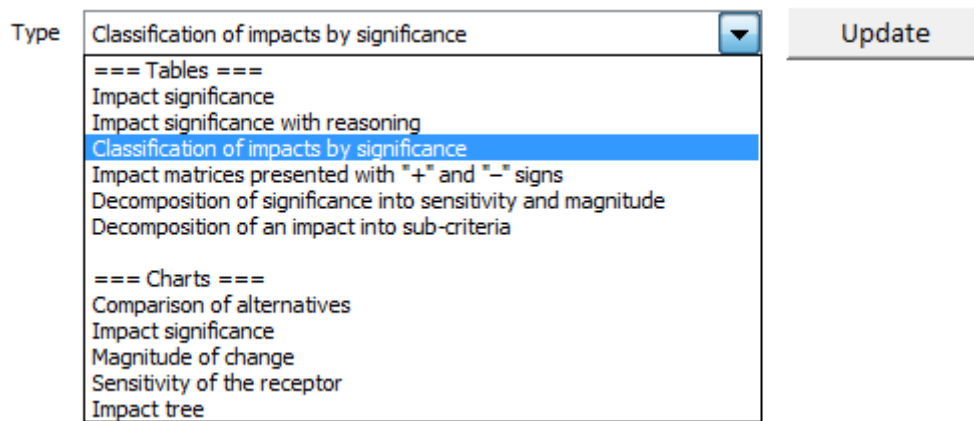
This section deals with the tables supporting the comparison of the alternatives, but documenting the characteristics of impact significance assessment are described in the next section. In the following, the most focal comparison tables are described.

11.1 Reasoning for the impact significance

This table summarizes the impact significance of different alternatives. This type of table is often presented in an EIA report. Besides significance, one can also show estimates for sensitivity and magnitude as well as the reasoning for these, in this table.

Impact Significance with Reasoning

Impact	ALT 1 Wind farm	ALT 1 Power line
Vegetation and habitats	**Moderate negative** Nam et blandit magna, id gravida lorem. Donec eu viverra risus, vel malesuada augue. Morbi a arcu pharetra, lacinia mauris. **Magnitude of change: moderate** Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam tristique rutrum lacus, nec fringilla nisi malesuada vitae. Ut nunc ipsum. **Sensitivity of the receptor: moderate** Lorem ipsum dolor sit amet, consectetur adipiscing elit. Pellentesque non nibh eget metus auctor dapibus vel nec libero.	**Low negative** Quisque imperdiet lacus sit amet sapien scelerisque fringilla. **Magnitude of change: low** Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam tristique rutrum lacus, nec fringilla nisi malesuada vitae. Ut nunc ipsum. **Sensitivity of the receptor: low** Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Sed ac consectetur nunc. Phasellus blandit scelerisque sodales.
Birds	**Moderate negative** Duis sollicitudin, risus vel lacinia tincidunt, ante risus rhoncus lacus, et imperdiet dolor lacus a urna. Vestibulum quis diam commodo, suscipit eros non, fringilla mauris.	**Low negative** Vestibulum vitae lectus diam. In sed pretium purus. **Magnitude of change: low**

11.2 Classification of the impacts on the basis of the significance

This table shows how various impacts are classified into the different classes. The aim is to illustrate the differences between the alternative and the most significant impacts.

	Significance	ALT 1 Wind farm	ALT 1 Power line
Positive	Very high		
	High		
	Moderate	- Local economy and employment	
	Low	- Climate and air quality	- Local economy and employment
↕	No impact		- Climate and air quality - Noise - Shadow flickering
Negative	Low	- Other Animals - Bedrock, soil and water systems - Land use - Traffic - Shadow flickering - Recreational activities - Safety	- Vegetation and habitats - Birds - Other Animals - Bedrock, soil and water systems - Land use - Landscape and cultural heritage - Traffic - Relics - Living conditions - Recreational activities - Safety
	Moderate	- Vegetation and habitats - Birds - Landscape and cultural heritage - Noise - Relics - Living conditions	
	High		
	Very high		

11.3 Impact significance

Table summarizes impact significances compactly with plus and minus signs. It may not be reasonable to show this table on EIA reports, but it can provide support for the user of the tool.

Impact Significance

Impact	ALT 1 Wind farm	ALT 1 Power line
Vegetation and habitats	– –	–
Birds	– –	–
Other Animals	–	–
Bedrock, soil and water systems	–	–
Climate and air quality	+	
Land use	–	–
Landscape and cultural heritage	– –	–
Traffic	–	–
Noise	– –	
Shadow flickering	–	
Relics	– –	–
Living conditions	– –	–
Recreational activities	–	–
Local economy and employment	+ +	+
Safety	–	–

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12. Documenting the characteristics of impact significance

Decomposition of the impacts into their characteristics, i.e. formation of impact significance from sensitivity and magnitude, can be documented separately for each impact or as one large list for all the impacts together. When dealing each impact separately, the documentation can be attached as a part of describing the impact in the EIA report, whereas a list of all the impacts is aimed to be used as an appendix of the EIA report.

The tables documenting the characteristics of impact significance can be created on the worksheet **4 Results**, by selecting corresponding option from the list.

12.1 Decomposition of an impact into sub-criteria

The characteristics of the significance, i.e. sensitivity and magnitude, can be described with three different tables for each impact:

- Decomposition of sensitivity into its sub-criteria
- Decomposition of magnitude into its sub-criteria
- Decomposition of impact significance into sensitivity and magnitude

One can create separate tables for each impact or combine various impacts into the same table. Below is an example of the table that describes the decomposition of magnitude into its characteristics, and in which several different impacts are presented in the same table.
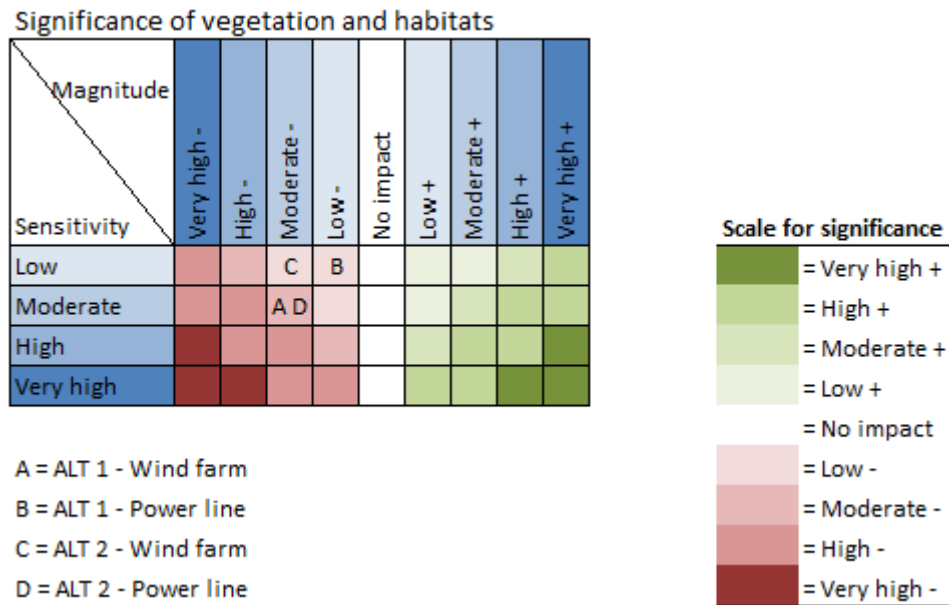
ALT 1 - Wind farm

	Characteristics of magnitude				Magnitude of the change
	Intensity and direction	Spatial extent	Duration		
Vegetation and habitats	Moderate -	Low	Very high	→	Moderate -
Birds	Moderate -	Low	Very high	→	Moderate -
Other Animals	Low -	Low	Very high	→	Low -
Bedrock, soil and water systems	Low -	Low	Moderate	→	Low -
Climate and air quality	Low +	Very high	High	→	Low +
Land use	Moderate -	Low	High	→	Low -
Landscape and cultural heritage	Moderate -	Moderate	High	→	Moderate -
Traffic	Moderate -	Moderate	Low	→	Moderate -
Noise	Moderate -	Low	High	→	Moderate -
Shadow flickering	Low -	Low	High	→	Low -

One can also create an impact-wise version of this table, in which different alternatives are shown in the same table for one impact.

12.2 Decomposition of significance into sensitivity and magnitude

Besides the table shown above, decomposition of significance into sensitivity and magnitude can also be presented as a matrix that is based on the impact significance assessment framework.

Below is an example of this kind of a matrix.

Significance of vegetation and habitats

Sensitivity \ Magnitude	Very high -	High -	Moderate -	Low -	No impact	Low +	Moderate +	High +	Very high +
Low			C	B					
Moderate			A D						
High									
Very high									

A = ALT 1 - Wind farm
B = ALT 1 - Power line
C = ALT 2 - Wind farm
D = ALT 2 - Power line

Scale for significance

	= Very high +
	= High +
	= Moderate +
	= Low +
	= No impact
	= Low -
	= Moderate -
	= High -
	= Very high -

This matrix is a very basic one, but one can make more advanced graphical variants to be used in EIA report by modifying this matrix.

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