Influence of global megatrends on the state of environment in Slovenia

**Interim report**

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Abbreviations

CEP: Collingwood Environmental Planning

EEA: European Environment Agency

**EIONET: European Environment Information and Observation Network**

GMTs: Global Megatrends

**PPT: Microsoft Power Point**

**SOER: European Environment - State and Outlook Report**

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# Introduction and context

This report is an Interim deliverable of the project *Influence of global megatrends on the state of environment in Slovenia* and presents the results of the work to date and in particular the outcomes of the workshop held in Ljubljana on 7th November 2017. More information on the project is provided in sub-section 1.1 below.

This report is divided into four sections and brings together the outputs from work completed under Task 1 and 2 of this project and will provide material for expert consultation to be undertaken as part of Task 3. Following this introduction this report sets out:

* A brief summary of the context and objectives of this study (Section 1.1)
* An overview of the methodology used and how it has been adapted to date to the case of a national study for Slovenia (Section 1.2.)
* A description of each session of the project scoping workshop providing a summary of the discussions recorded from each session (Section 2)
* A description of the outcomes of the project scoping workshop (Section 3)
* Finally the report summarises the key conclusions from the work to date and presents a brief description of the next steps in the project leading up to the second workshop on risks, opportunities and policy needs (Section 4)

Various annexes are also included which provide additional background materials relevant to different sections of the report.

## Background and objectives

In October 2017 the Slovenian Ministry of the Environment and Spatial Planning and the Slovenian Environment Agency commissioned Collingwood Environmental Planning (CEP) to support them in undertaking a study to understand the *Influence of global megatrends on the state of environment in Slovenia*.

The aim of this project is to adapt and apply the methodology described in the EIONET report *‘Mapping Europe's environmental future: understanding the impacts of global megatrends at the national level’[[1]](#footnote-2)* to analyse the potential implications of GMTs on the state of the environment in Slovenia and the ability of Slovenia to meet environmental goals set out in national strategic documents and the UN Sustainable Development Goals.

This project will consider global megatrends as analysed by the EEA in their European Environment State and Outlook Report (SOER) 2015[[2]](#footnote-3). The EEA identified 11 global megatrends (GMTs) of relevant to Europe, and at the request of the Ministry of the Environment and Spatial Planning this project will focus on identifying potential implications of two specific GMTs: GMT 7: Intensified global competition for resources; and GMT 9: Increasingly severe consequences of climate change.

Recognising this, the main objectives of the project are:

* To collect and review background materials of how GMTs 7 and 9 may influence the national level, and the preparation and facilitation of a scoping workshop
* To prepare and facilitate a Scoping workshop for national experts to discuss in an open manner how the two megatrends, as described by the EEA, might impact the state of environment in Slovenia
* To consult with relevant national experts to identify information and evidence that would facilitate the preparation of summary factsheets on national information and outlooks related to prioritised GMT implications in the scoping workshop
* To prepare and facilitate a second workshop on assessment of risks & opportunities and policy gaps and needs related to the prioritised implications from GMTs 7 and 9.
* To produce a Final report bringing together all project outcomes, and in particular the results of the two project workshops on impacts of GMTs 7 and 9 for the state of the environment in Slovenia and potential responses.

Box 1. What are global megatrends?

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| --- |
| The EEA SOER 2015 defines global megatrends (GMTs) as ‘large-scale, high impact and often interdependent social, economic, political, environmental or technological changes’ that can have decisive and critical implications. The megatrends analysed in the EEA SOER 2015 provide a research- and expert-judgement-based perspective on how interrelated and connected global drivers and trends are likely to evolve over time. The EEA SOER 2015 assessment of GMTs analyses 11 megatrends that are considered to be of key importance to Europe’s long-term environmental outlook.  EEA’s Global Megatrends:  1. Diverging global population trends  2. Living in an urban world  3. Changing disease burden and risks of pandemics  4. Accelerating technological change;  5. Continued economic growth?  6. An increasingly multipolar world  7. Intensified global competition for resources  8. Growing pressures on ecosystems  9. Increasingly severe consequences of climate change  10. Increasing environmental pollution  11. Diversifying approaches to governance. |

## Adaptation of the GMT implications method toolkit[[3]](#footnote-4)

This section presents a brief overview of the processes being followed to adapt and apply the methodological toolkit *“Mapping Europe's environmental future: understanding the impacts of global megatrends at the national level”* to develop knowledge on possible GMT implications for the state of environment in Slovenia. It also provides a summary of the activities completed to date.

### Methodology and process

The main project tasks follow the process described in the methodological toolkit and adapts them to the needs of the Slovenia national study. The methodological toolkit includes five steps, as described in the table below linking those to the tasks that will be delivered under each step to achieve the objectives of this project.

**Table 1.2.1 Mapping Europe's environmental future - process flow chart**

|  |  |
| --- | --- |
|  | In Task 1 (Step 1), the key aspects include clarifying the needs and expectations of the Ministry of the Environment identifying experts to be involved in the study; and setting out the project programme and outputs. |
| In Task 2 (Step 2) the consultant team collects and reviews the background materials followed by a scoping workshop in Ljubljana - prepared and facilitated by the project team (see Table A.2.2). Following the workshop a report on potential implications of GMTs 7 and 9 on the state of the environment in Slovenia is prepared. |
| The work in Task 3 (Step 3) builds on the scoping outcomes and includes desk-based research and expert consultations to prepare summary factsheets on national information and outlooks related to identified GMT implications. |
| This task (Step 4) brings together results of Tasks 2 and 3 for discussion in an expert workshop (workshop 2) to identify and assess the risks and opportunities for the state of the environment in Slovenia from the GMT implications. The workshop also provides an opportunity for experts to discuss policy gaps and potential responses to risks and opportunities. The aim is in particular to consider responses related to the ability of Slovenia to meet:   * The UN Sustainable Development Goals in Slovenia * Goals set in the Slovenian national development strategy and national environmental strategy. |
| Task 5 (Step 5) will bring together all project outcomes, and in particular the results of the two project workshops to prepare a final project report on impacts of GMTs 7 and 9 for the state of the environment in Slovenia and potential responses. Drawing in particular on Task 3, the final report will also include an overview of relevant indicators and outlooks identified through the project. |

### Familiarisation and preliminary research

Preliminary research (scoping) is the 2nd step as outlined in the method toolkit and follows the activities from Step 1 as described in Table 1.2.1.

The primary aim of the preliminary research under Task 2 was to review existing evidence to provide materials that would facilitate national experts to identify potential implications of GMTs on the state of the environment in Slovenia, focussing on GMT 7: Intensified global competition for resources, and GMT 9: Increasingly severe consequences of climate change.

A background research summarising existing evidence (i.e. national state of environment indicators) on trends and issues related to proposed initial thematic clusters of Ecosystem vulnerability and Energy stability was conducted following a review of the national environmental indicator database[[4]](#footnote-5). These clusters and identified trends were intended to be used in the scoping workshop as ‘Entry points’ into discussing potential GMT implications on the state of environment in Slovenia.

This review of the Environmental indicators in Slovenia database included shortlisting those indicators (see Annex 1) considered relevant for each of the proposed initial thematic cluster areas and in particular related to topic areas including:

* Ecosystem vulnerability

Thematic cluster

* + Agricultural land use

Topic areas

* + Biodiversity
  + Drinking water
* Energy stability
  + Renewable energy resources
  + Dependency on fossil fuel imports
  + Biomass – land use / forests,

The two thematic clusters where agreed based on discussions between the project team, the Slovenian National Environment Agency and the Ministry of Environment and Spatial Planning, with the aim of enabling a focused discourse at the scoping workshop. The GMTs were initially to be discussed in the context of the Slovenian National Environment Protection Action Programme objectives. However, at the time of the workshop preparations the document was still in a draft stage with no clearly agreed goals.

Furthermore, a handful of indicators were highlighted (see Table 1.2.2) as being the most relevant and forming the basis for presenting key trends in Slovenia related to each of the thematic clusters/topic areas presented above.

Table 1.2.2 Shortlist of most relevant indicators for the proposed initial thematic cluster areas

| Cluster area | Selected indicators from national environment indicators database |
| --- | --- |
| **Ecosystem vulnerability** | |
| Agriculture land use | Indicator KM01 Consumption of pesticides |
| Indicator KM04 Intensification of agriculture |
| Indicator KM10 Land use change and agriculture |
| Biodiversity | Indicator NB02 Endangered species |
| Indicator GZ05 Deforestation |
| Indicator NV03 Natura 2000 |
| Drinking water | Indicator ZD04 Outbreaks of waterborne diseases attributable to drinking water and bathing water |
| Indicator ZD05 Access to safe drinking water |
| Indicator VD08 Drinking water quality |
| **Energy stability** | |
| Renewable energy  resources | Indicator EN18 Renewable energy sources |
| Indicator EN19 Electricity production from renewable energy sources |
| Indicator EN24 The share of renewables in final energy consumption |
| Dependency on fossil  fuel imports | Indicator EN16 Total energy consumption by fuel type |
| Indicator EN20 Energy prices |
| Indicator EN25 Energy import dependency |
| Biomass – land use /  forests | Indicator EN18 Renewable energy sources |
| Indicator GZ03 Growing stock, increment and felling |

A project background note was prepared to provide workshop participants with an overview of the project objectives and scope including a short introduction to each of the tasks. Among other materials intended for participant familiarisation including:

* An overview note on GMT 7: Intensified global competition for resources, and GMT 9: Increasingly severe consequences of climate change.
* Agenda and workshop objectives

Instructions for facilitators were also provided before the start of the workshop to be used as key references for facilitating the workshop sessions.

# Scoping of GMT implications workshop

## Introduction and objectives of the workshop

This section represents a record of each session of a scoping workshop held on 7 November 2017 in Ljubljana as part of Task 2 of the project to discuss the potential implications of global megatrends for the state of environment in Slovenia. The subsequent sections provide a summary of the discussions and outcomes recorded from each session.

The objectives of the workshop were to:

* Discuss in an open manner how the selected megatrends, as described by the EEA, might impact Slovenia’s environment, with a particular focus on ecosystem vulnerability and energy stability.
* Provide a space for experts to share their knowledge and expertise.
* Generate workshop outcomes which will serve as the first step in a process of analysing the impacts of GMTs on the environment of Slovenia and national environmental goals.

The workshop provided an opportunity to bring together national experts to engage in a scoping exercise intended to identify and prioritise implications felt to be most relevant to and likely to have strongest effects for the state of environment in Slovenia. The workshop participants comprised representatives of Slovenian ministries (Environment and Spatial Planning, Infrastructure, and Health), national agencies (Environment, and Water), and research and sectoral institutes (Urban Planning, Macroeconomic Analysis, Agriculture, and Jožef Stefan). Table 2.1.1. summarises the key details of the workshop.

**Table 2.1.1 Key workshop details**

|  |  |
| --- | --- |
| **Venue** | Slovenian Ministry of Culture, Maistrova 10, 1000 Ljubljana, Slovenia |
| **Date** | 7 November 2017 |
| **Participants** | 28 participants (See Annex 2 for full list) |
| **Chair** | Owen White |
| **Facilitators** | Collingwood Environmental Planning (CEP) & Slovenian Environment Agency |
| **Rapporteur** | Collingwood Environmental Planning (CEP); |
| **Presentations and Workshop documents:** | Agenda, CEP presentations, GMT 7 and GMT9 overviews, Project overview note  Assessment of global megatrends (SOER 2015) <https://www.eea.europa.eu/soer-2015/global/action-download-pdf>  GMT 7 (SOER 2015)  <https://www.eea.europa.eu/soer-2015/global/competition>  GMT 9 (SOER 2015)  <https://www.eea.europa.eu/soer-2015/global/climate> |

The outputs of this workshop will inform a second workshop foreseen to be held in late March/early April 2018 with the intention to involve the same group of experts. The second workshop will focus on the risks and opportunities, for the state of the environment in Slovenia including existing policy gaps and potential responses from implications identified in the scoping workshop.

This record presents an overview of:

* The discussions held during the scoping workshop, including the working sessions and plenary discussions (Section 2).
* The workshop participant list and agenda (Annex 2 and 3).
* The long list of potential implications identified by experts through small working-group discussions (Annex 4)
* The completed causal chain diagrams prepared during a ‘live-mapping’ exercise during the workshop (PPT file)
* The prioritised implications assessment worksheets as completed by participants through small working-group discussions (Appendix 5)

The project outcomes, including the outputs of this workshop is intended to provide the participants, the Slovenian Ministry of the Environmental and Spatial Planning, and Slovenian Environment Agency:

* A better understanding of existing and future GMT links to environment of Slovenia.
* Thoughts on how to respond to the uncertainty and complexity related to long-term changes in Slovenia resulting from global drivers and trends.
* Ideas and materials on how GMTs may be integrated into national situations and analysis, for example in the process of national state of the environment reporting.

As part of the project *Influence of global megatrends on the state of environment in Slovenia* the Ministry of the Environment and the Slovenian Environment Agency requested a capacity building session for its staff on the use of participatory methods in the preparation of strategic plans and understanding environmental issues as described in detail in Box 2.

**Box 2. Capacity building session on participatory approaches**

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| The capacity building session on participatory approaches was a half-day event held on 8th November 2017 in Ljubljana run by consultants from Collingwood Environmental Planning Ltd[[5]](#footnote-6) (CEP) who have expertise in applying such approaches in a range of settings.  The main objective of this session was to introduce participants to participatory approaches and present how these can be applied in the preparation of strategic plans and understanding environmental issues - in particular related to climate change impacts, adaptation and global megatrends.  Through a practical exercise in small groups, participants were encouraged to explore the use of one participatory tool: causal mapping.  Two examples of an issue and a receptor were provided:   * Issue: Agricultural intensification / Receptor: pollution of water courses * Issue: Transitional freight transport / Receptor: human health,   These were then used to provide the basis for potential causal pathways to be explored. Through active discussions the participants in their groups created causal chain diagrams as seen in the Figure below.  This event provided an opportunity for participants to familiarise, share experiences and learn from each other in relation to the application of participatory approaches in their professional environments. At the end of the capacity building participants were invited to share their ideas and plans for how they may use such approaches in their work in future.  **Figure 2.1.1 Causal chain diagram: Transitional freight transport** |

Prior to the working sessions the representative of the Slovenian Government Office for Development and Cohesion Policy presented the inclusion of GMTs in the draft National Development Strategy and how they relate with environment related goals (G1: healthy and active life, G8: low carbon circular economy, G9: sustainable and efficient resource management, and G11: safe and globally responsible Slovenia; Government of the Republic of Slovenia, 2017) and priorities of the document. Jasmina Karba from the Slovenian Ministry of Environment and Spatial Planning gave insight on the preparation of the draft National Environment Protection Action Programme and how this project is beneficial in shaping that document. As emphasised, Slovenia has a long tradition of environmental protection. However there are some new areas in the programme such as resource efficiency, which are not yet well streamlined and coordinated.

Following this, the project team presented the project’s broader context and background, workshop objectives, outcomes and principles, previously conducted GMT case studies, and provide an overview of key aspects of the selected GMTs for this study in Slovenia.

## Working session 1a: Identifying potential implications and key drivers of selected GMTs

The objectives of working session 1a were:

* To discuss how GMTs 7 and 9 may be influencing the environment in Slovenia considering the proposed clusters : ecosystem vulnerability (defined as: agricultural land use, biodiversity, drinking water) & energy stability (defined as: Renewable energy resources, dependency on fossil fuel imports, Biomass – land use / forests)
* To enable experts to discuss in small groups the key drivers / trends and implications from the GMTs for the environment in Slovenia
* To develop simple causal chains (on paper) for selected drivers and implications
* To collect (using post-its) clusters of potential implications noted by experts during the discussions, as input to working session 1b – live mapping.

The working session was run in four small working groups (about six participants per group), each discussing one of the two GMTs identified by the European Environment Agency (EEA) in their European State and Outlook Report (SOER) 2015:

* GMT 7: Intensified global competition for resources
* GMT 9: Increasingly severe consequences of climate change

and one of the two proposed clusters:

* Ecosystem vulnerability (defined as: agricultural land use, biodiversity, drinking water) and
* Energy stability (defined as: RES, dependency on fossil fuel imports, biomass – land use/forests).

Firstly, all of the participants individually reflected on particular GMT drivers and trends as described by the EEA and how those might be having an effect on the proposed thematic cluster they were considering. They wrote the identified implications on post-it notes, each implication separately.

Following this individual consideration, the implications were discussed within the groups. With the intention of creating a simple causal chain, two of the implications considered of most interest by each group were selected and written on the right hand side of a flip paper provided. The participants then talked through and identified the global drivers causing the implications, wrote them on the left side of the paper, and drew the connections to the recognised implications in a simple causal chain diagram. The aim was to encourage the participants to map the logical process behind their decisions to identify a certain GMT implication as important for the state of environment in Slovenia.

In relation to the group discussion *GMT 7 and energy stability*, transport was identified as one of the main drivers of increased environmental burden, and it was also strongly related to the risk of supply and price volatility for critical resources (in this case mainly fossil fuels, however, not excluding other resources). Space (available land area in Slovenia) was also considered as a key factor in terms of relationships between different land uses (e.g. agriculture / food production) and energy production from biomass. Energy poverty, economic risks due to import dependency and the need for increased renewables, efficiency and waste reduction were also discussed.

The group discussing *GMT 7 and ecosystem vulnerability* recognised the expanding middle class and national trend for population relocation to coastal areas as being important for increased environmental pressure in Slovenia. Connection between increased pressure on water management (including water supply) in these areas and the rising use of chemicals for water quality treatment were also pointed out to likely have an effect on local ecosystems and biodiversity.

In discussions on *GMT 9 and* *energy stability* theimpacts of climate change on forests was recognised as insects propagate rapidly in hotter climate, during droughts and higher temperatures causing significant damage to forests in Slovenia. Timber is important raw material that also serves as a biofuel however it was agreed that Slovenia is not currently using timber in an optimal way. Variations in temperature and changes in the distribution of precipitation was considered to influence energy supply in Slovenia in the near future. Focusing on renewables and their dependency on climate change (water availability for energy use, geothermal availability etc.) was emphasised while recognising the need for diversification of renewable energy sources as they depend on meteorological conditions.

Following the group discussions the individually identified implications were then collected and grouped according to the proposed thematic clusters under each GMT (ecosystem vulnerability, energy stability, and other) on flipchart papers displayed on the wall of the room. Under the cluster “other” participants could put all other identified implications of the GMTs, which were not related to any of the two proposed thematic clusters.

The participants were then given six sticky dots each and invited to use them to ‘vote’ for the implications on the flipcharts they considered the most important in relation to Slovenia’s environment. They could distribute any number of dots to the selected implications (e.g. all six dots for one implication if considered extremely important).

The project team then selected the two highest ranked implications for each of the two GMTs, which were further used in working session 1b and 1c (Mapping global drivers / trends and identified implications for Slovenia). The team also selected six highest ranked implications for each of the two GMTs (see table 3.1.2), which were further on used in working session 2 (Initial scoping of implications).

## Working session 1b & 1c: Mapping global drivers / trends and identified implications for Slovenia

In the working sessions 1b and 1c the project team performed a live mapping of the global drivers / trends and identified implications for Slovenia**.** The objectives of session 1b and 1c were:

* To enable participants to discuss and reflect on the connections between global drivers / trends and identified potential implications in Slovenia from GMT 7 and GMT 9
* To map the implications discussed in Working session 1a using simple causal chains / mind-maps to be created using Vensim software
* Through this mapping, to explore and understand the logic / tell the story of how GMTs may be influencing the environment in Slovenia.

The live mapping was led by two members of the project team and included active participation of all participants. One member of the project team was providing the facilitation on the discourse with the participants, who were providing inputs on drivers, trends and their connections to the identified implications of GMTs. The four implications (two for each of the GMTs), which were distributed the highest number of sticky dots in in working session 1a were used for mapping. The live mapping of the causal chains using Vensim software was simultaneously conducted by the other project team member using a laptop and projector so that all participants could see and contributing to the emerging causal chain. The results of the mapping are provided as a separate PPT file to ensure their legibility.

## Working session 2: Initial scoping of implications

The objectives of working session 2 were:

* To identify the likelihood (high/low) of the key implications identified in Working session 1 (high/low)
* To identify the expected magnitude of effect of the implications (high/low) identified in Working session 1
* To identify the expected timescale (short, medium, or long term) in which the implications identified in Working session 1 may occur.

In this session the participants were divided in two working groups each assessing the six highest ranked implications from the same GMT they had worked on in session 1a. The participants were asked to apply the scoping criteria (likelihood, magnitude, and timescale), thinking within the context of Slovenia, to each of the identified implications in relation to the respected GMT. First, the contributors individually thought about the estimations and wrote them down. These were further discussed within the group, with the group facilitator noting the agreed scoping assessment for each of the six implications in a previously designed template. Where there were differences of opinion on the scoping assessment or key uncertainties this was also noted on the worksheets to ensure transparency.

The summary of the results (Table 3.1.1) and key observations are presented in section 3 of this report. The individual GMT worksheets are included in Annex 5.

Some of the key observations from the session include:

* Some implications (human health risks, risks to biodiversity, risks to biomass/forests, food security) of GMT 9 (Increasingly severe consequences of climate change) scored high in terms of likelihood, but their magnitude was less certain and considered having limited effect in the short term with the tendency increasing with longer timescales.
* The participants identified majority of the implications recognised under the GMT 7 (Intensified competition for natural resources), as high in likelihood and magnitude of effect, and variable in timescales in which they might occur. There where opposing opinions among the participants related to the nature and magnitude of the implications during the selected timescales.
* As explained, increased environmental burden will have high magnitude effects in long and short term. However, in case of successful implementation of environmental policies, the burden could over a longer period decrease. Similarly, the demand on natural resources is predicted to increase due to the population growth, thus the high magnitude of effect. However, if the transition to circular economy is successful the demand on natural resources will in medium term (2020-2030) decrease, thus the participants evaluated the magnitude of the effect as low.
* It was considered among the experts that food security in Slovenia will largely depend on the global (food) market and some aspects of it are already present (e.g. in high / changing food prices of certain products). However, the related effects (although at the moment considered low) are assumed to become more severe with time. Similarly, extreme weather events foreseen in short term are expected to become more common in future, thus the magnitude of the effects is assumed to be high. Human health risks and the risks to forests (biomass) are identified as low in magnitudes in short term, however in long term the magnitudes are recognised as high.

The full outcomes from this working session are presented in Section 3.

# Key workshop outcomes

This section summarises the outcomes from the four main working sessions based on the proposed workshop objectives. The key workshop outcomes are:

* A long-list of potential implications of global megatrends for the state of environment in Slovenia, based on expert judgement (working session 1a)
* Causal chain diagrams exploring the logic of how selected GMTs drive changes in Slovenia leading to the implications identified by experts (working sessions 1b and 1c)
* An initial assessment of the potential key implications, considering likelihood, extent and time-frames (working session 2).

Brief overviews are provided for each of the outcomes setting out the next steps for the project.

## Potential implications of global megatrends 7 & 9 for Slovenia

A summary of the worksheets recording the implications from GMTs 7 & 9 considered by experts to have potential influence for the state of the environment in Slovenia is presented in Table 3.1.1. The complete worksheet recordings are available in Annex 4.

**Table 3.1.1 Summary of all GMT implications identified by workshop participants**

|  |  |
| --- | --- |
| **GMT** | **Implications** |
| **GMT 7**  **Intensified competition for natural resources** | Increased demand on natural resources (exploitation) |
| Increased need for RES and (energy and resources use) efficiency, and waste reduction |
| Import dependency |
| Political environment implications |
| Loss of national sovereignty |
| Increased privatisation of natural resources (water, land, waste and waste water treatment facilities) |
| Effected water supply |
| Demand for more efficient energy use |
| Pressure on demand for land (change of land use) |
| Economic dependency (on other countries for resources, multinationals) |
| Demands on energy sovereignty and risk of energy supply (NEK-nuclear power plant end by 2045/50, TEŠ- coal power plant Šoštanj) |
| Rise of prices |
| Energy poverty |
| Increasing environmental burden |
| Need to increase/ expand (domestic/local) use of RES |
| Risk of (drinking) water supply |
| Better drinking water management |

|  |  |
| --- | --- |
| **GMT 9 Increasingly severe consequences of climate change** | Risks to food security and the need for more intensive agriculture |
| Risk for freshwater and terrestrial biodiversity / ecosystems |
| Increased use of plant protection products |
| Extreme weather events (flooding, wind, storms, hale) |
| Soil erosion and land slides |
| Opportunities in water management |
| Impacts on human health |
| Increased energy use |
| Risks to (national) energy supply |
| Increased demand for water |
| The shift in forest border |
| National security risks (migrations) |

The above results on the complete list of identified potential implications for the state of environment in Slovenia, were further explored in an exercise where participants were given the opportunity to select from this list those implications they consider most important, using a sticky-dot ‘voting’ process. Following this exercise the facilitators selected the top six highest voted implications from each GMT. The outcomes of this task are presented in Table 3.1.2.

**Table 3.1.2 List of prioritised GMT implications**

|  |  |
| --- | --- |
| **GMT** | **Prioritised implications (top six based on a count of participant ‘votes’)** |
| **GMT 7**  **Intensified competition for natural resources** | Increased privatisation of natural resources |
| Economic dependence |
| Increasing environmental burden |
| Demand on natural resources (increasing) |
| Energy import dependence |
| Pressure on water quality and supply |
| **GMT 9 Increasingly severe consequences of climate change** | Food Security |
| Extreme weather events (flooding, draughts, winds, hale) |
| Human health risks (related to heating/cooling and food security) |
| Risk to forests (biomass) |
| Threats/ risks to biodiversity |
| Infrastructure damage |

## Causal chain diagrams

Based on the outcomes from Session 1, workshop facilitators noted the two highest voted implications for each GMT to use these as entry points for mapping the potential interlinkages between the global drivers and national trends leading to the potential implication for the state of environment in Slovenia as identified earlier. This was done by creating simple causal chains using Vensim software.

This exercise provided an opportunity for the participants to validate their thinking of how GMTs may be influencing the environment in Slovenia and help build a common understanding drawing on their collective knowledge. The narratives emerging from these causal chains are provided as a separate PPT file together with this report.

## Assessment of key implications

Following the outcomes from Session 1, workshop facilitators noted the highest voted implications (see Table 3.1.2) into a worksheet template (Annex 5) designed for both GMTs to provide the participants with necessary materials for Session 2. A summary of the complete worksheets assessing the potential key implications, considering likelihood, extent and time-frames is presented in Table 3.3.1.

Table 3.3.1 Summary of key implications’ scoping exercise

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **GMT** | **Implications** | **Estimated likelihood**  **(high/low)** | **Magnitude**  **of effect**  **(high/low)** | **Timescale over which implication may occur[[6]](#footnote-7)** |
| **GMT 7**  **Intensified competition for natural resources** | Increased privatisation of natural resources | high | High | medium term  (has already started but the implications are not felt yet) |
| Economic dependence | high | High | short /medium /long term |
| Increasing environmental burden | high | high | short term (increased burden)  long term (decreased/increased burden) |
| Demand on natural resources (increasing) | high | low (transition to circular economy) | medium term |
| high (no transition to circular economy |
| Energy import dependence | high | high | long term |
| Pressure on water quality and supply | high | high | long term |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **GMT 9 Increasingly severe consequences of climate change** | Food Security | high | low | short term (low magnitude) |
| high | medium/long term (some present aspect will significantly increase with time) |
| Extreme weather events (flooding, draughts, winds, hale) | high | high | short term (increase in time) |
| Human health risks (related to heating/cooling and food security) | high | low | short term (low magnitude) |
| high | long term (high magnitude) |
| Risk to forests (biomass) | high | low | short term (low magnitude) |
| high | medium to long term (increasing to high magnitude) |
| Infrastructure damage | high | high | short term to high? |
| Threats/ risks to biodiversity | high | low | long term |

The use of traffic light system is used to prioritise and short-list the key implications, which will be analysed in more detail in the next project task (Task 3) by the project team in consultation with national experts.

To further assist in the short-listing of implications as indicated in the method tool kit the implications assessed are given a ranking where:

* Rank 1 is assigned to implications with high likelihood and effects or if there is considerable uncertainty assessing these criteria. Such implications are considered important and should be selected in the first instance for further review.
* Rank 2 is assigned to implications with high (medium) likelihood / low (medium) effects or low (medium) likelihood / high (medium) effects. These implications are potentially important to review further if the level of potential effects or certainty require further exploration
* Rank 3 is assigned to implications with low likelihood and effects, thus considered a low importance for further review.

This criteria were used for all implications across both GMTs. Those implications considered having high likelihood and effects across all timescales were prioritised over those for whom these two parameters varied over different timescales. The implications ranked important to consider further is presented in Table 3.3.2.

**Table 3.3.2 Rank 1 implications – judged as important to consider further**

|  |  |
| --- | --- |
| **Implication** | **GMT** |
| Increased privatisation of natural resources | GMT7 Intensified global competition for resources |
| Economic dependence |
| Increasing environmental burden |
| Energy import dependence |
| Pressure on water quality and supply |
| Extreme weather events (flooding, draughts, winds, hale) | GMT 9: Increasingly severe consequences of climate change |
| Infrastructure damage |

The implications ranked potentially important to consider further applying the principles from the tool kit are presented in Table 3.3.3.

**Table 3.3.3 Rank 2 implications – judged as potentially important to consider further**

|  |  |
| --- | --- |
| **Implication** | **GMT** |
| Demand on natural resources (increasing) | GMT7 Intensified global competition for resources |
| Food Security | GMT 9: Increasingly severe consequences of climate change |
| Human health risks (related to heating/cooling and food security) |
| Risk to forests (biomass) |
| Threats/ risks to biodiversity |

# Conclusions and next steps

The scoping workshop provided the basis to draw on the knowledge of national experts in Slovenia from a range of domains including environmental, economic, health, water management and research. The level of participation in the workshop was high, with all participants actively contributing through working sessions, which led to the successful meeting of all expected outcomes:

* The working session on identification of potential national implications of selected GMTs was well received and sparked lively discussions that provided a wide range of potential implications recognised by the experts
* A live mapping session was successfully conducted as a result of active participant engagement to ensure the ‘live’ creation of mind-maps on a screen and resulted in well-developed causal chains of potential relationships between GMT drivers/trends and selected implications for the state of environment in Slovenia
* Finally through interesting and valuable exchanges between experts a scoping assessment of the prioritised implications were completed based on their qualitative judgement.

The prioritised implications by experts are varied and illustrate some of the key ways in which the environment in Slovenia is being, and will be affected by the drivers and trends of GMTs 7 & 9.

Following the scoping workshop the implications short listed as important to consider further (see table 3.3.2) will be reviewed further by the project team using desk-based research on existing national information and seeking input from national experts by requesting suggestions for relevant information, data and indicators. This research will be used to prepare implication ‘factsheets’ for the selected implications, describing more fully the national evidence linking the global drivers and trends to environmental issues in Slovenia, as well as seeking to understand better relevant national policy and knowledge needs. These factsheets will form the basis for discussions to be held in the second project workshop related to risks, opportunities and policy needs, to be held in March or April 2018.

Annex 1: Shortlist of relevant indicators[[7]](#footnote-8)

| Thematic cluster areas | Indicators from national environment indicators database |
| --- | --- |
| **Ecosystem vulnerability** | |
| **Agricultural land use** | **Indicator 1 KM01 Consumption of pesticides** |
| Indicator 2 KM02 Consumption of mineral fertilisers |
| Indicator 3 KM03 Areas of land with agri-environmental measures |
| **Indicator 4 KM04 Intensification of agriculture** |
| Indicator 5 KM05 High Nature Value farmland areas |
| Indicator 6 KM06 Nature areas under protection and agriculture |
| Indicator 7 KM08 Areas of land with organic farming |
| **Indicator 8 KM10 Land use change and agriculture** |
| Indicator 9 KM11 Farm management practices |
| Indicator 10 KM12 Specialisation and diversification in agriculture |
| Indicator 11 KM13 Emissions of ammonia from agriculture |
| Indicator 12 KM14 Emissions of methane and nitrous oxide from agriculture |
| Indicator 13 KM21 Irrigation of agricultural land |
| Indicator 14 KM22 Gross nitrogen surplus in agriculture |
| Indicator 15 NB14 Birds in agricultural landscape |
| Indicator 16 KM16 Genetic diversity - domestic animals |
| Indicator 17 KM15 Genetic diversity - agriculture plants |
| Indicator 18 KM17 Soil quality |
| Indicator 19 KM23 Water protection areas and agriculture |
| **Biodiversity** | Indicator 1 GZ01 Forest decline and tree defoliation |
| Indicator 2 GZ02 Naturalness of forests |
| Indicator 3 GZ04 Forest area |
| **Indicator 4 GZ05 Deforestation** |
| Indicator 5 GZ06 Deadwood |
| Indicator 6 KM03 Areas of land with agri-environmental measures |
| Indicator 7 KM05 High Nature Value farmland areas |
| Indicator 8 KM06 Nature areas under protection and agriculture |
| Indicator 9 KM10 Land use change and agriculture |
| Indicator 10 KM11 Farm management practices |
| Indicator 11 MR03 Bottom oxygen concentrations |
| Indicator 12 MR04 Chlorophyll a in coastal waters |
| Indicator 13 MR07 Suitability of marine water to support marine bivalves and gastropods |
| Indicator 14 NB01 Population size of selected bird species |
| **Indicator 15 NB02 Endangered species** |
| Indicator 16 NB03 Game preservation |
| Indicator 17 NB04 Subterranean biodiversity |
| Indicator 18 NB05 Plants – species richness and endangered species |
| Indicator 19 NB06 Brown bear |
| Indicator 20 NB09 Plants – invasive species |
| Indicator 21 NB10 Dolphins |
| Indicator 22 NB11 Species of European interest |
| Indicator 23 NB12 Habitats of European interest |
| Indicator 24 NB14 Birds in agricultural landscape |
| Indicator 25 NV01 Nature areas under protection |
| Indicator 26 NV02 Protected areas |
| **Indicator 27 NV03 Natura 2000** |
| Indicator 28 NV04 Valuable natural features |
| Indicator 29 TP01 Land cover and land use |
| Indicator 30 TP06 Land cover and land use in water protection areas |
| Indicator 31 VD03 River balance |
| Indicator 32 VD07 Phosphorous in lakes |
| Indicator 33 VD10 Nutrients in rivers |
| Indicator 34 VD12 Chemical state of rivers |
| Indicator 35 VD16 Water protection areas |
| Indicator 36 ZD08 Exposure of roe dear to heavy metals (lead and cadmium) in fluorides |
| Indicator 37 ZR09 Emissions of substances that cause acidification and eutrophication |
| Indicator 38 ZR18 Effects of ozone on vegetation |
| Indicator 39 KM16 Genetic diversity - domestic animals |
| Indicator 40 KM15 Genetic diversity - agriculture plants |
| Indicator 41 KM17 Soil quality |
| Indicator 42 ZD06 Leaf injuries of indicator plants as indicators of external air pollution by ozone |
| Indicator 43 ZD09 Critical loads and exceedances of sulphur and nitrogen for ecosystems |
| Indicator 44 MR01 Accidental oil spills from marine shipping |
| Indicator 45 TU02 Outstanding natural features visited |
| Indicator 46 VD13 Meeting water quality criteria for freshwater fish |
| **Drinking water** | Indicator 1 KM21 Irrigation of agricultural land |
| Indicator 2 VD01 Water exploitation index |
| Indicator 3 VD05 Nitrates in groundwater |
| Indicator 4 VD06 Pesticides in groundwater |
| Indicator 5 VD03 River balance |
| Indicator 6 VD07 Phosphorous in lakes |
| Indicator 7 VD11 Groundwater quality |
| Indicator 8 VD10 Nutrients in rivers |
| Indicator 9 VD12 Chemical state of rivers |
| Indicator 10 VD15 Groundwater recharge |
| **Indicator 11 ZD04 Outbreaks of waterborne diseases attributable to drinking water and bathing water** |
| **Indicator 12 ZD05 Access to safe drinking water** |
| Indicator 13 KM18 Nitrates in Groundwater and Agriculture |
| **Indicator 14 VD08 Drinking water quality** |
| **Energy stability** | |
| **Renewable energy sources** | Indicator 1 EN09 Emissions of air pollutants from energy sources |
| Indicator 2 EN16 Total energy consumption by fuel type |
| **Indicator 3 EN18 Renewable energy sources** |
| **Indicator 4 EN19 Electricity production from renewable energy sources** |
| **Indicator 5 EN24 The share of renewables in final energy consumption** |
| Indicator 6 EN32 Energy efficiency and energy use in sectors of final energy consumption |
| Indicator 7 PR13 Introduction of alternative fuels in transport |
| Indicator 8 PR09 Transport emissions of greenhouse gases |
| Indicator 9 SE08 Ecological footprint |
| Indicator 10 EN17 Electricity production by fuel |
| Indicator 11 PR21 Introducing new technologies in transport |
| **Dependency on fossil fuel imports** | **Indicator 1 EN16 Total energy consumption by fuel type** |
| Indicator 2 EN18 Renewable energy sources |
| Indicator 3 EN19 Electricity production from renewable energy sources |
| **Indicator 4 EN20 Energy prices** |
| Indicator 5 EN24 The share of renewables in final energy consumption |
| **Indicator 6 EN25 Energy import dependency** |
| Indicator 7 EN30 Production and consumption of electricity |
| Indicator 8 PR13 Introduction of alternative fuels in transport |
| **Biomass – land use/forests** | Indicator 1 EN09 Emissions of air pollutants from energy sources |
| Indicator 2 EN16 Total energy consumption by fuel type |
| **Indicator 3 EN18 Renewable energy sources** |
| Indicator 4 EN19 Electricity production from renewable energy sources |
| Indicator 5 EN24 The share of renewables in final energy consumption |
| Indicator 6 GZ01 Forest decline and tree defoliation |
| **Indicator 7 GZ03 Growing stock, increment and felling** |
| Indicator 8 GZ04 Forest area |
| Indicator 9 GZ05 Deforestation |
| Indicator 10 GZ06 Deadwood |
| Indicator 11 KM10 Land use change and agriculture |
| Indicator 12 PR13 Introduction of alternative fuels in transport |

Annex 2: Workshop participants

The workshop participant list and project team members at the workshop are presented in Tables A.2.1 and A.2.2 respectively

**Table A.2.1 Participant list**

|  |  |  |
| --- | --- | --- |
| **No.** | **Institution** | **Participant name** |
| **1** | Ministry for Environment and Spatial Planning of the Republic of Slovenia | Alenka Fritzel |
| **2** | Urban Planning Institute of the Republic of Slovenia | Aljaž Plevnik |
| **3** | Ministry for Environment and Spatial Planning of the Republic of Slovenia | Barbara Simonič |
| **4** | Ministry for Environment and Spatial Planning of the Republic of Slovenia | Darja Piciga |
| **5** | Ministry for Environment and Spatial Planning of the Republic of Slovenia | Ines Lipuše |
| **6** | Ministry for Environment and Spatial Planning of the Republic of Slovenia | Jasmina Karba |
| **7** | Agricultural Institute of Slovenia | Jože Verbič |
| **8** | Institute of Macroeconomic Analysis and Development of the Republic of Slovenia | Jure Povšnar |
| **9** | Ministry of Infrastructure of the Republic of Slovenia | Marko Suhadolc |
| **10** | Ministry of Health of the Republic of Slovenia | Marta Ciraj |
| **11** | Ministry of Infrastructure of the Republic of Slovenia | Martina Gračner |
| **12** | Jožef Stefan Institute | Matjaž Česen |
| **13** | Slovenian Environment Agency | Mojca Dolinar |
| **14** | Journal for the Critique of Science | Nejc Jordan |
| **15** | Faculty of Technologies and Systems | Peter Novak |
| **16** | Slovenian National Institute of Public Health | Peter Otorepec |
| **17** | Ministry for Environment and Spatial Planning of the Republic of Slovenia | Peter Skoberne |
| **18** | Ministry of Infrastructure of the Republic of Slovenia | Stanislav Bras Meglič |
| **19** | Slovenian Environment Agency | Tanja Cegnar |
| **20** | Ministry for Environment and Spatial Planning of the Republic of Slovenia | Tatjana Orhini Valjavec |
| **21** | Participating as individual | Tomaž Gorenc |
| **22** | Slovenian Water Agency | Urška Kušar |
| **23** | Ministry for Environment and Spatial Planning of the Republic of Slovenia | Vesna Kolar Planinšič |

Table A.2.2 Project team

| No | Institution | Team member name |
| --- | --- | --- |
| **1** | CEP, UK | Owen White |
| **2** | CEP, UK | Rolands Sadauskis |
| **3** | CEP, UK | Špela Kolarič |
| **4** | Slovenian Environment Agency, Slovenia | Barbara Bernard-Vukadin |
| **5** | Slovenian Environment Agency, Slovenia | Nataša Kovač |

Annex 3: Workshop agenda

|  |  |  |
| --- | --- | --- |
| **Time** | **Item no.** | **Agenda item** |
| **08:30 – 08:45** | 1 | Arrival and registration |
| **08:45 – 09:10** | 2 | Introductions and welcome:   * Government Office for Development and European Cohesion Policy give short presentation on inclusion of GMTs in the draft National Development Strategy * Ministry of the Environment and Spatial Planning give short presentation on draft National Action Programme |
| **09:10 – 09:45** | 3 | Setting the scene for the workshop, including:   * Overview of the project plan and timeline * Key outcomes expected / value added |
| **09:45 – 10.15** | 4 | GMTs and proposed initial clusters   * Presentation:   + Linking implications to national evidence: description of method used   + Overview of initial scoping work * Introduction to Working session 1a |
| **10:15 – 11:15** | 5 | Working session 1a: Identifying potential implications from GMTs 7 & 9 |
| **11:15 – 11:30** | **COFFEE** | |
| **11:30 – 11:45** | 6 | Working session 1a: feedback and plenary |
| **11:45 – 13:00** | 7 | Working session 1b: GMT 7 Live mapping |
| **13:00 – 14:00** | **LUNCH** | |
| **14:00 – 15.15** | 8 | Working session 1c: GMT 9 Live mapping |
| **15:15 – 15:30** | **COFFEE** | |
| **15:30 – 15:45** | 9 | Introduction to Working session 2: Scoping of implications |
| **15.45 – 16.45** | 10 | Working session 2: Initial scoping of implications (magnitude, likelihood and time scales of effects) |
| **16:45 – 17:00** | 11 | Working session 2: Feedback and plenary |
| **17:00 – 17:15** | 12 | Reflections and next steps |
| **17:15** | **CLOSE** | |

Annex 4: Working session 1a - Identifying potential implications

|  |  |  |
| --- | --- | --- |
| GMT7: Intensified global competition for resources | | |
| Potential GMT implications identified for the Slovenian environment  Notes: e.g.   * Key explanations/ uncertainties / differences of opinion * Key geographies (e.g. national / whole region) | | |
| Thematic clusters | | |
| Ecosystem vulnerability (defined as: agricultural land use, biodiversity, drinking water) | **Energy stability** (defined as: RES, dependency on fossil fuel imports, biomass – land use/forests) | **Other** |
| Increased demand on natural resources (exploitation) | **Demand for more efficient energy use** | **Risk of (drinking) water supply**  - competition for drinking water resources  - uncertain supply in certain regions (Primorska, Prekmurje)  - drivers: Population growth and expansion of middle class, economic growth, and urbanisation |
| Increased need for RES and (energy and resources use) efficiency and waste reduction  - due to influence of technological innovations, circular economy, new ways to locate and exploit natural resources (drivers)  - to diminish supply and price volatility | **Pressure on demand for land** (change of land use) | **Better drinking water management**  - reducing the risk of supply by:  a)avoiding impact to existing water resources,  b)investment into water supply system  c)raising costs for local population |
| Import dependency  - Important due to the position of Slovenian industry in the value chain (usually parts providers, subcontractors) | **Economic dependency**  - on resources  - on multinationals  **-** Slovenia imports energy |  |
| Political environment implications  - drivers: values (economical protectionism, immigration)  - power relations in the international community, world economic order | **Demands on energy sovereignty and risk of energy supply**  - need to increase domestic/local use of RES  - risk of supply (fossil fuels)  - Slovenia imports energy  (NEK-nuclear power plant end by 2045/50, TES- coal power plant Šoštanj) |  |
| Loss of national sovereignty | **Rise of prices** |  |
| Increased privatisation of natural resources (water, land, waste and waste water treatment facilities) | **Energy poverty**  - risk of supply (fossil fuels)  **-** Slovenia imports energy |  |
|  | **Increasing environmental burden**  **-** unequal distribution of environmental burden  **-** heating/cooling  - transport (raise of transit traffic in Slovenia) |  |
| Water supply | **Need to increase/ expand (domestic/local) use of RES**  - water for: energy, agriculture, truism, urbanisation/new settlements |  |
| Comments | | |

|  |  |  |
| --- | --- | --- |
| GMT 9: Increased sever consequences of climate change | | |
| Potential GMT implications identified for the Slovenian environment  Notes: e.g.   * Key explanations/ uncertainties / differences of opinion * Key geographies (e.g. national / whole region) | | |
| Thematic clusters | | |
| Ecosystem vulnerability (defined as: agricultural land use, biodiversity, drinking water) | **Energy stability** (defined as: RES, dependency on fossil fuel imports, biomass – land use/forests) | **Other** |
| Food security and need for more intensive agriculture  - positive and negative consequences/ risks and opportunities  - food production in Slovenia will raise | **Impacts on human health**  - More heat leading to less sport  - Air pollution due to heating/cooling, production of RES from biomass | **Increased demand for water** (irrigation) and environmental consequences |
| Risk for freshwater and terrestrial biodiversity/ecosystems  - e.g. permanent grasslands: land abandonment in Carst areas and related risks  - low river discharge | **Increased energy use**  - heating/cooling  - less active mobility due to heat (cycling, walking) and use of other transport (mainly cars) | **Impact on human health**  - heat/ heat waves  - new factors for spreading diseases  - allergies to invasive species |
| Increased use of plant protection products | **Risks to global food security** | **The shift in forest border**  - migration of species  - risk for diseases |
| Extreme weather events  - Tornado like winds causing immobility  - forest devastation/damage  - Increased risks due to storms  - flooding (riverine, torrential floods) | **Risks to (national) energy supply**  **-** fluctuation in water level effecting energy production in hydropower plants (Slovenia very dependent on them) | **National security risks**  **-** migrations |
| Soil erosion and land slides | **Risks related to production of RES**  **-** Pollution from biomass as RES |  |
| Opportunities in water management | **Flooding** |  |
| Comments | | |

Annex 5: Working session 2 worksheets

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **GMT 7: Intensified global competition for resources** | | | | |
| **Implications** | **Estimated likelihood**  *(high/low)* | **Magnitude**  **of effect**  *(high/low)* | **Timescale over which implication may occur**  short term (to 2020);  medium term (2020–2030); l  long term (2030–2050) | **Notes and observations**  *E.g. any key differences of opinion or uncertainties etc.* |
| Increased privatisation of natural resources | high | high  (social and environmental effects) | medium term  (has already started but the implications are not felt yet) | * Some participants think the magnitude of the effect will not be high as the privatisation of water resources will be prevented with policy mechanisms * Other participants think it is already happening. The biggest players are the corporations which have/ or will have the support in international trade treaties like NAFTA and CEFTA |
| Economic dependence | high | high | short /medium /long term | * Industries depend of fossil fuels and gas, energy import, raw materials (metals, minerals) * Slovenian resources are wine, wood, gravel nature, water * Slovenian is strongly interrelated with EU and global markets, economic dependency is an will remain a fact * National Environmental Protection Programme lists the resources that are crucial for Slovenian economy. |
| Increasing environmental burden | high | high | short term (increased burden)  long term (decreased/increased burden) | * Some participants say there is a trend in the EU if decrease in environmental burdens and that is also reflected in the Energetic Concept of Slovenia (there will be new technologies, renewables, electric cars,…) * On the contrary, some think the air pollution will increase in Slovenia especially (due to large numbers of small domestic biomass firing installations) and will affect human health. As stated this is supported by OECD and WHO reports. * Transport and transit transport are expected to increase in Slovenia * Biodiversity is decreasing * Decrease in water quality (Karst, Eastern Slovenia, intensification of agriculture, decreased self-sufficiency * In business as usual we don’t stand a chance |
| Demand on natural resources (increasing) | high | low (transition to circular economy) | medium term  (if the circular economy is implemented, we assume it will be according to Slovenian Development Plan 2050) | * It will increase due to global changes growth in population and (immigration, climate change fugitives, tourism-Slovenia is a safe destination) * The population in Slovenia is currently stable (middle class is not expected to grow) |
| high (no transition to circular economy |
| Energy import dependence | high | high | long term | * Depends on how much RES Slovenia will have * Slovenia does not have enough resources to be 100% energy self sufficient * In future Slovenia will be less energy dependent as now (expectations). However, that can be questionable as the nuclear power plant will shot down presumably by 2050. Other big plant (TEŠ) is coal powered. Thus, in/dependency of Slovenia will depend on how much RES will it have in future. |
| Pressure on water quality and supply | high | high | long term | Pressure is carted by drinking water demand, use of water for RES, agriculture (irrigations du to more frequent draughts), tourism |
| **Comments** | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **GMT 9: Increasingly severe consequences of climate change** | | | | |
| **Implications** | **Estimated likelihood**  *(high/low)* | **Magnitude**  **of effect**  *(high/low)* | **Timescale over which implication may occur?**  short term (to 2020);  medium term (2020–2030);  long term (2030–2050) | **Notes and observations**  *E.g. any key differences of opinion or uncertainties etc.* |
| Food Security | high | low | short term (low magnitude) | * Magnitude will depend on timescale * Already seen in terms of food prices and certain products * Much will depend on the situation on global market. Possibly even some opportunities will arise * Several experts think the magnitude could also be low |
| high | medium/long term (some present aspect will significantly increase with time) |
| Extreme weather events (flooding, draughts, winds, hale) | high | high | short term (increase in time) |  |
| Human health risks (related to heating/cooling and food security) | high | low | short term (low magnitude) | * Magnitude will increase in time (spreading of ticks and related diseases, heat waves affecting ageing population) * NOTE: Assessing magnitude in long term is very difficult, as it is possible that technology and policy measures might change it. |
| high | long term (high magnitude) |
| Risk to forests (biomass) | high | low | short term (low magnitude) | * Some experts think that the likelihood is low, as there is perceived that the forests in Slovenia are resilient and abundant (Slovenia is one of the most forested areas in EU) |
| high | medium to long term (increasing to high magnitude) |
| Infrastructure damage | high | high | short term |  |
| Threats/ risks to biodiversity | high | low | long term | * Low as other pressures are more significant for biodiversity as climate change * In Slovenia there are certain bird and butterfly species which need extensive management of meadows * Climate change has a significant indirect impact on biodiversity as it effects land management and unsustainable land management leads to pressures on biodiversity |
| **Comments** | | | | |

1. <https://www.eea.europa.eu/publications/mapping-europes-environmental-future-understanding> [↑](#footnote-ref-2)
2. See: <http://www.eea.europa.eu/soer#tab-global-megatrends> [↑](#footnote-ref-3)
3. Eionet report No 1/2017 “Mapping Europe's environmental future: understanding the impacts of global megatrends at the national level”. Method tool kit [↑](#footnote-ref-4)
4. Environmental Indicators in Slovenia. See: <http://kazalci.arso.gov.si/?data=home&lang_id=94> [↑](#footnote-ref-5)
5. <http://www.cep.co.uk/> [↑](#footnote-ref-6)
6. *Short term (to 2020); medium term (2020–2030); long term (2030–2050)* [↑](#footnote-ref-7)
7. Key indicators highlighted in bold [↑](#footnote-ref-8)