

**EXERCISE 9 -  
ANALYSIS OF CRITICAL  
SCENARIOS AND “BLACK  
SWANS” IN  
ENVIRONMENTAL  
PROBLEMS**



Co-funded by  
the European Union



GREEN  
INDUSTRY  
FOUNDATION

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## Exercise 9 - Analysis of critical scenarios and “Black Swans” in environmental problems

Analysis of real, complex environmental problems and the search for effective, innovative solutions in the context of “black swans” – rare, unforeseeable events with a high impact.









**Educator**, start the exercise by introducing participants to the term “black swan”, which describes unpredictable, rare events that have a huge impact on the environment and society. Examples could include sudden environmental disasters, unexpected technological inventions or radical political changes affecting the environment.



Participants will work to analyse real-life cases that illustrate the complexity of environmental challenges and seek innovative solutions that can reduce the impact of “black swans” or enable better preparation for such events.

Divide participants into 4 groups. Each group will be given one scenario to analyse. The scenarios will deal with real, complex environmental problems related to “black swans”.

## Tasks for groups

-  **Case analysis** – each group should carefully analyse the assigned scenario, identify key challenges and risk factors associated with “black swans”.
  -  **Seeking solutions** – the group should develop strategies that can help minimise the impact of “black swans”, improve resilience to future such events, and come up with innovative solutions that can reduce risk or improve preparedness for unexpected events.
  -  **Presentation preparation** – groups prepare a 5–7 minute presentation in which they present their analysis and proposed solutions.
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-  Each group has 40 minutes to prepare a presentation and 7 minutes to present the results of their analysis and proposed solutions. The presentation should be organised, clearly present the problem, the proposed solutions and the justifications.
  -  After each presentation, other groups and the educator can ask questions, give feedback and suggest additional solutions or challenges that may have been missed.
  -  The educator summarises each presentation, highlighting the strengths of the proposed solutions and indicating how well the groups identified and addressed the problem of “black swans”.
  -  The reflection should include thoughts on the interdisciplinarity of environmental challenges and the role of innovation in preparing for the unexpected.
  -  The educator will conclude the exercise by stressing the importance of being prepared for unpredictable events and the need to continuously improve environmental strategies in the face of unexpected challenges.

## SCENARIO I

### Sudden oil spills and their impact on ecosystems

The failure of an offshore oil rig results in a massive oil spill that contaminates vast areas of sea and coastline. The event is a classic example of a ‘black swan’ due to the suddenness and scale of the disaster. Impacts include the death of thousands of marine organisms, habitat destruction and severe economic impacts on local communities dependent on fishing and tourism.

### Task for the group

- ➔ Analyse the causes and effects of the spill, taking into account environmental, social and economic aspects

- ➔ Develop a plan for responding to such incidents that includes both immediate actions and long-term prevention strategies

- ➔ Propose innovative technologies or methods that could prevent or minimise similar disasters in the future

## SCENARIO II

### Unexpected volcanic eruption and global climate cooling

A sudden, high-powered volcanic eruption spews huge amounts of volcanic ash into the atmosphere, leading to global climate cooling. This phenomenon, unexpected and difficult to predict, leads to changes in weather patterns, affects agriculture, reduces food production, and disrupts global supply chains.

### Task for the group

➔ Identify the main risks from eruption and global cooling

➔ Develop an adaptation action plan to help communities survive and adapt to new climate conditions

➔ Propose technological or policy innovations that can reduce the negative effects of similar events in the future

## SCENARIO III

### Sudden collapse of the coral reef ecosystem

Within a short period of time, there is massive bleaching and death of coral reefs due to rising ocean temperatures and acidification of the waters. The reefs, which are considered one of the richest ecosystems on Earth, begin to disappear, leading to drastic changes in marine ecosystems and loss of livelihoods for millions of people dependent on fishing and tourism.

## Task for the group

➔ Analyse the causes of coral reef ecosystem collapse and its effects

➔ Develop a coral reef protection and restoration strategy that includes both immediate actions and long-term adaptation plans

➔ Propose innovative approaches to protecting marine ecosystems that could reduce the risk of similar disasters in the future

## SCENARIO IV

### Spread of a new, aggressive invasive species

A new invasive species is accidentally introduced into the region and spreads rapidly, displacing native species and causing severe damage to the ecosystem. The species, previously unknown in the region, alters the structure of the ecosystem, leads to a loss of biodiversity and causes significant economic losses in agriculture and fisheries.

### Task for the group

- ➔ Investigate the causes and effects of the spread of the invasive species

- ➔ Develop a risk management strategy to help control the population of the invasive species and protect local ecosystems

- ➔ Propose innovative methods or technologies that can help to quickly identify and control new invasive species before they become a threat

## Role of the Educator:

- ➔ The educator should be thoroughly familiar with the scenarios and be ready to moderate discussions and support groups in identifying key aspects of the problem.
- ➔ During group work, the educator monitors progress, ensuring that each group remains focused on the task, and offers support where needed.
- ➔ During the presentation, the educator encourages discussion, asks questions to help deepen the analysis and reflection on the proposed solutions.
- ➔ The educator concludes the exercise by emphasising the importance of preparedness for “black swans” and the need for innovative and interdisciplinary approaches to solving environmental problems.