Interreg - IPA CBC
Bulgaria - Serbia

JOINT ACTION PLAN, JOINT EMERGENCY MANAGEMENT PLAN AND PROCEDURES FOR EMERGENCY SITUATIONS

Abstract

The present document has been developed under project: Joint prevention and mitigation of the consequences of natural and man-made cross-border disasters in the municipalities of Svoge and Merošina, tender for consultancy services for conduction of studies under project CB007.1.31.287, location - Republic of Bulgaria/ Republic of Serbia.

Center for social and economic development

This project is co-funded by the European union through the Interreg-IPA CBC Bulgaria-Serbia Programe

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Background

Background project information

The present document has been developed under project: Joint prevention and mitigation of the consequences of natural and man-made cross-border disasters in the municipalities of Svoge and Merošina, tender for consultancy services for conduction of studies under project CB007.1.31.287, location - Republic of Bulgaria/ Republic of Serobia.

The Project "Joint prevention and mitigation of the consequences of natural and man-made cross-border disasters in the municipalities of Svoge and Merošina " will support joint prevention and mitigation of the consequences of natural and man-made cross-border disasters in the municipalities of Svoge and Merošina. The project will focus on building sustainable cross-border capacity and join system for management and liquidation of consequences of natural and man-made disasters in the municipalities of Svoge and Merošina. The above referred municipalities from the border area have close social, economic, cultural, demographic and other characteristics and often face similar crisis situations. A major challenge for the municipalities of Svoge and Merošina is the lack of adequate equipment and resources for action in case of disasters. The project will allow for the purchase of necessary equipment, exchange of experience, creation of conditions for joint action and sharing of resources in the event of natural and man-made disasters in the border area. The project will be conducive to better cross-border cooperation and will establish a sustainable mechanism and model for risk prevention and management in the cross-border area.

The project will establish a system for effective sharing of resources on local and regional level, which is one of the key factors for successful prevention and mitigation of the consequences of natural and man-made cross-border disasters.The Lead partner under the present project - Svoge Municipality – regularly suffers from wild fires and flooding resulting in blockage of sewerage system and sewage overflow, which creates a major health risk for the local population. The municipality of Merošina on the other hand is located in the Nišava District and regularly experience wild fires and flooding problems. The municipalities of Svoge and Merošina have close social, economic, cultural, demographic and other characteristics and often face similar crisis situations. A major challenge for the municipalities of Svoge and Merošina is the lack of adequate equipment and resources for action in case of disasters. The project will address the above-referred challenges by creating an opportunity to purchase necessary equipment, exchange of experience, create conditions for joint action and sharing of resources in the event of natural and man-made disasters in the border area. The project "Joint prevention and mitigation of the consequences of natural and man-made cross-border disasters in the municipalities of Svoge and

Merošina " will establish an effective resource sharing and joint management system that will help for overcoming future environmental risks.

'The Project "Joint prevention and mitigation of the consequences of natural and man-made cross-border disasters in the municipalities of Svoge and Merošina" will directly contribute to achieve Programme overall aim by stimulating the balanced and sustainable development of the Bulgaria-Serbia border region integrated in the European space. The project implementation will establish a model and create conditions for environmental change adaptation in the cross-border area of Bulgaria and Serbia by joint prevention and mitigation of the consequences of natural and man-made cross-border disasters in the municipalities of Svoge and Merošina.

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Tender information

Description of the assignment

The activity implementation will take place in the NUTS III regions of Nišava and Sofia. The activity is aimed at the implementing joint risk assessment and preparation of plans and procedures for emergency situations for the municipalities of Svoge and Merošina. The implementation of this activity will have a direct impact on the efficiency and effectiveness of the cooperation in the Bulgaria Serbia cross-border area. The joint risk assessment will help to identify key areas for cooperation and develop a joint early warning system. The activity implementation will result in the development of joint action plan, joint emergency management plan and procedures for emergency situations. The methods for the implementation of this activity will include: analytical methods, baseline assessment; risk assessment; development of RMC cards; risk ranging, development risk elimination and mitigation strategies; development of a joint risk management plan; organization of round tables for local stakeholders in the field of prevention and management of natural and man-made disasters form both Svoge and Merošina.

In the implementation of the contract will be involved experts in the area of strategic planning with specific expertise and experience in the fields of emergency management, natural and manmade disaster management and prevention. The experts shell have proven experience in organizational analysis, as well as academic background in the field of administrative structure management, specifically related to national security and natural and manmade disaster management and prevention.

Geographical area to be covered

The project will cover the municipalities Svoge and Merošina, NUTS III regions of Nišava and Sofia in the CBC countries Bulgaria – Serbia.

Target groups

The different target groups of the assignment are as follows:

- local population living in risk of natural and man-made cross-border disasters, local authorities;
- local administrations in Svoge and Merošina;
- the voluntary teams involved in natural and manmade disaster management;

- population of Svoge and Merošina, SME sector, residents of neighboring municipalities.

Specific work

This activity consists of two main tasks:

❖ **Task 1: "Joint risk assessment"**

The development of "Joint risk assessment" will include:

- Thorough analysis of the strategic and planning documentation on the local and regional level related to natural and manmade disaster management and prevention in the respective NUTS III regions and municipalities;
- Analysis of the legal framework and organizational structure on municipal and regional level with regard to natural and manmade disaster management and prevention;
- Baseline assessment of the institutional capacity, functions and coordination related to natural and manmade disaster management and prevention;
- Natural and manmade disaster risk assessment;
- Risks identification through interviews and questionnaires;
- Development of RMC cards;
- Risk ranging and development of risk elimination and mitigation strategies;
- Formulation of specific measures and policies in the field of natural and manmade disaster management and prevention
- Development of a joint natural and manmade disaster risk management plan.

❖ **Task 2:** "Joint action plan, joint emergency management plan and procedures for emergency situations".

The development of "Joint action plan, joint emergency management plan and procedures for emergency situations" will include:

- Development of a joint data base of the respective authorities in the field of natural and manmade disaster management and prevention containing contact information, functions, competencies and structure;
- Development of joint action plan for natural and manmade disaster management and prevention containing specific responsibilities, time frame and resource allocations;
- Development of joint implementation schedule for the action plan for natural and manmade disaster management and prevention;
- Instructions for institutional coordination and implementation of the action plan for natural and manmade disaster management and prevention;
- Development of dynamic scenarios for natural and manmade disaster events ;
- Natural and manmade disaster scenario modelling ;
- Natural and manmade disaster scenario planning;
- Development of cross-border response patterns for natural and manmade disaster events;
- Resource planning and sharing models and procedures for natural and manmade disaster events;
- Development of measures and procedures for cross-border response to natural and manmade disaster events;
- Development of joint emergency management plan based on the dynamic scenario modelling.

Project management

Responsible body

Svoge Municipality will be Contracting Authority. Beneficiary country it's Republic of Bulgaria. The Contracting Authority is responsible for conducting the current tender procedure, signing the service contract and carrying out the overall control on the contract implementation.

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The Contracting Authority will appoint a contact person (as part of project management team) for the project who will be responsible on its behalf for the approval of all drafts of the materials and communication with the Contractor.

The Contractor is fully responsible for the quality and timely delivery of the contract results, according to the contractual provisions. In this sense, the Contractor shall ensure that the reports are delivered in time and the executed activities are in line with the ToR.

Management structure

Management structure of the Svoge Municipality (Contracting Authority) is based on the legal framework in the field of local self-government and administration. The Mayor of Svoge is the legal representative of the organization.

Overall objective

The overall objective of this tender is to establish a model and create conditions for environmental change adaptation in the cross-border area of Bulgaria and Serbia by joint prevention and mitigation of the consequences of natural and man-made cross-border disasters in the municipalities of Svoge and Merošina.

The successful implementation of the activities envisaged under the present tender will directly contribute to the realisation of the overall project objective by creating a strategic framework, plans, procedures and guidelines for joint action and coordination in the prevention and mitigation of the consequences of natural and man-made cross-border disasters in the municipalities of Svoge and Merošina.

Purpose

The Project "Joint prevention and mitigation of the consequences of natural and man-made cross-border disasters in the municipalities of Svoge and Merošina" will support joint prevention and mitigation of the consequences of natural and man-made cross-border disasters in the municipalities of Svoge and Merošina. The project will focus on building sustainable cross-border capacity and join system for management and liquidation of consequences of natural and man-made disasters in the municipalities of Svoge and Merošina.

The successful implementation of the activities envisaged under the present tender will directly contribute to the realisation of the above stated purpose since the analyses, assessments and development of strategic documents, plans, procedures and guidelines is key to the development of sustainable cross-border

capacity and join system for management and liquidation of consequences of natural and man-made disasters in the municipalities of Svoge and Merošina.

The purposes of this tender are as follows:

- To make a joint risk assessment in the both municipalities;
- To elaborate joint action plan, joint emergency management plan and procedures for emergency situations

The purposes of this tender are related to the overall project successful implementation. The process of realization of the above stated tender purposes is presented in detail tin the present document as methodology and organization below.

Results to be achieved

- One joint risk assessment made.
- Elaborated joint action plan, joint emergency management plan and procedures for emergency situations.

The results to be achieved by the contractor are vital for the successful implementation of the whole project. In that regard there are several key issues related to the successful implementation of activities in particular regarding the objectives and expected results subject to the present tender and the ToR which are planned to address by the following measures:

- Development of a systematic approach towards implementation;
- Ensuring the qualification and experience of the proposed experts;
- Establishment of effective and efficient risk identification and assessment methodology;
- Survey and analysis of relevant legislation and strategic documentation;
- Survey and analysis of relevant local and regional administrative structures capacity with regard to project implementation;
- Provision of strategic management knowledge and approach towards activities implementation;
- Excellent time management and planning of activities;
- Efficient communication with LP and PP2 teams;

- Survey and analysis of Svoge and Meroshina municipalities and the respective NUTS III regions;
- Provision of knowledge on Interreg-IPA Cross-border Cooperation Bulgaria-Serbia Programme goals, objectives and requirements.

An explanation of the risks and assumptions affecting the execution of the contract.

The identification and assessment of risks is vital to successful implementation of contract activities.

The potential risks to the successful implementation of the contract as stated in the Terms of Reference to the present tender include:

- Lack of communication and logistical coordination between the Contractor and the Contracting Authority. In order to avoid this risk, the Contractor should show initiative and maintain continuous contact with the relevant representatives of the Contracting Authority.
- Insufficient quality of the services provided by the Contractor experts and suppliers. In order to avoid this risk the Contractor should use the most reliable and experienced staff/service providers on its disposal.
- Poor cooperation between the Contractor and the target groups during the implementation of the contract.
- Political instability in one of the partnering countries.

In addition the potential risks stated above additional potential risks affecting the execution of the contract could be identified, monitored and if necessary addressed:

- Lack of support on behalf of stake holders on local, regional level and national level;
- Inefficient communication and coordination with project partners and the JS;
- Poor timing and planning of contract activities;
- Inconsistent legislation and strategic documentation framework;

- Lack of motivation and willingness to share knowledge, information and resources among local and regional authorities and administrative structures.

The Assumptions underlying the project as formulated in the ToR of the present tender are as follows:

- Clear understanding of the contract objectives and purposes on behalf of the Contractor;

The clear understanding of the contract objectives and purposes on behalf of the Contractor will guarantee effective implementation of the tasks and activities envisioned in the project and tender documentation.

- Full cooperation between the Contracting Authority and the Contractor in view to fulfil the tasks on time, with high quality and within the budget limitation.

Cooperation between the Contracting Authority and the Contractor in view to fulfil the tasks on time, with high quality and within the budget limitation is vital for the successful realization of the contract and the respective activities.

In addition to the assumptions stated above additional assumptions affecting the execution of the contract are:

- Efficient analysis of cross-border opportunities for disaster management and prevention is vital for successful cooperation of project partners;
- Effective and efficient cross-border cooperation is beneficial and conducive to prevention and mitigation of the consequences of natural and man-made disasters;
- Mutual planning and resource sharing is key to prevention and mitigation of the consequences of natural and man-made disasters;
- Intelligent and cost-efficient resource allocation requires coordinated specialization and joint investment plans.

Development of a joint data base of the respective authorities in the field of natural and manmade disaster management and prevention containing contact information, functions, competencies and structure

People residing (or using land) and owners of businesses operating in Project affected areas – municipalities of Svoge and Meroshina

Local community representatives

Local municipal authorities

Interested NGOs and other organisations

Relevant national and provincial level authorities:

- Ministry of Mining and Energy of the Republic of Serbia
- Ministry of Health of the Republic of Serbia
- Ministry of European Integration of the Republic of Serbia
- Ministry of Environmental Protection of the Republic of Serbia
- Ministry of Defence of the Republic of Serbia
- Ministry of Agriculture, Forestry and Water Economy of the Republic of Serbia
- Ministry of Internal Affairs of the Republic of Serbia
- Nišava Administrative District Administration

- Ministry of Energy of the Republic of Bulgaria
- Ministry of Health of the Republic of Bulgaria
- Ministry of Environmen and Waters of the Republic of Bulgaria
- Ministry of Defence of the Republic of Bulgaria
- Ministry of Agriculture and Food Republic of Bulgaria
- Ministry of Internal Affairs of the Republic of Bulgaria
- Sofia District Administration

Development of dynamic scenarios for natural and manmade disaster events

Issues of the prevention and eradication of the effects of natural and man-made transboundary disasters are permanently relevant due to their frequent occurrence and their direct impact on the living environment, including international relations. In a number of cases, cross-border disasters are a cause of distortion of

goodwill and traditions in neighboring countries. This is natural because of people's acute sensitivity to environmental hazards and a strong understanding of the quality of life, security and safety.

In recent years, a deliberate theory and practice has been developed to use scenarios to identify risks in cross-border environmental security. In this case, the classic meaning of the concept of a script as a literary work, a text with a detailed description of action, dialogue, etc., on the basis of which a stage, theatrical performance, a spectacle, an organized event or a film is created. Another meaning of the script is related to the understanding of a detailed plan, a specific program to accomplish, a specific purpose.

Scenarios can be used to create approximate and orientational knowledge defining the directions in which targeted and targeted actions are targeted and implemented. In this sense, the scenario may represent:

- a concept that is used to describe a variety of nuances and multiple occurrences of natural and man-made disasters;

- event-oriented symbol considered as a stand-alone factor.

- a modern method that is mainly used in research and management of social processes.

Moreover, on the one hand, an event related to natural and man-made disasters can be of varying degrees of scope and detail, and on the other hand - a model that allows quantitative measurements.

Scenarios can be grouped as: retrospective, prospective and futures. The retrospective are events that have occurred in the past and prospective of current events observed over a certain time interval. Future scenarios are for events in the future. In this case, the scenario is defined as a complex, comprehensive set of results that includes internal interactions between multiple variables. It explores different social and natural phenomena and processes in order to provide the directions of natural processes and phenomena, economic, technical, scientific and socio-political development of public communities.

Future scenarios are commonly defined as a description of a result that may occur in a so-called " "Conceptual future". This type of scenario includes the pathways involved in the development of certain future situations. In the conceptual future, the simple hypothetical represents a future state. The scenario describes the development, dynamics, methods used and stakeholders to achieve narrower and more specific results. The aim is to present the genesis and orientation of future development and, more precisely, to define the factors influencing the course of events.

Key features of the scenarios:

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1. Scenarios are chains of supposed events that reflect processes, causes, consequences, decisions, and results. Processes include various factors and events that should be accurately thought out and logically related. The interrelationships between the processes are presented. The main idea is to compose a complete composition of a past, current or future event or state, to describe the functions, to formulate aspects that are of interest to certain communities and society.

2. The scenario is not an absolutely comprehensive picture of the events. Rather, it focuses on one or more specific, but precisely formulated problems in a limited, real-world segment. The assumed construction is hypothetical. The more precisely the objects, the objects, the objectives, the tasks of the scenarios are defined, the more they will be more authentic. Scenarios follow a specific idea that develops under certain limits, conditions and circumstances.

The selection, combination and connection of the key components of the scenarios are design and build processes. He can not search for and expects absolute precision. These are approximate statements that need to be accepted with some reservations.

3. Scenarios are based on assumptions. They define the actions, the spatial scope of the emerging events, the boundaries of the changes, the districts and the distribution areas, the prospects for possible development. Assumptions allow to create variants that include supposed events and actions.

Assumptions are an indication of wide and varied mental boundaries of events, "mental maps" or patterns that reflect on individual perspectives that present a particular development. Some of the thought constructs present an unconditional future. In the concept of scenarios, they must be accepted, but their hypothetical character must not be forgotten. Therefore, they should be perceived as probable, random, possible or impossible, attractive or unattractive, with overriding subjectivity, pessimistic or optimistic.

4. Scenarios and forecasts are not identical. The forecasts have synthesized formulations for expected future developmental conditions. They are not the result of prophecy but are based on knowledge, statistical extrapolations, and mathematically outlined trends. Estimates can be understood as results in the present, which are withdrawn in the future, ie. as phased results. Therefore, instead of forecasts, the words "prospects", "predictions", "trends" are used. For example, in market research, forecasts are assimilated to scenarios, due to time-based traditions in the theory and practice of market play.

In general, there are three perceptions or paradigms about the relationship between the future, the past and the present:

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- "the future is predictable" - the past and the present are grounded. The more knowledge we have of the past and the present, the more predictions about the events in the future will be more secure. In this sense, the future can be managed and regulated;

- "the future is developing" - this means that our present knowledge is not adequate to the development of the predicted future. It is connected with chaotic processes, uncontrollable and random guidelines and changes. This paradigm suggests that no targeted control over future events, strategies and incomplete clarifications are possible;

- "the future is susceptible and sensitive to impacts" - it is assumed that future events can not be predicted and development is completely chaotic. Future development can be manipulated and our actions can change. Therefore, intervention can influence the future, change the role and the ability to carry out concrete actions, to form goals and to make decisions.

The development of dynamic scenarios of natural and man-made disasters is not prepared through universal methodological tools. It is hardly possible to describe all the active elements, processes and functions of the scenarios. That is why the application of the scenarios is specific. Over time, emphasis is placed on precisely defined moments. Their placement depends on the goals that are placed. On the other hand, it should be noted that the scenarios' capabilities are based on common forecasted knowledge. They can not serve for rapid and accurate prediction. Scenarios make sense of control questionnaires that answer the question "What will happen if?".

The first specific aspect of the scenarios is that the true meaning of prediction can not be evaluated. Through the scenarios, they can not fully depict the reality and future alternatives that may emerge. Scenarios can be used mostly to reveal the course of the processes. It can not be said that they are complete and as comprehensive as possible. In particular, their main task is to make direct sense of the changes in the various factors and the links between them.

Scenarios are a means of reflection and management that reflects and presents the spectrum of possibilities. There is no single scenario. A number of scenarios can be built on a specific problem.

The second specific aspect is the incomplete knowledge, the uncertainty and the ambiguity of the scenarios. Risk analyzes can lead to certain classifications, categories, groups, elements that reveal the uncertainty of the scenarios.

The events in the present may be terminated and a new direction for further development will be undertaken. That is why the focus on future development can be predicted, but with a high degree of uncertainty. Scenario methods do not

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use criteria to evaluate the accuracy of event reproduction. Therefore, it is always imperative to define their boundaries, the subject and the object, to clearly define objectives and to interpret, to define the conditions, to be clear to use.

The third specific aspect is that there are methodological similarities and differences between the scenarios. We should begin with a plan to precisely mark and systemize the application areas, the spectrum of the scenarios. The overall course of the scenario building process is the limits of their application. Then the emerging differences in the baseline characteristics need to be analyzed again and the differences in the solved tasks are determined. This preparation is necessary as the picture is gradually expanding and knowledge deepens.

The fourth specific aspect is that the scenario method is not a single, but a complete strategy. This statement can be explained by the fact that single methods for creating scenarios are not applied, but a system of methods. They define the framework of a complete modeling process that consists of a number of separate phases, stages, actions, operations. Their nature and variety determines the application of one or other methods. This can be argued through a deliberate methodology of situational risk modeling. In this sense, it is possible to talk about scenario management in which the scenarios are applied as part of the decision-making process. Another method, such as a multiplier scenario analysis, is possible.

There are also differences in the perceptions of the level of applied methods, the degree of extension of their applicability, the individual abilities of the subjects that construct the scenarios. In this sense, it is confirmed that scenarios are strictly limited in applicability. It depends on the specifics of the solved tasks and the capabilities of the applied methods.

There are several approaches to scenario development, but all have three general considerations.

1. The starting point for scenario development should be very precisely chosen as its place in the development strategy is perhaps the most important. It is the main prerequisite for objectively understanding and understanding the dynamics of the significant factors of the processes, the phenomena, the events, in what significance they decrease, respectively, the influence of time and a number of other regularities.

2. Separate scenarios are made when identifying significant factors that do not have accurately expressed trends. They influence, but their behavior is not legal. In such cases, it is appropriate to base them on expert analyzes where various scenarios can be discussed.

3. A number of alternative scenarios of the future, which in themselves are specific logical situations, need to be developed. There is one mandatory

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condition. Alternative scenarios should not contain contradictions in the mutual exclusion of events.

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Natural and manmade disaster scenario modelling

Scenario modeling of natural and man-made disasters is used to reveal the risks to the living environment - natural, urban, socio-economic. In this context, it is necessary to analyze the properties of the risk in the environment, to derive relevant characteristics. Various types of risk modeling are then made, for example: situational, linguistic scenario.

Various scenario building procedures have been identified that include stages such as:

- Scenario scope identification.
- disclosure of significant factors;
- factor analysis;
- generating the script;
- Scenario transfer.

The first stage of scenario creation is appropriate to define precisely the scope and limitations of the intentions, the objectives to be achieved and the tasks to be solved. At this stage, it is advisable to answer questions such as:

- what problem is being solved;
- what is specific;
- what are the boundaries of the script;
- what the subject of the script is;
- what the subject of the script is;
- what needs to be analyzed;
- what should be summed up;
- others. Similar, whose answers can describe the details in the essence of the stage.

The second stage consists in identifying significant or key factors. Key factors are the significant controllable, controllable and unmanageable variables, the parameters, the regularities of event transformation at different stages. They describe the essence of the scenarios. Information about them should be analyzed theoretically and experimentally. Theoretical analysis is appropriate to be done by justifying models of transformation of controllable and unmanageable, controlled and uncontrolled factors in baseline situations.

The third stage requires the use of special scenario methods. They draw up situational scenarios, system scenarios and spatial scenarios. They make their sections, reveal states, events and ongoing processes, track their development.

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The fourth stage covers actions that aim at designing the scenarios. The idea is based on the conclusions of the sections of the significant factors to specify the change and the trends of development. It is necessary to take into account not only the influence of the individual factors, but also their combined effect. At this stage there is the greatest difference between the applied methods. It brings together various procedures for formalizing scenarios.

The fifth stage consists of using the scenarios for other purposes, tasks, circumstances and conditions. This stage is probably not so much for different cases. Performed when absolutely necessary.

From the practice, the need for the development of futures scenarios with the inclusion of different phases has emerged:

1. Define the subject of the study and its structure;

2. Determination of the major factors influencing the scenario and their structure;

3. Determination of development trends;

4. Development and selection of alternative scenarios;

5. Interpretation of selected options;

6. Develop a final version of the scenario and counteract adverse events;

7. Application of the scenario in practice.

When revealing the content of the stages, many repetitions, vague definitions and content of the individual stages are allowed. Therefore, strict follow-up of these stages is not appropriate for the creation of riskcenters. There is no single basis for their construction.

Practice has so far not been endorsed with a methodology that clearly clarifies and at the same time allows universal application of scenarios. The most common are either too general or very narrowly specialized variants that limit the spectrum of varieties.

In general, the scenarios are classified by two attributes - in terms of character and measurability. By nature, the scenarios are research and normative, but measurable - quantitative and qualitative.

An additional important sign of division is the inclusion of possible future actions in a specific scenario, not just results for specific indicators. In this respect, the scenarios are divided into "scenarios of competences" and "policy scenarios".

Other attempts to classify scenarios include unexpected events or events that stop running them The type of scenarios determines the type of methods to create them.

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Exploratory scenarios require, above all, methods that allow us to analyze and establish the degree of desire for results. One of the varieties of this group are the scenarios that seek to answer the question: what would happen if? The answers to this question determine trends in development, deployment, development, improvement. This approach is widely used in risk identification and is recommended in today's standards of risk management, such as the International Standard ISO 31000: 2009. Risk Management - Principles and Guidelines.

The second variation is to seek unpredictability of events. It is mainly due to subjectivity in the formation and construction of scenarios. There are a number of reasons for this, such as:

• ignorance;

• Insufficient qualification of the analysts;

• lack of signs of occurrence and action of the factors;

• uncertainty and fluctuation in decision-making in scenarios;

• Errors and inadequate feelings of danger;

• inadequate perception and identification of the phenomena of the phenomena, the circumstances and conditions of the occurrence and the course of the processes;

• Inaccurate generalization and incorrect conclusions.

A third variety is devoted to development. Questions such as "what do we know and what we do not know?" Are used. Questions with exploratory and cognitive functions. They are used as simulators of possible consequences of decisions and actions taken.

The exploration scenario procedure is expressed in the study of the future development, while in the normative scenarios the future and subject of desired conditions and circumstances.

The actual implementation of the exploratory scenarios is an examination of the development and decision-making actions. These scenarios can include probability aspects of scenario development and implementation. Therefore, it is possible to directly take into account the accidents that could occur in a real environment.

Normative scenarios combine values and interests. The questions that are asked to reveal the desires and attractiveness of the future are:

"What do we expect to like in the future?",

"In what direction do we expect our development to come in the future?",

"How can we get there?",

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"What should happen to make our goal real?"

In other words, the normative scenarios recreate the process of achieving the purpose of events and of strategic development.

The implementation of the normative scenarios consists in defining and specifying the objectives, and / or, if appropriate, identifying the possible ways to achieve them. The probabilities of achieving the normative scenarios are considered indirectly as part of the acceptability of the plan.

In practice, the most common scenarios are applied, or as they are called research-normative.

Scenarios and scenarios vary according to the type of information that is used. There are different tools to identify and analyze key factors. When generating scenarios, qualitative and quantitative information on evidence, hypothesis testing, identification of dependencies between key factors is sought.

Quantitative information is most often applied in scenarios in the sphere of economics, demography, insurance, finance. In culture, governance, politics, disasters, accidents and the like, quality information is applied.

Risk assessments require the use of quantitative and qualitative information.

The choice of type of information is made taking into account the degree of formalization of the scenarios.

Risk scenarios can be systematized into three classes. The first class contains a description of the algorithm and structural elements that lead to the predicted state. Factors, processes and events, actions that affect their reproduction are included.

The second class contains a description of possible consequences, how to reach the desired, desired or unwanted outcome.

The third class is a combination of the two classes.

With regard to the prevention and eradication of the consequences of natural and man-made disasters, it can be argued that the risk or the damage is specific consequences. They are directly related to man's attitude towards them. Therefore, this ratio should also be taken into account in the first and second class of scenarios.

Man may have a different attitude to risk. He can analyze situations and choose those that involve less or greater risk. Initially, a riskier situation with a high probability of harm can be chosen, relying on great benefits. Risk mitigation measures can then be taken.

The perception of the risk of one person differs from the perception of a group of people. Perception is different and depends on:

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1) the source of the hazards;

2) social content;

3) personality and specific aspects of personality.

Once these aspects are taken into account, the relationship between risk perception and the characteristics of subjective risk is reached. A number of basic dimensions and perceptual characteristics can be formulated as an element of subjective risk. In summary, it can be concluded that they can be:

1. Potential degree of damage and fatality;

2. Physically defined area of damage or damage area;

3. The social extent of disability, including the number of injured people;

4. Distribution of the time of occurrence of destruction and other damages;

5. Likelihood of undesirable consequences;

6. Possibility of controlling the unwanted consequences independently of the person or by competent and trusted experts;

7. Knowledge and Conception of Consequences;

8. Conscious exposure to risk factors;

9. Clarity and appreciation of the importance of expected benefits;

10. Social risk and benefit distribution;

11. Deliberate harm.

The analysis shows that subjective risk and subjective security need to be measured. The value obtained from the measurement can be used in risk management and consequently to increase the level of security. Despite the argumentation of the psychological side of subjective risk, such as perception and the derivation of its basic characteristics, it is necessary to quantify the dependence on financial costs.

They can define three main groups of methods that are accurate and effective for futures scenarios:

I. Methods for trend analysis and extrapolation, including:

A) Trend Analysis,

(B) Extrapolation.

II. The key factors method, combining:

(A) System-formalizing methods,

(B) Creative - descriptive methods.

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III. Combined method.

The first group of methods is related to the trend. The trend has several meanings. The first meaning is the change, defining the general direction of development, the main trend of the dynamic lines of risk. The second point is the direction of the changes to the risk descriptors defined by processing statistical data and establishing trends of increase or decrease. The third meaning is a line of variation of risk indicators in function of time built by mathematical processing of statistics. This is the trend line.

The extrapolation used in the scenarios is applied to bring regularity from a particular area to adjacent areas. Using it shows us that the conclusions drawn for a part of the phenomena can be spread over another part of them. The reality of such transfer depends on the extrapolation boundaries. Moreover, the hazards, respectively the risks, are complex objects that can not be characterized by just one parameter. Data should not be extrapolated and can not be extrapolated to only one metric or different dates.

In analyzing and extrapolating the risk trend, it is appropriate to follow the following order:

1. Formulation of the risk determination task and the hypothesis of its development;

2. Explain the risk models and determine the need for extrapolation;

3. Formulate situational scenarios and establish their parameters;

4. Collection and systematization of empirical data;

5. Analysis and extrapolation.

It is important to determine the extrapolation time measured from the moment for which statistics are available to the time at which it is necessary to determine the value of the risk parameter under consideration. The least squares method is most often used for analyzing and constructing the trend and extrapolating. It is appropriate to extrapolate risk-based studies by means of:

• the average value of the order of the significance of the risk in function of the time,

• a moving or exponential average risk,

• average rate of change in risk,

• one-time time function functions such as stepping polynomial, parabola, linear function, exponential function, step function, logarithmic function, combination of linear and logarithmic function, logistic function, hyperbola, combination of linear function and hyperbola,

• multifactor polynomials,

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• Exponential smoothing of data,

Autoregressive conversion.

The method of trend analysis and extrapolation requires a large number of quantitative data, number of observations, duration of experiments, planning of studies. It is suitable for application in environmental risk studies. Through this method one can study the single, privately possible future. Predictions should be with maximum credibility. It depends on the variations in the characteristics that can be used to plan the experiment.

The second group is based on the key factors.

System-formalizing methods are one subgroup. They are based on concrete facts. Based on these, significant influence factors can be defined on the risk scenarios. Then the factors combine with each other and expand the range. It comes to generating a specific and differentiated scenario defined by multiple characteristics of the situation.

Initially identifying significant factors for the emergence and development of hazards and risk. For this purpose, trend analysis, graph patterns, statistical distributions of emerging events, dependencies between the elements of the risk structure can be used. They require large amounts of quantitative information.

In accelerated tests and scenario creation on a limited database this need can be overcome. For this purpose the expert method for analyzing the influence of the factors is used. They seek their own and their combined effect. The relationship between the factors is first established. If there is such a dependency, it is not necessary to investigate the effects of all factors. The influence of one factor is sought, and then his dependencies are judged on the influence of others.

When using the system - formalizing method, the number of key factors is particularly significant. They can be selected by certain individuals, which narrows its application. It is difficult to describe the intuitive and normative elements of the scenarios, and sometimes it is impossible to find them. Implementation costs are intense. Therefore, in risk management, including all analysis and evaluation processes, this method is difficult to apply.

The impact analysis method is most commonly used by the group of system-formalizing methods. In this case, is the question of how the scenario factors influence each other?

Correlation and regression analysis of the dependence between probabilities of occurrence of events included in the scenario is possible. The compatibility analysis serves to rank the different values of the key factors. A combination has to be defined which is coordinated with regard to the factors and which can play

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a significant role in the construction of the scenarios under construction. This demonstrates the credibility and specificity of the scenarios.

The compatibility analysis begins with the determination of the possible values of the key factors. It is assumed that the smallest two possible values are the basis for changing the relevant factor. The likelihood of their occurrence is not particularly important in analyzing the processes described.

The truncated impact analysis method is applied when it is necessary to use the probabilities for the individual occurrence of the key factors and their occurrence depending on the other factors. It provides the causal relationship between the possibilities of different future events. The probabilities are practically used to quantify the credibility of the scenarios. They are considered as an additional criterion. The key criterion is the meanings of the key factors.

The basic logic of this method is that future development depends on interactions between events. First, the probability of occurrence of each event individually, the so-called Initial probability. It shows which event can be excluded due to the small value of this probability, indicating its significance.

Conditional probabilities are then established. Their determination is made by answering the question: "If event A occurs, what is the probability and can it affect the occurrence of event B?" The results are presented in tabular form.

Based on the compatibility analysis, three variables can be defined:

- stability,

- volatility,

consistency.

Very often the scenario is considered "most likely" or one of two variants - "very bad" or "very good". Creative-descriptive methods for creating scenarios can be defined as easily formalizing. They are ways of creating novelties, intuitive and not limiting existing knowledge. They are close to communication processes and are somehow consistent approach to the actual development of events.

Intuitive logic, morphological analysis and normative-descriptive analysis can be applied to the group of creative-descriptive methods. Intuitive logic allows decisions to be made based on people's inner perception of events. Intuition allows people to anticipate events in the future. It is connected with secrets in perception, with inexplicable attitude to the knowledge of truth. Intuition is defined as a living contemplation of the truth in unity with immediate, early acquired knowledge.

The unconscious nature of human intuition does not mean that mechanisms, logical rules and properties are not known. Intuition is due to the particular natural logic of the intellect that is related to its immediate needs.

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There are three semantic areas of intuitive logic application in people making decisions. The first is the logic of satisfying the actual needs and through them an experience. The second logic is to get the pleasure of reaching specific forms of happiness. The third logic is constructivism. It leads to the acceptance of unconscious evaluations and decisions in conditions of considerable uncertainty and time constraints.

Intuitive logical rules are not perceived by consciousness, but nevertheless provide a quick subjective analysis of the situations. Everyone counts, including many unsubstantiated arguments, such as subconscious sensations and emotions. When reconciling intuitive and conscious formal analysis of situations, consistently and after repeated iterations, an initially vague but subsequently more clearly formulated and reasoned solution is adopted.

Intuitive logic is a limited method whose quality and legitimacy are difficult to access and explain to others. They are strictly subjective in terms of assessments and decision-making. In risk analyzes and assessments, we should not, in any case, rely on intuition, but we must apply objective, realistic methods.

Morphological analysis is a systematically-analytical method by which consistent scenarios are systematically and reasonably studied by structurally separated parts of the system. Morphological analysis is a systematizing creative method. It is visualized and documented clearly and accurately. It can be used for high-level analysis and synthesis. The disadvantage of the morphological analysis is that the number of factors is limited. The method is not clear and understandable. The number of persons involved is small and the costs are relatively high. Experience has shown that he is not sufficiently reliable in risk studies, as quantitative expressions of hypotheses are sometimes impossible.

The normative and descriptive scenarios motivate and speed up the processes of creating innovations, creatively attractive and responsive to positive concepts. They can cover many actors of different types. It requires open discussions and consensus-seeking. There are no limitations on the number of factors. Emphasizes on the construction possibilities and the choice of suitable options.

The regulatory dimension focuses on the positioning of actions in the relevant scenario, on targeting forces to reveal the need for change, on taking appropriate steps towards the expected results. At the same time, potential opportunities, their roots and development paths are combined.

The descriptive form of the scenarios in the social sciences would be called quasi-fiction. It presents the functions of certain individuals or institutions. This layout is not a form of communication, but is suitable for task definition and documentation. The desired scenarios are generated in a particularly selective and provocative way. The method has a very limited application and is considered as

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some end product, accompanied by intensive resource costs. It is not suitable for creating risk scenarios, respectively criticisms and security.

Therefore:

Scenarios have been tested and proven to be a powerful method of building events and processes in the past, present and future. They allow the appearance and development of events, causes and consequences, the logic of connecting subjects, objects, actions, circumstances, space and time.

A major part of the scenario-making methods are geared exclusively to future events and results. They create a set of rules that can not be effectively applied to prospective and retrospective scenarios.

3. Well-known and widely used in science-based scenario-building methods are not suited to risk analyzes and assessments, or criticisms, respectively. They are only applicable in some of their private varieties, which may be linked to a limited number of risk descriptors.

4. Scenarios are a modeling method. They are an image of a set of real actors and objects, objects and entities on which specific factors, space, time, environment, boundaries, results work. Scenarios are dynamic models that recreate changes, circumstances, conditions, development or preservation of key features.

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Natural and manmade disaster scenario planning

Scenario planning of actions in the realization of natural and man-made actions is important to address cross-border environmental hazards and risk management respectively. In this plan, the main tasks to be solved are:

• Discovery of scenario problems;

• Logical, structural and functional scenario building;

• Assessment of scenarios;

• Establishing the causal relationship in the scenarios;

When formulating the problems of the scenarios it is done:

• Analysis of obvious and potential problems that are or may be due to environmental hazards;

• Analyzing and establishing the conditions of occurrence of problems;

• Classify problems;

• Determination of characteristics and problem-solving;

• Identification of the possible consequences of environmental hazards and prioritization;

• Formulate the possibilities for solving the problems.

It is appropriate for the problems to be grouped into general and private. Common issues are valid for all tactics, methodologies and techniques of environmental security management. Risk identification, forecasting, causality, modeling, decision-making can be addressed. Private issues include classifications, the subjectivity of ecological risk assessment, perception and information about risk, morbidity and traumatism, inheritance relations mechanism, methods of analysis and conclusions on causal links, organization and planning of an investigation Environmental emergency situations.

The formulation of a goal, tasks, subject and subject, scope and boundaries of the scenarios is necessary because the task should be oriented to a specific area of problems. A scenario that is generally valid for absolutely all problems can not be built. The task is endless. Therefore, a closer and rigorous definition is needed. Particular attention should be paid to the scope and boundaries as they best shape the applicability and relevance of the scenarios, their place in environmental security management.

The system phase allows ecologically dangerous situations and their scenarios to be viewed as a system characterized by structure and functions, interactions between elements, internal and external environment. The phase includes:

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1. Build Scenario Logic;

2. Structuring scenarios;

3. Descriptive analysis;

4. Functional analysis.

In pursuit of the first task and study of logically explained claims on environmental security, it has been established in recent years that the concepts are critical. Their meaning, however, is not defined. Critical risk analysis is used but it reflects a narrow range of hazard aspects as it is only a numerical criterion, it is considered more appropriate for complex hazardous systems and activities such as critical infrastructures to use analysis Of criticism. They reflect more fully and accurately the overall process and the structure of the objects of the impacts of dangerous factors.

A practically crucial issue is which process is critical to the critical infrastructure sectors and what is its criticality? In answer to the question, it is advisable to analyze all the processes and determine the probability that some of them will interrupt due to emergency situations.

Several criteria are used to evaluate critical processes:

• health and life expectancy of the population;

• duration of dangerous processes;

• Relative share of hazardous processes in the overall life or production cycle;

• contractual, internal and political significance;

• Economic harm.

This requires the selection of current and important criteria depending on the specifics of the infrastructure, such as:

• Dangers are the cause of criticality;

• Criticality is the cause of uncertainty;

• insecurity and security are alternatives.

Criticism is associated with phenomena, conditions and situations. The critical environmental phenomenon is the emergence of particular properties and the occurrence of physical, chemical, biological or combined effects. The critical state of a system is what determines given characteristics, however small their change, leads to system transformations and transformations.

The critical ecological situation is a specific category. The situation can be presented as a set of circumstances and conditions that create specific relationships, situations, states and phenomena. Consequently, the critical

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situation covers critical phenomena and conditions and will have its own characteristics and indicators as it leads to new relationships and dangers. In this sense, the critical situation can be defined as such a state of the analyzed system, where differential hazards of the first and second genes are identified - dangerous phenomena and dangerous impacts. There is no harm, only the necessary conditions for harm are available. There is a potential for injury. Therefore, it is identified with differential dangers.

A critical environmental event occurs when damage occurs or is a combination of dangerous phenomena, impacts and effects. Danger is "an opportunity for harm", and these events have specific and apparent results, damages, defeats that have already occurred. Therefore, the critical event must be identified by the integral danger.

Critical environmental phenomena, conditions and situations are related to the occurrence of significant change, breakthrough, acquisition of new values of characteristics, appearance of new properties. Critical characteristics, for example, can be critical mass, critical load, critical temperature, critical pressure, and a number of others.

At some point in time, any possible combination of indicators, characteristics and dimensions of dangerous phenomena and impacts can be considered as a current critical situation. It is critical because it has a dangerous effect on a particular object, space, and time. When there is only a dangerous phenomenon, the case is not critical, as there is no impact, no fate, no threat, no danger for anything or anyone.

The adopted hazard model and criticality considerations give reason to formulate two categories of criticality:

Category I. Differential Criticality - a set of current critical situations defined by the indicators, characteristics and dimensions of the dangerous phenomena and the dangerous effects.

Category II. Integral Criticality - a set of emerging critical events, whose dangerous phenomena and actions have caused dangerous effects - harm.

The security model is determined by the structure of the hazards. It reflects the significant underlying elements that determine the state of security. The structure is not enough. It does not reflect the type, the type and the nature of the actions between the structural elements. Furthermore, in an extended structural-functional aspect, it is necessary to draw out the most significant interactions that reflect and explain the links between the elements.

In fulfillment of the second task - the structure of the scenario, an advanced model of cross-border environmental hazards is presented. The exhibited model is static. It serves as a structural basis for creating scenarios of elementary situations of

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cross-border threats. In order to convert into a situation scenario, a model reflects the parameters of the situations and the interrelationships between their elements. In this way, it can be argued that scenarios are objective and responsive to situations.

The implementation of the third task - analysis, defining situations in cross-border environmental security as conditions requires the following characteristics to be taken into account:

• Persistence of existence, at the time when damage occurs;

• Involvement of people to move from one state to another from undesirably normal to their needs;

• Appearance and development that are related to the interest of society but can lead to irreversible and irreparable losses;

• Variable genesis and variable process of development;

• Controversy due to two reasons. The first reason is the need to carry out a specific, socially meaningful activity. The second, the opposite, is the occurrence of material and non-material damages,

• Volatility over time. Situations are non-stationary and temporary situations;

• Requirements for accurate and timely solutions to prevent, reduce or compensate for damage.

The basic features of cross-border security situations are defined in accordance with:

1) Reality and concreteness of existence;

2) Variable coordinate systems;

3) Spatial determination;

4) Time Determination;

5) Partial or complete repeatability of typical features;

6) Subjectivity, as a result of which the person - subject and at the same time the person - subject to the effects of the situation can, through their actions, alter and transform the existing situation into a new situation or may fall into another situation;

7) Problem manifesting as related dangerous phenomena, impacts and damage.

The main constitutive events of the situational scenario are the dangerous phenomena and the dangerous impact.

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The dangerous phenomena we present are

- Reasons for occurrence of environmentally hazardous events,
- Processes of generating impact factors,
- Sources of environmental impact,
- Preventive protective actions,
- Emission factors for environmental impacts,
- Protective safety actions at source,
- Emissions of environmental impact factors,
- Process of issuing in the environment of the country of origin,
- Environment of the spread of the impact factors,
- Spatial and surface distribution of emissions,
- Emission standards country of origin,
- Impact factors.

Dangerous impacts include:

- Spatial and surface allocation of emissions in the country of origin,
- Process of emissions in the country of origin,
- Sites of impacts in the country of origin,
- Space and time of reconciliation of objects and emissions in the country of origin,
- Vulnerability of the sites of impact in the country of origin,
- Emission protection in the country of origin,
- Cross-border dissemination in the affected country,
- Transmission factors in the affected country,
- Environment of spreading the transits in the affected country,
- Trans actions of the impact factors in the affected country,
- Spatial and surface distribution of transits in the affected country,
- Normalization of transits in the affected country,
- Transit process in the affected country,
- Transaction impacts of the affected country,

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- Space and time of site reconciliation and transits in the affected country,
- Vulnerability of objects to the effects of transits in the affected country,
- Transmission protection in the affected country,
- Range of impacts.
- Dangerous effects are presented by:
- Issue damage in the country of origin,
- Compensating protection in the country of origin,
- Transmission damage in the affected country,
- Compensating protection in the affected country.

Situational scenarios can be presented in a sophisticated multidimensional model as a set of heterogeneous scenarios - events, actions, acting entities, acting objects, processes, circumstances, conditions and other possible components. The effectiveness of the scenarios can be established by comparing the impact of protection with the environmental risks and costs required to achieve it.

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Development of cross-border response patterns for natural and manmade disaster events

Risk measurements or, in short, "risk metrics" are integrated operations in a single system to identify dangers and threats, risks and criticisms, uncertainty and security for the environment in a cross-border environment. Cross-border risk is a complex operation and means for collecting, processing, analyzing, assessing and using environmental hazard information in border areas.

Cross-border risk in the environmental security of border areas is designed to create the risk-information environment needed to analyze and assess the hazards, risks and criticisms of cross-border environmental security. It consists of cross-border risk metric technology and a cross-border risk fund.

The risk of cross-border environmental security builds on a new analytical apparatus. New analytical and experimental models, assessments and rankings have been developed.

Cross-border risk is aimed at creating a risk-sensitive information environment that presents objectively the dangers and threats, risks and criticisms of cross-border environmental security.

Cross-border integrated environmental risk is a criterion serving to uncover the significance of the processes, circumstances and conditions of transformation of the environmentally dangerous phenomena occurring in one country into dangerous impacts in another country and the dangerous effects of dangerous effects typical of situations of Action of ecologically dangerous events on natural, urban and socio-economic systems, jointly analyzed and evaluated on the territory of the country of origin and on the territory of the affected country.

The cross-border environmental hazard situation is a set of conditions, circumstances, events and processes that over time describe the phase and elementary transformations of cross-border integrated risk. Cross-border integrated risk is illustrated by the hierarchical structure. Hierarchical levels are like operating risk, allowing it to be used as part of cross-border risk.

The risk is not just about harm, as we do in the past. The risk of cross-border environmental events and the hazards created by them is a quantitative measure of occurrence at four levels - factorial, indicator, component and integral. In cross-border risk, the risk reflects the probability of occurrence of each element and time. This, on the one hand, leads to a complete and systematic formalization of occurrence and development, and on the other hand it penetrates the details of the three basic components - cross-border ecologically dangerous phenomena, ecologically dangerous effects and ecologically dangerous effects. Based on the morphological model of environmental hazards, the integrated cross-border risk

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A new point in the definition of emissions is the reporting of its character over time. In system hazards studies in urban environments it is found that emissions can be considered as determinant in extremely rare cases. With running sources, emissions are continuous, random processes with strong dynamics. In this sense, there are grounds for adopting two new criteria for assessing this kind of emissions - the number of exceedances of the allowable value and the duration of time overruns. The nature of the emergency emissions is also random, but of a discrete nature over time.

After fulfilling the condition for exceeding the allowable emission, which is a real need for hazard identification, the "environment of the spreading of the dangerous factor" is formulated. Practically, in order to expect or predict dangerous effects, the subject of the impact has to be spatially compatible with the area where the emission eligibility condition is not met. In a spatial aspect, this current situation is an environmentally hazardous area. As the time of action affects the dangerous effects, it is necessary to establish and evaluate the temporary compatibility.

The scenarios in cross-border environmental security are built on assumptions. It sets out the actions, the spatial scope of emerging events, the boundaries of changes, the districts and areas of distribution, the prospects for possible development. Assumptions allow for the creation of variants that include supposed events and actions. Through them, the scenarios are closer to reality, but assumptions must be well grounded. Scenarios are virtual and hypothetical descriptions of cross-border environmental security. The scenario model is interpreted graphically and meaningfully. Vectors are defined by which scenarios of individual situations can be assessed.

The structure of the scenarios is achieved through a spatial, temporal, causal and probable poly situational graphical model. A wide-ranging model of cross-border environmental hazards is being developed to analyze the nature of the events and processes presented.

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Resource planning and sharing models and procedures for natural and manmade disaster events

To reach the policy objectives for protection against natural and man-made disasters, it is necessary to use the financial support instruments, while at the same time the EU has identified the use of several types of instruments to be analyzed.

Structural Funds.

As structural support funds we can identify the European Regional Development Fund (ERDF). The ERDF is designed to reduce disparities between European regions, with a view to promoting their development and structural adjustment. Therefore, the Structural Funds in terms of development priorities, through the Fund, will be able to set the following objectives for achievement and realization:

- Investments in infrastructure and environmental protection;
- Renewal of low-living industrial areas and settlements, including the improvement of life and access to rural and fishing areas. For this purpose, activities related to spatial planning, renovation of building plans, environmental protection, as well as investments for infrastructure and facilities should be implemented and planned. Through the Fund, the EU supports and promotes cross-border, international and inter-regional cooperation and initiatives to finance flood and rehabilitation programs and projects.

Another fund to support the development of the regions is the European Agricultural Guidance and Guarantee Fund (EAGGF). Through this fund, within the framework of European economic and social cohesion policy, the development of agriculture and structures is supported and its main priorities are:

- Agri-environmental measures;
- Development and optimization of the use of forests;
- Rural development through provision of services, support for the local economy, promotion of tourism, development of crafts and others.

Financial instruments for the environment.

Instrument addresses the other aspect of the problem of sustainable development of the regions. For example, the LIFE program was created to increase the level of development, innovative techniques and approaches through the funding of demonstration projects. Five main areas for development and funding have been identified and included in this program:

- Land use development;
- Water management;
- Reducing the impact of economic activities on the environment;
- Waste Management;
- Reducing the impact of economic potential on the environment through an integrated policy;

Flood protection and protection measures are also included in the scope of this program. The program in its environmental section does not fund research or investment in existing technologies or infrastructure. The main objective of the program is to create a bridge between research and its widespread application. To achieve the goal, demonstration projects based on research and development programs are carried out as a priority.

European Union Solidarity Fund / EUSF /.

This fund is the next mechanism to deal with floods and natural disasters of a different nature. Due to the large floods within the EU, this special financial instrument has been created, the objective of the fund is to help financially support people, regions and countries Suffered from major disasters to restore them to normal living conditions. Under the terms of the fund, the funds allocated can be used to cover non-subject and subject-matter damage. Another condition set out in the Fund's program is that the EUSF can not be used to finance long-term protection measures. In this regard, it is necessary to specify that preventive measures can be financed through the EUSF only in the case of urgent activities concerning the provision and protection of infrastructure and cultural heritage sites. Next, it is necessary to clarify that after the use of funds from the Fund a report is prepared to the Managing Authority indicating the preventive measures introduced or proposed to limit the impact and to prevent recurrent damage from the disaster.

Support schemes.

Supportive schemes are the other mechanism for addressing the issues of protection from natural disasters and floods. As tools that are included in the support schemes, we can point to research, training and exchange of experience. In this regard, we need to analyze the support tools that are referred to in the support schemes.

Research is considered to be one of the main ways to achieve the objective of reducing flood risk. Therefore, it is necessary to emphasize better reliance on

climatic, hydrological, environmental and landscape factors of floods, these factors are extremely important Disaster risk management, as well as for the implementation of flood prevention strategies. As a result, there is a growing need for more in-depth research into The effectiveness of the applied risk prevention and management measures for floods and natural disasters. Next, we can note that with regard to the improvement of the forecasting studies, there is a clear need to harmonize the sources of data processing and to submit information on Primary data and the specific requirements for their exchange. Improving research will also depend on comparing existing models and practices by applying new methods and But the same river basin as a result of which these models are compared and evaluated. When analyzing the structural mechanisms, it is also necessary to analyze the measures and approaches of good practices as well as the experience of protection and protection against floods. As a result, we can summarize that research needs to focus on forecasting and prevention as well as actions to reduce the effects of floods during non-disaster-prone periods. In this context, we can emphasize that international cooperation will help improve disaster risk management activities by sharing experiences that will enable us to learn from each other.

Forecasting and early warning systems need to be linked in a single system, which in turn will lead to an improved information exchange, which will require the development of measures for more effective risk management and disaster response by managing authorities The state. To this end, it is necessary to improve the exchange of information and to interact horizontally and vertically between different stakeholders and administrative structures. Therefore, research needs to be directed to flood management by analyzing changes in their causes such as For example; Causes of floods, causes and degree of impact on the environment and in socio-economic aspect.

Training and sharing of experience, when analyzing this instrument, we need to point out that research has little benefit to EU citizens before their widespread application. Due to this fact, the EC and funding institutions in the countries focus on the realization of scientific results and developments. Therefore one of the approaches to achieving these results is to involve executive agencies and services in the design and implementation of projects through the implementation of flood protection and natural disaster programs.

The exchange of experience at national and international level is one of the functions of professional structures and communities, therefore the exchange of experience needs to be directed to research programs such as: River Basin Modeling; Flood risk planning and interactive user response system; Reducing the harmful effect of climate phenomena; Making technological innovations in flood forecasting.

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Public consciousness, analyzing this parameter, needs to conclude that it is essential that the public is aware of the fact that floods are part of nature. In which we must be aware that this risk exists, which means that it must be recognized, have a real idea of it and be properly analyzed when undertaking actions to protect the population from natural disasters and accidents. Therefore, if a risk assessment is not properly prepared, then the decisions that will need to be taken as a result will not be effective. In the context of the analysis, we can summarize that this analysis can be effective and accurate enough when we have a map of flood risk, reliable information and effective training. Hence, the knowledge of the hazard and the risk assessment will depend on whether all possible parameters are included, such as: the type of flood (static, dynamic), event probability, intensity / magnitude, wave velocity / and spread of impact . The above mentioned parameters are an important and necessary condition for getting to know and communicated as information to the public and the institutions.

Preparation is an important part of the result for raising public awareness and is the result of the information needed for individual recognition of the possibilities for action. Therefore, in preparation, it is necessary to include individual planning and readiness but all actors to reduce flood damage. In this sense, it is necessary to emphasize that the planning of actions is important to take into account the time of the warning and the available resources, it is advisable to be ready for the worst situation at the time when the plan is drawn up and the risk assessment.

Next, we can summarize that solving training problems will depend on well-structured disaster organization, which is vital, due to the fact that a well-planned evacuation-rescue operation will reduce the number of victims, Next, to minimize risk, there is a need for planning and designing temporary protective devices. As a result of these planned events, a reduction in the likelihood of harm will be achieved, especially in areas with a large scale disaster.

To mitigate the adverse impact of floods, mutual action of the affected public and authorities is needed. Early warnings and predictions are an important element for an adequate behavior of citizens in a disaster. In order to ensure joint action between the public and the authorities, it is necessary to create a platform for informing and public participation in decision-making.

- The public must be informed by the competent authorities that floods are a natural component of the river hydrological regime. Raise awareness of the need for restrictions on economic activities in risk areas. Information on building restrictions in such areas should be readily available. Risk assessment information should be provided in a comprehensible form.
- The public should be encouraged to take individual protection measures and be informed how to act in emergency situations. Therefore, it requires that the

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forecast and other important information on the disaster be readily available, as well as their media coverage.

- All planned flood prevention and protection measures need to be tailored and developed in a detailed action plan, these plans should cover a period of several years. Most measures developed in the plans have a significant impact on the environment.
- It is necessary for the authorities to provide accessible information on flood prevention and protection. The information needs to be disseminated actively and timely, not just on request. This process must be accompanied by public participation procedures.
- Public participation in decision-making on flood prevention and protection is necessary both to improve the quality and implementation of such decisions, and to give the opportunity to express their relations and the institutions to take them into account
- All measures related to public participation and raising public awareness are more effective when engaging participation at all levels - from the local community to the regional and national levels.

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Development of measures and procedures for cross-border response to natural and manmade disaster events

Measures for cross-border response to natural and manmade disaster events:

- Identification of local contact points / emergency management plan coordinators on municipal level
- Implementation of training for contact points personnel
- Real-time information exchange
- Database yearly update
- Joint equipment inventory development and yearly update
- Local stakeholders capacity assessment on an yearly basis
- Implementation of yearly events aimed at joint action capacity building

Procedures for cross-border response to natural and manmade disaster events

The respective emergency management plan coordinator on the local level, in conjunction with and local management will determine which Teams/Team members are responsible for each function during each phase. As tasking is assigned, additional responsibilities, teams, and

Emergency management plan coordinator phases' procedures

Response Phase

- To establish an immediate and controlled presence at the incident site.
- To conduct a preliminary assessment of incident impact, known injuries, extent of damage, and disruption to the services and business operations.
- To find and disseminate information (on local, regional, national and cross border levels) on if or when access to the facility will be allowed.
- To provide management with the facts necessary to make informed decisions regarding subsequent resumption and recovery activity.
- To assess joint cross-border action feasibility, resources and timeframe.

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Resumption Phase

- To establish and organize a management control center and headquarters for the resumption operations.
- To mobilize and activate the support teams (on local, regional, national and cross border levels) necessary to facilitate and support the resumption process.
- To notify and appraise time-sensitive operation resumption team leaders of the situation.
- To alert administrative structures, employees, vendors and other internal and external individuals and organizations.

Recovery Phase

- To prepare and implement procedures necessary to facilitate and support the recovery of time-sensitive operations.
- To coordinate with higher headquarters to discern responsibilities that will fall upon Operations Recovery Teams and Technology Recovery Teams.
- To coordinate with administrative structures, employees, vendors, and other internal and external individuals and organizations.

Restoration Phase

- To prepare procedures necessary to facilitate the relocation and migration of operations.
- Implement procedures necessary to mobilize operations, support and technology.
- Manage the relocation/migration effort as well as perform administrative structures employee, vendor, and customer notification before, during, and after relocation or migration.

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Development of joint emergency management plan based on the dynamic scenario modelling.

Assumptions

The assumptions could range from absolutely necessary conditions to helpful information in support of the contingency plan phases.

- Telecommunications connectivity and fiber optic cabling will be relatively intact.
- That all necessary Plans, Procedures, Contracts, Memorandums of Agreement (MOAs) and Memorandums of Understanding (MOUs) have been executed.

Critical Success Factors and Issues

This section addresses the factors and issues that specifically apply to the Contingency Plan project that have been identified to be critical to the successful implementation of the Contingency Plan. These factors are as follows:

- Absolute commitment at all levels of government and cross-border partners to Contingency Planning and Disaster Recovery.
- Budgetary commitment to Disaster Recovery.
- Modifications and improvements to the current scheduling procedures implemented as planned.
- Development and execution of the necessary Plans, Procedures, Contracts, Memorandums of Agreement (MOAs), Memorandums of Understanding (MOUs), and Service Level Agreements (SLAs).
- Completion of requirement assessment for, and then completion of the procurement of necessary equipment.

Threats

When developing strategies for an emergency management plan, it is helpful to consider the entire range of probable and possible threats that present a risk to the project affected area. From that range of threats, likely scenarios can be developed and appropriate strategies applied. An emergency management plan

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should be designed to be flexible enough to respond to extended range of events, as well as major disasters. `

The best way to achieve this goal is to design an emergency management plan that could be used to address a major disaster, but is divided into sections that can be used to address extended range of events. While each of the identified threats could result in a disaster by itself, in a major disaster several of the threats might be present concurrently or occur sequentially, depending on the circumstances.

As a result, it is advisable to develop several levels of strategies that can be applied as needed. Time sensitivity and mission criticality in conjunction with budgetary limitations, level of threat and degree of risk will be major factors in the development of recommended strategies.

Probable Threats

The table depicts the threats most likely to impact the cross-border region and components of their management. The specific threats that are represented by (XX) are considered the most likely to occur within the cross-border environment.

PROBABILITY OF THREATS			
Probability of Occurrence:	**High**	**Medium**	**Low**
Air Conditioning Failure		X	
Aircraft Accident			X
Blackmail		X	
Bomb Threats		X	
Chemical Spills / HazMat	X		
Cold / Frost / Snow	XX		
Communications Loss		X	
Data Destruction		X	
Earthquakes	X		

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Fire	XX		
Flooding / Water Damage	XX		
Nuclear Mishaps			X
Power Loss / Outage	XX		
Sabotage / Terrorism		X	
Storms / Hurricanes	X		
Vandalism / Rioting		X	

When an emergency occurs, the first priority is always life safety. The second priority is the stabilization of the incident. There are many actions that can be taken to stabilize an incident and minimize potential damage. First aid and CPR by trained employees can save lives. Use of fire extinguishers by trained employees can extinguish a small fire. Containment of a small chemical spill and supervision of building utilities and systems can minimize damage to a building and help prevent environmental damage.

Some severe weather events can be forecast hours before they arrive, providing valuable time to protect a facility. A plan should be established and resources should be on hand, or quickly, available to prepare a facility. The plan should also include a process for damage assessment, salvage, protection of undamaged property and cleanup following an incident. These actions to minimize further damage and business disruption are examples of property conservation.

Life safety actions

When there is a hazard within a building such as a fire or chemical spill, occupants within the building should be evacuated or relocated to safety. Other incidents such as a bomb threat or receipt of a suspicious package may also require evacuation. If a tornado warning is broadcast, everyone should be moved to the strongest part of the building and away from exterior glass. If a transportation accident on a nearby highway results in the release of a chemical cloud, the fire department may warn to "shelter-in-place." To protect employees from an act of violence, "lockdown" should be broadcast and everyone should hide or barricade themselves from the perpetrator.

Protective actions for life safety include:

- Evacuation

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- Sheltering
- Shelter-In-Place
- Lockdown

Your emergency plan should include these protective actions. If you are a tenant in multi-tenanted building, coordinate planning with the building manager.

Evacuation

Prompt evacuation of employees requires a warning system that can be heard throughout the building. Test your fire alarm system to determine if it can be heard by all employees. If there is no fire alarm system, use a public address system, air horns or other means to warn everyone to evacuate. Sound the evacuation signal during planned drills so employees are familiar with the sound.

Make sure that there are sufficient exits available at all times.

- Check to see that there are at least two exits from hazardous areas on every floor of every building.
- Walk around the building and verify that exits are marked with exit signs and there is sufficient lighting so people can safely travel to an exit. If you find anything that blocks an exit, have it removed.
- Enter every stairwell, walk down the stairs, and open the exit door to the outside. Continue walking until you reach a safe place away from the building. Consider using this safe area as an assembly area for evacuees.

Appoint an evacuation team leader and assign employees to direct evacuation of the building. Assign at least one person to each floor to act as a "floor warden" to direct employees to the nearest safe exit. Assign a backup in case the floor warden is not available or if the size of the floor is very large. Ask employees if they would need any special assistance evacuating or moving to shelter. Assign a "buddy" or aide to assist persons with disabilities during an emergency. Contact the fire department to develop a plan to evacuate persons with disabilities.

Have a list of employees and maintain a visitor log at the front desk, reception area or main office area. Assign someone to take the lists to the assembly area when the building is evacuated. Use the lists to account for everyone and inform the fire department whether everyone has been accounted for. When employees are evacuated from a building, OSHA regulations require an accounting to ensure that everyone has gotten out safely. A fire, chemical spill or other hazard may

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block an exit, so make sure the evacuation team can direct employees to an alternate safe exit.

Sheltering

If a tornado warning is broadcast, a distinct warning signal should be sounded and everyone should move to shelter in the strongest part of the building. Shelters may include basements or interior rooms with reinforced masonry construction. Evaluate potential shelters and conduct a drill to see whether shelter space can hold all employees. Since there may be little time to shelter when a tornado is approaching, early warning is important. If there is a severe thunderstorm, monitor news sources in case a tornado warning is broadcast. Consider purchasing an Emergency Alert System radio - available at many electronic stores. Tune in to weather warnings broadcast by local radio and television stations. Subscribe to free text and email warnings, which are available from multiple news and weather resources on the Internet.

Shelter-In-Place

A tanker truck crashes on a nearby highway releasing a chemical cloud. A large column of black smoke billows into the air from a fire in a nearby manufacturing plant. If, as part of this event, an explosion, or act of terrorism has occurred, public emergency officials may order people in the vicinity to "shelter-in-place." You should develop a shelter-in-place plan. The plan should include a means to warn everyone to move away from windows and move to the core of the building. Warn anyone working outside to enter the building immediately. Move everyone to the second and higher floors in a multistory building. Avoid occupying the basement. Close exterior doors and windows and shut down the building's air handling system. Have everyone remain sheltered until public officials broadcast that it is safe to evacuate the building.

Lockdown

An act of violence in the workplace could occur without warning. If loud "pops" are heard and gunfire is suspected, every employee should know to hide and remain silent. They should seek refuge in a room, close and lock the door, and barricade the door if it can be done quickly. They should be trained to hide under a desk, in the corner of a room and away from the door or windows. Multiple people should be trained to broadcast a lockdown warning from a safe location.

Incident stabilization

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Stabilizing an emergency may involve many different actions including: firefighting, administering medical treatment, rescue, containing a spill of hazardous chemicals or handling a threat or act of violence. When you dial 112 you expect professionals to respond to your facility. Depending upon the response time and capabilities of public emergency services and the hazards and resources within your facility, you may choose to do more to prepare for these incidents. Regulations require you to take action before emergency services arrive.

Elements of emergency preparedness

Common elements for strengthening preparedness, and information on their application at community, local, subnational, national, regional and cross-border levels.

Governance

- International, national, regional, local policies and legislation that integrate emergency preparedness
- Plans for emergency preparedness, response and recovery

Coordination mechanisms

- Capacities
- Assessments of risks and capacities to determine priorities for emergency preparedness
- Surveillance and early warning, information management
- Access vital services during emergencies
- Basic and safe health and emergency services
- Risk communications
- Research development and evaluations to inform and accelerate emergency preparedness Resources

Financial resources for emergency preparedness and contingency funding

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- Logistics mechanisms and essential supplies for health
- Dedicated, trained and equipped human resources for emergencies

Emergency management strategies

There are several key strategic areas for emergency management intervention in the event of natural or manmade disaster. Most of the emergency management intervention in the event of natural or manmade disaster strategies could involve cross-border cooperation.

Strategic intervention area	Phases of intervention	Intervention type	Effective cross-border cooperation
Planning and prevention		Management and coordination	Yes
Data collection and analysis	Response Phase Resumption Phase	Analysis	No
Effective communication	All for phases	Management and coordination	Yes
Management and coordination	All for phases	Management and coordination	No
First aid and evacuation	Response Phase Resumption Phase	Physical intervention	Yes
Critical decision making	Response Phase Resumption Phase	Management and coordination	Yes

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		Physical intervention	
Relief efforts	Recovery Phase Restoration Phase	Physical intervention	Yes
Provision of resources required	Recovery Phase Restoration Phase	Management and coordination Physical intervention	Yes
Restoration	Recovery Phase Restoration Phase	Management and coordination Physical intervention	Yes

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use criteria to evaluate the accuracy of event reproduction. Therefore, it is always imperative to define their boundaries, the subject and the object, to clearly define objectives and to interpret, to define the conditions, to be clear to use.

The third specific aspect is that there are methodological similarities and differences between the scenarios. We should begin with a plan to precisely mark and systemize the application areas, the spectrum of the scenarios. The overall course of the scenario building process is the limits of their application. Then the emerging differences in the baseline characteristics need to be analyzed again and the differences in the solved tasks are determined. This preparation is necessary as the picture is gradually expanding and knowledge deepens.

The fourth specific aspect is that the scenario method is not a single, but a complete strategy. This statement can be explained by the fact that single methods for creating scenarios are not applied, but a system of methods. They define the framework of a complete modeling process that consists of a number of separate phases, stages, actions, operations. Their nature and variety determines the application of one or other methods. This can be argued through a deliberate methodology of situational risk modeling. In this sense, it is possible to talk about scenario management in which the scenarios are applied as part of the decision-making process. Another method, such as a multiplier scenario analysis, is possible.

There are also differences in the perceptions of the level of applied methods, the degree of extension of their applicability, the individual abilities of the subjects that construct the scenarios. In this sense, it is confirmed that scenarios are strictly limited in applicability. It depends on the specifics of the solved tasks and the capabilities of the applied methods.

There are several approaches to scenario development, but all have three general considerations.

1. The starting point for scenario development should be very precisely chosen as its place in the development strategy is perhaps the most important. It is the main prerequisite for objectively understanding and understanding the dynamics of the significant factors of the processes, the phenomena, the events, in what significance they decrease, respectively, the influence of time and a number of other regularities.

2. Separate scenarios are made when identifying significant factors that do not have accurately expressed trends. They influence, but their behavior is not legal. In such cases, it is appropriate to base them on expert analyzes where various scenarios can be discussed.

3. A number of alternative scenarios of the future, which in themselves are specific logical situations, need to be developed. There is one mandatory

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condition. Alternative scenarios should not contain contradictions in the mutual exclusion of events.

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Natural and manmade disaster scenario modelling

Scenario modeling of natural and man-made disasters is used to reveal the risks to the living environment - natural, urban, socio-economic. In this context, it is necessary to analyze the properties of the risk in the environment, to derive relevant characteristics. Various types of risk modeling are then made, for example: situational, linguistic scenario.

Various scenario building procedures have been identified that include stages such as:

- Scenario scope identification.
- disclosure of significant factors;
- factor analysis;
- generating the script;
- Scenario transfer.

The first stage of scenario creation is appropriate to define precisely the scope and limitations of the intentions, the objectives to be achieved and the tasks to be solved. At this stage, it is advisable to answer questions such as:

- what problem is being solved;
- what is specific;
- what are the boundaries of the script;
- what the subject of the script is;
- what the subject of the script is;
- what needs to be analyzed;
- what should be summed up;
- others. Similar, whose answers can describe the details in the essence of the stage.

The second stage consists in identifying significant or key factors. Key factors are the significant controllable, controllable and unmanageable variables, the parameters, the regularities of event transformation at different stages. They describe the essence of the scenarios. Information about them should be analyzed theoretically and experimentally. Theoretical analysis is appropriate to be done by justifying models of transformation of controllable and unmanageable, controlled and uncontrolled factors in baseline situations.

The third stage requires the use of special scenario methods. They draw up situational scenarios, system scenarios and spatial scenarios. They make their sections, reveal states, events and ongoing processes, track their development.

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The fourth stage covers actions that aim at designing the scenarios. The idea is based on the conclusions of the sections of the significant factors to specify the change and the trends of development. It is necessary to take into account not only the influence of the individual factors, but also their combined effect. At this stage there is the greatest difference between the applied methods. It brings together various procedures for formalizing scenarios.

The fifth stage consists of using the scenarios for other purposes, tasks, circumstances and conditions. This stage is probably not so much for different cases. Performed when absolutely necessary.

From the practice, the need for the development of futures scenarios with the inclusion of different phases has emerged:

1. Define the subject of the study and its structure;

2. Determination of the major factors influencing the scenario and their structure;

3. Determination of development trends;

4. Development and selection of alternative scenarios;

5. Interpretation of selected options;

6. Develop a final version of the scenario and counteract adverse events;

7. Application of the scenario in practice.

When revealing the content of the stages, many repetitions, vague definitions and content of the individual stages are allowed. Therefore, strict follow-up of these stages is not appropriate for the creation of riskcenters. There is no single basis for their construction.

Practice has so far not been endorsed with a methodology that clearly clarifies and at the same time allows universal application of scenarios. The most common are either too general or very narrowly specialized variants that limit the spectrum of varieties.

In general, the scenarios are classified by two attributes - in terms of character and measurability. By nature, the scenarios are research and normative, but measurable - quantitative and qualitative.

An additional important sign of division is the inclusion of possible future actions in a specific scenario, not just results for specific indicators. In this respect, the scenarios are divided into "scenarios of competences" and "policy scenarios".

Other attempts to classify scenarios include unexpected events or events that stop running them The type of scenarios determines the type of methods to create them.

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Exploratory scenarios require, above all, methods that allow us to analyze and establish the degree of desire for results. One of the varieties of this group are the scenarios that seek to answer the question: what would happen if? The answers to this question determine trends in development, deployment, development, improvement. This approach is widely used in risk identification and is recommended in today's standards of risk management, such as the International Standard ISO 31000: 2009. Risk Management - Principles and Guidelines.

The second variation is to seek unpredictability of events. It is mainly due to subjectivity in the formation and construction of scenarios. There are a number of reasons for this, such as:

• ignorance;

• Insufficient qualification of the analysts;

• lack of signs of occurrence and action of the factors;

• uncertainty and fluctuation in decision-making in scenarios;

• Errors and inadequate feelings of danger;

• inadequate perception and identification of the phenomena of the phenomena, the circumstances and conditions of the occurrence and the course of the processes;

• Inaccurate generalization and incorrect conclusions.

A third variety is devoted to development. Questions such as "what do we know and what we do not know?" Are used. Questions with exploratory and cognitive functions. They are used as simulators of possible consequences of decisions and actions taken.

The exploration scenario procedure is expressed in the study of the future development, while in the normative scenarios the future and subject of desired conditions and circumstances.

The actual implementation of the exploratory scenarios is an examination of the development and decision-making actions. These scenarios can include probability aspects of scenario development and implementation. Therefore, it is possible to directly take into account the accidents that could occur in a real environment.

Normative scenarios combine values and interests. The questions that are asked to reveal the desires and attractiveness of the future are:

"What do we expect to like in the future?",

"In what direction do we expect our development to come in the future?",

"How can we get there?",

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"What should happen to make our goal real?"

In other words, the normative scenarios recreate the process of achieving the purpose of events and of strategic development.

The implementation of the normative scenarios consists in defining and specifying the objectives, and / or, if appropriate, identifying the possible ways to achieve them. The probabilities of achieving the normative scenarios are considered indirectly as part of the acceptability of the plan.

In practice, the most common scenarios are applied, or as they are called research-normative.

Scenarios and scenarios vary according to the type of information that is used. There are different tools to identify and analyze key factors. When generating scenarios, qualitative and quantitative information on evidence, hypothesis testing, identification of dependencies between key factors is sought.

Quantitative information is most often applied in scenarios in the sphere of economics, demography, insurance, finance. In culture, governance, politics, disasters, accidents and the like, quality information is applied.

Risk assessments require the use of quantitative and qualitative information.

The choice of type of information is made taking into account the degree of formalization of the scenarios.

Risk scenarios can be systematized into three classes. The first class contains a description of the algorithm and structural elements that lead to the predicted state. Factors, processes and events, actions that affect their reproduction are included.

The second class contains a description of possible consequences, how to reach the desired, desired or unwanted outcome.

The third class is a combination of the two classes.

With regard to the prevention and eradication of the consequences of natural and man-made disasters, it can be argued that the risk or the damage is specific consequences. They are directly related to man's attitude towards them. Therefore, this ratio should also be taken into account in the first and second class of scenarios.

Man may have a different attitude to risk. He can analyze situations and choose those that involve less or greater risk. Initially, a riskier situation with a high probability of harm can be chosen, relying on great benefits. Risk mitigation measures can then be taken.

The perception of the risk of one person differs from the perception of a group of people. Perception is different and depends on:

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1) the source of the hazards;

2) social content;

3) personality and specific aspects of personality.

Once these aspects are taken into account, the relationship between risk perception and the characteristics of subjective risk is reached. A number of basic dimensions and perceptual characteristics can be formulated as an element of subjective risk. In summary, it can be concluded that they can be:

1. Potential degree of damage and fatality;

2. Physically defined area of damage or damage area;

3. The social extent of disability, including the number of injured people;

4. Distribution of the time of occurrence of destruction and other damages;

5. Likelihood of undesirable consequences;

6. Possibility of controlling the unwanted consequences independently of the person or by competent and trusted experts;

7. Knowledge and Conception of Consequences;

8. Conscious exposure to risk factors;

9. Clarity and appreciation of the importance of expected benefits;

10. Social risk and benefit distribution;

11. Deliberate harm.

The analysis shows that subjective risk and subjective security need to be measured. The value obtained from the measurement can be used in risk management and consequently to increase the level of security. Despite the argumentation of the psychological side of subjective risk, such as perception and the derivation of its basic characteristics, it is necessary to quantify the dependence on financial costs.

They can define three main groups of methods that are accurate and effective for futures scenarios:

I. Methods for trend analysis and extrapolation, including:

A) Trend Analysis,

(B) Extrapolation.

II. The key factors method, combining:

(A) System-formalizing methods,

(B) Creative - descriptive methods.

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III. Combined method.

The first group of methods is related to the trend. The trend has several meanings. The first meaning is the change, defining the general direction of development, the main trend of the dynamic lines of risk. The second point is the direction of the changes to the risk descriptors defined by processing statistical data and establishing trends of increase or decrease. The third meaning is a line of variation of risk indicators in function of time built by mathematical processing of statistics. This is the trend line.

The extrapolation used in the scenarios is applied to bring regularity from a particular area to adjacent areas. Using it shows us that the conclusions drawn for a part of the phenomena can be spread over another part of them. The reality of such transfer depends on the extrapolation boundaries. Moreover, the hazards, respectively the risks, are complex objects that can not be characterized by just one parameter. Data should not be extrapolated and can not be extrapolated to only one metric or different dates.

In analyzing and extrapolating the risk trend, it is appropriate to follow the following order:

1. Formulation of the risk determination task and the hypothesis of its development;

2. Explain the risk models and determine the need for extrapolation;

3. Formulate situational scenarios and establish their parameters;

4. Collection and systematization of empirical data;

5. Analysis and extrapolation.

It is important to determine the extrapolation time measured from the moment for which statistics are available to the time at which it is necessary to determine the value of the risk parameter under consideration. The least squares method is most often used for analyzing and constructing the trend and extrapolating. It is appropriate to extrapolate risk-based studies by means of:

• the average value of the order of the significance of the risk in function of the time,

• a moving or exponential average risk,

• average rate of change in risk,

• one-time time function functions such as stepping polynomial, parabola, linear function, exponential function, step function, logarithmic function, combination of linear and logarithmic function, logistic function, hyperbola, combination of linear function and hyperbola,

• multifactor polynomials,

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• Exponential smoothing of data,

Autoregressive conversion.

The method of trend analysis and extrapolation requires a large number of quantitative data, number of observations, duration of experiments, planning of studies. It is suitable for application in environmental risk studies. Through this method one can study the single, privately possible future. Predictions should be with maximum credibility. It depends on the variations in the characteristics that can be used to plan the experiment.

The second group is based on the key factors.

System-formalizing methods are one subgroup. They are based on concrete facts. Based on these, significant influence factors can be defined on the risk scenarios. Then the factors combine with each other and expand the range. It comes to generating a specific and differentiated scenario defined by multiple characteristics of the situation.

Initially identifying significant factors for the emergence and development of hazards and risk. For this purpose, trend analysis, graph patterns, statistical distributions of emerging events, dependencies between the elements of the risk structure can be used. They require large amounts of quantitative information.

In accelerated tests and scenario creation on a limited database this need can be overcome. For this purpose the expert method for analyzing the influence of the factors is used. They seek their own and their combined effect. The relationship between the factors is first established. If there is such a dependency, it is not necessary to investigate the effects of all factors. The influence of one factor is sought, and then his dependencies are judged on the influence of others.

When using the system - formalizing method, the number of key factors is particularly significant. They can be selected by certain individuals, which narrows its application. It is difficult to describe the intuitive and normative elements of the scenarios, and sometimes it is impossible to find them. Implementation costs are intense. Therefore, in risk management, including all analysis and evaluation processes, this method is difficult to apply.

The impact analysis method is most commonly used by the group of system-formalizing methods. In this case, is the question of how the scenario factors influence each other?

Correlation and regression analysis of the dependence between probabilities of occurrence of events included in the scenario is possible. The compatibility analysis serves to rank the different values of the key factors. A combination has to be defined which is coordinated with regard to the factors and which can play

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a significant role in the construction of the scenarios under construction. This demonstrates the credibility and specificity of the scenarios.

The compatibility analysis begins with the determination of the possible values of the key factors. It is assumed that the smallest two possible values are the basis for changing the relevant factor. The likelihood of their occurrence is not particularly important in analyzing the processes described.

The truncated impact analysis method is applied when it is necessary to use the probabilities for the individual occurrence of the key factors and their occurrence depending on the other factors. It provides the causal relationship between the possibilities of different future events. The probabilities are practically used to quantify the credibility of the scenarios. They are considered as an additional criterion. The key criterion is the meanings of the key factors.

The basic logic of this method is that future development depends on interactions between events. First, the probability of occurrence of each event individually, the so-called Initial probability. It shows which event can be excluded due to the small value of this probability, indicating its significance.

Conditional probabilities are then established. Their determination is made by answering the question: "If event A occurs, what is the probability and can it affect the occurrence of event B?" The results are presented in tabular form.

Based on the compatibility analysis, three variables can be defined:

- stability,

- volatility,

consistency.

Very often the scenario is considered "most likely" or one of two variants - "very bad" or "very good". Creative-descriptive methods for creating scenarios can be defined as easily formalizing. They are ways of creating novelties, intuitive and not limiting existing knowledge. They are close to communication processes and are somehow consistent approach to the actual development of events.

Intuitive logic, morphological analysis and normative-descriptive analysis can be applied to the group of creative-descriptive methods. Intuitive logic allows decisions to be made based on people's inner perception of events. Intuition allows people to anticipate events in the future. It is connected with secrets in perception, with inexplicable attitude to the knowledge of truth. Intuition is defined as a living contemplation of the truth in unity with immediate, early acquired knowledge.

The unconscious nature of human intuition does not mean that mechanisms, logical rules and properties are not known. Intuition is due to the particular natural logic of the intellect that is related to its immediate needs.

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There are three semantic areas of intuitive logic application in people making decisions. The first is the logic of satisfying the actual needs and through them an experience. The second logic is to get the pleasure of reaching specific forms of happiness. The third logic is constructivism. It leads to the acceptance of unconscious evaluations and decisions in conditions of considerable uncertainty and time constraints.

Intuitive logical rules are not perceived by consciousness, but nevertheless provide a quick subjective analysis of the situations. Everyone counts, including many unsubstantiated arguments, such as subconscious sensations and emotions. When reconciling intuitive and conscious formal analysis of situations, consistently and after repeated iterations, an initially vague but subsequently more clearly formulated and reasoned solution is adopted.

Intuitive logic is a limited method whose quality and legitimacy are difficult to access and explain to others. They are strictly subjective in terms of assessments and decision-making. In risk analyzes and assessments, we should not, in any case, rely on intuition, but we must apply objective, realistic methods.

Morphological analysis is a systematically-analytical method by which consistent scenarios are systematically and reasonably studied by structurally separated parts of the system. Morphological analysis is a systematizing creative method. It is visualized and documented clearly and accurately. It can be used for high-level analysis and synthesis. The disadvantage of the morphological analysis is that the number of factors is limited. The method is not clear and understandable. The number of persons involved is small and the costs are relatively high. Experience has shown that he is not sufficiently reliable in risk studies, as quantitative expressions of hypotheses are sometimes impossible.

The normative and descriptive scenarios motivate and speed up the processes of creating innovations, creatively attractive and responsive to positive concepts. They can cover many actors of different types. It requires open discussions and consensus-seeking. There are no limitations on the number of factors. Emphasizes on the construction possibilities and the choice of suitable options.

The regulatory dimension focuses on the positioning of actions in the relevant scenario, on targeting forces to reveal the need for change, on taking appropriate steps towards the expected results. At the same time, potential opportunities, their roots and development paths are combined.

The descriptive form of the scenarios in the social sciences would be called quasi-fiction. It presents the functions of certain individuals or institutions. This layout is not a form of communication, but is suitable for task definition and documentation. The desired scenarios are generated in a particularly selective and provocative way. The method has a very limited application and is considered as

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some end product, accompanied by intensive resource costs. It is not suitable for creating risk scenarios, respectively criticisms and security.

Therefore:

Scenarios have been tested and proven to be a powerful method of building events and processes in the past, present and future. They allow the appearance and development of events, causes and consequences, the logic of connecting subjects, objects, actions, circumstances, space and time.

A major part of the scenario-making methods are geared exclusively to future events and results. They create a set of rules that can not be effectively applied to prospective and retrospective scenarios.

3. Well-known and widely used in science-based scenario-building methods are not suited to risk analyzes and assessments, or criticisms, respectively. They are only applicable in some of their private varieties, which may be linked to a limited number of risk descriptors.

4. Scenarios are a modeling method. They are an image of a set of real actors and objects, objects and entities on which specific factors, space, time, environment, boundaries, results work. Scenarios are dynamic models that recreate changes, circumstances, conditions, development or preservation of key features.

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Natural and manmade disaster scenario planning

Scenario planning of actions in the realization of natural and man-made actions is important to address cross-border environmental hazards and risk management respectively. In this plan, the main tasks to be solved are:

• Discovery of scenario problems;

• Logical, structural and functional scenario building;

• Assessment of scenarios;

• Establishing the causal relationship in the scenarios;

When formulating the problems of the scenarios it is done:

• Analysis of obvious and potential problems that are or may be due to environmental hazards;

• Analyzing and establishing the conditions of occurrence of problems;

• Classify problems;

• Determination of characteristics and problem-solving;

• Identification of the possible consequences of environmental hazards and prioritization;

• Formulate the possibilities for solving the problems.

It is appropriate for the problems to be grouped into general and private. Common issues are valid for all tactics, methodologies and techniques of environmental security management. Risk identification, forecasting, causality, modeling, decision-making can be addressed. Private issues include classifications, the subjectivity of ecological risk assessment, perception and information about risk, morbidity and traumatism, inheritance relations mechanism, methods of analysis and conclusions on causal links, organization and planning of an investigation Environmental emergency situations.

The formulation of a goal, tasks, subject and subject, scope and boundaries of the scenarios is necessary because the task should be oriented to a specific area of problems. A scenario that is generally valid for absolutely all problems can not be built. The task is endless. Therefore, a closer and rigorous definition is needed. Particular attention should be paid to the scope and boundaries as they best shape the applicability and relevance of the scenarios, their place in environmental security management.

The system phase allows ecologically dangerous situations and their scenarios to be viewed as a system characterized by structure and functions, interactions between elements, internal and external environment. The phase includes:

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1. Build Scenario Logic;

2. Structuring scenarios;

3. Descriptive analysis;

4. Functional analysis.

In pursuit of the first task and study of logically explained claims on environmental security, it has been established in recent years that the concepts are critical. Their meaning, however, is not defined. Critical risk analysis is used but it reflects a narrow range of hazard aspects as it is only a numerical criterion, it is considered more appropriate for complex hazardous systems and activities such as critical infrastructures to use analysis Of criticism. They reflect more fully and accurately the overall process and the structure of the objects of the impacts of dangerous factors.

A practically crucial issue is which process is critical to the critical infrastructure sectors and what is its criticality? In answer to the question, it is advisable to analyze all the processes and determine the probability that some of them will interrupt due to emergency situations.

Several criteria are used to evaluate critical processes:

• health and life expectancy of the population;

• duration of dangerous processes;

• Relative share of hazardous processes in the overall life or production cycle;

• contractual, internal and political significance;

• Economic harm.

This requires the selection of current and important criteria depending on the specifics of the infrastructure, such as:

• Dangers are the cause of criticality;

• Criticality is the cause of uncertainty;

• insecurity and security are alternatives.

Criticism is associated with phenomena, conditions and situations. The critical environmental phenomenon is the emergence of particular properties and the occurrence of physical, chemical, biological or combined effects. The critical state of a system is what determines given characteristics, however small their change, leads to system transformations and transformations.

The critical ecological situation is a specific category. The situation can be presented as a set of circumstances and conditions that create specific relationships, situations, states and phenomena. Consequently, the critical

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situation covers critical phenomena and conditions and will have its own characteristics and indicators as it leads to new relationships and dangers. In this sense, the critical situation can be defined as such a state of the analyzed system, where differential hazards of the first and second genes are identified - dangerous phenomena and dangerous impacts. There is no harm, only the necessary conditions for harm are available. There is a potential for injury. Therefore, it is identified with differential dangers.

A critical environmental event occurs when damage occurs or is a combination of dangerous phenomena, impacts and effects. Danger is "an opportunity for harm", and these events have specific and apparent results, damages, defeats that have already occurred. Therefore, the critical event must be identified by the integral danger.

Critical environmental phenomena, conditions and situations are related to the occurrence of significant change, breakthrough, acquisition of new values of characteristics, appearance of new properties. Critical characteristics, for example, can be critical mass, critical load, critical temperature, critical pressure, and a number of others.

At some point in time, any possible combination of indicators, characteristics and dimensions of dangerous phenomena and impacts can be considered as a current critical situation. It is critical because it has a dangerous effect on a particular object, space, and time. When there is only a dangerous phenomenon, the case is not critical, as there is no impact, no fate, no threat, no danger for anything or anyone.

The adopted hazard model and criticality considerations give reason to formulate two categories of criticality:

Category I. Differential Criticality - a set of current critical situations defined by the indicators, characteristics and dimensions of the dangerous phenomena and the dangerous effects.

Category II. Integral Criticality - a set of emerging critical events, whose dangerous phenomena and actions have caused dangerous effects - harm.

The security model is determined by the structure of the hazards. It reflects the significant underlying elements that determine the state of security. The structure is not enough. It does not reflect the type, the type and the nature of the actions between the structural elements. Furthermore, in an extended structural-functional aspect, it is necessary to draw out the most significant interactions that reflect and explain the links between the elements.

In fulfillment of the second task - the structure of the scenario, an advanced model of cross-border environmental hazards is presented. The exhibited model is static. It serves as a structural basis for creating scenarios of elementary situations of

cross-border threats. In order to convert into a situation scenario, a model reflects the parameters of the situations and the interrelationships between their elements. In this way, it can be argued that scenarios are objective and responsive to situations.

The implementation of the third task - analysis, defining situations in cross-border environmental security as conditions requires the following characteristics to be taken into account:

• Persistence of existence, at the time when damage occurs;

• Involvement of people to move from one state to another from undesirably normal to their needs;

• Appearance and development that are related to the interest of society but can lead to irreversible and irreparable losses;

• Variable genesis and variable process of development;

• Controversy due to two reasons. The first reason is the need to carry out a specific, socially meaningful activity. The second, the opposite, is the occurrence of material and non-material damages,

• Volatility over time. Situations are non-stationary and temporary situations;

• Requirements for accurate and timely solutions to prevent, reduce or compensate for damage.

The basic features of cross-border security situations are defined in accordance with:

1) Reality and concreteness of existence;

2) Variable coordinate systems;

3) Spatial determination;

4) Time Determination;

5) Partial or complete repeatability of typical features;

6) Subjectivity, as a result of which the person - subject and at the same time the person - subject to the effects of the situation can, through their actions, alter and transform the existing situation into a new situation or may fall into another situation;

7) Problem manifesting as related dangerous phenomena, impacts and damage.

The main constitutive events of the situational scenario are the dangerous phenomena and the dangerous impact.

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The dangerous phenomena we present are

- Reasons for occurrence of environmentally hazardous events,
- Processes of generating impact factors,
- Sources of environmental impact,
- Preventive protective actions,
- Emission factors for environmental impacts,
- Protective safety actions at source,
- Emissions of environmental impact factors,
- Process of issuing in the environment of the country of origin,
- Environment of the spread of the impact factors,
- Spatial and surface distribution of emissions,
- Emission standards country of origin,
- Impact factors.

Dangerous impacts include:

- Spatial and surface allocation of emissions in the country of origin,
- Process of emissions in the country of origin,
- Sites of impacts in the country of origin,
- Space and time of reconciliation of objects and emissions in the country of origin,
- Vulnerability of the sites of impact in the country of origin,
- Emission protection in the country of origin,
- Cross-border dissemination in the affected country,
- Transmission factors in the affected country,
- Environment of spreading the transits in the affected country,
- Trans actions of the impact factors in the affected country,
- Spatial and surface distribution of transits in the affected country,
- Normalization of transits in the affected country,
- Transit process in the affected country,
- Transaction impacts of the affected country,

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- Space and time of site reconciliation and transits in the affected country,
- Vulnerability of objects to the effects of transits in the affected country,
- Transmission protection in the affected country,
- Range of impacts.
- Dangerous effects are presented by:
- Issue damage in the country of origin,
- Compensating protection in the country of origin,
- Transmission damage in the affected country,
- Compensating protection in the affected country.

Situational scenarios can be presented in a sophisticated multidimensional model as a set of heterogeneous scenarios - events, actions, acting entities, acting objects, processes, circumstances, conditions and other possible components. The effectiveness of the scenarios can be established by comparing the impact of protection with the environmental risks and costs required to achieve it.

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Development of cross-border response patterns for natural and manmade disaster events

Risk measurements or, in short, "risk metrics" are integrated operations in a single system to identify dangers and threats, risks and criticisms, uncertainty and security for the environment in a cross-border environment. Cross-border risk is a complex operation and means for collecting, processing, analyzing, assessing and using environmental hazard information in border areas.

Cross-border risk in the environmental security of border areas is designed to create the risk-information environment needed to analyze and assess the hazards, risks and criticisms of cross-border environmental security. It consists of cross-border risk metric technology and a cross-border risk fund.

The risk of cross-border environmental security builds on a new analytical apparatus. New analytical and experimental models, assessments and rankings have been developed.

Cross-border risk is aimed at creating a risk-sensitive information environment that presents objectively the dangers and threats, risks and criticisms of cross-border environmental security.

Cross-border integrated environmental risk is a criterion serving to uncover the significance of the processes, circumstances and conditions of transformation of the environmentally dangerous phenomena occurring in one country into dangerous impacts in another country and the dangerous effects of dangerous effects typical of situations of Action of ecologically dangerous events on natural, urban and socio-economic systems, jointly analyzed and evaluated on the territory of the country of origin and on the territory of the affected country.

The cross-border environmental hazard situation is a set of conditions, circumstances, events and processes that over time describe the phase and elementary transformations of cross-border integrated risk. Cross-border integrated risk is illustrated by the hierarchical structure. Hierarchical levels are like operating risk, allowing it to be used as part of cross-border risk.

The risk is not just about harm, as we do in the past. The risk of cross-border environmental events and the hazards created by them is a quantitative measure of occurrence at four levels - factorial, indicator, component and integral. In cross-border risk, the risk reflects the probability of occurrence of each element and time. This, on the one hand, leads to a complete and systematic formalization of occurrence and development, and on the other hand it penetrates the details of the three basic components - cross-border ecologically dangerous phenomena, ecologically dangerous effects and ecologically dangerous effects. Based on the morphological model of environmental hazards, the integrated cross-border risk

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A new point in the definition of emissions is the reporting of its character over time. In system hazards studies in urban environments it is found that emissions can be considered as determinant in extremely rare cases. With running sources, emissions are continuous, random processes with strong dynamics. In this sense, there are grounds for adopting two new criteria for assessing this kind of emissions - the number of exceedances of the allowable value and the duration of time overruns. The nature of the emergency emissions is also random, but of a discrete nature over time.

After fulfilling the condition for exceeding the allowable emission, which is a real need for hazard identification, the "environment of the spreading of the dangerous factor" is formulated. Practically, in order to expect or predict dangerous effects, the subject of the impact has to be spatially compatible with the area where the emission eligibility condition is not met. In a spatial aspect, this current situation is an environmentally hazardous area. As the time of action affects the dangerous effects, it is necessary to establish and evaluate the temporary compatibility.

The scenarios in cross-border environmental security are built on assumptions. It sets out the actions, the spatial scope of emerging events, the boundaries of changes, the districts and areas of distribution, the prospects for possible development. Assumptions allow for the creation of variants that include supposed events and actions. Through them, the scenarios are closer to reality, but assumptions must be well grounded. Scenarios are virtual and hypothetical descriptions of cross-border environmental security. The scenario model is interpreted graphically and meaningfully. Vectors are defined by which scenarios of individual situations can be assessed.

The structure of the scenarios is achieved through a spatial, temporal, causal and probable poly situational graphical model. A wide-ranging model of cross-border environmental hazards is being developed to analyze the nature of the events and processes presented.

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Resource planning and sharing models and procedures for natural and manmade disaster events

To reach the policy objectives for protection against natural and man-made disasters, it is necessary to use the financial support instruments, while at the same time the EU has identified the use of several types of instruments to be analyzed.

Structural Funds.

As structural support funds we can identify the European Regional Development Fund (ERDF). The ERDF is designed to reduce disparities between European regions, with a view to promoting their development and structural adjustment. Therefore, the Structural Funds in terms of development priorities, through the Fund, will be able to set the following objectives for achievement and realization:

- Investments in infrastructure and environmental protection;
- Renewal of low-living industrial areas and settlements, including the improvement of life and access to rural and fishing areas. For this purpose, activities related to spatial planning, renovation of building plans, environmental protection, as well as investments for infrastructure and facilities should be implemented and planned. Through the Fund, the EU supports and promotes cross-border, international and inter-regional cooperation and initiatives to finance flood and rehabilitation programs and projects.

Another fund to support the development of the regions is the European Agricultural Guidance and Guarantee Fund (EAGGF). Through this fund, within the framework of European economic and social cohesion policy, the development of agriculture and structures is supported and its main priorities are:

- Agri-environmental measures;
- Development and optimization of the use of forests;
- Rural development through provision of services, support for the local economy, promotion of tourism, development of crafts and others.

Financial instruments for the environment.

Instrument addresses the other aspect of the problem of sustainable development of the regions. For example, the LIFE program was created to increase the level of development, innovative techniques and approaches through the funding of demonstration projects. Five main areas for development and funding have been identified and included in this program:

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- Land use development;
- Water management;
- Reducing the impact of economic activities on the environment;
- Waste Management;
- Reducing the impact of economic potential on the environment through an integrated policy;

Flood protection and protection measures are also included in the scope of this program. The program in its environmental section does not fund research or investment in existing technologies or infrastructure. The main objective of the program is to create a bridge between research and its widespread application. To achieve the goal, demonstration projects based on research and development programs are carried out as a priority.

European Union Solidarity Fund / EUSF /.

This fund is the next mechanism to deal with floods and natural disasters of a different nature. Due to the large floods within the EU, this special financial instrument has been created, the objective of the fund is to help financially support people, regions and countries Suffered from major disasters to restore them to normal living conditions. Under the terms of the fund, the funds allocated can be used to cover non-subject and subject-matter damage. Another condition set out in the Fund's program is that the EUSF can not be used to finance long-term protection measures. In this regard, it is necessary to specify that preventive measures can be financed through the EUSF only in the case of urgent activities concerning the provision and protection of infrastructure and cultural heritage sites. Next, it is necessary to clarify that after the use of funds from the Fund a report is prepared to the Managing Authority indicating the preventive measures introduced or proposed to limit the impact and to prevent recurrent damage from the disaster.

Support schemes.

Supportive schemes are the other mechanism for addressing the issues of protection from natural disasters and floods. As tools that are included in the support schemes, we can point to research, training and exchange of experience. In this regard, we need to analyze the support tools that are referred to in the support schemes.

Research is considered to be one of the main ways to achieve the objective of reducing flood risk. Therefore, it is necessary to emphasize better reliance on

climatic, hydrological, environmental and landscape factors of floods, these factors are extremely important Disaster risk management, as well as for the implementation of flood prevention strategies. As a result, there is a growing need for more in-depth research into The effectiveness of the applied risk prevention and management measures for floods and natural disasters. Next, we can note that with regard to the improvement of the forecasting studies, there is a clear need to harmonize the sources of data processing and to submit information on Primary data and the specific requirements for their exchange. Improving research will also depend on comparing existing models and practices by applying new methods and But the same river basin as a result of which these models are compared and evaluated. When analyzing the structural mechanisms, it is also necessary to analyze the measures and approaches of good practices as well as the experience of protection and protection against floods. As a result, we can summarize that research needs to focus on forecasting and prevention as well as actions to reduce the effects of floods during non-disaster-prone periods. In this context, we can emphasize that international cooperation will help improve disaster risk management activities by sharing experiences that will enable us to learn from each other.

Forecasting and early warning systems need to be linked in a single system, which in turn will lead to an improved information exchange, which will require the development of measures for more effective risk management and disaster response by managing authorities The state. To this end, it is necessary to improve the exchange of information and to interact horizontally and vertically between different stakeholders and administrative structures. Therefore, research needs to be directed to flood management by analyzing changes in their causes such as For example; Causes of floods, causes and degree of impact on the environment and in socio-economic aspect.

Training and sharing of experience, when analyzing this instrument, we need to point out that research has little benefit to EU citizens before their widespread application. Due to this fact, the EC and funding institutions in the countries focus on the realization of scientific results and developments. Therefore one of the approaches to achieving these results is to involve executive agencies and services in the design and implementation of projects through the implementation of flood protection and natural disaster programs.

The exchange of experience at national and international level is one of the functions of professional structures and communities, therefore the exchange of experience needs to be directed to research programs such as: River Basin Modeling; Flood risk planning and interactive user response system; Reducing the harmful effect of climate phenomena; Making technological innovations in flood forecasting.

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Public consciousness, analyzing this parameter, needs to conclude that it is essential that the public is aware of the fact that floods are part of nature. In which we must be aware that this risk exists, which means that it must be recognized, have a real idea of it and be properly analyzed when undertaking actions to protect the population from natural disasters and accidents. Therefore, if a risk assessment is not properly prepared, then the decisions that will need to be taken as a result will not be effective. In the context of the analysis, we can summarize that this analysis can be effective and accurate enough when we have a map of flood risk, reliable information and effective training. Hence, the knowledge of the hazard and the risk assessment will depend on whether all possible parameters are included, such as: the type of flood (static, dynamic), event probability, intensity / magnitude, wave velocity / and spread of impact . The above mentioned parameters are an important and necessary condition for getting to know and communicated as information to the public and the institutions.

Preparation is an important part of the result for raising public awareness and is the result of the information needed for individual recognition of the possibilities for action. Therefore, in preparation, it is necessary to include individual planning and readiness but all actors to reduce flood damage. In this sense, it is necessary to emphasize that the planning of actions is important to take into account the time of the warning and the available resources, it is advisable to be ready for the worst situation at the time when the plan is drawn up and the risk assessment.

Next, we can summarize that solving training problems will depend on well-structured disaster organization, which is vital, due to the fact that a well-planned evacuation-rescue operation will reduce the number of victims, Next, to minimize risk, there is a need for planning and designing temporary protective devices. As a result of these planned events, a reduction in the likelihood of harm will be achieved, especially in areas with a large scale disaster.

To mitigate the adverse impact of floods, mutual action of the affected public and authorities is needed. Early warnings and predictions are an important element for an adequate behavior of citizens in a disaster. In order to ensure joint action between the public and the authorities, it is necessary to create a platform for informing and public participation in decision-making.

- The public must be informed by the competent authorities that floods are a natural component of the river hydrological regime. Raise awareness of the need for restrictions on economic activities in risk areas. Information on building restrictions in such areas should be readily available. Risk assessment information should be provided in a comprehensible form.
- The public should be encouraged to take individual protection measures and be informed how to act in emergency situations. Therefore, it requires that the

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forecast and other important information on the disaster be readily available, as well as their media coverage.

- All planned flood prevention and protection measures need to be tailored and developed in a detailed action plan, these plans should cover a period of several years. Most measures developed in the plans have a significant impact on the environment.
- It is necessary for the authorities to provide accessible information on flood prevention and protection. The information needs to be disseminated actively and timely, not just on request. This process must be accompanied by public participation procedures.
- Public participation in decision-making on flood prevention and protection is necessary both to improve the quality and implementation of such decisions, and to give the opportunity to express their relations and the institutions to take them into account
- All measures related to public participation and raising public awareness are more effective when engaging participation at all levels - from the local community to the regional and national levels.

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Development of measures and procedures for cross-border response to natural and manmade disaster events

Measures for cross-border response to natural and manmade disaster events:

- Identification of local contact points / emergency management plan coordinators on municipal level
- Implementation of training for contact points personnel
- Real-time information exchange
- Database yearly update
- Joint equipment inventory development and yearly update
- Local stakeholders capacity assessment on an yearly basis
- Implementation of yearly events aimed at joint action capacity building

Procedures for cross-border response to natural and manmade disaster events

The respective emergency management plan coordinator on the local level, in conjunction with and local management will determine which Teams/Team members are responsible for each function during each phase. As tasking is assigned, additional responsibilities, teams, and

Emergency management plan coordinator phases' procedures

Response Phase

- To establish an immediate and controlled presence at the incident site.
- To conduct a preliminary assessment of incident impact, known injuries, extent of damage, and disruption to the services and business operations.
- To find and disseminate information (on local, regional, national and cross border levels) on if or when access to the facility will be allowed.
- To provide management with the facts necessary to make informed decisions regarding subsequent resumption and recovery activity.
- To assess joint cross-border action feasibility, resources and timeframe.

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Resumption Phase

- To establish and organize a management control center and headquarters for the resumption operations.
- To mobilize and activate the support teams (on local, regional, national and cross border levels) necessary to facilitate and support the resumption process.
- To notify and appraise time-sensitive operation resumption team leaders of the situation.
- To alert administrative structures, employees, vendors and other internal and external individuals and organizations.

Recovery Phase

- To prepare and implement procedures necessary to facilitate and support the recovery of time-sensitive operations.
- To coordinate with higher headquarters to discern responsibilities that will fall upon Operations Recovery Teams and Technology Recovery Teams.
- To coordinate with administrative structures, employees, vendors, and other internal and external individuals and organizations.

Restoration Phase

- To prepare procedures necessary to facilitate the relocation and migration of operations.
- Implement procedures necessary to mobilize operations, support and technology.
- Manage the relocation/migration effort as well as perform administrative structures employee, vendor, and customer notification before, during, and after relocation or migration.

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Development of joint emergency management plan based on the dynamic scenario modelling.

Assumptions

The assumptions could range from absolutely necessary conditions to helpful information in support of the contingency plan phases.

- Telecommunications connectivity and fiber optic cabling will be relatively intact.
- That all necessary Plans, Procedures, Contracts, Memorandums of Agreement (MOAs) and Memorandums of Understanding (MOUs) have been executed.

Critical Success Factors and Issues

This section addresses the factors and issues that specifically apply to the Contingency Plan project that have been identified to be critical to the successful implementation of the Contingency Plan. These factors are as follows:

- Absolute commitment at all levels of government and cross-border partners to Contingency Planning and Disaster Recovery.
- Budgetary commitment to Disaster Recovery.
- Modifications and improvements to the current scheduling procedures implemented as planned.
- Development and execution of the necessary Plans, Procedures, Contracts, Memorandums of Agreement (MOAs), Memorandums of Understanding (MOUs), and Service Level Agreements (SLAs).
- Completion of requirement assessment for, and then completion of the procurement of necessary equipment.

Threats

When developing strategies for an emergency management plan, it is helpful to consider the entire range of probable and possible threats that present a risk to the project affected area. From that range of threats, likely scenarios can be developed and appropriate strategies applied. An emergency management plan

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should be designed to be flexible enough to respond to extended range of events, as well as major disasters. `

The best way to achieve this goal is to design an emergency management plan that could be used to address a major disaster, but is divided into sections that can be used to address extended range of events. While each of the identified threats could result in a disaster by itself, in a major disaster several of the threats might be present concurrently or occur sequentially, depending on the circumstances.

As a result, it is advisable to develop several levels of strategies that can be applied as needed. Time sensitivity and mission criticality in conjunction with budgetary limitations, level of threat and degree of risk will be major factors in the development of recommended strategies.

Probable Threats

The table depicts the threats most likely to impact the cross-border region and components of their management. The specific threats that are represented by (XX) are considered the most likely to occur within the cross-border environment.

PROBABILITY OF THREATS			
Probability of Occurrence:	**High**	**Medium**	**Low**
Air Conditioning Failure		X	
Aircraft Accident			X
Blackmail		X	
Bomb Threats		X	
Chemical Spills / HazMat	X		
Cold / Frost / Snow	XX		
Communications Loss		X	
Data Destruction		X	
Earthquakes	X		

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Fire	XX		
Flooding / Water Damage	XX		
Nuclear Mishaps			X
Power Loss / Outage	XX		
Sabotage / Terrorism		X	
Storms / Hurricanes	X		
Vandalism / Rioting		X	

When an emergency occurs, the first priority is always life safety. The second priority is the stabilization of the incident. There are many actions that can be taken to stabilize an incident and minimize potential damage. First aid and CPR by trained employees can save lives. Use of fire extinguishers by trained employees can extinguish a small fire. Containment of a small chemical spill and supervision of building utilities and systems can minimize damage to a building and help prevent environmental damage.

Some severe weather events can be forecast hours before they arrive, providing valuable time to protect a facility. A plan should be established and resources should be on hand, or quickly, available to prepare a facility. The plan should also include a process for damage assessment, salvage, protection of undamaged property and cleanup following an incident. These actions to minimize further damage and business disruption are examples of property conservation.

Life safety actions

When there is a hazard within a building such as a fire or chemical spill, occupants within the building should be evacuated or relocated to safety. Other incidents such as a bomb threat or receipt of a suspicious package may also require evacuation. If a tornado warning is broadcast, everyone should be moved to the strongest part of the building and away from exterior glass. If a transportation accident on a nearby highway results in the release of a chemical cloud, the fire department may warn to "shelter-in-place." To protect employees from an act of violence, "lockdown" should be broadcast and everyone should hide or barricade themselves from the perpetrator.

Protective actions for life safety include:

- Evacuation

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- Sheltering
- Shelter-In-Place
- Lockdown

Your emergency plan should include these protective actions. If you are a tenant in multi-tenanted building, coordinate planning with the building manager.

Evacuation

Prompt evacuation of employees requires a warning system that can be heard throughout the building. Test your fire alarm system to determine if it can be heard by all employees. If there is no fire alarm system, use a public address system, air horns or other means to warn everyone to evacuate. Sound the evacuation signal during planned drills so employees are familiar with the sound.

Make sure that there are sufficient exits available at all times.

- Check to see that there are at least two exits from hazardous areas on every floor of every building.
- Walk around the building and verify that exits are marked with exit signs and there is sufficient lighting so people can safely travel to an exit. If you find anything that blocks an exit, have it removed.
- Enter every stairwell, walk down the stairs, and open the exit door to the outside. Continue walking until you reach a safe place away from the building. Consider using this safe area as an assembly area for evacuees.

Appoint an evacuation team leader and assign employees to direct evacuation of the building. Assign at least one person to each floor to act as a "floor warden" to direct employees to the nearest safe exit. Assign a backup in case the floor warden is not available or if the size of the floor is very large. Ask employees if they would need any special assistance evacuating or moving to shelter. Assign a "buddy" or aide to assist persons with disabilities during an emergency. Contact the fire department to develop a plan to evacuate persons with disabilities.

Have a list of employees and maintain a visitor log at the front desk, reception area or main office area. Assign someone to take the lists to the assembly area when the building is evacuated. Use the lists to account for everyone and inform the fire department whether everyone has been accounted for. When employees are evacuated from a building, OSHA regulations require an accounting to ensure that everyone has gotten out safely. A fire, chemical spill or other hazard may

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block an exit, so make sure the evacuation team can direct employees to an alternate safe exit.

Sheltering

If a tornado warning is broadcast, a distinct warning signal should be sounded and everyone should move to shelter in the strongest part of the building. Shelters may include basements or interior rooms with reinforced masonry construction. Evaluate potential shelters and conduct a drill to see whether shelter space can hold all employees. Since there may be little time to shelter when a tornado is approaching, early warning is important. If there is a severe thunderstorm, monitor news sources in case a tornado warning is broadcast. Consider purchasing an Emergency Alert System radio - available at many electronic stores. Tune in to weather warnings broadcast by local radio and television stations. Subscribe to free text and email warnings, which are available from multiple news and weather resources on the Internet.

Shelter-In-Place

A tanker truck crashes on a nearby highway releasing a chemical cloud. A large column of black smoke billows into the air from a fire in a nearby manufacturing plant. If, as part of this event, an explosion, or act of terrorism has occurred, public emergency officials may order people in the vicinity to "shelter-in-place." You should develop a shelter-in-place plan. The plan should include a means to warn everyone to move away from windows and move to the core of the building. Warn anyone working outside to enter the building immediately. Move everyone to the second and higher floors in a multistory building. Avoid occupying the basement. Close exterior doors and windows and shut down the building's air handling system. Have everyone remain sheltered until public officials broadcast that it is safe to evacuate the building.

Lockdown

An act of violence in the workplace could occur without warning. If loud "pops" are heard and gunfire is suspected, every employee should know to hide and remain silent. They should seek refuge in a room, close and lock the door, and barricade the door if it can be done quickly. They should be trained to hide under a desk, in the corner of a room and away from the door or windows. Multiple people should be trained to broadcast a lockdown warning from a safe location.

Incident stabilization

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Stabilizing an emergency may involve many different actions including: firefighting, administering medical treatment, rescue, containing a spill of hazardous chemicals or handling a threat or act of violence. When you dial 112 you expect professionals to respond to your facility. Depending upon the response time and capabilities of public emergency services and the hazards and resources within your facility, you may choose to do more to prepare for these incidents. Regulations require you to take action before emergency services arrive.

Elements of emergency preparedness

Common elements for strengthening preparedness, and information on their application at community, local, subnational, national, regional and cross-border levels.

Governance

- International, national, regional, local policies and legislation that integrate emergency preparedness
- Plans for emergency preparedness, response and recovery

Coordination mechanisms

- Capacities
- Assessments of risks and capacities to determine priorities for emergency preparedness
- Surveillance and early warning, information management
- Access vital services during emergencies
- Basic and safe health and emergency services
- Risk communications
- Research development and evaluations to inform and accelerate emergency preparedness Resources

Financial resources for emergency preparedness and contingency funding

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- Logistics mechanisms and essential supplies for health
- Dedicated, trained and equipped human resources for emergencies

Emergency management strategies

There are several key strategic areas for emergency management intervention in the event of natural or manmade disaster. Most of the emergency management intervention in the event of natural or manmade disaster strategies could involve cross-border cooperation.

Strategic intervention area	Phases of intervention	Intervention type	Effective cross-border cooperation
Planning and prevention		Management and coordination	Yes
Data collection and analysis	Response Phase Resumption Phase	Analysis	No
Effective communication	All for phases	Management and coordination	Yes
Management and coordination	All for phases	Management and coordination	No
First aid and evacuation	Response Phase Resumption Phase	Physical intervention	Yes
Critical decision making	Response Phase Resumption Phase	Management and coordination	Yes

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		Physical intervention	
Relief efforts	Recovery Phase Restoration Phase	Physical intervention	Yes
Provision of resources required	Recovery Phase Restoration Phase	Management and coordination Physical intervention	Yes
Restoration	Recovery Phase Restoration Phase	Management and coordination Physical intervention	Yes

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