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COMMUNITY SAFETY ACTION FOR SUPPORTING CLIMATE ADAPTATION

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EU STRATEGY FOR THE BALTIC SEA REGION
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UNDERSTANDING DISASTER RISK

Workshop
Train the Trainers

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What is the relation between safety and risk?

Safety definition

Safety (security) is the state of natural and/or human environment designated by value of risk

It means that:

1. Safety is measurable.
2. Risk is the measure of safety.
3. The measure can be quantitative or qualitative.

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Why risk?

General remark:
The World is not determined! The World rather consists of a random sequence of events.
Moreover:

- There are many uncertainties related to future events versus today's financial decisions.
- We don't know if they happen, assuming that they might happen.
- We don't know what is the possibility of their occurence.
- We don't know what are consequences if unwilling event happens.
- We don't know if it is single event or sequence of events creating a cascading effect.

Due to risk assessment and risk management we will be able to somehow manage these uncertainties.

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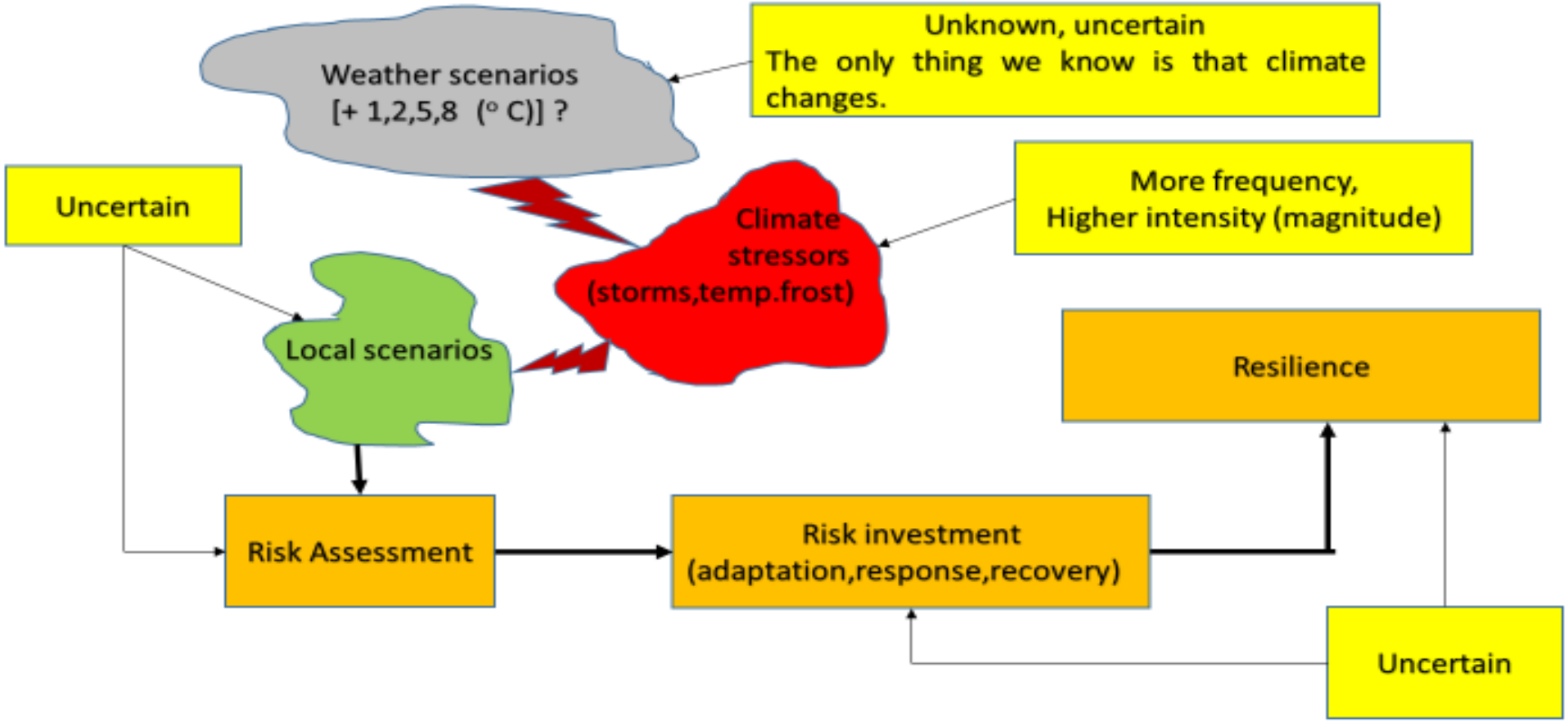
What is going on ? – a simple illustration



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What are the goals of our work?

During our lectures and exercise we should reach the following aims:

1. getting a general view about ideas of risk and risk management.
2. getting organizational outline how to organise risk assessment and risk management process.
3. understanding fundamental risk and risk management characteristics.
4. getting skills at scenario description and possibility assessment.
5. getting skills at risk communication to further analyses.
6. estimating risk investment in case of climate change (an option)

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What about costs ?

It seems that each risk reduction way ends with money.

The fundamental questions are:

1. How should we invest to lower risk at an acceptable level?
2. What does it mean an acceptable level? What are the criteria of acceptability?
3. What to do with predicted weather scenarios?
4. Which weather scenario should be taken into account?
5. What is the link between local scenario and vulnerability?

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What is risk?

The simplest and most practicable definition of risk:

Risk is a combination of possibility (probability) and consequences of unwanted event.

In our discussion unwanted events are these events which negatively affect natural and/or human environment.
These two characteristics of unwanted future evets are enough to fully characterise them.

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But why is risk still taken into account?

The question is:

Having definition of risk why is risk still most convenient to be calculated or at least assessed?

Let's look at definition of risk again: *Risk is a combination of possibility (probability) and consequences of unwanted event.*

So, knowing the assessed possibility (in most precise case, counted probability) and knowing values of consequences it can be found product of these both values that is :

Risk = probability x consequences.

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Qualitative/quantitative risk description

1. Since risk consists of two elements possibility event occurrence and its consequences always both of them should be taken into account.
2. Both elements should be calibrated.
3. Calibration can be descriptive, for instance:
    1. Negligible, small, medium, high, very high (extreme)– consequences
    2. very often, often, rare, very rare, improbable – frequency (possibility)
4. Calibration of frequency can be characterized by numbers, for instance :

1 – less than once a 1000 years	probability less than 10^{-3}
2 – once a 100 till 1000 years	probability between 10^{-2} and 10^{-3}
3- once a 10 till 100 years	probability between 10^{-1} and 10^{-2}
4 – once a 1 till 10 years	probability equals 10^{-1}
5 – more often than once a year	probability more than 10^{-1}

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Risk Matrix – general view

Consequences frequency	Very small A	Small B	Medium C	High D	Extreme E
Very often (high likely) 5				Not tolerable risk	Catastrophe
Often (likely) 4		Acceptable risk	Tolerable risk	Immediate action Is needed	**Disaster**
Rare (possible) 3		(monitoring, preventive response – adaptation)		ALARP	**Worst scenario**
Very rare (unlikely) 2	Negligible Risk		ALARP		Chemical plant incidents
Improbable (impossible) 1					

Increasing risk

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Risk acceptability criteria – introduction

According to domain theory there are some kinds of safety domains.

Briefly there are :

- individual domain of safety **(IDS)** - individual perception of risk
- family (friends) domain of safety **(FDS)** – small group perceiving the risk
- local domain of safety **(LSD)** – risk perceived by community (municipality, county, district) inhabitants
- Regional domain of safety **(RDS)**
- State domain of safety **(SDS)**
- And so on…

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Risk acceptability criteria – the problem

The problem, amongst others, is that taking into account the same consequences of particular hazards the acceptability criteria are extremely different.

Assume that flood consequences in city which has 100 000 inhabitants will be one fatality and two family homes are destroyed.

Risk estimation might be as follows:

IDS - disastrous (extreme, worst scenario)
FDS – disastrous, optionally high
LSD – high
MSD – medium
RSD – medium, optionally small
SDS – small, optionally negligible.

Remark – *threat realization means that probability of its occurrence equals to 1. In such a case consequences analysis is under consideration. This is conditional risk.*

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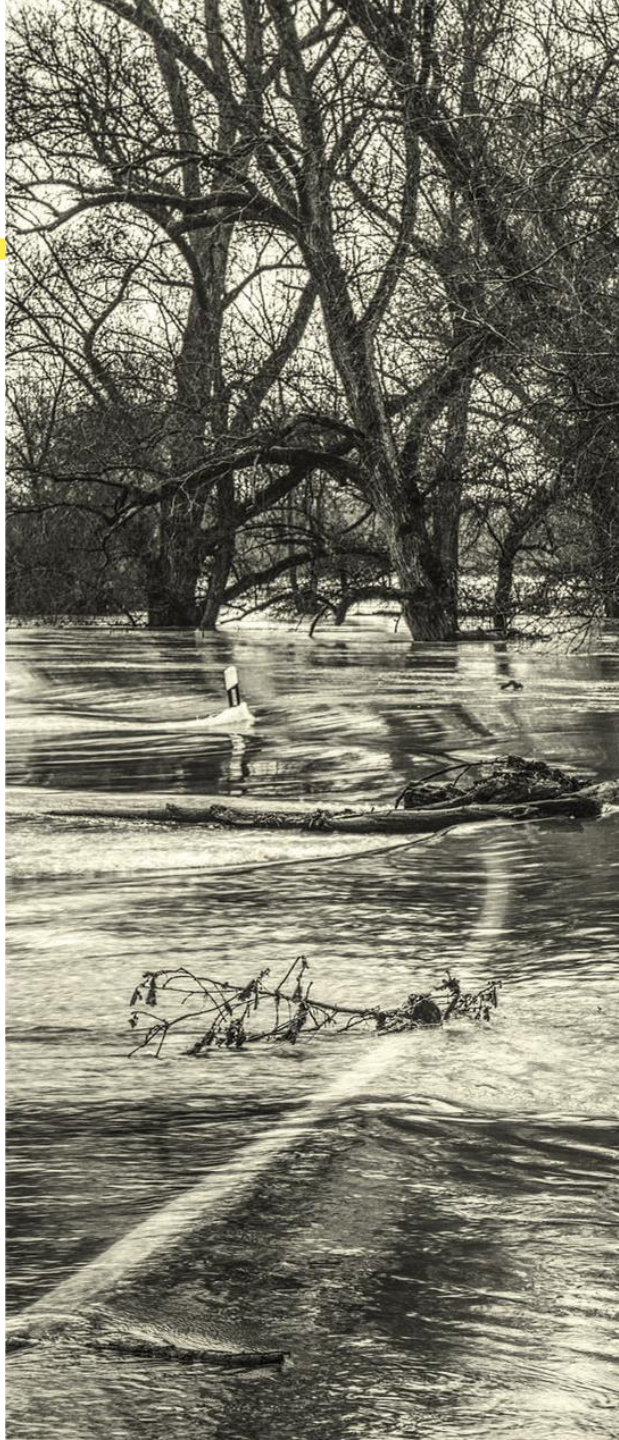
Climate change risk –what're differences?

1. The fundamental difference is that we consider climate hazards occurrence as inevitable. This statement is equivalent statement that occurrence of hazards probability equals 1 (it means that in the future hazards take place for sure).

2. So, instead of calculating or assessing possibility of occurrence "only" scenario analysis should be done.

3. It should be distinguished between weather scenario (predicted by experts) and "local" scenario (weather phenomena consequences on particular area).



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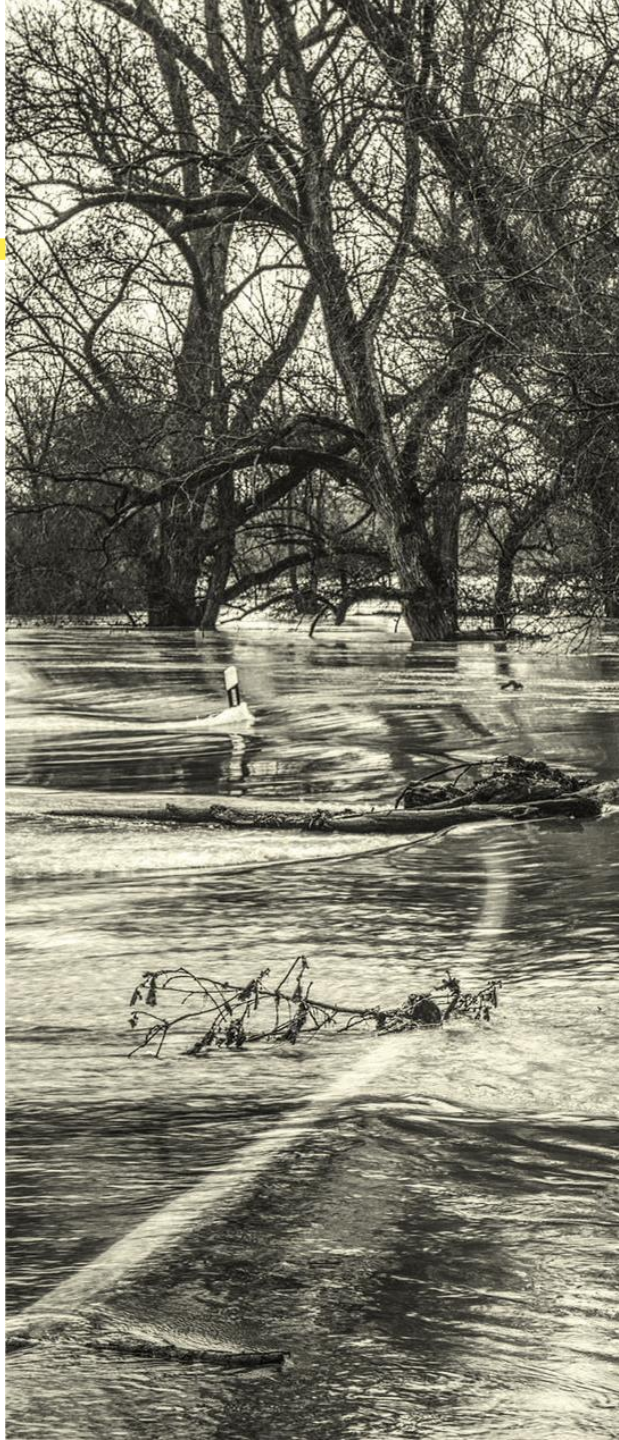
Climate change risk –what're differences?

4.Both kinds of scenarios are weighted by uncertainties.

5. Rising Intensity, magnitude and duration of hazards conditions cause much higher consequences and magnify costs.

6. The climate hazards as natural hazards are blinded. Therefore, climate risk management is a Game with Nature.



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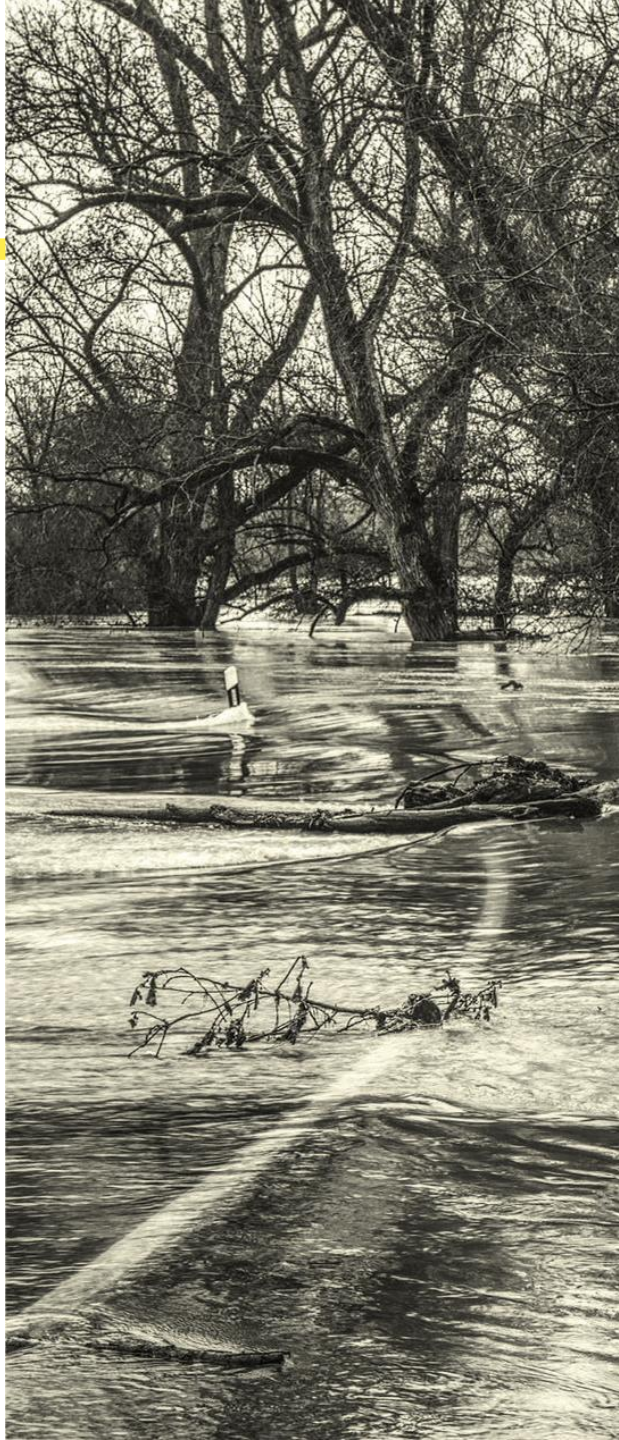
Conclusions

- Knowing three weather scenarios, there should be done a description of three local (extent of negative consequences of weather stressors affecting human/natural environment) scenarios and related to them consequences.
- Knowing historical data and assuming that they are routine frequencies, the expected frequency and worst scenario frequency should be taken into account.
- Having frequencies and scenarios, risk matrix can be created.
- Having the risk criteria, hierarchization of risk should be made.



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Risk Matrix

Consequences/ frequency	A	B	C	D	E
more often than once a year 5				Worst scenario	
once in 1 till 10 years 4			expected		
once in 10 till 100 years 3		routine			
once in 100 till 1000 years 2					
less than once in 1000 years 1					

Thank you!

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