FLOOD RISK AND ADAPTATION CLIMATE CHANGE CHALENGES -ROMANIAN PERSPECTIVE-

Roundtable 4 : ADAPTATION TO CLIMATE CHANGE: KNOWLEDGE OF FLOOD RISKS, MANAGEMENT OF AQUATIC ENVIRONMENTS AND PREVENTIVE MEASURES IN THE BASINS

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1. World and European adaptation measures in climate change context:

In April 2013 the EC adopted an EU strategy on adaptation to climate change. The aim: Europe more climate-resilient.

-Water Framework Directive – 2nd cycle of implementation
-Flood Directive – 1st cycle of implementation

Climate change adaptation – partially taking into consideration by MS

The Sendai Framework is the successor instrument to the Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters

Priority 1 Understanding disaster risk
Priority 2 Strengthening disaster risk governance to manage disaster risk
Priority 3 Investing in disaster risk reduction for resilience
Priority 4 Enhancing disaster preparedness for effective response, and to «Build Back Better» in recovery, rehabilitation and reconstruction

2.Relevant statistics concerning floods effect at EU level -150 bil. €, over 1000 fatalities (10yr)

Table 1: Headline findings on the financial, economic and social impacts of floods (2002-2013, EU28)

Member State	No. flood events (2002-2013)[1]	No. with quantified cost data	Total costs (quantified events only) (€ millions) (2002-2013)[2, 3]	Average cost per event (€ millions) (2002-2013)[2,3]	Total costs over all events, extrapolated (€ millions) (2002-2013)[2, 3]	Total no. fatalities (2002-2013)[4]	Total no. people evacuated (2002-2013)[5]	Money provided through EU Solidarity Fund (€ millions)[6]
EU28	**363**	**201**	**€72,000**	**€360**	**€150,000**	**Around 1,000**	**More than 1.7 million**	**€1,800**
Austria	8	7	€ 4,700	€ 660	€ 5,300	19	1,500	€ 171
Belgium	10	1	€ 180	€ 180	€ 1,800	5	0	-
Bulgaria	15	5	€ 480	€ 96	€ 1,400	62	11,00	€ 20.35
Croatia	6	3	€ 240	€ 80	€ 480	0	750	€ 5.23
Cyprus	3	0	€ 0	€ 0	€ 0	0	0	-
Czech Republic	12	6	€ 4,100	€ 690	€ 8,200	66	1.5 million	€ 161
Denmark	3	3	€ 1,400	€ 450	€ 1,400	4	0	-
Estonia	2	2	€ 390	€ 190	€ 390	0	600	-
Finland	11	4	€ 60	€ 15	€ 170	0	120	-
France	48	48	€ 8,700	€ 180	€ 8,700	152	39,000	€ 94
Germany	11	6	€ 19,000	€ 3,100	€ 34,000	52	100,000	€ 804
Greece	22	5	€ 1,000	€ 200	€ 4,500	19	0	€9.306
Hungary	10	5	€ 1,400	€ 270	€ 2,700	3	10,900	€ 37.55
Ireland	16	10	€ 920	€ 92	€ 1,500	2	1,500	€ 13.02
Italy	20	16	€ 8,900	€ 560	€ 11,000	127	3,200	€34.971
Latvia	1	1	€ 3	€ 3	€ 3	0	0	-
Lithuania	5	0	€ 0	€ 0	€ 0	4	70	-
Luxembourg	0	0	€ 0	€ 0	€ 0	0	0	-
Malta	13	1	€ 30	€ 30	€ 390	0	0	€ 0.96
Netherlands	3	3	€ 14	€ 5	€ 14	0	0	-
Poland	10	2	€ 4,800	€ 2,400	€ 24,000	24	32,000	€ 105.57
Portugal	11[7]	2	€ 1,100	€ 550	€ 6,100	51	0	€ 31.26
Romania	20	13	€ 4,100	€ 310	€ 6,300	183	68,000	€ 107.95
Slovakia	24	24	€ 790	€ 33	€ 790	33	380	€26.099
Slovenia	7	5	€ 1,100	€ 220	€ 1,500	11	300	€ 29.80
Spain	23	12	€ 1,500	€ 120	€ 2,800	85	730	-
Sweden	1	1	€ 320	€ 320	€ 320	0	0	-
UK	48	16	€ 7,700	€ 480	€ 23,000	57	3,200	€ 162.39

Notes:
[1] A flood for this study is defined as an event of sufficient magnitude to be recorded in EM-DAT, or Member State databases. An event is identified as a flood in a specific Member State for a discrete period of time
[2] Due to difficulties identifying the years in which the damages are given in some sources, costs from earlier

Study on Economic and Social Benefits of Environmental Protection and Resource Efficiency Related to the European Semester -DG Environment - February 2014

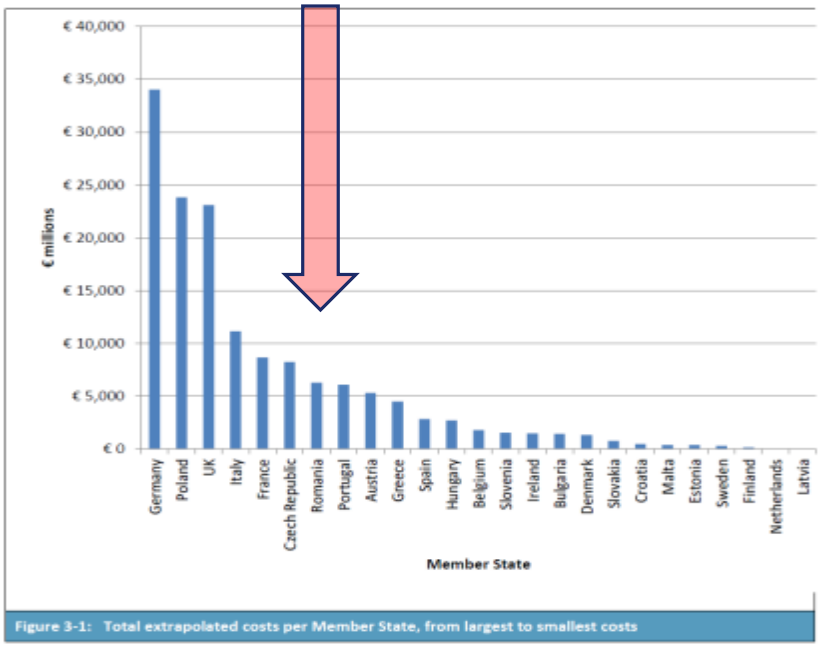


Figure 3-1: Total extrapolated costs per Member State, from largest to smallest costs

Facts for Romania 2002-2012:

-183 fatalities – biggest no. in UE
-68000 evacuated people – third place in UE
-107.95 mil Euro from EU Solidarity Fund – four place in UE
-Total cost of flood impact 6300 mil. Euro – seven place UE
-43,900 houses damaged – biggest no. in UE

IMPORTANCE OF FLOOD RISK MANAGEMENT IN CLIMATE CHANGE CONTEXT !

3. Climate change impact- scientific challenge

RISK=HxExV

Hazard (H): *occurrence of a natural danger (event), including the probability of this event;*

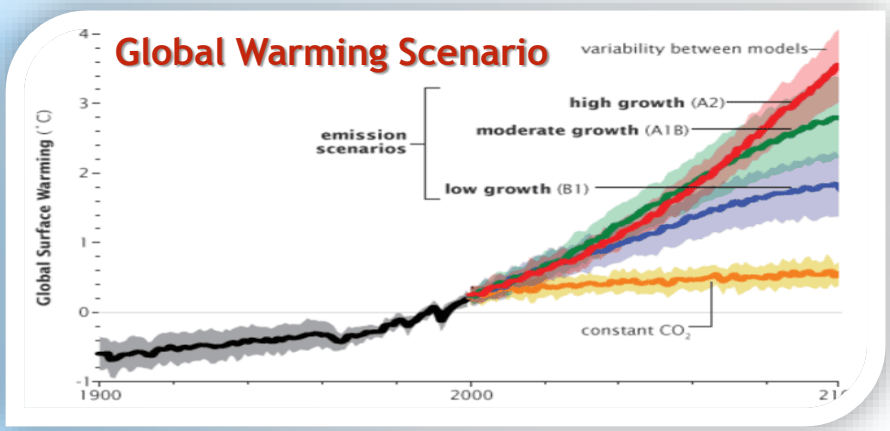
Exposure (E): *the assets amount and number of inhabitants in the affected area;*

Vulnerability (V): *the lack or loss of resistance to destructive forces or damages.*

- good knowledge of fluvial floods and coastal floods
- knowledge gaps in pluvial floods, flash flood and underground floods

- difference between countries in availability of data; "disaster databases it is a disaster"

- direct link between development of countries or region and vulnerability degree

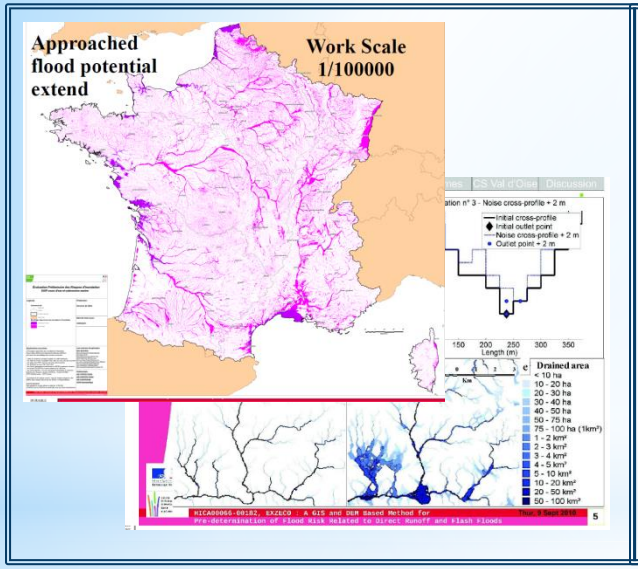


Hydro-meteorological scenario

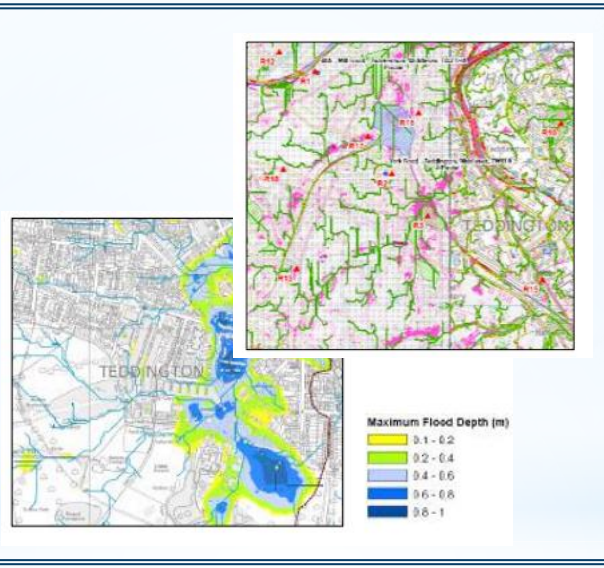
- Estimation of hydro-meteorological patterns changes
- Co-existence of floods and drought in the same area
- Increasing of flood frequency
- Increasing of flood amplitude

INCERTITUDE DEGREE?

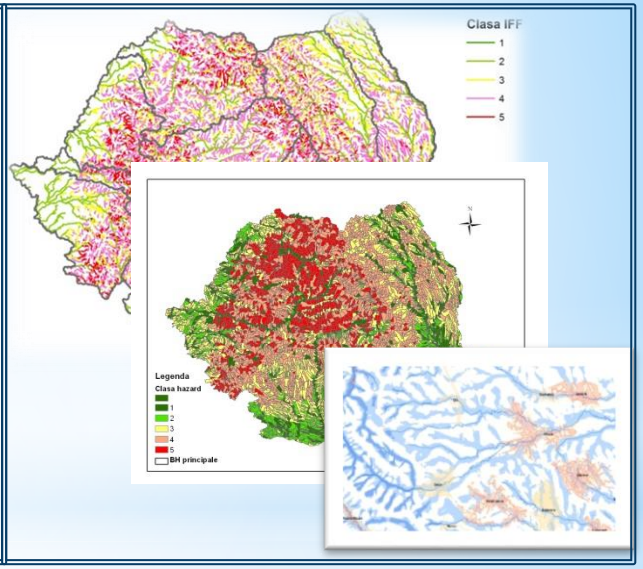
4. Flash floods and pluvial floods mapping in climate change context



France - (**Frédéric Pons (FRANCE/MEDDE/CETE Méditerranée)**



United Kingdom -(Ronnie Falconer, Jacobs Engineering)



Romania - (M. Matreata, V. Chendes - NIHWM)

-difficulties in applying known hydrological-hydraulic models – huge amount of necessary data at local level;
-how to find new ways to create regional/national maps ? Example: hydro-geo-morphological methods and Exzeco method (FR), rolling balls (UK), susceptibility index and small basin hazard classes (RO);
-acceptance of impossibility or at least <u>difficulties in association a probability to flash/pluvial/underground flood hazard;</u>
-how to clarify/detect climate change impact in a heavily modified water body or in anthropic environment (urbanized)?; reference to natural hydraulic regime?
-<u>lack of hydrological data in unmonitored small river basin</u>, etc

5. Damage recording and potential damage assessment in climate change context

"Access to information is critical to successful disaster risk management. You cannot manage what you cannot measure."
Margareta Wahlström, United Nations Special Representative of the Secretary-General for Disaster Risk Reduction

-Understanding gaps between countries concerning data availability in terms of recorded damages:

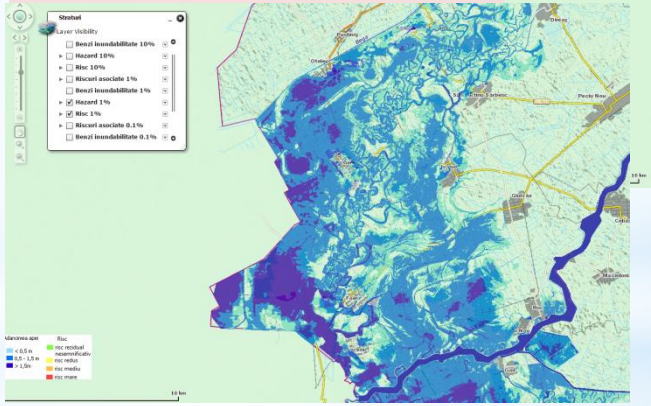
-missing cadaster data,
-missing reference to flood mechanism,
-incertitude of economical assessment, etc

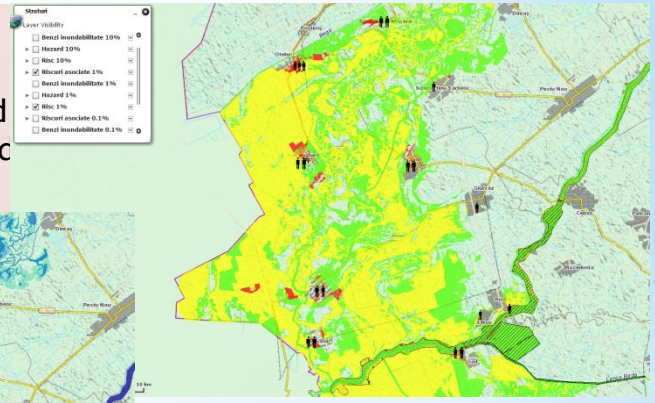
-Different institution with responsibility in damage assessment - no damage databases standardization;

Needs: "best practice" in damage assessment and potential damage evaluation in various context (compensation of missing data using of extrapolation and normalization method etc)

6. Climate change adaptation measures - governance and policy level

Banat – April 2005
- 22.000 Ha
- 12 localities completed flooded
- 5000 houses affected/destroyed





EU Policy level and governance concerning Climate change adaptation measure:

– existing link between Water Framework Directive and Flooding Directive (also with another EU Directive, Biodiversity and Habitats, Inspire) – needs to improve
- what about link with Critical Infrastructure Directive and Humanitarian Aid and Civil Protection Mechanism? ….“solidarity principle”

7. Ways to increase resilience and reducing technological risk…

"if a man is poor, even his horses cannot pull the carriage…" (Romanian saying)

FACTS:		Extrap. Cost of Damage (mil EURO)	POPULATION	GDP/INHAB ($)	GDP/INHAB (EURO)	Cost/Pop	Resilience index (% GDP
1	GERMANY	34000	82210000	44000	30985.9	413.57	1.33
2	POLAND	24000	38116000	13300	9366.2	629.66	6.72
3	UK	23000	61113000	39600	27887.3	376.35	1.35
4	ITALY	11000	59338000	33600	23662.0	185.38	0.78
5	FRANCE	8700	65073000	41700	29366.2	133.70	0.46
6	CZECH	8200	10501000	18400	12957.7	780.88	6.03
7	ROMANIA	6300	22323000	8900	6267.6	282.22	4.50
8	PORTUGAL	6100	10606000	21000	14788.7	575.15	3.89
9	AUSTRIA	5300	8206000	49100	34577.5	645.87	1.87
10	GREECE	4500	11147000	21800	15352.1	403.70	2.63

- education/awareness, warnings and forecast improvement, hazard and risk communication, increasing of emergency intervention efficiency, etc; - horizontal measures

- green infrastructure, land use adaptation, improvement of construction/infrastructure resilience and of existing standards/norms, etc; - vulnerability reduction measures

- natural and artificial retention measures, adaptation of existing flood defense infrastructure and operating rules, etc; - hazard reduction measures

- **Needs to adaptive and aggregated measures, is no way to find only one "miracle" solution**
- **Avoid classification of measures in "bad" or "good", taking into consideration world discrepancy in development – best practices sharing and know how transfer between countries**

Thank you for attention!

Question?