ADAPTATION TO CLIMATE CHANGE THROUGH TERRITORIAL DEVELOPMENT STRATEGIES:

Pilot Project of the Municipality of Varna

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Introduction: Brief Profile of the Municipality of Varna

Country: BULGARIA

Established: in 681

EU accession: January 1st, 2007

Population: 7 640 000

Total area: 110 910 km²

Parliamentary republic

Capital City: Sofia

Pilot zone: Municipality of VARNA

Location: on the Black Sea coast

Pilot area: 237 km²

Population: 346,000 people

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Introduction: The vision of Varna in 2022

- Varna's inhabitants benefit fully from its **natural richness**
- Varna's **hotels are fully booked**
- **Active public / private cooperation** that keeps innovating the public area
- **Lively water front** (playing, jogging, eating, fishing, shopping, boating)
- Varna's **bathing water are clean**
- Varna is **safe from flooding** and **much greener**

Goals and the objectives of the Pilot Project of Varna

Developing a Territorial Strategy for Adapting to the Climate Change

In a nutshell:

The Pilot Project of the Municipality of Varna is an example of a climate adaptive planning practice for a peri-urban area with different stakeholders and different levels of authorities involved.

Main features of the area around Varna

- **Fragmented plain area** bordered by a plateau and the Black Sea, divided by the Lake of Varna
- Clearly divided **watershed parts, separated by gulches** which pass through the city and go to the lake or to the sea
- Highly urbanised area, **almost no arable land** of commercial importance
- Climate change: Varna is turning into a **"two seasonal"** area

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Components of the Pilot Project

1. **Field Survey** of the natural storm-water drainage system
2. **Water Balance Study** of the pilot area
3. **Proposed technical measures** against floods in the pilot area
4. **Cost-Benefit Analysis** of the proposed technical measures
5. **Public input** to the proposed technical measures and to the Territorial Adaptation Strategy
6. **Stakeholders' support** for the Strategy
7. **Territorial Adaptation Strategy** and **Policy Issue Paper**

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Applying the F:ACTS! guidelines

Eight out of all eleven F:ACTS! guidelines have been applied in the three phases of the Pilot Project of Varna

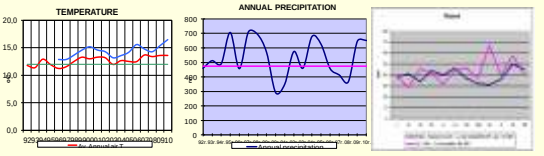
1) **Set-up phase**
2) **Implementation phase**
3) **"Political" phase**

Applying the F:ACTS! guidelines in the Set-up Phase

Guideline No. 1: Incorporate adaptation in a bigger story of sustainable and resilient areas

General Urban and Land-Use Plan of the Municipality of Varna, approved in September, 2012

Guideline No. 5: Make climate change and your actions visual and measurable



Guideline No. 3: Identify the driving social and economic forces

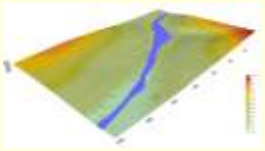
F:ACTS! guidelines in the Implementation Phase

Guideline No. 9: Combine different goals and budgets

- **Site survey of the natural rain water drainage system (≈ 500 000 EUR external input)**



- **Water Balance Study (numerical model) of the pilot area (≈ 59 000 EUR external input)**



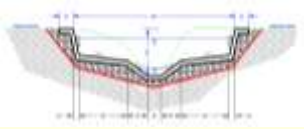

Guideline No. 2: Care about your ecosystem services

- **Artificial wetlands in the new General Spatial and Land-Use Plan of Varna (Cost of the Plan 1 000 000 EUR)**

F:ACTS! guidelines in the "Political" Phase

Guideline No. 5: Make climate change and your actions visual and measurable

- **Concrete technical measures**
- **Multifunctional use**
- **Cost-Benefit Analysis**




Guideline No. 4: Involve all stakeholders

Guideline No. 6: Make stakeholders shareholders



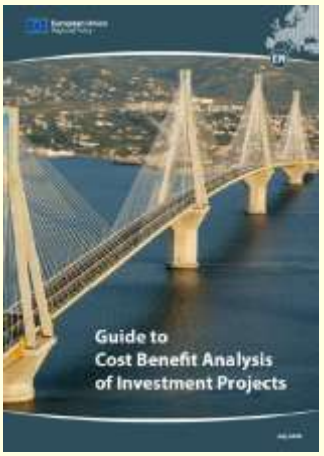
Guideline No. 10: Powers and legal framework to act locally

- *UN Framework Convention on Climate Change*
- *Kyoto Protocol to the UN Framework Convention on Climate Change*
- *EU White Paper on Adapting to Climate Change*
- *Bulgarian Law for Protection of the Environment*

Economic viability of the proposed Territorial Adaptation Strategy

Cost-benefit analysis of the proposed measures:

- Exploring the economic aspects **of saving the drinking water** which is currently being used for municipal "non-drinking" purposes
- Exploring the economic aspects of **improving bathing water quality versus the costs for creating settlers and temporary storage facilities for storm-waters**
- Exploring possibilities for **obtaining financial revenue from rain-water storage facilities (settlers)**
- **Identifying funding sources** at national level and at EU level

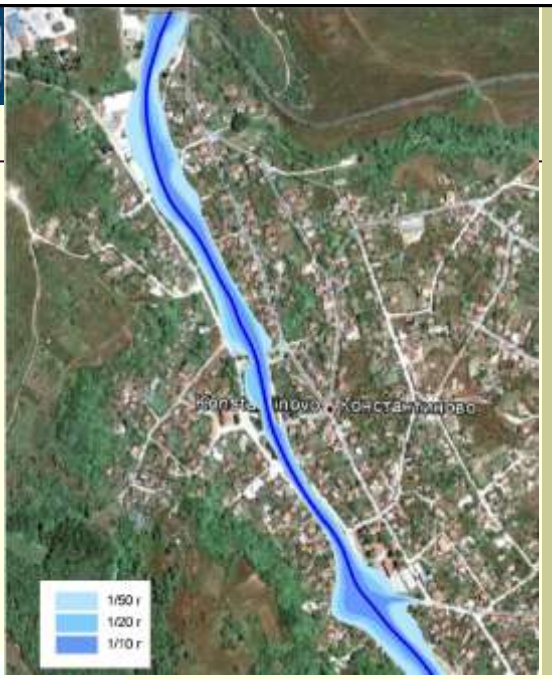


Climate changes in the pilot area taken into account in the cost-benefit analysis

- Annual average **temperature rise of 1.5ºC**
- Frequent climatic contrasts: **sharp changes between high and low temperatures**
- Increase of annual rainfall with **max values in July and in September**
- Cyclic alternations of **very dry and very rainy periods**
- Change of traditional climate parameters with **more tropical ones**

Changes in flood-wave frequencies:

- the **100-year wave** becomes a **50-year one**
- the **50-year wave** becomes a **30-year one**
- the **30-year wave** becomes a **10-15-year one**
- Floods which used to happen in the past **ones every 5-6 years** became more frequent and now **occur ones or even twice a year**



Floods caused in the Pilot Area by different flood waves

1/50 years

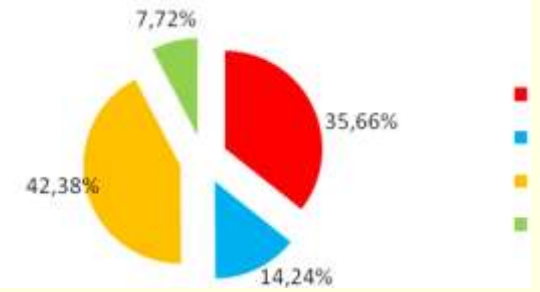
1/20 years

1/10 years

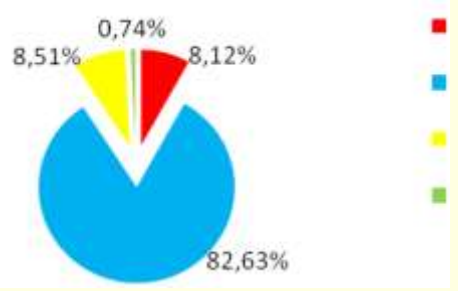
Statistical profile of disasters in Bulgaria

- Total number of disasters - 4 571
- Number of floods - 651
- Proportional share of floods - 14%
- Damages caused by disasters - 321,7 mill. €
- Damages caused by floods - 265,7 mill. €
- Proportional share of flood damages - 82,63%

Statistical profile of disasters in Bulgaria - Occurrences



Statistical profile of disasters in Bulgaria – Damages



Types of economic benefits from the pilot project assessed in the CBA

1) Prevented spending on recovery of damages caused by disasters triggered by climate change
2) Prevented penalties for non-compliance with Directive 2006/7/EC for bathing water quality
3) Preventing withdrawal of tourists and losses in the tourist business
4) Preventing additional health care costs
5) Financial revenue from trapped sand (using or selling) in the storm-water settlers
6) Financial revenue from non-drinking water (using or selling) from the storm-water retention basins
7) Financial revenue from sports and amusements organised in and around the retention basins

Economic Benefits for the Pilot Area

Alternative 1: River bed correction and storm-water settler

- Total Economic Benefits (B) from Alternative 1 - 779.2 thou. €
- Total Economic Costs (C) from Alternative 1 - 291.8 thou. €
- Economic Result of Alternative 1 (B – C) - 487.4 thou. €
- **Ratio Benefits/Costs (B/C)** **- 2.7**

Economic Benefits for the Pilot Area

Alternative 2: **River bed correction and retention basin**

- Total Economic Benefits (B) from Alternative 1 - 840.4 thou. €
- Total Economic Costs (C) from Alternative 1 - 340.5 thou. €
- Economic Result of Alternative 1 (B – C) - 599.9 thou. €
- **Ratio Benefits/Costs (B/C)** **- 2.5**

Economic Viability Criterion

The Guide for Cost-benefit Analysis of Investment Project **issued by** ***DG Regional Policy of the EC*** **recommends to consider investment projects in the field of Environment and Water Management economically effective, in case they reach a ratio**

B/C > 1

Main lessons and policy issues coming from the pilot project of Varna

- The ***territorial strategy for adapting to climate change must really cover a territory*** (in the case of Varna - an agglomeration of seven neighbouring municipalities)
- The **construction of technical facilities is inevitable** – it is very unlikely to cope with the threats posed by climate change by organisational measures only
- **Multifunctional use** of the technical facilities and of the land
- **Institutional** policies and measures are also inevitable
- **Financial and insurance** policies and measures

What did we learn from F:ACTS!

- **11 guidelines for climate-proof territorial development**
- **29 good practices suggested by the project partners**
- **Many elements of local adaptive strategies demonstrated also by the F:ACTS! partners**
- **The Dutch "Sketch Match" method**

Thank you!
Budapest, 13th November, 2012