Measures taken in the Baltic Sea Region following the winter storm of 7 - 9 January - Baltic

1. Policy Objective & Theme

- ADAPTATION TO RISK: Preventing and managing natural hazards and technological (human-made) hazards

2. Key Approaches

- Participation
- Socio-economic

3. Experiences that can be exchanged

The lessons that were learnt, and the measures taken, following a devastating storm in the Baltic Sea Region.

4. Overview of the case

Following a severe winter storm in 2005, the Baltic Sea states recognised that they needed to improve many aspects of their disaster response to mitigate the consequences of such storms.

5. Context and Objectives

a) Context

The winter storm Gudrun (also known as Erwin) of 7th - 9th January 2005 was considered the fiercest since 1969 based on its spatial reach and on the loss of 17 lives that it caused. The highest wind speed was measured in Denmark (46 m/s on the coast) and the highest sustained wind speed in Sweden (42 m/s). In other countries, the maximum wind speed was above 30 m/s, which corresponds to the highest force of the Beaufort Wind Scale (Force 11-12).

In Finland, the storm raised the sea-level to new record heights (1.51 m.) in many places along the coast, although the wind speeds did not even reach that of a severe storm. The property damage to both public and private sectors caused by flooding added up to nearly €20m. In Estonia, the maximum sea level was reached in Pärnu, +2.75 m. on the morning of the 9th. Total property damage in Estonia was over €9 m. although many people were not insured. The situation was quite similar in all of the Baltic countries with excess flooding common.

In Denmark and Sweden the storm caused huge forest losses, with damages totalling some €230m. in Sweden alone. Here, about 75 million m3 of trees were felled, totalling the normal annual harvest in the whole country. In Denmark the damage was greater still, as the amount of felled forest of 1.5 - 2 million m3 (almost €40m.) was equal to 1.5 times the annual conifer harvest.

Latvia, Poland and Germany reported excessive coastal erosion. In Latvia, about 3 million m3 of sand and gravel was washed away. The contour of the coastline was significantly affected and between 3 -10 m. of coastline was removed although at Kolka it was 28 m. At Hel peninsula, in Poland, 4000 m3 of sand from a stretch of 15 kms was lost and small stones were deposited on the beach temporarily reducing its recreational value.

Both the trends in the number of weather-related events and in insured losses they cause have been rising during the past decades. In fact, the cost of such events has doubled each decade starting from the 1970's: the average annual cost during the past 15 years is €12.8 billion. In terms of insured losses, the cost of storm Gudrun totalled €9 billion, second only to the

storms of 1999.

b) Objectives

The main objective has been to assess the regional impacts of severe storms and to adapt strategies and policies to mitigate the worst effects of the storms.

6. Implementation of the ICZM Approach (i.e. management, tools, resources)

a) Management

Various government departments at national level in each member state have responsibility for those sectors in which response measures need to be improved.

b) ICZM tools

Taking into consideration the variable impacts Gudrun had at the national and local/regional level, different measures have needed to be implemented in the Baltic countries following the events of the storm. Early warnings issued in time by the meteorological offices helped in most countries to lessen damages. Even a warning issued a day in advance can help providing that both a rescue organisation with defined tasks and an effective communication network exist.

The effects of a storm surge can be reduced if the most vulnerable areas are mapped. Storm surges are temporary and cause unexpected sea-level rise which has a great impact on coastal areas. New coastal developments and underground constructions on coastal areas unavoidably increase potential damage and so, wherever possible, planning land use needs to take into more careful consideration those geographical characteristics that increase vulnerability.

Some damage, like the impacts on forests, are unavoidable in the short term but adaptive planning helps. Modern forestry methods have left northern European forests vulnerable to storm damage. Planted monocultures are more common with, especially, spruce forests being vulnerable to storms. This is partly because of their root structure, partly due to being evergreen plants with large foliage to take the power of winter storms. Rougher harvesting techniques also increase root damage on adjacent trees and trees are often planted on soils not totally suitable for them. Deciduous trees were found to be less vulnerable than coniferous and mixed forest plantations would be better able to withstand such a storm. In some countries this has been taken up as a part of the means to overcome forest damage.

Hazard identification is a key issue in both urban and rural areas as some effects can be diminished with proper planning in advance e.g. to minimise economical losses on coastal zones it is important to fix the damages to natural storm protections like fore-dunes as soon as possible. In terms of erosion and maintaining the recreational value of coastal areas soft methods, such as reinforcing foredunes mechanically or with planted vegetation, seem to work better than hard means which often leads to problems elsewhere.

Communication between actors is one of the key priorities in storm situations and information sharing is a necessity. The means of enhancing communication between key actors was found to be a key priority during the storm. Following Gudrun, communication systems have been integrated and made more robust. It was seen that coordination between different actors on different levels also needed to be re-thought. Information of the effects of the storm need to be collected centrally and the Rescue Services Advisory Board operating in Helsinki was a good example.

The consequences of the storm had far-reaching economic effects. In the forestry sector, apart from the unavoidable cost of clearing up and replanting the forests felled by storm winds, many cumulative factors increased the cost of re-planting. The felled areas had to be surveyed and, to avoid insect damage, the trees needed to be harvested before the summer. This added to the cost of normal harvesting. The excess amount of dry timber in the forest further increases the risk of forest fires. Large amounts of timber on the market, although of poor quality, decrease the timber price per cubic meter. On top of this, the growing cycle has to be started anew and it takes decades before the trees reach their prime growing age again.

Effects of extreme events can be felt even on a national level for those countries being to a large extent dependant on some forms of energy production, such as wind power in Denmark and nuclear power in Sweden. Weather disturbances often affect

large areas, making it harder to compensate the energy needed with imports from abroad. Trees fallen on low-voltage distribution lines caused most of the power cuts. After Gudrun, power was in most places restored in a few days however, aided by warm weather.

7. Cost and resources

The work to determine the improvements needed was largely done through the Baltic Sea Region Interreg IIIB Neighbourhood Programme “Developing Policies and Adaptation Strategies to Climate Change in the Baltic Sea Region” (June 2005 till December 2007). The budget was €2,246,822.

8. Effectiveness (i.e. were the foreseen goals/objectives of the work reached?)

Gudrun stimulated technical improvements, as well as organizational and institutional changes in almost all countries. Their effectiveness will be put to the test in the next major winter storm.

9. Success and Fail factors

Some key elements in damage control and ways of reducing vulnerability towards extreme weather events were identified. The event also showed good practices in terms of adaptation policies that could be shared. Adaptive measures, such as the use of spare power generators used on Swedish farms, can minimize the impact of extreme events.

10. Unforeseen outcomes

In Denmark, a storm council (Stormrådet) was established. If the Ministry of Environment calls it up, this council can decide if, according to the law, financial support from the Danish state is granted for private forest owners. In addition, a forest counselling organ was established (skovrådet). The support given covers for clearing the affected forests and re-planting them with sturdy tree species.

11. Prepared by

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12. Verified by

It has not been possible to verify this case.

13. Sources

- Impacts of winter storm Gudrun of 7th – 9th January 2005 and measures taken in Baltic Sea Region (2006) S.Haanpää, S. Lehtonen, L. Peltonen (Centre for Urban and Regional Research, Finland) and E.Talockaite (Environmental Centre for Administration and Technology, Lithuania).
- Windstorm Erwin / Gudrun – January 2005 (2005) Property Special 2. Guy Carpenter & Company Ltd

Impacts of winter storm Gudrun (1.23 MB)

Winter Storm Erwin-Gudrun Jan 2005 (1.04 MB)