



Good practice

Risk assessment in the Safety Region South-Holland South (The Netherlands)

In The Netherlands the 25 Safety Regions perform a risk assessment based upon a nationally developed method. The resulting *regional risk profiles* give insight in the present and future risks within every municipality, the impact and probability of these risks and the possible policy options for risk reduction and disaster preparedness. The result is an informed decision by the municipalities on the best policy strategies.

In The Netherlands the municipalities are primarily responsible for safety and crisis management. Through spatial planning they also have a big influence on risk prevention. The 418 Dutch municipalities are divided into 25 so-called Safety Regions. Together the municipalities within these regions establish a regional organization which is responsible for the fire services, the medical emergency management, the joint emergency room (112), the disaster preparedness and response and also advising on risk prevention. The national Safety Region Act requires the 25 regions to develop (and continuously revise) a regional risk profile, as a basis for the policies on risk and crisis management.

National guideline

In order to facilitate the Safety Regions in complying to the legislation the Dutch national associations for fire brigades, medical emergency management, police and municipalities have developed a national guideline for the regional risk

profiles. The overall objective was the realization of 25 mutually comparable regional risk profiles. Specific objectives of the guideline where to set national standards for:

- risk identification using the provincial risk maps;
- risk analysis of the impact and probability of incident scenarios;
- risk evaluation by the political decision makers and the formal regional political decision process;
- the assessment of risk mitigation policy strategies in multi layer safety.

An important additional goal was to realize a direct interconnection of the regional method for risk assessment with the National Safety and Security Strategy of the central government. Furthermore the regional method is in accordance with the Risk Assessment and Mapping Guidelines for Disaster Management of the European Commission.

In 2010 all 25 Safety Regions have decided to implement the national guideline. In October 2010 the board of the Safety Region South-Holland South has decided upon its definitive regional risk profile. Hereafter the lessons learnt of the implementation process have been exchanged in the national Platform Regional Risk Profiles. In this good practices the Dutch approach to risk assessment and the experiences of

the Safety Region South-Holland South are described.

Risk identification

The starting point of the Dutch approach is that in analyzing safety and security risks all kinds of hazards have to be taken into account. In the Netherlands the width of an all hazard analysis contains issues ranging from natural disasters (like floods, extreme weather and earthquakes), to technological driven disasters with hazardous materials (like explosions, toxic fumes) or transport (like planes, trains, pipelines) and ultimately also man-made disasters like terrorism. Moreover an all hazard approach brings together all these kinds of ‘classical’ disasters with ‘modern’ crises like long-term failures of utility supplies, political instability, polarization of populations and health crises like the flu pandemic.

A hazardous situation consists of two components. Firstly a ‘source’ with an inherent risk of the occurrence of a disastrous incident, like for example industries, transportation and natural disasters. The other component defining a hazardous situation are the ‘recipients’ or vulnerabilities, that bare the consequences of a disastrous incident, like inhabitants, housing, cultural heritage and the environment. Only the combination of ‘source’ and ‘recipient’ make a hazardous situation. For example, an industry with toxic materials will only lead to a considerable risk if there are people living or working nearby. This definition of hazardous situations in itself presents a possible solution for risks: separating the source from the recipient.

Based upon the concept of ‘all hazard’ for The Netherlands the 25 different types of disasters and crises are defined. Based upon these types

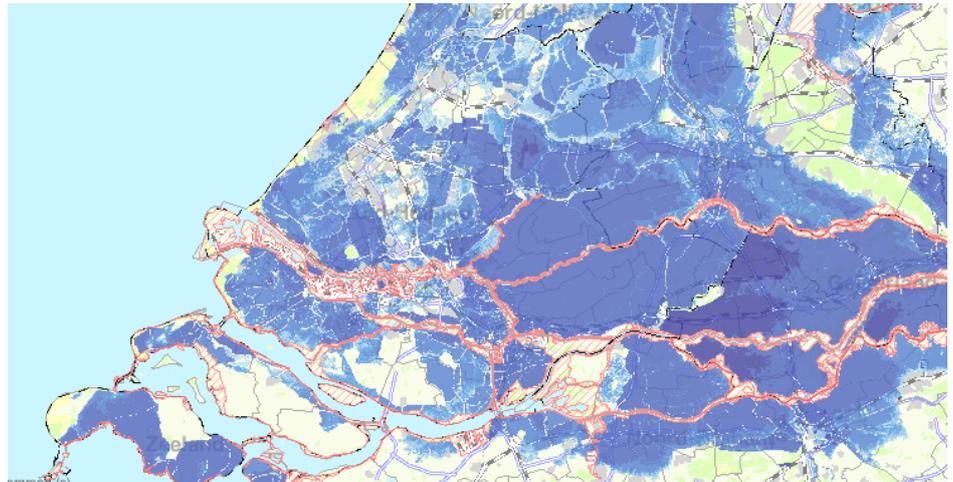


Figure: provincial risk map for flooding

the Safety Regions make an inventory of all ‘hazardous situations’. The municipalities and provinces are by law required to provide data on all relevant industries, buildings and infrastructures. These data are presented on the so-called ‘provincial risk map’, a digital database which is accessible from the internet. The Safety Regions use this system to generate maps for every type of disaster or crisis with a geographical component. Because hazards are not limited to manmade borders, the Safety Regions jointly analyze risks that are ‘border crossing’.

The risk inventory provides insight in the current risks. However, in the near or more distant future these risks might change. New hazardous situations may occur, or even new types of hazards can develop. Therefore it is important for the Safety Regions to explore the foreseeable risks in the future. Examples are new industries, housing projects near existing risks, new infrastructure, environmental changes and demographical changes like aging of the population. Especially global warming is a long term development that has to be taken into account because of the potentially enormous impact on the risks of floods, extreme weather conditions, public services like energy and water supply and maybe even (international) social unrest.



Risk analysis

Insight in actual and future hazardous situations does not automatically translate into a risk analysis. It is impossible to try to separately analyze the hundreds or even thousands identified hazardous situations. In the Dutch approach this is considered not only impossible, but even useless, because the risk assessment needs to be directed to strategic policy making. In order to enable politicians to choose between strategic policy options rather than concrete measures for individual hazards, it is important to abstract the hazard identification to a strategic level. The Dutch method for risk assessment therefore presupposes that threats to the safety and security are described in *scenarios*. Dutch risk analysis in fact is an example of *scenario analysis*.

The main reason for the use of scenarios as an instrument for risk assessment is the possibility to define the critical elements in the development of a disaster or crisis, as a basing for strategic policies. A scenario analysis enables the identification of the most important factors with which the outcome of a disaster or crisis can be influenced positively. This means in one case risk reduction (meaning either reduction of the impact or of the probability) needs the most attention, while in another case disaster preparedness is most important. The risk assessment therefore enables a tight correlation between risk management and disaster preparedness.

To enable a scenario analysis the identified hazards have to be described in terms of potential disaster or crisis scenarios. For every of the 25 types of disasters and crises the experts of the Safety Regions have to determine which scenarios could realistically occur on their territory. This is called the first 'funnel': from many hazardous situations to a limited number of scenarios.

In the Dutch approach the concept of 'risk' is defined as a composition of the 'impact' (total of the consequences) and 'probability' (a forecast about the occurrence) of a disaster or crisis scenario. To be able to compare totally different risks in an *all hazard approach* some sort of 'yardstick' is needed: a predefined model that makes it possible to measure risks in a comparable manner. In order to compare the completely different kinds of risks, that 'yardstick' needs to distinguish between the different sorts of consequences for the various kinds of 'risk recipients'. In The Netherlands these different sorts of impacts are clustered in six so-called 'vital interests of the society':

1. *Territorial security*, defined as the actual or functional loss of use of parts of the Dutch territory for a longer period of time. Functional loss is mainly deemed to mean the loss of the use of buildings, homes, infrastructures and agricultural land.
2. *Physical safety*, defined as the disruption of the functioning of the people of the Netherlands. This impact is measured in terms of fatal injuries (immediate or premature death), seriously injured and chronically ill, physical suffering in terms of lack of basic necessities of life.
3. *Economical security*, defined as the disruption of the functioning of the Netherlands as an effective and efficient economy. This is measured in euro's in terms of repair costs for damage sustained, costs for the disaster relief and loss of income.
4. *Ecological security*, defined as the disruption of the continued existence of the natural environment in and around the Netherlands. This is measured by the long-term impact on the environment and on nature (flora and fauna), in terms of harm to designated wildlife and scenery conservation areas (Natura 2000), and harm to the environment in the broad sense.

5. *Social and political stability*, defined as the disruption of the continuing existence of a social climate in which individuals can function undisturbed and groups of people can live together peacefully within the framework of the Dutch democratic constitutional state and shared values. The impact is measured by means of 3 criteria: disruption to everyday life; violation of the local and regional democratic system; and social psychological impact (public rage and anxiety).
6. *Safety of cultural heritage*, defined as the disruption of the continued existence of the physical remains of the past that are valued by society because of collective memories, national identity, scientific research and/or education of future generations. The value of cultural heritage is explicitly separated from the commercial value. The value instead is measured in terms of uniqueness, loss of national identity, limited possibilities for restoration and importance as source for science and education.

In the Dutch guideline for regional risk assessment these six kinds of impacts are measured by in total 10 different criteria, based upon the method of the Dutch National Safety and Security Strategy. For each criterion the impact is expressed in an ordinal scale: A to E (A being limited impact and E being catastrophic impact). The total of the 10 criteria delivers an overall impact score of A to E.

Also for the determination of the probability this division into five categories is used. Category A represents an incident scenario which is deemed very unlikely, while E represents a very likely scenario. If possible the probability is calculated quantitatively (% chance of occurrence in the next 4 years), if not it is

estimated by the experts qualitatively.

Risk evaluation

The third and final phase of risk assessment, the risk evaluation, constitutes of the political interpretation of the risk analysis. The analyzed risks are presented by means of a *risk diagram* and weighed by the decision makers on specific criteria. In order to rank the risks a risk diagram is used, because this way the two dimensions of risk (impact and probability) can be taken into account separately. The traditional formula of 'risk is probability *times* impact' is deliberately avoided, because this tends to suggest a strictly quantitative interpretation. It would reduce 'risk' to a single number which in fact conceals the two fundamentally different dimensions. In risk assessment impact and probability cannot be interchangeable, because they are not always weighed equally by the decision makers. For example very unlikely disaster scenarios with potential catastrophic impact (worst case scenarios) are often given more priority than very likely scenarios with less impact. Depending on the political agenda and the risk consciousness of the inhabitants either the impact or the probability can have a deciding influence on the policy priorities.

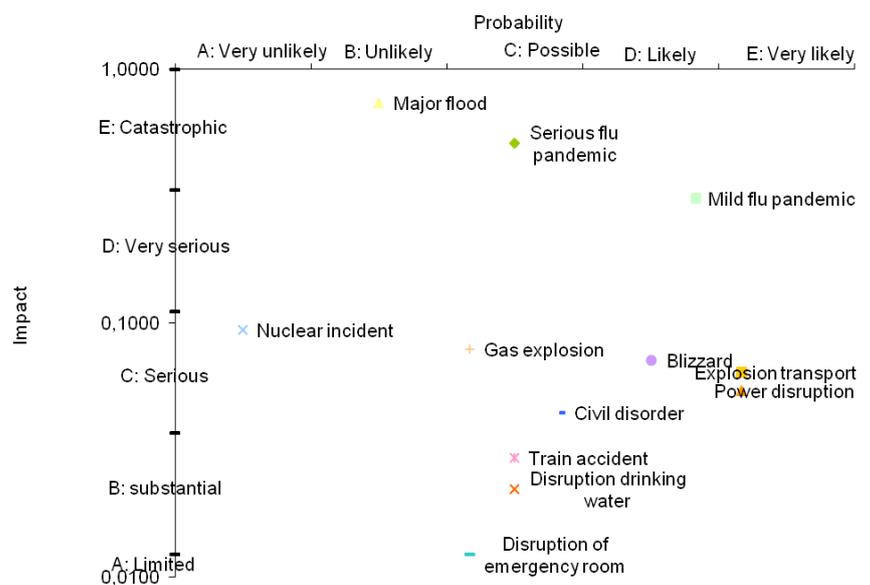


Figure: risk diagram



The political criteria which are used for the policy decisions on the risk diagram can differ for every region, municipality and in fact for every individual decision maker. In The Netherlands the political decision process by law requires involvement of all the municipal councils and a final decision by the board of the Safety Region, comprising of the Mayors. In the guideline the different kinds of evaluation criteria are described in order to enable the professionals and management of the Safety Regions to take these considerations into account in advance. Examples are:

- public risk awareness and concerns of inhabitants;
- existing policy priorities and political programs;
- instructions from higher government levels;
- prestigious projects (like new housing or industries);
- quick wins (cheap measures with considerable advantages);
- an imbalance between the risk level and the actual disaster preparedness.

It is important for the safety and security professionals to allow the political authorities to define their own set of preferences with which they decide on the future risk policies. Political decision making is more about subjective preferences than objective risk diagrams

In this first stage of political consultation, the main question is: which of the analyzed risks demand more attention? This phase therefore is about strategic priorities, rather than elaborate policy options. In the Dutch approach this is called the second 'funnel': from a wide scope of analyzed scenarios to a limited set of priority risks. These priorities are the basis for further research into concrete policy options.

Capability assessment

As described before the risk assessment is based upon the concept of scenario analysis. The choice

for a method of scenario analysis has been made in order to enable the identification of concrete risk mitigation and disaster preparedness measures. The description of a crisis or disaster scenario therefore has to be concrete enough to provide leads for policy strategies. The actual process of identifying, analyzing and evaluating policy options is called capability assessment.

Capability is a very broad term, which stands for all possible factors with which the final outcome of disasters and crises can be influenced positively. This varies from mitigation policies to prevent and constrain the possible impact and decrease the probability, to policies to improve disaster preparedness. In the Dutch guideline a (non exhaustive) list of possible risk mitigation and disaster preparedness measures is included.

The capability assessments addresses three questions:

- What are we already doing about the risks? (capability identification)
- What more can we do? (capability analysis)
- What more do we want to do? (capability evaluation)

The result of the capability assessment is a proposal for policy strategies for the priority risks.

Lessons learnt

During the development of the guideline and the implementation in South-Holland South and the other Safety Regions the following lessons were learned:

- An all hazard approach requires the consequences (impact) of disasters and crises to be measured in terms of all vital interests of society (not just the fatalities and injuries). Otherwise 'classical' disasters and 'modern' crises cannot be compared.
- Strategic policy making demands a strategic orientation from professionals (no focus on



risk measures for specific locations, but on strategic political priorities).

- Political decision making combines objective risks and subjective political preferences. The safety professionals have to be aware of these preferences.
- Risk management and disaster preparedness demands networking capabilities: no single government agency bears full responsibility, all public and private partners need to cooperate to make risk policies successful.
- Hazards are not limited to manmade borders. Adjacent regions/municipalities need to cooperate to effectively address 'border crossing' risks. In that case the usage of a single method for risk assessment is a big advantage.
- Risk assessment in borderlands demands more international cooperation, especially for hazards with potential international consequences (like nuclear incidents).

The MiSRaR project

The MiSRaR project is about Mitigation of Spatial Relevant Risks in European Regions and Towns.

The project is a cooperation between seven partners in six EU member states:

- *the Safety Region South-Holland South, The Netherlands (lead partner)*
- *the city of Tallinn, Estonia*
- *the region of Epirus, Greece*
- *the province of Forlì-Cesena, Italy*
- *the municipality of Aveiro, Portugal*
- *the municipality of Mirandela, Portugal*
- *the Euro Perspectives Foundation (EPF), Bulgaria.*

The goal of the project is to exchange knowledge and experiences on risk mitigation in spatial policies. The project will result in a handbook in which the lessons on the mitigation process are described and the good practices from the partners are presented. The Risk Assessment and Mapping Guidelines for Disaster Management of the European Commission will be implemented in the handbook.

The MiSRaR project is cofinanced by the European Regional Development Fund and made possible by the INTERREG IVC programme.

www.misrar.eu

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