

FREEMAN – Flood Resilience Enhancement and Management: a pilot study in Flanders, Germany and Italy.

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Abstract

The objective of the FREEMAN project, funded under the CRUE ERA-NET 2nd Common Call, is to assist efforts in improving the resilience of communities in flood prone areas. The project aims to find indicators and drivers that can increase the overall level of resilience. In doing so, FREEMAN will be able to provide guidance on the integration of flood resilience into operational Flood Risk Management – and provide practical policy recommendations to aid the implementation of the EU Flood risk Directive (FRD).

Former Flood Risk Management focused solely on the technical, so called structural, flood measures (protection). These measures include the raising and strengthening of levees or dikes and creating dams. The general idea seemed to be that when good Flood Risk Management (FRM) measures were taken no flooding could occur, and there would be no need for preparation. Within this view, existing structures were made more resistant against floods (Vis *et al.*, 2003). These were measures aimed at preventing floods and protecting inhabitants to withstand floods. Although safety levels in most flood prone areas have gone up due to these technical measures, the effect of a possible flood have become worse (Klein *et al.*, 2003).

The FREEMAN project focuses on finding ways to minimize the possible impact of a flood by taking non-structural measures. One of the ways in which potential damage can be minimized is by decreasing the level of vulnerability and increasing the level of resilience. Although this might sound straightforward, it is more complicated than it seems at first sight.

The project is aiming to find **indicators** that can help enhancing the level of resilience. Indicators identify measures that can or could be taken into account when you are dealing with flood risks. (Lankao & Tribbia, 2009; Bharwani *et al.*, 2008; Kaspersen & Dow, 2005; Klein *et al.*, 2003). According to FREEMAN resilience consists of several main underlying principles: “risk perception and communication”, “flood modelling tools” and “institutional organization”. First, before any discussion on indicators can be held a clear definition of resilience should be defined.

Within the study of the human dimensions of floods, the concepts of vulnerability (V), adaptive capacity (AC) and resilience (R) are increasingly important. The three concepts (VAR concepts) each have a rich history and their origins do not necessarily lay within the same research domain. With the years, a plurality of definitions were defined, not only with different foci but also different meanings across disciplines. Today, this plurality is a hindrance to understand and communicate the concepts. The concepts cannot be viewed as unique individual concepts, as they are interlinked within a non-trivial way. However, it is necessary to

find an operational definition to be able to bring the concept of resilience into practice.

In FREEMAN the choice has been made to view resilience as adaptive capacity. We view resilience as the ability to cope and respond before, during and after a hazard occurs. Resilience is about returning to the original state or beyond. Our approach is shown in the figure below:

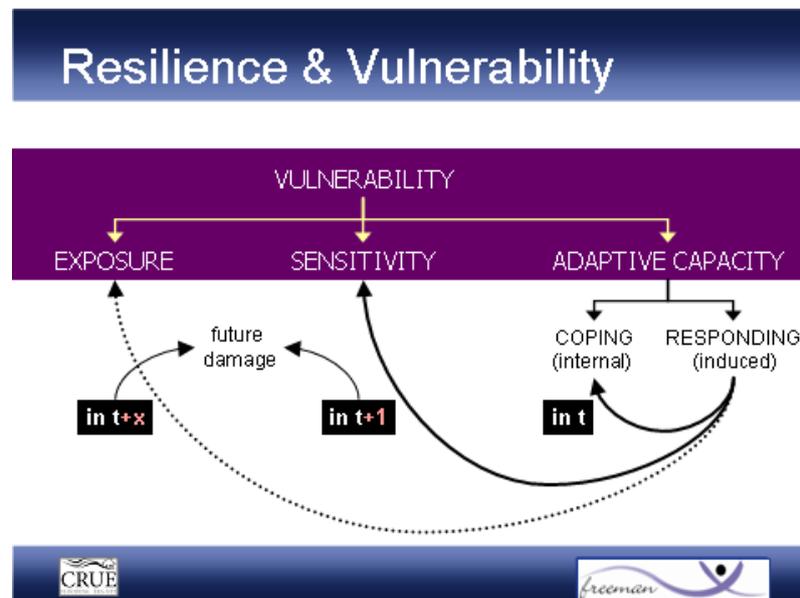


Figure 1. Resilience according to FREEMAN.

Resilience is considered as an ongoing dynamic process, which will not only return to its equilibrium (resistance or persistence) but will gradually increase and thereby bringing its equilibrium to a higher level.

Indicators provide a means of measuring resilience and vulnerability. Within Freeman, indicators (drivers) will be selected that will have a positive effect (pressure) on the level of flood resilience (state) therefore diminishing the vulnerability to an adversary (impact) and increasing adaptive capacity (response) (using the DPSIR-model). Indicators can be identified in several fields of expertise and across several levels.

In FREEMAN we discern four levels of resilience:

- Individual: meaning the individual person.
- Community: meaning a municipality, or system acting as a community (serving the same goals and objectives).
- Sub-national: this can be water basins, regions, provinces etc. This depends on the governmental structure of a country.
- National: meaning the national government or national based institutions and organisations.

Freeman focuses on social resilience and institutional resilience, Within Freeman, it is considered that economic resilience is a part of social resilience (Bharwani *et al.* ,2008).

Freeman operates using three distinct work packages, each with their own focus.. The titles of the work packages are self explanatory.

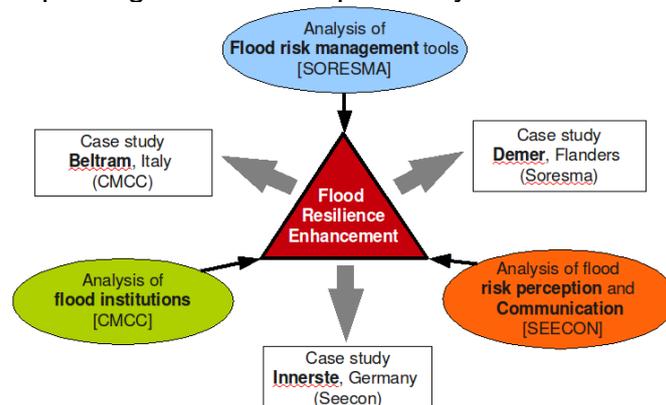


Figure 2. The FREEMAN workpackages

In order to be able to compare the different case studies a Case Study Report (CSR) will be filled out by all partners. The CSR consists of a list of predetermined questions covering all work packages and all defined indicators. It will measure each characteristic using several indicators. To be able to quantify the outcomes a grading system will be set up. This means that an answer found to a question will be awarded a certain score.

This would then contribute to the overview of the characteristic. The amount of “points” or arms of the diagram change according to the number of indicators used on an characteristic. This could result in an overview like the example below – given for the work package of Flood Risk Management (taken from Shaw, 2008).

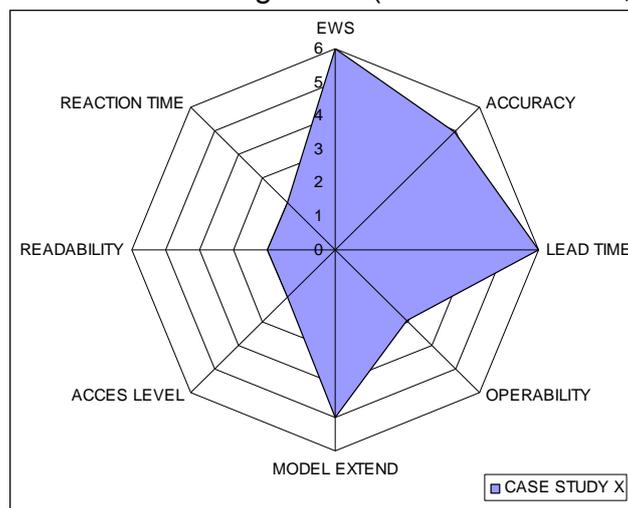


Figure 3. A star diagram for WP3.

In the end, the collected Case Study Reports will give a state of the art overview on the level of operational resilience in the chosen case study areas.

In FRM resilience can be seen as a key concept. FREEMAN aims to find useful measures to enhance FRM – and make the community more resilient.