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Flood damage functions at national scale for activities: challenges and insights

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Flood depth damage functions are critical to carry on Cost Benefit Analysis (CBA) to evaluate the efficiency of flood management projects. In France, CBA are mandatory for flood management projects which cost more than 2 million Euro. Meanwhile, as a support for local communities which have to produce those CBA, the French Ministry in charge of Environment proposed a methodology which is based on the estimation of flood damage. Economic activities often have a major share of damage on a territory. Then developing adequate flood damage functions for this sector at national scale is critical and raises challenging issues: i)How to deal with the diversity of activities? ii)How to make the best use of expert knowledge on damage to activities ? iii) How to estimate the value of equipment and stocks? iv) How to develop flood damage functions which are matchable with existing national database for application?

In this presentation, we aim at presenting flood damage functions we produced after a long methodological process (6 years). Our approach falls in what Flood Hazard Research Center calls synthetic approaches in which expert knowledge is used to collect damage data. The originality of our approach is that we collected this information at elementary level (building materials, pieces of equipment, furniture...). For this first step, 20 interviews with insurance adjusters have been carried out and enabled us after a formalization of quantitative data collected, to produce a library of elementary damage functions. The second step has consisted in elaborating a typology of activities based on the French Nomenclature of Activities (NAF) which matches with the European Nomenclature of Activities (NACE). With the help of insurance experts, we classified 577 activity types in 16 categories based on the similarity of their type of equipment and stocks. Third, we conducted enquiries with representatives of those categories to collect information on: the geometry and type of materials used in the building, the type and localization (elevation) of equipment and furniture. To combine data at activity level with elementary damage functions, we developed the software floodam® which generates loss and relative damage functions. This enabled us to produce flood damage functions for the three following parts of activity: building, equipment, stocks. Then based on relative damage functions at category level, we used the national data base ESANE to estimate the value of stock and equipment and to extrapolate loss damage functions. At the end, we produced 577 loss damage functions which match with the data base that enable to locate the activity in France (SIRENE).

As a conclusion, we will discuss the potentials and warnings for a use in another context (transferability to other country, international damage comparison...).