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Statistical and GIS approach for vulnerability assessment on a catchment scale

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Statistic economic data represent different elements and factors of our economy for a defined regional unit like a municipality, county or district. As income, gross domestic product or employment rate they give an idea of the wealth, growth and economic situation of such a political or administrative unit and can be used to compare different regional units and their importance for a higher unit. For flood risk management a lot of techniques have been developed to evaluate potential damages on different scales. The core of these techniques is mainly the in situ data collection and resulting a damage estimation on a micro or meso scale. For a spatial analysis this precise approach would be desirable, but is not feasible for a river basin or the area of a nation. The new European flood risk directive binds member states to evaluate the flood risk for the areas of their basins. This requires on the one hand side a spatial examination of flood events, but on the other hand side the evaluation of potential damages and the vulnerability of our society. Main unit for this evaluation is the river basin, as sub-units a sub-basin or river reach. If we intersect now the selected units for risk assessment like the river basin (makro scale) and national economic statistics, like the municipality (meso scale), we'll find out that they do not fit exactly, but give a good representation of each others shape. This situation would allow a very good estimation of the economic situation for different sections of the catchment using statistic data. In developed countries numerous statistical data for different geographical and administrative units are available: Gross domestic product (GDP) (GDP per statistical unit, GDP per sector; GDP per capita); Population and population density; Households and income per household; Statistical distribution of land use types; Commuters, employment and employment per sector. Except intangible damages vulnerability is from an economic point of view always a combination of spatial and income relevant data. From the mentioned economic information a lot of new and flood relevant data can be

derived combining available spatial information from geo information systems (GIS) and statistical data. In a first step all this economic relevant data allows a direct comparison of two regions and conclusions about potential vulnerabilities, focal topics (protection for agriculture, industry, infrastructure or settlements) and areas for different measures of flood risk management on a river basin and sub-basin scale. One big advantage of the use of economic statistic data for flood vulnerability assessment is the availability of historic, actual and forecasted data. This offers the possibility not only to look at the status quo, but also use growth rates, forecasts and time lines to make prediction about the development of a regional unit in contrasts to its neighbours. Flood risk management plans can not only derive measures for a status quo, but include future vulnerability scenarios.