An analysis of flooding economic impact in Urumea area

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Abstract

Several severe phenomena impact the Basque society and economy in many ways, from disruption in various sectors and substantial damages to infrastructure in human and economic losses. Particularly flooding is the natural event that causes the most disaster damage in Basque Country. In this work we focus on flood impact produced in Urumea area during this century. Urumea river is in the East part of Basque Cantabric Basin, flowing to the Bay of Biscay through the city of San Sebastian. It is a representative river for this part of the country, with rather steep slope and short concentration time. In Urumea basin high precipitation events, flash floods and associated impact are relatively usual.

In this study we use, as a reference for impact, the losses from flood damage paid by Spanish Insurance Compensation Consortium (CICS) during last twenty years. Data are analyzed and presented in different ways grouped per decade, period, amount, damage type, location, etc. The final objective is to contribute to knowledge of impact characteristics in this area, including awareness and preparedness in flash floods events.

Introduction

In the Basque Country, north of the Iberian Peninsula, rivers flow in two main watersheds, the Cantabric and the Mediterranean (see Fig. 1 and 2). In the Cantabric basin high precipitations are quite common producing flooding with variable regularity. Nevertheless, the rivers of the Mediterranean slope have less incidence rate of flood events.

The Mediterranean basins are mainly in the territory of the Alava (the largest, 2,963 km²) of the three provinces in the Basque Arroses, mostly in the city of San Sebastian. In this basin we find Gipuzkoa, in the southwest, and Nafarroa, in the northeast, with the first two being highly populated and affected with industrial activities. If we consider those different geographical and sociological factors, we conclude that the fraction of economic losses produced during the first three months of the Cantabric basin were, particularly, more than 30% in basinized area (1,800 km²) and an amount slightly lower in Urumea basin with six less times length (270 km²) (Fig. 2).

The Urumea river is 56,3 km long and flows in a mountainous area of 6,095 km² to the city of Donostia-San Sebastian (capital of Gipuzkoa), in catchment area 272,7 km². The length of the river is 24,9 km, with mean depth of 1,55 m. Its main tributaries are: Goyazi, in the southwest, and Urumea river, in the northeast, which makes Urumea river the most inhabited drainage basin in Gipuzkoa (213,000 inhabitants). The main towns on the river are Hernani (13,700 inhabitants), with the first industrial estates upstream locating on its banks, and Ondarroa, a town well known for its port in the middle of Urumea basin (200,100 inhabitants), through different parts of Donostia-San Sebastian (138,500 inhabitants) (Fig. 1).

In order to get a full description of the Urumea basin it is necessary to consider the local climate, natural phenomena and events (Rios [natural phenomena and events of a political or social nature], on the condition of holding a policy in the field of damages to goods, or life and/or accidents, with any insurance company). When giving compensation, the CICS will take into account the same goods, the same insured caption and any other conditions established in the insurance policy for the aforementioned contingencies.

Methodology

Original data consist on a excel file from CICS with accepted claims corresponding to “floods” for Basque Country during 1996-2015. Information is structured in data, mainly: zip code, risk and type of economic asset. Original data present gaps (void data), different type of economically name (for same place or municipality, language, etc.), inconsistencies (in between zip code, location and municipalities) and errors (in claims).

A derived data file is prepared after manual depuration of raw data so as to avoid most of such problems. Additionally, the data for Urumea basin area are based on location information (zip codes and municipalities). Derivation is done through different techniques of statistical presentation and analysis of data in various categories (Fig. 3). This allows getting useful information, making possible to calculate and compare the impact and extension of damages in Urumea basin and also for other basins, by means of methodologies and procedures contained in the CICS database. It would be very useful to keep those information in order to get a better knowledge of the flood damages produced in a given event, as physical characteristics (river flow, river side conditions, etc.), information related with preventive measures applied, previous damages or evidence of damage. Those related with the insurance politics and cultural aspects (characteristics and amount of the insured assets, compensation policies, etc.) of all of this factors must be considered in a temporal perspective.

In order to extract full conclusions about economic impact due to floods, using insurance claims data, many factors must be considered. Those affecting economic impact are potential exposure of the insured population and goods (those affected areas during episodes, two claims same day period, etc.) and those related with preventive measures applied, previous damages or evidence of damage. Those related with the insurance politics and cultural aspects (characteristics and amount of the insured assets, compensation policies, etc.) of all of this factors must be considered in a temporal perspective.

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In this study we use, as a reference for impact, the losses from flood damage paid by Spanish Insurance Compensation Consortium (CICS) during last twenty years. Data are analyzed and presented in different ways grouped per decade, period, amount, damage type, location, etc. The final objective is to contribute to knowledge of impact characteristics in this area, including awareness and preparedness in flash floods events.

Discussion

The data analyzed correspond to the compensation of authorized claims for flood damages, during the period 1996-2015 by the CICS. The amount of accepted claims (€) during different days (D) with some degree of impact is given.

Damas are negligible in the Nafarroa part of the Basin, and are produced in three different episodes (an up to 14% of the economic amount) during 76, 78, and 43 days respectively. This is explained considering the particular characteristics of occupational and industrial areas. Damages are negligible in the Nafarroa part of the Basin, and are produced in three different episodes (early warning, dam operations, etc.). In this work insurance claims data are analyzed for a selected area) and to different considerations inherent to the “extraordinary risk” compensation procedures.

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However, the Urumea basin is very well associated as representative area of economic losses due to floods in Basque Country. In order to extract full conclusions about economic impact due to floods, using insurance claims data, many factors must be considered. Those affecting economic impact are potential exposure of the insured population and goods (those affected areas during episodes, two claims same day period, etc.) and those related with preventive measures applied, previous damages or evidence of damage. Those related with the insurance policies and cultural aspects (characteristics and amount of the insured assets, compensation policies, etc.) of all of this factors must be considered in a temporal perspective.

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