3.3 Economic sectors

Introduction

Natural hazards are a major threat to sustainable development, economic stability and growth, territorial cohesion, and community resilience. According to the estimates of the European Environment Agency, the economic damage due to only natural hazard risks in the EU amounted to more than EUR 557 billion ([1]) in 1980–2017, mostly triggered by extreme weather and climate-related events whose frequencies and/or intensities are expected to increase as a result of human-induced climate change. The bulk of this damage was caused by relatively few low-probability, high-impact hazard events.

These estimates account only for the direct economic damages to physical assets only and omit often significant indirect economic losses generated by slow-onset hazards, spillover effects and indirect costs from the disruption of social networks, economic flows and ecosystem services. As a result of neglected attention to disaster risk impacts in the past, it is not easy to portray the spatial and temporal patterns of disaster damage and losses with reasonable precision.

The Sendai framework for disaster risk reduction 2015–2030 (UN, 2015) emphasised multi-hazard, inclusive, science-based and risk-informed decision-making, and laid down priorities for action and policy targets. The policy targets include a commitment to substantial reduction of economic damage. A sound understanding of risk does not only imply accounting for past damage and losses. Model-based economic risk assessment has been propelled by high-performance computing, large-scale hazard and disaster loss/impact models, and high-resolution exposure datasets of the Copernicus Earth observation programme.

A better understanding of natural hazard risk and ensuing economic losses is important for coordinating responses to shocks and crises within the European Economic and Monetary Union (Aizenman et al., 2013; Ureche-Rangau and Burietz, 2013). In the absence of financial protection tools for coping with disasters, the incidence of major disasters in several EU Member States may exacerbate economic imbalances and deteriorate credit ratings (Mysiak and Perez-Blanco, 2015).

This subchapter reviews the methods and models used, recent advances, and challenges in analysing disaster damage and losses in residential, agricultural and industrial sectors. Gross fixed capital formation in residential housing sector amounts to 5 % of gross domestic product (GDP) in the EU-27 (Eurostat, 2020). Housing statistics and prices are important indicators of living conditions and therefore regularly collected

by national statistical offices and Eurostat. The characteristics of residential building stocks are surveyed by statistical censuses, and those of residential built-up areas can also be obtained from very high-resolution remote sensing data (e.g. European Settlement Map (Sabo et al, 2019; European Commission, 2020). Housing prices are sensitive to past experiences of risk and availability of insurance coverage. Insurance premiums determined at actuarial risk pricing, on the other hand, are a function of a property's hazard exposure.

The agricultural sector contributes around 1.1 % of the EU's GDP but manages almost 40 % of the EU's total land area and represents an important employment opportunity for the rural population. Agriculture is heavily exposed to weather- and climate-related hazards (storms, droughts, floods, heat and hail), other risks such as pests and diseases, and market volatility. Assessments of economic impacts of water scarcity or droughts may be based on statistical, crop growth and/or Ricardian land price models. The econometric models exploit the historical covariation between yields and weather on an annual or more frequent basis to infer the effect of climate variability and change (e.g. Schlenker and Roberts, 2011). The Ricardian method assumes that agricultural land rents reflect the expected productivity of agriculture (Moore and Lobell, 2014; Van Passel et al., 2017).

Hazard-induced disruptions of energy supply or industrial production set off supply and demand shocks that affect regional economies in and beyond the areas directly affected by the disasters. The damage to tangible productive assets is equivalent to losses caused by disruption of production networks (Rose, 2004). The demand for liquid capital may increase its price; the level of fiscal consolidation and perceived trustworthiness play a role. Efforts to restore productive and non-productive capital losses generate new demand and change consumption patterns, which may lead to changes in prices, trade levels and fiscal revenues. These effects can be modelled by input–output, computable general equilibrium, social accounting matrix and econometric models.

(1) EU-28 Member States as in 2018 (including the United Kingdom), European Free Trade Association countries and Turkey, based on the NatCatService of Munich Re, estimated for the European Environmental Agency and Eurostat climate change indicators.