5.3 Recovery and avoiding risk creation

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5.3.1 Introduction

Most disasters are difficult to predict in the short term, but research to quantify the impact and understand recovery processes can help reduce the uncertainties associated with these events. Recovery is, however, the least understood aspect of DRM (Smith and Wenger, 2006). It is considered a complex, non-linear process with physical, social, economic and institutional dimensions (Johnson and Hayashi, 2012; Alexander, 2016). The recovery period is also an opportunity to facilitate economic, social and physical development long after the disaster (Berke et al., 1993); and the promotion of social and intergenerational equity is a key principle for sustainable recovery.

In this subchapter we examine scientific knowledge of recovery processes and the policies that have been implemented to enhance recovery, focussing primarily on Europe. Europe has experienced a range of disasters in recent years, though perhaps with less frequency and intensity than other parts of the world.

It is important to be prepared to live with the possibility that disasters may occur in one's lifetime or in that of the next generation. Anticipating the multiple dimensions of recovery is key to effective risk management.

The aim is not to provide an extensive coverage of all disasters or hazard types but rather cases that have been illustrative of the recovery process and that have led to scientific innovations and advances in theory. Not all recovery processes are covered here, but authors have attempted to cover a range of physical reconstruction and economic, social and psychological aspects, as well as knowledge about the planning and coordination of measures aimed at assisting recovery.

Europe is the focus of analysis, but whenever experience from other locations helps to understand recovery processes and policies in Europe, these are mentioned. Within Europe there are differences between north and south, not only in the types of hazards that are prevalent, but also in the cultural processes shaping recovery. These are mentioned here but not explored in detail due to space restrictions.

5.3.2 Planning for recovery

The recovery process is multidimensional and progresses at different rates for different people, businesses,

institutions and places affected by a disaster (Wein et al., 2011). Institutional fragmentation and short-term planning can hinder recovery and often result in new risks being created. Thus, cross-scale and longer-term strategies are needed in recovery, integrating different stakeholder perspectives and knowledge and coordination across policy domains. Innovations in our understanding of recovery planning are discussed in this section and provide a starting point for a deeper exploration of recovery processes later in the subchapter.

5.3.2.1 Recovery plans

The core purpose of disaster recovery planning is to offer a vision of the future after a disaster, provide a direction-setting framework (strong fact base, goals and policies) to achieve the vision; ensure that even short-term actions build longer-term resilience and that community needs are linked to broader regional, state and national disaster response and reconstruction policies (Berke and Campanella, 2006). Successful plans maintain both a combination of as well as distinct short-term recovery and long-term planning goals (Ingram et al., 2006).

Recovering from damage, loss and social disruption involves different types of activities. Categorising the impact can provide focus for both planning and research activities. Common recovery sectors are: reconstruction of buildings, restoration of livelihoods, system repairs, human and social rehabilitation, amongst others, to restore society back to being a well-functioning community, and preferably a better functioning community. Lindell and Prater (2003) define disaster impact sectors as physical (both built and human) and social (psychosocial, sociodemographic, socioeconomic and political); while Davis (2006) divides the process into five sectors, psychosocial, economic, physical, environmental and administrative/institutional sectors. Overall, identifying and classifying areas of recovery is best done on the basis a Post-Disaster Needs Assessment (PDNA). PDNA is a common assessment approach to support governments to assess damage and recovery needs. It is an inclusive process that builds on the capacity and expertise of national and international actors (GFDRR, 2013). PDNA provides damage and loss estimates and quantifies needs. A recovery framework is then needed to build on the damage and loss assessment for detailed sequencing, prioritisation, financing and implementation of recovery efforts.

Pre-disaster planning, participatory planning, capacity building, scheduling and process coordination can all help improve recovery and build more resilient communities.

Recovery goals commonly include the timely restoration of normal living conditions (Alexander, 2004; Lu and Xu, 2014); however, there is a trade-off between speed and deliberation (Olshansky, 2006; Lu and Xu, 2014). Pressure to urgently address complex, difficult decisions can result in reactive policies that may increase long-term vulnerability of affected populations (Ingram et al., 2006). Time compression has thus been identified as an important overarching characteristic of the recovery process (Olshansky et al., 2012).

5.3.2.2 Integrating mitigation in recovery plans

Disaster recovery provides opportunities for reducing risk through mitigation measures (Ingram et al. 2006). Mitigation measures should be integrated into pre-disaster recovery planning (NGA, 1979; Alexander, 2004; Lu and Xu, 2014) and can include proposals to reform building codes and land-use plans as one of the steps needed to meet recovery objectives (along with reconstruction, restoring systems, rehabilitation of people and re-establishment of livelihoods) (Thorvaldsdóttir and Sigbjornsson, 2014). Methodologies developed for evaluating benefits and costs of disaster mitigation measures (e.g. Chang, 2003) can also be used to guide the recovery process, although CBA needs to be used carefully (see Chapter 5.1.5).

5.3.2.3 Promoting participation

Recovery is also considered an interactive problem requiring coordination between numerous agencies and stakeholders (Berke and Campanella, 2006; Lu and Xu, 2014). Research on actors includes: the role of local offi-

cials (Rubin and Barbee, 1985), affected people (Ingram et al., 2006), citizen participation (Kweit and Kweit, 2004), the private sector (De Tura et al., 2004), community participation in general (Johnston et al., 2012) and auditors of the planning and implementation of recovery (Labadie, 2008). The role of partnerships (Mitchell, 2006) and management types (normal line ministries, special task force of government and new organisation) (Davis, 2006) are also addressed in the literature.

5.3.3 Reconstruction, building and urban design in post-disaster contexts

5.3.3.1 Principles for reconstruction

In post-disaster reconstruction, location and exposure to risk are important considerations, as are the type of construction materials, the constraints on materials (due to environmental conditions), timing of execution and access. Understanding the appropriateness of different materials that would be needed for reconstruction prior to a disaster can speed up reconstruction decisions, although the disaster itself will create new challenges. In the 1755 Lisbon earthquake (Oliveira, 2012), for example, scientific knowledge was lacking and guidelines for reconstruction (new urban design, introduction of seismic and fire-resistant techniques, new sanitary system, etc.) were drawn up quickly alongside a large number of decrees dealing with feeding, healthcare, defence, property jurisdiction, commerce activities and taxes. In comparison, discussion on the types of new defences needed for future tsunamis in the zones affected by the Tohoku tsunami have occurred over several years (Ieda, 2012), culminating in the decision to build big barriers made of concrete or soft dunes to dampen the energy of waters (Figure 5.3).

Disasters affect communities for varying periods of time and reconstruction is often required. Rebuilding poses various challenges, from defining suitable locations to merging tradition with modern construction techniques.

Reconstruction time varies tremendously depending on the level of resilience and the degree of impact of the event. There are cases where reconstruction has been greatly influenced by low pre-existing levels of development and will take a very long time, as is the case of the earthquake in Haiti in 2010. In these cases, the urban systems themselves need to be developed at the same time as reconstruction is happening. In other cases, the value and ownership of property has to be correctly identified and agreed before reconstruction or rehabilitation can begin.

For the historical centre of L'Aquila a roadmap for housing reconstruction was developed and building has been carefully monitored (Murao et al., 2007; Ishikawa, 2012; Chern, 2012). Considerable attention has been paid to discussing options with the affected population to ensure reconstruction decisions are acceptable to them (see Box 5.7).

5.3.3.2 Local construction practices

The process of rebuilding residential property, industrial stock, critical infrastructures and historical buildings is shaped by existing arrangements for urban planning as well as educational, technical and financial resources available. Pre-disaster construction practices, including the mix of 'engineered structures' versus 'low-cost structures' and how building is guided by regulations and land-use/urban plans, all affect the type of reconstruction activity that is appropriate and necessary. The political system also affects the success of a reconstruction process (Lucas et al., 1992; Oliveira et al., 2008).

Table 5.3 provides an intentional oversimplification of reconstruction options and the norms guiding these in countries of 'higher income' and of 'lower income'. Understanding the most common reconstruction techniques used and other considerations influencing reconstruction patterns is really important. For engineered structures, codes of practice and technological tools can help guide reconstruction. In particular, EN-1998-3 (2005) is a code of practice to guide

reconstruction and rehabilitation of structures, but needs to be adapted to a country in accordance with material properties, techniques of reconstruction, etc.

The knowledge contained in codes needs to be communicated to the technical community and to practical contractors through manuals as well as training courses, and even using the media to reach a broader population. Codes that are efficient but not too complex are more likely to reduce non-compliance. For 'low-cost structures', on the other hand, building techniques that are compatible with traditional practices are more effective, adjusting the codes to local materials and local traditions.

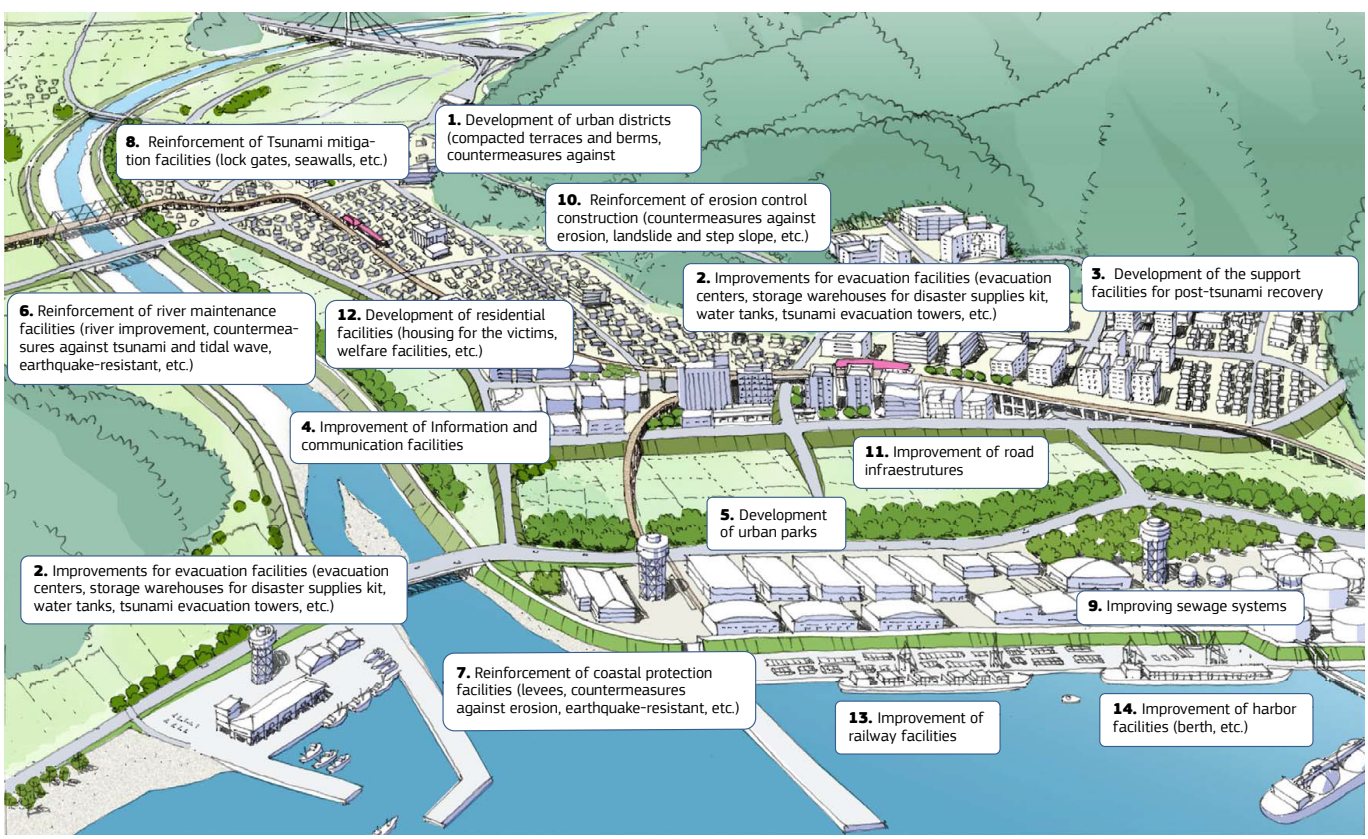
5.3.3.3 Avoiding future risk

Housing and other structures can be relocated to areas where exposure to hazards and other sources of risk is a lesser problem. Techniques can be used to weigh the various components of risk. For instance, 'Sirius' (Mota de Sá et al., 2013) is an indicator referring to geographic zones which are more prone to urban impact in case of an event. It deals with two variables, one concerning the vulnerability of the existing housing and the other reflecting the human concentration. It is organised into several plateaus which define the level of impact for that event. The opinions of those affected on whether to rebuild in the same place or move to another environment is also of great importance.

Reconstruction can be used to correct urban development problems, such as high population concentrations, and to widen roads for more

FIGURE 5.3

Sketch of possible solutions for Tohoku earthquake. Source: MLIT (2013)



effective drainage. The case of Italy, with the several earthquakes in the last 25 years, is critical (Dolce and Bucci, 2015), and the project C.A.S.E. (Costruttori ForCase, 2009) is particularly relevant for avoiding future risk, where new buildings have been constructed in a short period of time with base isolation.

Similarly, the Guidelines for seismic microzonation (SM Working Group, 2015) and the European Floods Directive (European Parliament and Council, 2007) are good examples of how to minimise risk through reconstruction after major disasters (European Parliament and Council, 2007; IPCC, 2014; Thaler and Hartmann, 2016). Reconstruction after the floods in the Netherlands in 1953 is, however, perhaps the most striking example of taking measures to control flood risk in the future (See Box 5.8).

Another example of significant mitigation measures being taken to limit risk in the future in the wake of a high-impact disaster can be found in Madeira (see Box 5.9).

BOX 5.7

Temporary housing construction in recent Italian earthquakes

On 24 August 2016, a M6.0 earthquake started a seismic sequence in central Italy, which included a M6.5 event on 30 October 2016. There were at least 299 fatalities, essentially caused by the collapse of buildings during the first main shock.

So, how should long-term temporary housing be managed after an initial period in tent and caravan campsites or hotels and before reconstruction takes place? A variety of responses can be seen after the three strongest earthquakes occurred in Italy in the past 30 years: Umbria-Marche in 1997, Abruzzo in 2009 and Emilia in 2012. Due to the long lapse of time typically required in Italy to complete the repair and reconstruction process — especially for the historical centres — housing arrangements are needed for homeless families for several years. Different solutions have been adopted (Dolce and Di Bucci, 2015). In Umbria-Marche and Emilia, the temporary solution consisted of public contributions to autonomous construction or, alternatively, pre-fabricated homes. In Abruzzo, four different alternative solutions were conceived for about approximately 45 000 people.

The first two consisted in the requisition of unused apartments and in a monetary contribution for autonomous lodging arrangement. Moreover, two ad hoc projects were set up and realised. The project C.A.S.E. consists of seismically isolated three-story buildings that can host around 15 000 people in 4 449 apartments. It was completed 10 months after the event. The limited land needed made them suitable for the city of L'Aquila. The project M.A.P. consisted principally of single-family timber houses in small settlements near the original villages. In total, 3 535 houses were erected in 141 areas, for approximately 8 500 people. For the Amatrice sequence, the choice was to use monetary contributions or 'Emergency housing solutions' similar to the M.A.P.s housing.

All of the described choices have a sound rational basis and could be adopted under different conditions. For the earthquake disaster recovery there is no 'one size fits all' model. Territories are different, available scientific and technologic support evolves and the expectations of the affected population change over time. A mature civil protection system looks for tailored solutions, building on previous experience while exploring new alternatives.

5.3.4 Economic recovery processes from households to the macro economy

Economic recovery refers to the process by which an economic unit (household to country) returns to conditions of stability following a disaster (Chang and Rose, 2012). Recovery does not require returning to a pre-disaster state; in fact, economic systems may never return to pre-disaster states, but rather achieve a new equilibrium (DFID, 2011).

In this section we examine knowledge on recovery processes that take place at different scales after a disaster. This literature draws on a wide range of post-disaster experiences in many different countries.

5.3.4.1 Economic recovery processes at the microlevel

The processes that enable households to recover levels of wealth after a shock or a disaster have been extensively studied (see, for instance, Christiaensen et al., 2007; Dercon and Christiaenen, 2011). In the short term after a disaster, incomes drop and the loss in income can lead to a reduction in consumption, with direct impact on individuals within the households, including higher levels of malnutrition (Alderman et al., 2006; Beegle et al., 2006).

The recovery process begins immediately but partially depends on the initial economic situation of the household: diversified sources of income and relatively high income levels are found to be beneficial for recovery across a range of countries and contexts (Adger et al., 2002; Morris et al., 2002). High levels of assets as well as access to credit, government grants and social protection give people a wider range of options and opportunities following a disaster and can speed up recovery (Twigg, 2015).

Measures can be taken to support and accelerate the economic recovery process at various scales, although the economy may not return to the pre-disaster state.

Social networks, safety nets and remittances play a particularly important role. These mechanisms are often ignored by DRM policies (Gaillard and Le Masson, 2007), yet social and physical connections are a major factor in people's vulnerability to disas-

TABLE 5.3

Matrix of construction types
Source: courtesy of authors

Structures, technologies and related norms	Higher-income countries	Lower-income countries
"Engineered"	Home made	Imported
"Low-Cost"	Contracts	Self-construction
Construction legislation	Comply if compulsory	Need supervision
Urban design considerations	Comply if discussed	Low priority

BOX 5.8

Improving flood defence after the Dutch flood disaster of 1953

Its geographical position means the Netherlands is not only threatened by the sea but also by major (international) rivers (Figure 5.4).

On 1 February 1953, there was a major flood causing significant losses due to high water on the North Sea and a severe northwestern storm. A total of 800 km of dikes were severely damaged and 200 000 hectares of land flooded. The Netherlands was not prepared and the condition of the dikes was inadequate. A more structural approach to preventing damage in the future was needed and a Delta Commission was appointed, the Delta Act passed (Bulletin of Acts, 1958) and the Delta Works project initiated to close off all tidal waters between the Western Scheldt and the Rotterdam Nieuwe Waterweg and to strengthen primary dikes along the coast and the Western Scheldt. The central government decided to fund a massive investment in flood defense: the Eastern Scheldt barrier, with its sliding gates, was considered a technical and expensive innovation at the time but was considered a good investment, saving dike-strengthening costs and promoting Dutch hydraulic engineering.

In 2008 the Delta Commission produced new advice on water safety in the context of climate change and sea level rise. Yearly, delta programmes and a fund have been established and new rights-based legislation passed, guaranteeing Dutch citizens a safety standard (likelihood of dying in a flood disaster is no bigger than 1: 100 000 per year) and stimulating further investment in dike projects. The legal water safety standards are unique in the world and (much) higher than in other countries, and knowledge on water safety is also high. Recent research also suggests that water safety is affordable, costing the ministry (from 1954 to the present day) approximately EUR 35 per capita.

FIGURE 5.4

Netherlands' flood hazard map
Source: Bulletin of Acts (1958)

Virtual coastline shore up in the Netherland
Sea level +1m and flooding in rivers

ters and their capacity to recover from them. Families, neighbours and social networks can help people to recover their assets (Twigg, 2015), while remittances from family members not affected by a shock often increase after disasters (Ebeke and Combes, 2013). Families that have access to remittances can recover more quickly (Savage and Harvey, 2007), as remittances act in a similar way to insurance for people who have no access to these financial services.

Transport and communications infrastructure and support, for instance, in helping people to access credit, as well as other key services, are essential for household recovery.

5.3.4.2 Economic recovery at the business and sectoral level

Disasters can cause long-term structural changes in local economies. According to the Federal Emergency Management Agency in the United States, more than 40 % of businesses never reopen after a disaster (natural or man-made). Over the period 2006-2010, the average commercial flood claim amounted to USD 85 000 (FEMA 2016). Small businesses and financially marginal businesses in particular tend to have greater difficulty in recovering from disasters (Webb et al. 2002; Alesch et al. 2001; Alesch et al. 2009). A recent national survey in the United States estimates that 52 % of small business owners consider it would take at least 3 months to recover from a disaster (Nationwide Insurance 2016). Thus, research on business continuity highlights the importance of strengthening capacity for pre-disaster mitigation and preparedness (Webb et al. 2002; Chang 2010). A business continuity strategy is considered a relevant response to natural disasters for businesses. Cerullo and Cerullo (2004) showed that of all the businesses damaged by Hurricane Andrew in 1992, 80 % of those lacking a business continuity plan failed within 2 years of the storm. In 2014, regarding a Forrester's survey (Balaouras, 2015), the most common scenarios of these plans mentioned by private sector decision-makers included natural

BOX 5.9

Debris flow in 2010 in Madeira Island

Madeira is a mountainous island prone to landslides and debris flow risks. On 20 February 2010 a strong storm occurred with intense rainfalls, provoking flash floods and a mixture of water and sediments came down the very narrow valleys of five streams, killing around 50 people and causing EUR 1 billion of damage. The capital, Funchal, is built on the common alluvial fan of three of these small rivers and was severely hit by the debris. The reconstruction process began, but safe space is very scarce and further measures had to be taken to limit debris floods:

- removal of damaged buildings that were in dangerous flood-prone areas in the valleys;
- rehabilitation and reinforcement of defence walls in the vulnerable areas and in the main urban areas;
- several retention structures (slit dams) were built upstream to reduce the volume of sediment;
- the EU inundation directive is being adapted to Madeira (inundation and risk maps) as well as flood risk management guidelines (land-use guidelines) for 27 critical valleys;
- a warning system based on meteo radar and prediction models, as well as rainfall triggers, is being developed;

Despite the strong difficulties to guarantee completely safe areas against floods, due to prediction uncertainties and the potential high energy flows that can be induced and propagated into densely occupied valleys, it is believed that the protection measures will be able to mitigate future debris flood risk in Madeira.

Source: Gouveia-Reis et al. (2016)

disasters/extreme weather (83 % over 118 business continuity decision-makers and influencers that have or will have scenario-based plans in 2014). The sample is based on a self-selected group of respondents (predominantly Disaster Recovery Journal subscribers and Forrester clients).

Contingency plans can ensure, for instance, the continuity of key activities during a crisis, while recovery plans accelerate the recovery process and limit loss in the aftermath of a shock. A recent study in the United States, for example, found that having an emergency plan was significantly associated with reduced levels of physical damage after Hurricane Ike in 2008 on the Gulf Coast (Xiao and Peacock, 2014). If disaster recovery plans (DRP) and business continuity plans (BCP) are recognised as efficient tools to reducing the impact of natural disasters, most small businesses still do not have any disaster plan. This share is decreasing with the size of the firm. Thus, the nationwide insurance survey showed that 75 % of small business owners who settle do not have such a plan, whereas for one third of them it is a low priority (34 %). For companies with fewer than 50 employees, only 18 % have a disaster recovery plan (National Insurance, 2016).

Disaster can also have a major impact on key sectors. For instance, during the Eyjafjallajökull eruption, the European airlines industry was heavily affected. The International Air Transport Association estimated that airlines lost GBP 130 million (EUR 154 million) per day while flight disruptions cost airlines USD 1.7 billion (EUR 1.56 billion) in total (BBC News, 2010). Other transport companies benefited, however, from the airline disturbance (passengers looking for alternative transport means), but specific fragile and perishable product importation such as flowers was reduced during the crisis period.

The overall recovery process is closely linked to the characteristics of the sector and the value chain. Thus, very large firms, such as multinational corporations are more likely to be well diversified, and localised disasters are unlikely to affect the overall organisation (Stevenson et al., 2016). Horwitz (2009), for example, shows that although Wal-Mart temporarily closed 126 stores after Hurricane Katrina due to major damage, there was little long-term effect on income.

The August 2002 flood in Germany, with a total damage of EUR 11.6 billion, became one of the most expensive natural hazard events in the country (Thieken et al., 2016a). In June 2002, Fischerdorf, across the Danube, was inundated after several levees collapsed, leaving the entire town's small industrial and commercial businesses under 3 metres of water with important consequences on small businesses and individuals. Similarly, a recent survey on German businesses affected by flood in 2013 (557 business interviewed) shows that 60 % were affected by staff absences due to problems of reaching the workplace. Around 80 % of businesses mentioned they were affected by turnover loss and 88 % faced interruption of their operations, sometimes lasting up to 8 weeks with long-term consequences on their activities (Thieken et al., 2016b; OECD, 2016). The 'commerce, hotels, restaurants and transportations businesses' seem to have been the most affected by the event, whereas manufacturing and construction firms mainly suffered 'own delivery problems', highlighting the importance of value chain and vertical integration in supporting recovery. Thus, Thieken's analysis suggests linkages between geographical sectors organisation and unbalanced regional impact of 2013's floods. Consequences of natural disasters on a sector can be regional or global (OECD, 2016). For example, the flooding in Thailand in 2011 had global and regional impacts in the automotive and electronics sectors as global companies such as Toyota, Honda, Nissan, Ford, Apple, Sony, Canon and Toshiba faced disruptions to production as a result of their linkages to sites located in the flood zone. According to Schanz and Wang (2015), global industrial production declined by 2.5 % as a result of the floods (OECD, 2016). These examples suggest that both the sector's organisation and the firm's echelon interplay within the value chain, in addition to the firm's characteristics to influence businesses' recovery pattern.

Economic stimuli are also provided by the reconstruction process and can have a significant impact on key sectors: in particular, construction and other sectors involved in reconstruction often benefit from this (Chang, 2010; Chang and Rose, 2012). Similarly, trade can play an important buffering role in recovery (Bierkandt et al., 2014; Meng et al., 2015), compensating for the lack of products after a disaster. The role of market in the recovery process is essential and is often poorly understood or biased by recovery policies.

5.3.4.3 Economic recovery process at the national level

At the national level, pre-disaster trends are accelerated or exacerbated during the recovery period (Alesch et al., 2009; Chang, 2010), with impacts on gross national product (GNP) or gross domestic product (GDP) and key economic sectors (agriculture; health) highly dependent on the initial level of income and financial penetration (as highlighted after Hurricane Katrina). After a disaster, new investments made in infrastructure and human capital can increase productivity and growth (Skoufias et al., 2011) — a phenomenon known as 'creative destruction', but disasters can also have negative impacts on the economy more than 1 year after the shocks, affecting early recovery (Simonet et al., 2016). Nonetheless, the financial capacity of the country is usually lessened by the recovery process (Cochrane, 2004).

Finally, external funds such as humanitarian assistance can influence the recovery process in both ways (Raghuram and Subramanian, 2008). The absorptive capacity of the country and its ability to smooth temporary and volatile external financial inflows will determine its ability to make efficient use of external assistance.

5.3.4.4 Supporting economic recovery

Accessing financial resources after a disaster is critical to rebuilding and maintaining essential functions (Haworth et al., 2016; World Bank, 2012; World Bank, 2016). Financing at all scales is needed (see Chapter 5.4).

The European Union Solidarity Fund (EUSF) is a good example of efficient risk sharing at the regional level. Created in 2002, the EUSF's objective is to assist the EU Member States in recovering from natural disasters. The fund primarily aims to cover non-insurable loss and to support critical infrastructure such as energy and drinking water during the recovery phase. Since 2002, 24 different European countries have received aid for an amount of over EUR 3.784 million for the recovery (see list of beneficiaries by EUSF (2017)). Flood events are the main disasters leading to the EUSF's assistance to date, which supports the recovery of major natural events (damages exceed EUR 3 billion and the total loss is up to 0.6 % of gross national income of the Member State). National or local events can be considered if the two economic conditions are fulfilled. The annual budget of EUSF is EUR 500 million in addition to the unallocated funds of the previous year. Moreover, rules for disbursement and funds used across each year ensure its sustainability. The EUSF can be combined with other national risk transfer measures such as the one implemented in the Czech Republic, where aid for recovery and reconstruction is provided to municipalities and regions if their budget is not sufficient (OECD, 2015). Thus the combination of national and regional risk transfer measures provides a more efficient coverage of loss in case of disasters. If the fund is a good example of regional, fair and effective risk transfer mechanisms (OECD, 2015; Olsson, 2009), the criteria of the fund's categories, thresholds issues and a significant delay in the fund delivery (Olsson, 2009) could prevent its efficiency. The EUSF is to date the only funds available to support recovery after disasters even if other funds (such as rural development funds) can provide financial aid for prevention activities (Olsson, 2009).

Nonetheless, the policies supporting economic recovery should not focus solely on financing. A mix of policy initiatives is needed to build resilience after a disaster (Twigg, 2015): from the design of Early Warning Systems (EWSs) tailored to specific audiences to the development of efficient regulations. For instance, the work of the European Commission (ECHO) on DRR through providing trainings and policy guidelines, as well as economic support is also essential to support efficient recovery (ECHO, 2016). Overall, combinations of financial support with other market support and service provision are needed. Building an efficient and flexible private sector will speed up the recovery. A good knowledge of the vulnerabilities along the value chain will help to anticipate fracture points and key actions to be taken when there is a disaster. Providing vouchers, for example, is known to have a destabilising effect on local prices.

External assistance after a major disaster can overcome local financial resource constraints but can have what is known as 'a Dutch effect'. If a country cannot smooth or absorb the financial support provided, growth patterns can be destabilised. This occurred after the 2004 tsunami in the

Indian Ocean (De Ville de Goyet and Morinière, 2006).

Overall, economic recovery strategies need to not only consider the short-term impacts of disaster, but also avoid indirect and destabilising effects. Strategies need to consider and avoid environmental impacts and find ways to improve sustainability and resilience. Global Facility for Disaster Reduction and Recovery (GFDRR) frameworks guide of the World Bank provides a good summary of how the combination of policy and strategy settings, financial support, institutional frameworks and implementation arrangements can ensure an efficient economic recovery as well as relevance of timely activities (GFDRR, 2013; 2015).

5.3.5 Psychosocial recovery

Recovery originates in social relationships before disasters occur and more marginal groups usually find it harder to recover (Nigg, 1995; Tierney and Oliver-Smith, 2012). Gender, disability, income and ethnicity are strongly associated with differential recovery trajectories (Cutter et al., 2006; Fothergill, 1996; Fothergill and Peek, 2004; Priestley and Hemingway, 2007; Bolin, 2007; Pomonis, 2002).

Other influences are the severity of the impact of each disaster, the effectiveness of initial responses, the quality of governance systems and the strength of the civil societies in which the events occur (Tierney and Oliver-Smith, 2012), as well as the pressure to make quick decisions with long-term consequences (Ingram et al., 2006; Olshansky et al., 2012). Overall, psychological recovery underpins broader social recovery and vice versa: the relationships between all aspects of recovery are reciprocal.

5.3.5.1 The psychosocial approach to disasters

Understanding the behaviour and the psychosocial and mental health needs of people affected by disasters is vital to disaster recovery because it affects how:

- societies, governments, communities and families prepare for disasters;
- responsible authorities work with communities to meet people's needs and preferences and ensure their continuing agency;
- governments and responsible authorities communicate with the public;
- the responsible authorities and agencies manage responses in the immediate, short and medium terms.

Patel (2014) identifies the gap between mental health specialists' use of the terms 'mental health' and 'mental disorder' and public conceptualisations of psychosocial suffering that affects many more people than those who require specialist mental healthcare. Thus, here, psychosocial refers to the psychological, social and physical experiences of people in the context of their social, cultural and physical environments.

5.3.5.2 The psychosocial and mental health impacts of disasters

There is a broad spectrum of ways in which people react emotionally, cognitively, socially, behaviourally and physically before, during and after a disaster. Research into these reactions has, however, identified some common psychosocial and mental health impacts (Box 5.10).

The majority of people are not likely to develop a mental disorder, but distress after emergencies is very common. In most cases, it is transient and not associated with dysfunction, and many people are psychosocially resilient despite their distress. People affected by large-scale events that destroy infrastructure may be immobilised by fear and hopelessness. In the immediate aftermath of most events, people behave in rational and altruistic ways, but the frequency of panic remains the most pervasive myth about disasters and is sometimes exaggerated in official policies (Carter et al., 2013).

Psychosocial resilience and trajectories of response

Social relationships have powerful influences on how people cope with disasters (Williams et al., 2014a). Most people recover reasonably well given social support from relatives, friends and acquaintances. Resilience is a dynamic process '… linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance' (Norris et al., 2009) and can be seen in differing trajectories of people's responses over

time (Norris et al., 2009; Bryant et al., 2015; Fink et al., 2016) (Box 5.11).

Risk factors

Psychosocial impacts of disaster vary in severity with a number of factors, the most significant being the magnitude of the event and the degree of exposure to it, as well as gender, age, ethnicity, pre-existing psychosocial problems and the perceived quality of psychosocial support. Groups of people at greater risk of dysfunctional distress, social problems and mental disorders following disasters include: women; children and adolescents; older people; people who have pre-existing health problems and disorders; socially disadvantaged people; and staff of rescue and responding services.

5.3.5.3 Policies and interventions for psychosocial recovery

BOX 5.10

The psychosocial and mental health effects of disasters

Direct effects on people

1.Immediate and short term
- a. Short-term distress and dysphoria (a state of feeling unwell or unhappy)
- b. Acute stress reactions

2. Medium and longer term
- a. Persisting distress and dysphoria maintained by secondary stressors
- b. Grief
- c. Mental disorders (NB: these disorders are very frequently comorbid with each other)
  - i. Substance use disorders
  - ii. Adjustment disorders
  - iii. Post-traumatic stress disorder
  - iv. Anxiety disorders
  - v. Depression
  - vi. Impacts on personality

Direct effects of complicated, sustained and/or multiple events

1. Sustained distress and dysphoria that impacts on people's functioning
2. Exacerbation of existing mental disorders
3. Precipitation of new episodes of previous mental disorders
4. Increased frequency of new mental disorders

Indirect effects on people

Disasters increase medium- and longer-term psychiatric and physical morbidity because of their effects on social conditions that affect physical and mental health. These social determinants of mental health include:
1. Increased poverty
2. Changed social and societal relations
3. Threats to human rights
4. Domestic and community violence

Priority 4 of SFDRR calls on states 'to enhance recovery schemes to provide psychosocial support and mental health services for all people in need'. Indeed, the European Network for Traumatic Stress – TENTS (2008), which surveyed 33 European countries in 2007-2008, found planning and delivery of psychosocial care after disasters was suboptimal and inconsistent, with wide variations in plans and interventions. It concluded that more effective and evidence-based services were needed. In 2014, the Royal College of Psychiatrists in the United Kingdom drew together the NATO guidance (NATO, 2009) and the TENTS findings and guidance to produce a comprehensive approach to developing the quality of comprehensive policy, planning and practice for delivering psychosocial and mental healthcare for people affected by disasters — called 'OP94' (Williams et al., 2014a). The approach taken by OP94 builds on guidance from the Inter-Agency Standing Committee (IASC, 2008), WHO (2013), IFRC et al. (2009) and publications from McFarlane and Williams (2012) and Williams et al. (in press). Operationalising Psychosocial Support in Crisis (OPSIC), another initiative supported by the EU, has produced comprehensive guidance on psychosocial and mental healthcare in disaster settings to support harmonisation of approaches across countries. It is based on an extensive survey of research and practices (OPSIC, 2015).

Flexible, generic approaches are needed that can be adjusted as events and people's needs evolve. The NATO guidance (NATO, 2009), for example, is constructed around a strategic framework that contains components including the following.

- Constructing an evidenced knowledge base: appropriate knowledge provides a baseline for creating and implementing plans before events occur and adjusting them later.
- Working from core principles: identifying evidence-informed and values-based principles ensures lessons are learned from past events when planning, designing and delivering services:
- Gathering information: emergency specialists require services to gather and supply information to adjust generic plans as events evolve.
- Using a model of care: a model enables resources and services to be treated efficiently and effectively against people's assessed needs.
- Providing psychosocial care for the staff of all responding organisations: the needs of all responding organisation staff require active consideration.
- Incorporating psychosocial recovery and mental healthcare in an integrated emergency management cycle: using a single, integrated management cycle for all responses to disasters enables planners to design, deliver, review and adjust the services that the public requires.

The number of people who require

BOX 5.11

Trajectories of psychosocial and psychiatric responses

Resilient responses: around 70 % of people show psychosocial resilience. They suffer mild or moderate distress that rapidly reduces in severity if they receive support they perceive as adequate.

Deteriorating responses: initially, up to 20 % of people have stress symptoms of low severity, which become more severe and/or associated with dysfunction over time. About half recover later on, while others develop more chronic problems or disorders.

High initial stress responses: around 10 % of people may have high levels of stress before and/or immediately after events. The symptoms of about half may run a chronic course, while others improve.

The percentages in this box are approximations made from drawing together several different studies. They are only intended to illustrate broad orders of magnitude.

supporting psychosocial interventions to assist them with distress after disasters is very substantial. Early intervention and interagency coordination are vital elements in psychosocial responses. Williams and Kemp (2016) summarise the principles: intervening early can reduce the risks of survivors developing disorders later; there is a great deal that family members and friends can do in the response phases to alleviate people's suffering; families and communities are the main sources of emotional and tangible social support that people exposed to disasters prefer and receive.

Psychosocial recovery after disasters is a multidimensional process linked to measures that are taken before disasters occur, to the social and economic circumstances and to actions taken to restore assets and services.

Most people do not require specialist mental healthcare, but a substantial minority may. They require timely personal mental healthcare and a small proportion of them require long-term mental health services. Survivors at particular risk require surveillance and clinical assessment. OP94 provides a summary of specific components of the responding services that are required within the first week, first month, first to third months, and beyond 3 months after a disaster.

Psychosocial first aid, assessment and surveillance is needed for people who appear to be at risk of developing a mental disorder, and biomedical clinical treatments for people who have specific disorders. Psychosocial care offers people safety, calm, connectedness, hope and self-efficacy with the intention of promoting psychosocial recovery (WHO et al., 2011; WHO, 2013). Education, consultation and discussion processes for survivors, communities and responders also play an important role (Eyre, 2006; Aloudat and Christensen, 2012). Mutual support groups, such as Disaster Action in the United Kingdom, help survivors of disasters to come to terms with their experiences and loss and can also be a platform for action to improve safety and emergency management practice (Eyre and Dix, 2014).

In summary, research demonstrates that people's recovery in the short and medium term after disasters can be promoted through a psychosocial approach, using a strategic framework and generic policies that can be adapted as each disaster evolves. Psychosocial interventions can be made universally available to reduce suffering and risks of people developing mental disorders. Those with mental disorders can be supported through surveillance, assessment and effective, timely and sustained evidence-based treatments.

5.3.6 Conclusions and key messages

Partnership

Governance is key to reconstruction and recovery processes, particularly intergovernmental relations and public participation and engagement in post-disaster policies. Close collaboration across sectors and with affected groups is beneficial for physical, economic and psychosocial recovery processes. People and systems may not return to their pre-disaster state, but strong multisectoral pre-disaster plans and flexibility in response can help improve the speed and efficacy of recovery, avoiding indirect and adverse impacts after the disaster.

Knowledge

While the impacts of disasters have been well studied, recovery is multifaceted and not well understood. Significant progress has been made in understanding the psychosocial impact of disasters and on (re)construction techniques to improve the built environment after a disaster.

Innovation

Innovation in recovery promotion is particularly seen in reconstruction and more comprehensive approaches to rebuilding in urban areas. Given the diverse scales at which impacts are felt, more research is needed on the relationship between the different aspects of recovery, that is physical, social, psychological and economic.

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5.3 Recovery and avoiding risk creation

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