



The territorial impact of the earthquakes in Türkiye

Policy Note

Andrew Paterson
Tadashi Matsumoto
Cem Özgüzel
Stephan Visser
Ece Özçelik
Candan Kendir
Courtenay Wheeler

The territorial impact of the earthquakes in Türkiye

Policy Note

Andrew Paterson
Tadashi Matsumoto
Cem Özgüzel
Stephan Visser
Ece Özçelik
Candan Kendir
Courtenay Wheeler

On 6 February 2023, two large earthquakes with magnitudes of 7.6 and 7.7 hit central and southern Türkiye and northern Syria resulting in widespread damage and fatalities in the region and leaving 3.3 million displaced. This note – prepared for a workshop to support the affected city of Gaziantep in March 2023 - provides an overview of the affected regions, and key issues and recommendations to support the recovery, based on international experience. It highlights that a plan should be made to support displaced residents for an extended period, identify high-risk families, train the workforce needed for the reconstruction effort, strengthen governance processes to protect recovery funds, coordinate reconstruction efforts across levels of government and with international donors, and engage communities in ambitious plans to improve infrastructure going forward.

ABOUT THE OECD

The OECD is a multi-disciplinary inter-governmental organisation with member countries which engages in its work an increasing number of non-members from all regions of the world. The Organisation's core mission today is to help governments work together towards a stronger, cleaner, fairer global economy. Through its network of specialised committees and working groups, the OECD provides a setting where governments compare policy experiences, seek answers to common problems, identify good practice, and co-ordinate domestic and international policies. More information available: www.oecd.org.

ABOUT OECD REGIONAL DEVELOPMENT PAPERS

Papers from the Centre for Entrepreneurship, SMEs, Regions and Cities of the OECD cover a full range of topics including regional statistics and analysis, urban governance and economics, rural governance and economics, and multi-level governance. Depending on the programme of work, the papers can cover specific topics such as regional innovation and networks, sustainable development, the determinants of regional growth or fiscal consolidation at the subnational level. OECD Regional Development Papers are published on <http://www.oecd.org/cfe/regional-policy>.

This paper is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and the arguments employed herein do not necessarily reflect the official views of OECD member countries.

This paper was authorised for publication by Lamia Kamal-Chaoui, Director, Centre for Entrepreneurship, SMEs, Regions and Cities, OECD.

This document, as well as any statistical data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

© OECD 2023

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at <https://www.oecd.org/termsandconditions>.

Key issues

- The earthquake impacted 110 000 km² over 11 provinces, leaving 3.3 million displaced in Türkiye. Initial estimates put the costs of damage at USD 103.6 billion, but total costs will be higher and difficult to quantify, including the loss of learning, health, and social institutions. The costs will have the greatest impacts on vulnerable groups, including refugees, children, and low income households, who are over-represented in the region.
- Plans should be made to support the displaced population, including with temporary accommodation, over an extended period. In the aftermath of past disasters, evacuees spent between 5 and 10 years in shelters and temporary housing, requiring temporary services (e.g., schools, hospitals, care facilities) to be maintained for the duration. Given the timeframes, support should be provided to refugees to settle, work, integrate and rebuild their lives elsewhere rather than to expect them to return quickly to the affected region.
- Natural disasters have long-term, intergenerational impacts on education, health, and other socio-economic outcomes. Immediate support should be provided to address the mental and physical health of the displaced and to identify “high-risk” families to track and prioritise for additional support to avoid potentially larger long term socio-economic costs. Past disasters suggest such high-risk families include those with pregnant women and children in the first two years of life. Programmes should also be established to support girls – including in their education - as the hardship brought on by disasters can exacerbate pre-existing inequalities (e.g., prioritising resources for males).
- Training the workforce needed to support the reconstruction effort should begin as soon as possible. Efforts should be made to develop the skills of those that have been displaced and reemploy them to meet emerging reconstruction needs, and to support affected businesses and entrepreneurs to restructure and establish new ventures with increased resilience.
- Domestic and international donors have already pledged substantial financial and material support to the recovery effort. To manage these, all levels of government should establish:
 - Strong co-ordination structures to manage the various efforts and contributions to avoid duplication, conflict, and gaps in support for those affected;
 - Support mechanisms to rebuild local institutions to take a leadership role in providing support and reconstruction;
 - Robust systems to protect against aid flows being captured by vested interests and corruption, and to provide transparency to the public on the use of funds; and
 - Channels to consult with and leverage the efforts of businesses and the social economy.
- While it will be necessary to quickly address critical basic needs, policymakers should resist short term pressures to begin reconstruction work at the expense of developing more ambitious plans to improve infrastructure and strengthen resilience. There will be a need to:
 - Establish joint planning and co-ordination mechanisms across administrative jurisdictions to develop a clear and ambitious recovery plan, aligned with functional urban areas where possible;
 - Enhance building safety by not only examining collapsed and damaged buildings to learn lessons but also to test the resilience of unaffected buildings; and
 - Involve local communities to build a sense of ownership and to ensure that the public do not lose faith in the effort.

A snapshot of the affected region

On 6 February 2023, two large earthquakes with magnitudes of 7.6 and 7.7 hit central and southern Türkiye and northern Syria (OCHA, 2023^[1]). The earthquakes affected 11 Turkish provinces¹, covering an area of 110 000 km² and a population of 14 million (16% of the national population). These earthquakes and numerous aftershocks resulted in widespread damage and fatalities in the region. As of 27 March, the death toll in Türkiye exceeded 48 000. In addition, close to 280 000 buildings have reportedly collapsed or will need to be demolished. Many more were severely damaged, leaving between 3.3 million displaced; and almost two million people are being sheltered in tent camps and container settlements (Government of Türkiye, 2023^[3]).

Figure 1. The affected provinces in Türkiye

Provinces (TL3 regions)



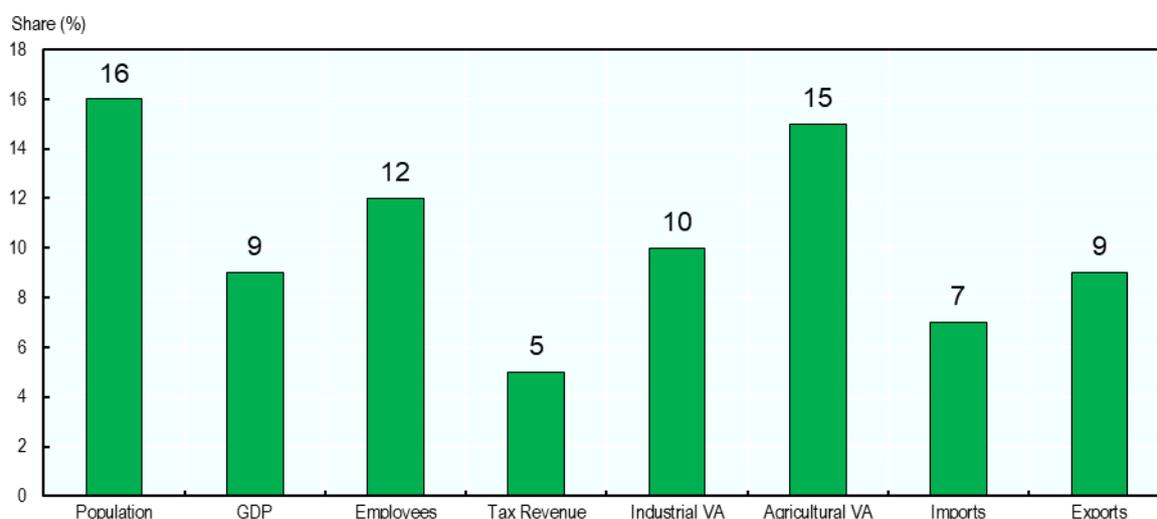
Note: The map presents 81 provinces (TL3 regions) in Türkiye. 11 provinces affected by the earthquake are indicated in pink.

The affected region hosts a disproportionate number of vulnerable groups

The eleven provinces making up the affected region represent 9% of national GDP, 12% of employees in the formal sector and 5% of the total tax revenue (Figure 2). The area's largest contribution to national output is in the agricultural sector, corresponding to 15% of the national agricultural gross value added (GVA), followed by industry with 10% of the national industry GVA. Despite a relatively larger share of exporting and importing activities in industrial provinces like Adana or Gaziantep, the region contributes around 7% and 9% of the country's imports and exports, respectively.

¹ The earthquakes affected 11 provinces which correspond to Territorial Level 3 regions. These provinces include Adana, Adıyaman, Diyarbakır, Elazığ, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Şanlıurfa and Osmaniye.

Figure 2. Contribution of the affected region to the national population and economy, 2022



Note: The figure plots the share of the affected region (consisting of 11 provinces) as part of the national population and economy.

Source: OECD calculations based on TURKSTAT (2023^[8]), data accessible at <https://www.tuik.gov.tr/Home/Index> (accessed in March 2023)

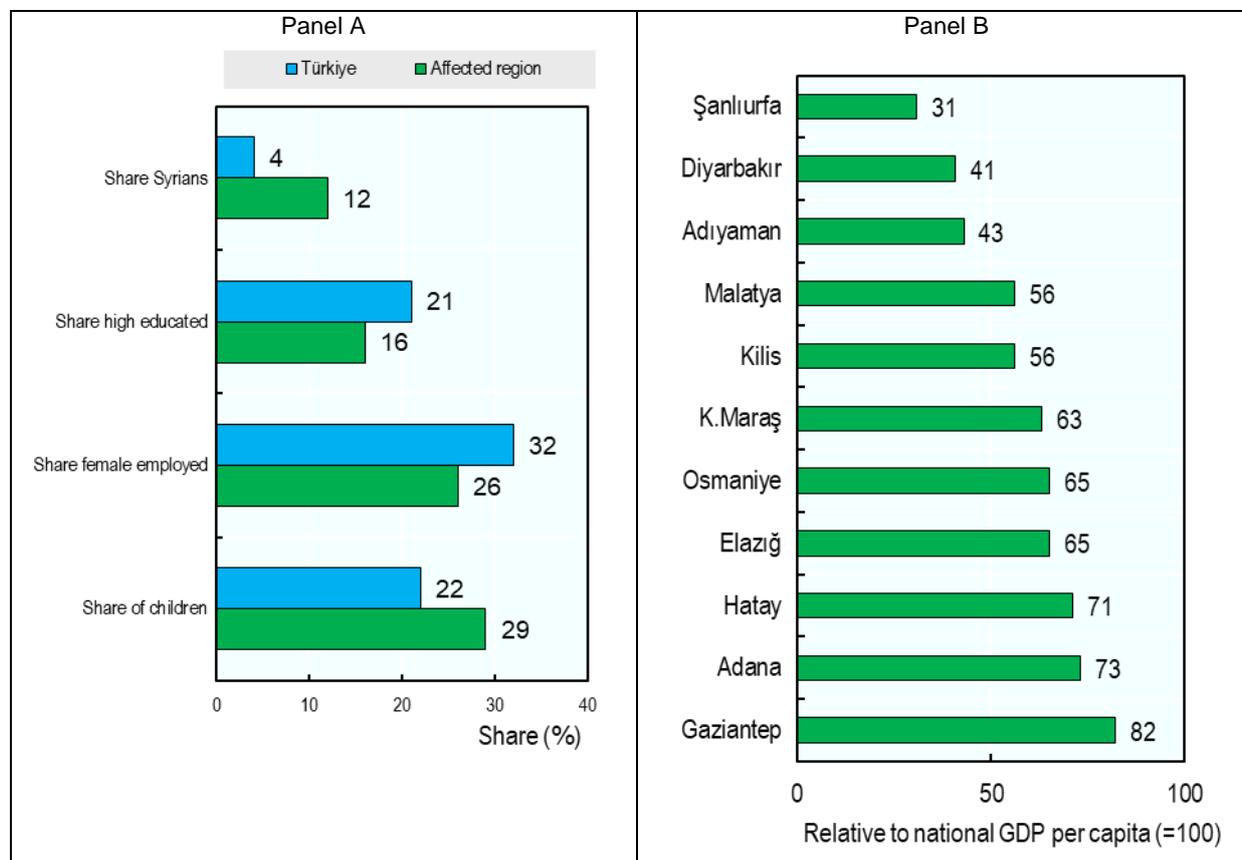
The region was host to a large share of Türkiye's most vulnerable groups, including:

- Refugees, who made up 14% of the region's population in 2020 compared to around 4% nationwide (Panel A, Figure 3);
- Children, who accounted for one third of the population compared to one fifth nationwide;
- The poor: all provinces in the region had average income levels below the national average in 2020, on average 40% below (Panel B, Figure 3); and
- Those with more limited education: in 2022, only 16% of the region had completed tertiary education compared to 21% across Türkiye.

In addition, compared to the rest of the country, women in the region were less likely to be in formal employment. In 2022, the share of women in total employment was around 26% in the region, compared to 32% nationwide.

Figure 3. The region faced significant challenges prior to the earthquakes

Shares of vulnerable populations in the affected region and Türkiye (Panel A), and province per capita GDP relative to the national average (Panel B), most recent available data



Note: Panel A plots various socio-economic characteristics. It shows the share of vulnerable groups across the 11 provinces (in blue) and the averages in Türkiye (in grey). The data for the share of Syrians are from 2023 while all other variables are from 2022.

Panel B plots the GDP per capita of the 11 most effected provinces relative to the national average in the same year.

Source: OECD calculations based on TURKSTAT (2023^[8]), data accessible at <https://www.tuik.gov.tr/Home/Index> (accessed in March 2023), and Republic of Türkiye Ministry of Interior (2023^[9]), data accessible at <https://en.goc.gov.tr> (accessed in March 2023).

Scale of the losses

According to the Türkiye Earthquakes Recovery and Reconstruction Assessment (TERRA), the overall financial burden of the earthquakes (including damage to infrastructure, revenue losses and macroeconomic impacts) is likely to amount to USD 103.6 billion, equivalent to 9% of gross domestic product (GDP). Almost half of this cost is related to damaged housing units but huge damage has also been inflicted on public infrastructure and public service buildings (10%) and on the business sector, in particular manufacturing, energy, and tourism sectors (10%) (Government of Türkiye, 2023^[3]). The earthquake losses in Türkiye is likely to lead to a decline in economic activity at the beginning of 2023, although the economy is expected to recover as reconstruction spending kicks in, with GDP forecast to grow by 2.8% in 2023 and 3.8% in 2024 (OECD, 2023^[3]).

Following the Marmara earthquake in 1999, earthquake insurance was made compulsory for residential and commercial properties and is provided by the Turkish Catastrophe Insurance Pool (TCIP, DASK in Turkish), which has a claims-paying capacity approaching USD 2.5 billion. While this provides some measure of recompense, such coverage is likely to be limited as compulsory insurance is capped at

TRY 320 000 (USD 16 829) for homes and TRY 640 000 (USD 33 660) for all buildings, and excludes human losses, liability claims or indirect losses, such as business interruption (DASK, 2023^[4]). Moreover, it is likely that – despite legal requirements – many residential properties remained uninsured, especially in low-income neighbourhoods (Fitch, 2023^[5]).

Losses will be unevenly shared and will hit the vulnerable hardest. As poorer groups have more limited savings and income, a recent World Bank analysis of past disasters estimated that while people at the bottom 20% in terms of consumption in a given country only experience 11% of total asset losses following natural disasters, they experience 47% of well-being losses, which can be 60% larger than asset losses (Hallegatte et al., 2017^[6]). In addition to these impacts, earthquakes can result in broader socio-economic losses by inflicting psychological trauma and disrupting social networks and the education of children (Kousky, 2016^[7]).

Responding to the disaster

On 19 February, most search and rescue efforts ceased, capping the first stage of the post-disaster response (Aljazeera, 2023^[10]). The next stage of the post-disaster response involved providing relief and recovery assistance to affected individuals and communities, including housing and emergency medical care, which is followed by more long-term recovery and reconstruction efforts.

Providing accommodation

Large-scale disasters, such as the 6 February earthquakes, require significant effort to provide displaced people with shelter and housing. Providing shelter and housing solutions can be divided into three stages: emergency sheltering; temporary housing; and permanent housing (FEMA, 2020^[11]). Decision making procedures should vary from one stage to the next.

For example, a need to act swiftly in the immediate aftermath of a disaster means that decisions on emergency shelter often need to be made top-down, without much public participation. On the other hand, when transitioning to temporary housing, public consultation is essential, particularly as past experiences from large-scale earthquakes suggest that evacuees may need to spend 5-8 years, but sometimes more than 10 years, before moving to permanent housing.

For example, in 2017, six years after the 2011 Great East Japan Earthquake, approximately 34 000 victims were still living in prefabricated temporary housing (Tanji et al., 2018^[12]), also requiring temporary services and support structures (e.g., schools, hospitals, care facilities, transport, and employment opportunities) to be established and maintained for the duration. These facilities must be well located and supported; there is international evidence that people decided to remain in shelters when temporary housing was provided far from urban centres, limiting their opportunities to resume daily activities (Peacock et al., 2017^[13]). Plans should also be made to allow for temporary housing to be adapted to new uses after temporary needs have been met (Félix et al., 2014^[48]) (Arslan and Cosgun, 2008^[48]) (Johnson, 2007^[50]).

To facilitate the transition from shelters to temporary housing, national and local authorities need to fast-track planning processes. However, in doing so, plans should ensure that temporary housing is resilient to possible future emergencies, including new earthquakes. Innovations can be explored to support a rapid scaling-up of temporary infrastructure provision, such as by harnessing prefabricated and containerised buildings, and standardising infrastructure designs. Following the 2010/2011 earthquakes in Christchurch, New Zealand, for example, a “pop-up” container mall called Re:START and “cardboard cathedral” were created in the central business district (NZ DPMC, 2012^[14]; NZ Story, nd^[15]). In Japan, since the 1990s, all 47 prefectures have entered into agreements with the Japan Prefabricated Construction Suppliers and Manufacturers Association regarding construction of temporary housing. The agreements ensure that its member companies construct the necessary temporary housing upon requests of the governor of each

prefecture in times of disaster (Iwata, Harada and Maly, 2023^[16]; Japan Prefabricated Construction Suppliers and Manufacturers Association, n.d.^[17]).

Managing impacts on vulnerable populations

International experience suggests the poor, the young and women are likely to be hardest hit by the earthquake. This is for several reasons. First, because they are twice as likely to have been living in fragile accommodation, which is less likely to have withstood the earthquake. Second, because their wealth is more limited and tends to be concentrated in vulnerable assets: when poor people are affected by a natural disaster, the share of their lost wealth is two to three times that of the nonpoor. Third, because their level of savings, social protection and insurance coverage tends to be lower than for other groups, providing little to fall back on. Finally, poor people are likely to lack broader social and financial support networks to help them recover.

These factors can force families to make difficult choices that can have long lasting and intergenerational impacts, for example forgoing medical care or schooling to make ends meet (Hallegatte et al., 2017^[6]). For example, evidence from the 1970 Ancash earthquake in Peru highlights long term impacts on education, health and other socioeconomic outcomes, and a particular need for attention to be given to pregnant women and children in the first two years of life, as well as girls, as the hardship brought on by disasters can exacerbate inequalities (e.g. by families prioritising resources for males) (Caruso and Miller, 2015^[17]; Neumayer and Plümper, 2007^[18]). Efforts should therefore be made at an early stage to identify such “high-risk” households for targeted support and monitoring.

Among the groups most severely affected are the 1.7 million refugees who over the past decade had settled in the provinces hit hardest by the 6 February earthquakes. The refugees—most of whom fled the Syrian civil war—rely on temporary or international protection status, which confines them to the provinces where they are registered residents. However, due to the devastation caused by the earthquakes, many refugees—as well as Turkish nationals—have left the region (World Bank, 2023^[19]). In the wake of the earthquakes, the government provided the refugees with a 60-day exemption to travel to other provinces without seeking permission from provincial authorities (Human Rights Watch, 2023^[20]). When this grace period ends, refugees who do not receive official permission from the local authorities to remain where they are staying are mandated to return to the disaster-stricken region. However, a lack of safe housing and dire employment prospects in the affected areas are likely to make a return impracticable for an extended period, requiring measures to be put in place for them to settle, work, integrate and rebuild their lives elsewhere rather than to expect them to return quickly to the affected region.

Considering health impacts

Health threats from earthquakes include both the need to treat immediate injuries and to repair and replace affected medical infrastructure. Previous evidence demonstrates that in the immediate aftermath of earthquakes, the risk of disease outbreaks caused by water-borne diseases, respiratory illnesses and parasitic infections (e.g., leishmaniasis) are also elevated (Kouadio et al., 2012^[21]). Poor housing conditions and sanitation can exacerbate disease transmission. In this light, it is vital to ensure access to housing, safe water and sanitation services across the cities impacted by the earthquakes.

Previous studies also show that earthquakes can disrupt access to healthcare services, particularly among the most vulnerable population groups (Ghazanchaei et al., 2021^[22]). In the case of Türkiye, the initial health system response to the earthquakes centred on the provision of acute curative services. Moving forward, it is important to ensure continued access to maternal and childcare services, considering that many of the provinces impacted were already lagging the national average in terms of maternal and child health outcomes (Hacettepe University, 2018^[23]). In addition, it is crucial to ensure continuity of care for

people who are living with non-communicable diseases and chronic conditions including cardiovascular disease, diabetes, and cancer.

Efforts must also be made to support the mental health of displaced groups. Evidence from similar disasters suggests such events are often associated with a significant increase in mental health issues, such as depression and post-traumatic stress disorder (Yokoyama et al., 2014^[24]) as well as in domestic violence (Thurston, Stöckl and Ranganathan, 2021^[25]; True, 2016^[26]). For example, after the 2011 earthquake and tsunami in Japan, the prevalence of moderate or serious mental health issues appears to have risen by 50% among survivors (Yokoyama et al., 2014^[24]). It is therefore important that immediate efforts are made to provide mental health support to affected individuals.

Managing impacts on labour markets

Natural disasters can severely affect labour markets. Some job displacements can be prevented by providing short-term assistance and income support, through wage or social security subsidies, to otherwise-viable firms to maintain jobs. These types of programmes should be short-term to avoid continuing support for unviable firms. Providing low-interest loans can also be a useful tool to help these firms restructure and rebuild, while avoiding unnecessary job losses.

There can be winners as well as losers from the shock to the labour market. In the nine months following the 2009 earthquake that hit the area surrounding L'Aquila in Italy, males experienced a 1.4 percentage point fall in their probability of participating in the labour market, whereas women experienced a drop of 5.5 percentage points. However, the impact of the earthquake also varied across educational levels. For individuals with primary education or less, the earthquake was linked to a 4.6 percentage point increase in the likelihood of joining the workforce linked to the surge in demand associated with the recovery effort. On the other hand, for those with a tertiary education, the effect on labour market participation was extremely negative as high skilled jobs were destroyed or displaced (-10.4 percentage points) (Di Pietro and Mora, 2015^[27]). Similarly, following the destruction wrought by hurricanes Katrina and Rita on the U.S. Gulf Coast in 2005, some workers such as those in construction and manufacturing, saw large wage gains, driven mainly by the increased labour demand during reconstruction. However, workers in other sectors such as tourism, and hospitality suffered reduced earnings (Groen, Kutzbach and Polivka, 2016^[28]; Deryugina, Kawano and Levitt, 2018^[29]).

To manage these impacts, workers should be supported with job searches and retraining in new sectors that match the needs of the post-disaster economy or the area to which they have been displaced (Venn, 2012^[30]). Leveraging data and digital tools to provide information on job vacancies can help deliver services to those recently displaced, such as through online job matching systems. For example, the French Public Employment Service has developed an application (“La Bonne Boîte”) which allows jobseekers to target their unsolicited applications at enterprises that would be likely to employ them (OECD, 2023^[31]).

Training programmes can help displaced workers take up emerging job opportunities during the reconstruction phase if the required skills can be gained quickly. For example, following the 2011 Great East Japan Earthquake, the government of Japan launched an innovative cash-for-work project to support people who had lost their jobs due to the emergency. As part of this initiative, over 31 000 jobless people were hired to work on reconstruction projects or perform need assessments at evacuation centres. This scheme enabled the government to reemploy displaced workers while meeting the pressing needs to support the vulnerable and the recovery effort (Ranghieri and Ishiwatari, 2014^[32]).

However, if extensive retraining is required, it may be better to focus on medium- and long-term skill needs, possibly linked to broader economic development plans, rather than those only needed during reconstruction. If skills shortages cannot be met by retraining the local labour force, it may be necessary to consider inward migration from elsewhere in the country or even abroad to avoid holding up reconstruction unnecessarily.

National and international support for reconstruction

In the weeks after the earthquakes, many national and international organisations, and institutions pledged financial and material support for Türkiye's reconstruction efforts. The EU and international donors have pledged USD 7.5 billion (0.7% of GDP) to cover humanitarian needs and help the reconstruction of the affected regions (Reuters, 2023^[33]). While in specific instances the provision of goods instead of cash support is necessary, for example when local capacity to produce critical goods, such as emergency tents, is insufficient, in most instances it is important that the Government communicates to donors a preference for cash donations over unsolicited material ones. Providing cash or monetary donations can offer public institutions and non-governmental organisations greater flexibility to meeting local needs quickly (USAID/CIDI, 2023^[34]; UNDP, 2023^[35]). This is particularly important in the early stages of post-disaster reconstruction, as priorities can change rapidly. In addition, material donations (e.g., food, clothes), particularly coming from abroad, can be expensive to transport and hamper the recovery of local business, as the demand for similar products is affected. At the same time, to prevent the misuse of cash donations, oversight and transparency mechanisms need to be in place at all levels of government involved in managing reconstruction and recovery funds and projects (see below).

Organising and co-ordinating the support effort

Strong co-ordination structures will be required to manage the volume of financial and material support flowing from national and international institutions and donors, and avoid duplication, conflict, and gaps in provision. Structures should provide for effective alignment of effort, as well as a clear division of roles between the national and local governments. They should also ensure clarity of communication channels and messaging to the public. National and subnational governments, as well as non-governmental actors, including citizens, need to know what is happening, what is expected of them, and feel reassured that they are being supported during an uncertain and difficult period (OECD, 2022^[36]). One example of an effective co-ordination mechanism is the Bangladesh Disaster Forum, a national network of 70 humanitarian and development NGOs, research institutions, government departments and independent activists that works on disaster preparedness (Twigg, 2004^[37]). By contrast, in the wake of 2011 Great East Japan Earthquake, the lack of effective communication may have undermined the effectiveness of the support provided by non-government organisations (Ranghieri and Ishiwatari, 2014^[32]).

For shocks that are concentrated in particular regions, such as the 6 February earthquakes in Türkiye, a decentralised approach to managing relief and reconstruction work can be beneficial as it enables the implementation of solutions tailored to local needs and priorities (OECD, 2022^[36]). However, many of the affected local governments suffered heavy damage to public buildings and the loss of civil servants, affecting their ability to guide local reconstruction efforts and manage the inflow of national and international financial and material aid (Union of Municipalities of Türkiye, 2023^[38]). In such instances, it is important for national-level bodies, such as Türkiye's Disaster and Emergency Management Authority, as well as the Union of Municipalities of Türkiye, to work alongside local governments and help rebuild their capacity to meet local needs. Experience from past-earthquakes shows that the quality of local public institutions—pre-earthquake—involved in reconstruction and recovery matters. Relatively weak public institutions are more prone to misallocate aid to less productive activities (Guglielmo and Mocetti, 2014^[36]).

At the same time, provisions must be made to head off risks of aid flows being captured by vested interests and corruption. These risks are heightened in post-disaster contexts due to a combination of a vast inflow of reconstruction funds, pressure on authorities to allocate resources swiftly, and strained absorption capacity in national and subnational institutions (Transparency International, 2012^[39]). To reduce the risk of corruption in the short term, national policy makers should consider investing in community-based accountability processes that can be established relatively rapidly. Examples of citizen-based accountability mechanisms include citizen monitoring of public service delivery and citizen advisory boards (World Bank, 2004^[40]). To strengthen transparency, as well as public accountability to citizens, government

at all levels should be expected to produce and disseminate transparent data on public spending and updates on the progress and plans for reconstruction. A good example comes from Ukraine, which created the ProZorro electronic procurement system that ensures transparency by publishing information on public procurement (ProZorro, n.d.^[41]; OECD, 2022^[42]).

Policy makers should also seek to establish mechanisms to leverage the efforts of non-governmental organisations, businesses, and the social economy. Non-governmental actors can help identify local needs, provide essential services, and support reconstruction, as well as help contribute to trust and buy-in (Love and Vallance, 2013^[43]; Cretney, 2016^[44]). In addition, non-governmental organisations can provide grassroots knowledge and capacity to deliver services in places that subnational governments may not be able to reach on their own, particularly in the early stages of reconstruction. In the aftermath of Japan's 2011 earthquake, social economy organisations rapidly provided relief services such as free meals, housing, childcare, and volunteer co-ordination (Sakamoto, 2012^[45]). Moreover, during the recovery process, municipal governments partnered with social economy organisations to organise debris removal and set up logistic support systems.

Reconstruction and recovery

It is crucial that short-term pressures to begin reconstruction work do not result in poorly designed projects that are not resilient to future disasters, lack the necessary supporting infrastructure (e.g., public services and transport), and/or fail to prepare communities for future transitions (e.g., green, and digital). Instead, policymakers should seek to use the reconstruction and recovery phase to “build back better”: to improve the design, amenities and resilience of settlements (OECD, 2020^[47]).

The recovery strategy developed by Puerto Rico after it was hit by hurricanes Irma and Maria in 2017 is a good example of reconstruction planning that takes into account the damage caused by a disaster and pre-existing conditions, while also articulating a vision for future development, including increased resilience to future shocks (Government of Puerto Rico, 2018^[47]). The recovery plan, developed with input from municipal governments, as well as non-governmental actors, among others, incorporated longer-term objectives including stimulating formal employment and broadening the tax base. The plan also incorporated actions for upgrading the island's workforce, stimulating increased digitalisation, and expanding opportunities for entrepreneurship.

Another good example, related to post-earthquake reconstruction, comes from Chile. In 2010, the country was hit by a magnitude 8.8 earthquake, and subsequent tsunami, which affected 75% of the population of the country and damaged or destroyed 370 000 housing units. Six months after the disaster, the government published a plan to repair or reconstruct over 200 000 housing units with government assistance within four years. The housing reconstruction plan was completed within the four-year time frame. In addition, as the plan also included goals for improved design and construction of affordable housing, updated zoning plans and new master plans for the affected cities, the reconstruction helped increase the resilience of the region to future shocks. (Bullivant, 2011^[48]). A similar example comes from the Abruzzo region, where the city of L'Aquila (the capital of the region) was able to improve, not just replace, infrastructure by embedding new technologies and network systems, for example fibre-optic cabling, renewable energy sources and increased energy efficiency in the city's buildings (OECD, 2013^[49]).

As the damaged area extends across multiple regions and municipalities, it will be important to establish joint planning and co-ordination mechanisms across administrative geographies. Within an overarching regional plan, it may be helpful to organise local reconstruction and recovery plans around Functional Urban Areas (FUAs) to ensure they fully reflect economic and social interactions that range beyond administrative borders. OECD data shows that the damaged areas comprise five FUAs with more than 100 000 inhabitants – Gaziantep, Adana, Hatay, Diyarbakir and Malatya (OECD, n.d.^[53]).

After the 2010/2011 earthquakes in Christchurch, the New Zealand government established the Canterbury Earthquake Recovery Authority (CERA) as a government department to lead recovery efforts, in co-ordination with the Christchurch City Council. CERA was effective in leading a co-ordinated government response to the earthquakes and developing the overarching recovery strategy, although, as a new department, CERA took time to put in place the co-ordination structures, systems, and controls to effectively manage its projects as a coherent program of work (NZ Auditor-General, 2017^[51]). Effective collaboration and co-operation, building public management capacity and putting in place framework governance conditions for effective public investment will be essential during the reconstruction phase (OECD, 2014^[52]).

Box 1. OECD policy recommendations for rebuilding after a disaster

The OECD assisted the Government of Italy in designing a long-run strategy to relaunch the local economy of The Abruzzo region, after the 2009 earthquake that struck a wide area with the city of L'Aquila (the Regional Capital) as its epicentre. Discussions between experts from OECD regions hit by disasters led to the elaboration of eight policy recommendations for rebuilding. The recommendations can guide regions in all countries to more resilient growth and help them monitor good practices and improve the well-being of local communities after disasters:

1. Make sure that short-term decisions do not constrain long-term options.
2. Identify the economic base and the social and economic drivers specific to the region to increase its resilience.
3. Develop an integrated strategy to redevelopment after a disaster by strengthening the dialogue among stakeholders to raise the profile of needed reforms and quality of decisions.
4. Strategic choices must be locally led.
5. Use the occasion of a crisis to introduce reforms or standards for the country.
6. Foster public participation to help decision making.
7. Make public deliberation a regular component of the regional development strategy.
8. Build trust, increase accountability of policy making and improve capacity of administrations.

Source: [Building Resilient Regions after a Natural Disaster - OECD](#)

Managing expectation and preparing to resettle

At the same time, policy makers should be aware that the public goodwill and hope that often marks the first years of reconstruction tends to be short-lived. Analysis from different post-disaster settings shows that in most countries, people become frustrated and lose trust in the reconstruction process within three to six years (Galtung, 2008^[50]). To bridge the gap between providing emergency shelter and delivering ambitious reconstruction plans—which may take several years—the government should provide quality temporary settlements and clearly communicate timelines for resettlement to the affected communities to manage expectations and maintain trust in the reconstruction process.

In parallel, policy makers should consider how to attract people back to affected regions over the longer term. (Peacock et al., 2017^[13]). Supporting local firms and up-skilling the workforce in the affected region to reinvigorate the economy will be as important to the region's long-term prospects as rebuilding its core infrastructure. Improving local public services and facilitating access to jobs will help attract and retain young people to the damaged regions. L'Aquila (Italy) established an international postgraduate school, and investments in research and infrastructure followed, making the city more open and international

(OECD, 2022^[54]). In Fukushima (Japan), Futaba Future High School, a prefectural school established in 2015, provides project-based education to help students interact with local firms and communities. The prefecture also initiated company-visit programmes for high school students and revised the curriculum at vocational training schools for the industries that can drive future economic development of the region (e.g., in robotics and renewable energy) (OECD, 2022^[54]).

Strengthening resilience

Enhancing building safety from earthquakes must be central to Türkiye's efforts in the short and long term, and the construction sector has a key role to play. Both the national and local governments must deploy experts to examine collapsed and damaged buildings in the region and understand why structures failed and what lessons must be learned. Care must also be taken to examine unaffected infrastructure to ensure that it is resilient to future disasters. This review process must be open, transparent, and independent to build trust. Project appraisal processes should also be reviewed and updated to learn lessons and to account for the benefits of investing in increased resilience, including reduced disaster risks as well as reduced operation and maintenance costs – which can justify the higher upfront investment (OECD, 2020^[59]).

In Japan, for example, most local governments carry out seismic diagnosis for buildings built before 1981, when stricter building codes were introduced, and reinforcement for the buildings whose earthquake-resistant level is assessed to be insufficient (OECD, 2016^[55]). They provide financial support to building owners, and the central government support such programmes financially. Moreover, many local governments provide support local architects and constructors to obtain skills necessary for seismic diagnosis and reinforcement and share the list of these professionals at their webpages, which can help improve access to skilled experts. Following the 2010/2011 earthquakes in Christchurch, 100 000 buildings were inspected for faults as part of a post-earthquake building safety inspection programme and residents were required to vacate unsafe buildings until strengthening work was completed (Marshall et al., 2013^[56]; Galloway et al., 2014^[57]). Many OECD countries and regions (such as State of California, United States) can provide useful insights on how to strengthen compliance with building safety standards, as well as in the use of ICT tools to better monitor and model infrastructure resilience (OECD, 2023^[58]).

Building trust

Communities should be fully engaged in reconstruction plans. Participatory approaches that engage a wide range of stakeholder groups should be established to guide national and local long-term recovery planning and implementation. When securing community participation, governments can collect relevant information on needs and priorities, and build a sense of ownership and obtain community support. Otsuchi Town (Japan) was severely devastated and lost more than 10% of its population due to the Tsunami of 2011 in Japan. In 2012, residents in the Ando district formed a neighbourhood association and started developing a district disaster management plan. They held 11 discussion meetings, briefed their plan to the mayor, organised social gathering with other residents, and conducted a resident survey. Every discussion lasted 4 hours, and a questionnaire achieved a high response rate. After the Tsunami Disaster Management Plan of Ando District was developed in October 2013, the residents continue to propose further improvements to the plan, as they regularly carry out disaster management drills based on the plan (Cabinet Office, Government of Japan, 2016^[60]).

Similarly, after the 2009 “Black Saturday” fires in Victoria, Australia, a Victorian Bushfire Reconstruction and Recovery Authority was established to oversee the recovery and rebuilding programme. The authority adopted a long-term planning framework that put the local community at the centre (Victorian Bushfire Reconstruction and Recovery Authority, 2010^[61]). The approach included special support for affected families and vulnerable groups, which helped build community cohesion, and included engagement

channels to keep the community informed and involved in designing and implementing recovery projects (Mannakkara and Wilkinson, 2015^[62]).

As for the initial support effort, Türkiye should establish mechanisms to report transparently on the use of reconstruction and recovery funding and strengthen anti-corruption efforts at all levels. For example, digital platforms could be established that enable governmental and non-governmental actors to track recovery funds and projects. The government should ensure that anti-corruption mechanisms are designed in such a way that they do not stifle local decision making or reduce local absorption capacity. The L'Aquila recovery process highlighted that improving accessibility, quality, and disclosure of information on reconstruction expenditures, criteria and timelines can help build trust and engage communities (see Box 1 (OECD, 2013^[49])). Finally, robust policy evaluation should be implemented to review the effectiveness of the reconstruction to strengthen future efforts (OECD, 2013^[49]).

References

- ACTED (2016), *Jordan: How cash for work activities make life move forward in refugee camps*, <https://reliefweb.int/report/jordan/jordan-how-cash-work-activities-make-life-move-forward-refugee-camps> (accessed on 29 March 2023). [16]
- Aljazeera (2023), *Turkey earthquake rescue operations to end, government says*, <https://www.aljazeera.com/news/2023/2/19/earthquake-rescue-operations-ended-in-most-turkey-provinces-afad> (accessed on 28 March 2023). [10]
- Bullivant, L. (2011), *PRES Constitución Masterplan, Constitución*, Routledge. [48]
- Cabinet Office, Government of Japan (2016), *Build back better from Great East Japan Earthquake Case studies*, https://www.bousai.go.jp/kyoiku/fukko/shisai/higashinohon_en.html. [60]
- Caruso, S. and S. Miller (2015), *Long run effects and intergenerational transmission of natural disasters: A case study on the 1970 Ancash Earthquake*, <https://www.sciencedirect.com/science/article/pii/S0304387815000917>. [17]
- Cretney, R. (2016), "Local responses to disaster", *Disaster Prevention and Management*, Vol. 25/1, pp. 27-40, <https://doi.org/10.1108/dpm-02-2015-0043>. [44]
- DASK (2023), *Compulsory Earthquake Insurance Coverage*, <https://dask.gov.tr/en/guarantees-and-coverage>. [4]
- Deryugina, T., L. Kawano and S. Levitt (2018), "The Economic Impact of Hurricane Katrina on Its Victims: Evidence from Individual Tax Returns", *American Economic Journal: Applied Economics*, Vol. 10/2, pp. 202-233, <https://doi.org/10.1257/app.20160307>. [29]
- Di Pietro, G. and T. Mora (2015), "The Effect of the L'Aquila Earthquake on Labour Market Outcomes", *Environment and Planning C: Government and Policy*, Vol. 33/2, pp. 239-255, <https://doi.org/10.1068/c12121r>. [27]
- Egbelakin, T. et al. (2018), "Preparation of small to medium-sized enterprises to earthquake disaster", *Bulletin of the New Zealand Society for Earthquake Engineering*, Vol. 51/4, pp. 171-182, <https://doi.org/10.5459/bnzsee.51.4.171-182>. [63]
- FEMA (2020), *Planning Consideration Disaster Housing*, <https://www.fema.gov/sites/default/files/2020-07/planning-considerations-disaster-housing.pdf> (accessed on 29 March 2023). [11]

- Fitch (2023), *Fitch Ratings Comments on Insurance Losses from Türkiye-Syria Earthquake*, [5]
<https://www.fitchratings.com/research/insurance/fitch-ratings-comments-on-insurance-losses-from-turkiye-syria-earthquake-09-02-2023>.
- Galloway, B. et al. (2014), "Lessons from the post-earthquake evaluation of damaged buildings in Christchurch", *Earthquake Spectra*, Vol. 30/1, pp. 451-474, [57]
https://doi.org/10.1193/022813EQS057M/ASSET/IMAGES/LARGE/10.1193_022813EQS057M-FIG2.JPEG.
- Galtung, F. (2008), *Integrity After War: Why Reconstruction Assistance Fails to Deliver to Expectations*, Tiri. [50]
- Ghazanchaei, E. et al. (2021), "Identifying and Describing Impact of Disasters on Non-Communicable Diseases: A Systematic Review", *Iranian Journal of Public Health*, [22]
<https://doi.org/10.18502/ijph.v50i6.6413>.
- Government of Puerto Rico (2018), *Transformation and Innovation in the Wake of Devastation: An Economic and Disaster Recovery Plan for Puerto Rico*, <https://recovery.pr/documents/pr-transformation-innovation-plan-congressional-submission-080818.pdf> (accessed on [47]
 28 May 2022).
- Government of Türkiye (2023), *Türkiye Earthquakes Recovery and Reconstruction Assessment*, [3]
<https://www.sbb.gov.tr/wp-content/uploads/2023/03/Turkiye-Recovery-and-Reconstruction-Assessment.pdf>.
- Groen, J., M. Kutzbach and A. Polivka (2016), "Storms and Jobs: The Effect of Hurricanes on Individual Employment and Earnings Over the Long Term", *SSRN Electronic Journal*, [28]
<https://doi.org/10.2139/ssrn.2782038>.
- Hacettepe University (2018), *Turkey Demographic and Health Survey*, [23]
<https://dhsprogram.com/publications/publication-FR372-DHS-Final-Reports.cfm> (accessed on 6 April 2023).
- Hallegatte, S. et al. (2017), *Unbreakable: Building the Resilience of the Poor in the Face of Natural Disasters*, <https://documents1.worldbank.org/curated/en/512241480487839624/pdf/110618-PUB-Box396333B-PUBLIC-PUBDATE-11-24-16-UNIT-ITSKI.pdf>. [6]
- Human Rights Watch (2023), *Turkey: Suspend Time Limit on Travel Outside Quake Zone*, [20]
<https://reliefweb.int/report/turkiye/turkey-suspend-time-limit-travel-outside-quake-zone-entr>
 (accessed on 29 March 2023).
- International Medical Corps (2023), *Syria/Turkey Earthquakes Situation Report #7, March 8, 2023*. [2]
- Kouadio, I. et al. (2012), "Infectious diseases following natural disasters: prevention and control measures", *Expert Review of Anti-infective Therapy*, Vol. 10/1, pp. 95-104, [21]
<https://doi.org/10.1586/eri.11.155>.
- Kousky, C. (2016), "Impacts of natural disasters on children", *The Future of Children*, Vol. 26/1, [7]
 pp. 73-92.
- Love, R. and S. Vallance (2013), "The role of communities in post-disaster recovery planning: A Diamond Harbour case study", *Lincoln Planning Review*, Vol. 5/1-2, pp. 3-9, [43]
<https://researcharchive.lincoln.ac.nz/bitstream/handle/10182/10138/765-Article%20Text-983-2-10-20140402.pdf?sequence=1&isAllowed=y> (accessed on 13 March 2023).

- Mannakkara, S. and S. Wilkinson (2015), "Supporting post-disaster social recovery to build back better", *International Journal of Disaster Resilience in the Built Environment*, Vol. 6/2, pp. 126-139, <https://doi.org/10.1108/IJDRBE-06-2013-0019/FULL/PDF>. [62]
- Marshall, J. et al. (2013), "Post-earthquake building safety inspection: Lessons from the canterbury, New Zealand, earthquakes", *Earthquake Spectra*, Vol. 29/3, pp. 1091-1107, https://doi.org/10.1193/1.4000151/ASSET/IMAGES/LARGE/10.1193_1.4000151-FIG2.JPEG. [56]
- Neria, Y. (ed.) (2014), "Mental Health and Related Factors after the Great East Japan Earthquake and Tsunami", *PLoS ONE*, Vol. 9/7, p. e102497, <https://doi.org/10.1371/journal.pone.0102497>. [24]
- Neumayer, E. and T. Plümper (2007), *The Gendered Nature of Natural Disasters: The Impact of Catastrophic Events on the Gender Gap in Life Expectancy, 1981-2002*, https://www.researchgate.net/publication/30523075_The_Gendered_Nature_of_Natural_Disasters_The_Impact_of_Catastrophic_Events_on_the_Gender_Gap_in_Life_Expectancy_1981-2002?enrichId=rgreq-5bf0d6c0cbcacc1dad59d2c9d82e19d-XXX&enrichSource=Y292ZXJQYWdlOzMwNT. [18]
- NZ Auditor-General (2017), *Canterbury Earthquake Recovery Authority: Assessing its effectiveness and efficiency.*, <https://oag.parliament.nz/2017/cera>. [51]
- NZ DPMC (2012), *Christchurch Central Recovery Plan*, <https://dPMC.govt.nz/our-programmes/greater-christchurch-recovery-and-regeneration/recovery-and-regeneration-plans/christchurch-central-recovery-plan>. [14]
- NZ Story (nd), *A cathedral made out of cardboard?*, <https://www.nzstory.govt.nz/stories/a-cathedral-made-out-of-cardboard/>. [15]
- OCHA (2023), *Flash Appeal: Türkiye Earthquake (February - May 2023)*, <https://reliefweb.int/report/turkiye/flash-appeal-turkiye-earthquake-february-may-2023-entr> (accessed on 23 March 2023). [1]
- OECD (2023), *Building resilience: New strategies for strengthening infrastructure resilience and maintenance*, <https://doi.org/10.1787/14e1c5e8-en-fr>. [58]
- OECD (2023), *OECD Economic Surveys: Türkiye 2023*, <https://doi.org/10.1787/19990480>. [31]
- OECD (2022), "From recovery to resilience: Designing a sustainable future for Fukushima", *OECD Regional Development Papers*, No. 37, OECD Publishing, Paris, <https://doi.org/10.1787/e40cbab1-en>. [54]
- OECD (2022), *Public governance in Ukraine. Implications of Russia's war*, <https://www.oecd.org/ukraine-hub/policy-responses/public-governance-in-ukraine-c8cbf0f4/> (accessed on 5 January 2023). [42]
- OECD (2022), *Rebuilding Ukraine by Reinforcing Regional and Municipal Governance*, OECD Multi-level Governance Studies, OECD Publishing, Paris, <https://doi.org/10.1787/63a6b479-en>. [36]
- OECD (2020), *Recommendation of the Council on the Governance of Infrastructure*, <https://www.oecd.org/gov/infrastructure-governance/recommendation/>. [59]
- OECD (2016), *OECD Territorial Reviews: Japan 2016*, OECD Territorial Reviews, OECD Publishing, Paris, <https://doi.org/10.1787/9789264250543-en>. [55]
- OECD (2014), *Recommendation of the OECD Council on Effective Public Investment Across* [52]

- Levels of Government*, <https://www.oecd.org/effective-public-investment-toolkit/recommendation-effective-public-investment-across-levels-of-government.htm> (accessed on 27 August 2021).
- OECD (2013), *Policy Making after Disasters: Helping Regions Become Resilient – The Case of Post-Earthquake Abruzzo*, OECD Regional Development Studies, OECD Publishing, Paris, <https://doi.org/10.1787/9789264189577-en>. [49]
- OECD (2009), “Service delivery in fragile situations: Key concepts, findings and lessons”, *OECD Journal on Development*, https://doi.org/10.1787/journal_dev-v9-art26-en. [46]
- OECD (n.d.), *Functional Urban Areas. Türkiye*, <https://www.oecd.org/cfe/regionaldevelopment/T%C3%BCrkiye.pdf> (accessed on 29 March 2023). [53]
- Peacock, W. et al. (2017), “Post-Disaster Sheltering, Temporary Housing and Permanent Housing Recovery”, in *Handbook of Disaster Research, Handbooks of Sociology and Social Research*, Springer International Publishing, Cham, https://doi.org/10.1007/978-3-319-63254-4_27. [13]
- ProZorro (n.d.), *ProZorro is a hybrid electronic open source government e-procurement system created as the result of a partnership between business, government and the civil society*, <https://prozorro.gov.ua/en> (accessed on 21 March 2023). [41]
- Ranghieri, F. and M. Ishiwatari (eds.) (2014), “Mobilizing and Coordinating Expert Teams, Nongovernmental Organizations, Nonprofit Organizations, and Volunteers”, in *Learning from Megadisasters: Lessons from the Great East Japan Earthquake*, The World Bank, https://doi.org/10.1596/978-1-4648-0153-2_ch14. [32]
- Republic of Türkiye Ministry of Interior (2023), , <https://en.goc.gov.tr/>. [9]
- Reuters (2023), *EU-led donors to provide 7 bln euros to help rebuild Turkey after earthquake*, <https://www.reuters.com/world/middle-east/eu-executive-offers-1-billion-euros-help-rebuild-turkey-earthquake-2023-03-20/>. [33]
- Sakamoto, M. (2012), “The Rise of NGOs/NPOs in Emergency Relief in the Great East Japan Earthquake”, *Japan Social Innovation Journal*, Vol. 2/1, <https://doi.org/10.12668/jsij.2.26>. [45]
- Tanji, F. et al. (2018), “Period of residence in prefabricated temporary housing and psychological distress after the Great East Japan Earthquake: a longitudinal study”, *BMJ Open*, Vol. 8/5, p. e018211, <https://doi.org/10.1136/bmjopen-2017-018211>. [12]
- Thurston, A., H. Stöckl and M. Ranganathan (2021), “Natural hazards, disasters and violence against women and girls: a global mixed-methods systematic review”, *BMJ Global Health*, Vol. 6/4, p. e004377, <https://doi.org/10.1136/bmjgh-2020-004377>. [25]
- Transparency International (2012), *Lessons learned in fighting corruption in post-conflict countries*, https://knowledgehub.transparency.org/assets/uploads/helpdesk/355_Lessons_learned_in_fighting_corruption_in_post-conflict_countries.pdf (accessed on 24 May 2022). [39]
- True, J. (2016), “Gendered violence in natural disasters: Learning from New Orleans, Haiti and Christchurch”, *Aotearoa New Zealand Social Work*, Vol. 25/2, pp. 78-89, <https://doi.org/10.11157/anzswj-vol25iss2id83>. [26]
- TURKSTAT (2023), *Geographic Statistics Portal*, <https://cip.tuik.gov.tr/>. [8]

- Twigg, J. (2004), *Disaster risk reduction: mitigation and preparedness*. [37]
- UNDP (2023), *In Türkiye, local businesses are on the frontline of the earthquake response and recovery efforts*, <https://www.undp.org/policy-centre/istanbul/blog/turkiye-local-businesses-are-frontline-earthquake-response-and-recovery-efforts> (accessed on 9 March 2023). [35]
- Union of Municipalities of Türkiye (2023), *Depremzede Belediyelerin Yaraları Sarılıyor [The Wounds of Earthquake Victim Municipalities are Healed]*, https://www.tbb.gov.tr/Tr/Haberler_depremezede-belediyelerin-yaralari-sariliyor_20792 (accessed on 13 March 2023). [38]
- USAID/CIDI (2023), *Why “cash is best” for international disaster relief*, <https://www.cidi.org/why-cash-is-best-for-international-disaster-relief/> (accessed on 13 March 2023). [34]
- Venn, D. (2012), *Helping Displaced Workers Back Into Jobs After a Natural Disaster: Recent Experiences in OECD Countries*, <https://doi.org/10.1787/1815199X>. [30]
- Victorian Bushfire Reconstruction and Recovery Authority (2010), *100 Day Report*, <http://royalcommission.vic.gov.au/getdoc/d4fdd202-24b9-4625-996a-288fb655b492/TEN.046.001.0001.pdf> (accessed on 23 March 2023). [61]
- World Bank (2023), *Global Rapid Post-Disaster Damage Estimation (GRADE) Report*, <https://documents1.worldbank.org/curated/en/099022723021250141/pdf/P1788430aeb62f08009b2302bd4074030fb.pdf> (accessed on 8 March 2023). [19]
- World Bank (2004), *Social Accountability an Introduction to the Concept and Emerging Practice*, World Bank, <https://documents1.worldbank.org/curated/en/327691468779445304/pdf/310420PAPER0So1ity0SDPOCivic0no1076.pdf> (accessed on 18 May 2022). [40]



Stay in touch



Find us at www.oecd.org/cfe | oecd.cogito.blog | <https://www.oecd.org/cfe/newsletter.htm>



Twitter: [@OECD_local](https://twitter.com/OECD_local)



LinkedIn: [company/oecd-local](https://www.linkedin.com/company/oecd-local)



OECD

BETTER POLICIES FOR BETTER LIVES