

6 Effects of Disasters

The previous chapters have focused on the preconditions and pressures that make hazards more, or less, likely to occur, and how societies respond to these hazards – with a view to stopping them turning into disasters. It is clear, however, that even in the face of adaptive measures, many societies throughout history could not prevent disastrous consequences – and it is those consequences that are the focus of this chapter. We divide our discussion between those effects seen only in the immediate aftermath or the short term – mortality and victims, demographic recovery, blame, scapegoating, and social dislocation – and longer-term structural consequences for economic reconstruction, social relations, and redistribution of resources. Across the course of the chapter we show that disasters – even ones of similar type and magnitude – did not always produce homogeneous outcomes, and in some cases even led to divergent paths of development in the long term. Furthermore, rather than being totally damaging or even controversially regarded as a ‘force for good,’ we show that the effects of disasters are best assessed when making a basic distinction between developments at the aggregate level (for example, on the basis of GDP recovery) and those at the distributive level – where it is clear disasters could also be instrumentalized to benefit a certain segment of a given population over others.

6.1 Short-Term Effects

6.1.1 *Victims, Selective Mortality, and Population Recovery*

Mortality is one obvious short-term consequence of hazards and shocks, although it could also have very significant knock-on consequences in the long term, depending on the scale and nature of death. Mortality has for a long time been a common indicator for measuring the impact of disasters – both for contemporary and for historical societies – but, as we come to see in this section, we still lack solid empirical information on mortality characteristics from many disasters. To some extent, this is down to

source limitations. Before the nineteenth century, and even in large parts of the world today, the victims are not always registered meticulously or accurately. This is sometimes exacerbated because certain groups are under-represented in statistics as a consequence of their isolated or marginal position in society. Even when deaths are recorded, problems can emerge: for example, the registration of casualties in selective environments such as refugee camps.¹ Before enumeration by census became widespread in the nineteenth century, church burial records offer insights into excess mortality – although even with this source, coverage is patchy over time and space (and mainly for Europe only), with limitations such as our inability to calculate accurate death rates (percentage mortality as proportion of resident population) and very unsystematic attempts to say much about cause of death.

Moreover, the discussion on mortality as a measure of disaster impact raises even more fundamental issues. One pertinent question is whether mortality figures can actually be a good indicator for the success or failure of a society to deal with a particular hazard or shock. On the one hand, mortality seems like the perfect indicator, as it signals the ability of a society's institutions, technology, and knowledge to offer protection to inhabitants' lives in the face of pre-existing vulnerabilities.² However, at the same time, mortality can be a flawed indicator in this regard. First, it often happens that hazards and the disasters that ensue do not kill, but rather destroy capital, disrupt societies and institutions, or ruin ecosystems. When mortality is considered the main indicator, all of these disasters are overlooked or underestimated. Furthermore, some of the health implications connected to disasters play out only over an extended period of time. The famine of the Great Leap Forward in China in 1958–61, for example, created early-life stresses that caused lasting damage to health much further down the line. Individuals born during the famine were, having reached adulthood, more susceptible to hypertension than the non-exposed, and they did not attain the same height. They also worked, on average, fewer hours and their incomes were lower.³ But second, and more importantly, the causes of death can be unrelated to a resilience or vulnerability framework. In pre-industrial societies in particular, many people died of diseases that were perhaps more likely to occur during periods of hardship, but also could quite reasonably be the result of a random association or chain of events. More fundamentally, mortality

¹ For an interesting and unusual early example seen during the disaster relief program of the Yellow River Floods of 1935 in Shandong, China, see Li, 'Life and Death.'

² For a positive view on mortality as an outcome variable: Sen, 'Mortality.'

³ Chen & Zhou, 'The Long-Term Health and Economic Consequences'; Huang *et al.*, 'Early Life Exposure.'

shocks more frequently occurred in what some people may deem a 'successful' society. In the countryside of early-modern England it was often the case that the poorer marginal areas with low levels of aggregate wealth were much more salubrious than those with more commercialized forms of agricultural production – one clear reason being that overall poverty acted as a stimulant to outward migration rather than inward.⁴

Selective Mortality Hazards and shocks kill varying numbers of people, but equally important is that the 'type' or 'status' of those who die is not always the same. Floods are generally not the biggest killers, but of those that do kill, there is often a social profile to the victims – we see this even in modern times with Hurricane Katrina, along the lines of race and socio-economic status.⁵ For the pre-modern era, it has been shown in a variety of contexts around the world that floods tended to afflict the poor to a larger degree, because of the greater likelihood that they were residing in places much more unsuitable for human habitation.⁶ Indeed, recent literature on the North Sea coastal floods has shown that landless agricultural laborers, often living in flimsy structures close to dikes, were much more likely to die, while wealthy farmers survived.⁷ Certain disasters in history did kill large numbers of high-status individuals, however: in Catania during the earthquake of 1693, 62 percent of the clergy were reported to have died. They fell victim to the collapse of many of the city's churches, where at the exact moment of the earthquake an important religious ceremony was going on.⁸

Given that the poor live closer to the edge of subsistence than wealthier groups, it is unsurprising that famines tend to discriminate in their mortality effects according to wealth.⁹ The belief that poverty reduces access to scarce food supplies is in fact one of the pillars of Amartya Sen's 'entitlement theory.' Entitlements can be based on the ability to purchase food, but also on production: Sen has shown that, during the 1974 Bangladesh famine, mortality was far higher among wage laborers than among farmers.¹⁰ During the 1984–85 Darfur famine, however, the relationship between economic situation and mortality was largely absent, probably because the effects of occupation were greatly overshadowed by the highly localized impact of disease.¹¹ In pre-industrial

⁴ Dobson, 'Contours of Death,' 88–89.

⁵ Elliott & Pais, 'Race, Class, and Hurricane Katrina.'

⁶ Morera, 'Environmental Change,' 92–93; Perdue, 'Official Goals,' 762; Borsch, 'Environment and Population'; Ali, 'Malign Growth?,' 124.

⁷ Soens, 'Resilient Societies,' 163–164.

⁸ Condorelli, "*U tirrimotu ranni*," 231, 403–405.

⁹ Dyson & Ó Gráda, 'Introduction,' 14–15. ¹⁰ Sen, *Poverty and Famines*, 144.

¹¹ De Waal, 'Famine Mortality,' 16.

Europe, the extent of famine mortality tended to diverge between urban and rural environments. It was often higher in the countryside, even though that was where food was produced, while the cities stockpiled provisions for their own residents (attempting to avoid social disorder), called upon distant trade links for emergency provisions, and generally had a stronger set of relief institutions.¹² It is no surprise, then, that, during times of famine, country dwellers often migrated to the cities in search of food and resources – a migration process that in turn helped raise mortality in the cities.¹³ Famine mortality could also differ between rural environments. For example, in sixteenth-century Italy, mountain communities showed lower mortality rates and recovered more quickly than the lowlands, despite the harsh environmental conditions, due to their lower population densities, isolated location, and diversified production methods.¹⁴ In general, highly specialized regions, especially those focused on grain production, were more likely to witness high mortality rates than regions that diversified their economic activities and grew different crops.¹⁵

Famines can kill men and women, young and old, at different rates. Significant amounts of research have suggested over the years that women have a greater capacity to survive famines than men and that the underlying cause is their superior ability to deal with periods of acute malnutrition.¹⁶ Various social factors have been posited as causes, including things such as women's 'marketable value' in prostitution, control over household resources, restricted fertility limiting the dangers of childbirth, preferential welfare schemes, and a reduced tendency to migrate, but the overriding explanation is still based on physiology – the 'body fat hypothesis.'¹⁷ Notably, more body fat also means higher amounts of leptin – a key driver of the body's immune system – which is important given that (a) famines often led to death via diseases rather than outright starvation, and (b) modern laboratory work tends to show that adult women are more resistant than adult men to most kinds of bacteria, viruses, parasites, and fungi (with only a few exceptions such as malaria and measles). However, while case study evidence is plentiful for the period after 1850,¹⁸ direct quantifiable evidence for the pre-industrial period is scanty, and we should be careful not to assume that the pre-

¹² Curtis & Dijkman, 'The Escape from Famine,' 239–240.

¹³ Alfani, 'The Famine of the 1590s,' 31–32; Landers, 'Mortality,' 356–361.

¹⁴ Alfani, *Calamities and the Economy*, 136–168.

¹⁵ For example in the Beauvais region in early-modern France: Goubert, *Beauvais et le Beauvaisis*, 79–80. On the impact of diversification see also Section 4.2.2.

¹⁶ Ó Gráda, *Famine*, 99–102.

¹⁷ With nuances: Speakman, 'Sex- and Age-Related Mortality Profiles,' 823.

¹⁸ Zarulli *et al.*, 'Women Live Longer.'

industrial experience inevitably mirrors the modern. When bioarchaeological or documentary material has appeared, it does not necessarily provide clear proof – at least not to the same extent.¹⁹ Even if we accept the scientific principle that women have ‘natural’ advantages, certain social conditions can conspire to push women into close proximity with points of contagion or vectors, or limit their access to welfare and resources.²⁰ Male prioritization during scarcity occurred in Northern India in the early nineteenth century, for example.²¹ In terms of intra-household resource distribution during famines, gender-based inequalities also often differed along age lines. In late-Qing China, for example, it has been shown that elderly women were high up in the food hierarchy, because of an enduring principle of filial piety, while younger females and girls were at the bottom.²²

Moreover, if there was a ‘female mortality advantage’ during periods of acute malnutrition, superior survival capacities often came together with terrible experiences for women – which links back to our previous statement that mortality is not without its limitations as a disaster effects indicator. In both nineteenth- and twentieth-century famines in China, it has been noted that women could often obtain lifesaving resources such as rice and grain, but at the expense of exploitation – frequently in the form of rape and sexual abuse.²³ Women – especially in the countryside – could also often find themselves abandoned in isolated areas during famines, as more mobile men went off in search of resources or employment in cities.²⁴ Other works have noted the potential for young girls during food crises to be forced into marriage as minors to obtain the household’s early access to marital dowries,²⁵ and women could be ‘pawned’ into other households as seen in nineteenth-century Kenya.²⁶ Posing moral dilemmas on food sharing, these kinds of tactics can be seen in the same light as infanticide – the sacrifice of the individual for a perceived ‘greater good.’²⁷ Linked to this, we should also note that, in certain parts of the world, female children were more likely to be abandoned than their male counterparts in times of hardship caused by

¹⁹ Healey, ‘Famine and the Female Mortality Advantage,’ 186; Yaussy, DeWitte & Redfern, ‘Frailty and Famine.’

²⁰ Curtis & Han, ‘The Female Mortality Advantage.’

²¹ Sharma, *Famine*, 112. On this concept of male prioritization during disasters more generally: Rivers, ‘Women and Children Last.’

²² Edgerton-Tarpley, ‘Family and Gender in Famine,’ 142; Edgerton-Tarpley, *Tears from Iron*, 165, 188.

²³ Yang & Cao, ‘Cadres, Grain and Sexual Abuse.’

²⁴ Vaughan, ‘Famine Analysis,’ 186–189. ²⁵ Devereux, ‘Goats before Ploughs,’ 56.

²⁶ Jackson Jr., ‘The Family Entity,’ 205–208.

²⁷ Sen, *Poverty and Famines*, 29; Agarwal, ‘Gender Relations and Food Security,’ 192.

famine.²⁸ Certain institutional configurations have been cited as more likely to provide protection to women in times of food crisis and famine, however. The development economics literature has exalted the effects of the commons for women's adaptive capacities – often presented in opposition to the market, which is apparently more likely to be organized by males.²⁹ Furthermore, an alternative to the 'wife and daughter selling' narrative during famines in Qing China has recently been posed – noting also how, in times of crisis, women would bring an 'extra' husband into the family for support.³⁰

The epidemic diseases that were such an important cause of death in the pre-industrial period could also vary in terms of the population sector they targeted, and this is important because it had knock-on consequences for the organization of societies and economies. If more adults of working age died during an epidemic, this created new kinds of societal vulnerabilities – who was left to care for the elderly, the infirm, the disabled, or minors? In underdeveloped and developing countries today, unexpected deaths in adulthood, often during epidemic outbreaks, create significant social problems – orphaned children and uncared for elderly parents,³¹ young survivors left with reduced family or community support, weak social networks, and poor access to food and healthcare, and all the while minors assume new roles as 'heads of household,' principal care-givers, and earners.³² Conversely, if an epidemic killed more of the 'frail' – those seen to be a drain on resources rather than a contributor – it could thereby alleviate a number of societal pressures: fewer to care for, fewer to feed. On a related point, if an epidemic was highly selective by socio-economic status, mainly victimizing the poor (perhaps in specific neighborhoods), this led to little structural change in the economy as new poor migrants simply came in to replace the old ones – a feature often seen in urbanized areas of early-modern Europe.³³ On the other hand, if a disease had 'universal characteristics,' killing a wider range of people, this could destroy a pre-industrial society's human capital levels – and then it was not always a given that this would be quickly and easily replenished.³⁴ Although diseases such as the plague

²⁸ Strengthening the 'missing women' phenomenon in places such as China and India: Das Gupta & Shuzhuo, 'Gender Bias,' 487.

²⁹ Agarwal, *A Field of One's Own*, 455. And for eighteenth-century Western Europe it was claimed that the "resources of the commons were often all that stood between [women] and total destitution": Hunt, *Women in Eighteenth-Century Europe*, 148.

³⁰ Sommer, *Polyandry*, 33, 57–58, 71.

³¹ Atrash, 'Parents' Death and Its Implications for Child Survival.'

³² Ronsmans *et al.*, 'Effect of Parents' Death on Child Survival'; De Vreyer & Nilsson, 'When Solidarity Fails.'

³³ Cipolla, 'The Plague.' ³⁴ Alfani & Murphy, 'Plague and Lethal Epidemics,' 335.

are often suggested to be selective against the poor – a link posited from late Antiquity to present-day outbreaks in Madagascar – episodes such as the plague of 1629–30 have been shown to be indiscriminate killers.³⁵

Population Recovery One difficulty in accounting for the casualties of disasters is the blurred line between immediate mortality and other facets of post-disaster population recovery – connected to fertility, nuptiality, and migration, for example. Given that we do not always have good time series for mortality over long periods, some scholars are reliant on sources giving population counts at different intervals – sometimes with long temporal gaps – and naturally this kind of information tends to hide the reality behind what is driving differential rates of recovery after a disaster.³⁶

Some scholars have suggested that population recovery after disasters is influenced less by the immediate death rate, and more by other demographic factors linked to nuptiality and fertility.³⁷ During serious economic crises – especially those linked to harvest failures and famines – societies have often experienced lower fertility rates, and this could last for some time afterwards – as seen with the famine in China associated with the Great Leap Forward.³⁸ Especially in the pre-industrial period, marriages were often dependent on the ability to set up an independent household. This required a plot of land, employment, or adequate savings. Disastrous famines, therefore, forced individual households to postpone marriages of their members, and thus birth rates could drop significantly in the first years or even decades after a disaster. Indeed, it has been said that, in many contexts throughout history, there has been a cultural aversion to marriage during times of scarcity, and in any case, even disregarding new marriages, fertility rates went down in existing marriages simply through conditions much less suitable for conception and for successful full-term pregnancy.³⁹ Parallels can be found in the modern era: in Ethiopia conceptions declined during the prolonged and multidimensional crisis of the 1980s, when a combination of civil war, repression, inflation, and especially famine induced married couples to practice birth control.⁴⁰

³⁵ On plague and poverty: Alfani & Murphy, 'Plague and Lethal Epidemics,' 326; Carmichael, *Plague and the Poor*, 1; Campbell, *The Great Transition*, 306–307. On the 1629–30 plague as universal killer: Alfani, 'Plague.'

³⁶ See the critique offered in Roosen & Curtis, 'The "Light Touch,"' 36.

³⁷ This is a distinctive view attributed most famously to the Cambridge Population Group: Wrigley & Schofield, *The Population History*; perhaps in contrast to those more inclined to highlight mortality itself: Hatcher, *Plague*; Benedictow, 'New Perspectives.'

³⁸ Zhao & Reimondos, 'The Demography.' ³⁹ Alfani, 'The Famine of the 1590s.'

⁴⁰ Lindstrom & Berhanu, 'The Impact.'

This was not always the case for all disasters, however – especially not for those linked to significant mortality spikes such as epidemics occurring outside famine periods (such as plagues). Here, instead, marriages and birth rates may have declined temporarily during the chaos of the peak mortality periods, but in the immediate aftermath, new marriages spiked – especially driven by remarriages of those who had lost their partner to disease.⁴¹ Of course, this depended on institutional factors too – some newly single widows or widowers became attractive to prospective new partners on the basis of inheriting resources from their previous marriage, and in some places, such as Southern Italy, the remarriage of men was acceptable but not that of women (who remained lifelong widows after their husband's death) – making it necessary for some to look outside their immediate localities of residence for new partners.⁴² Of those women who could technically remarry, not all decided to do so – those inheriting resources from deceased partners to support themselves independently may have chosen to enjoy freedoms outside the constraints of marriage.⁴³ Furthermore, in some rural areas men left women and children behind, and did not return – creating sex-skewed habitation patterns in their places of origin, with distorting effects upon marriage opportunities. Accordingly, the rates of remarriage depended on a complex set of pre-existing configurations in inheritance practice, dowry demands, and access to and control of property.⁴⁴ This process was often further complicated by the fact that mortality crises caused by famines or epidemics affected not only nuptiality rates, but also the average ages at which people decided to marry, and this had obvious knock-on effects for fertility and the rate at which populations could replenish themselves.⁴⁵

Population levels could also be affected by societal shifts that were initiated during or after a disaster. For example, during the 'calamitous' fourteenth century, many people succumbed to disease, famine, and warfare, but population recovery was sometimes halted, and this did not always have purely demographic causes. Regions that were previously densely populated and supporting labor-intensive arable agriculture in Europe, for example, were transformed into labor-extensive pastoral societies. Before the Black Death the main problem was keen competition for agricultural opportunities, but after the plague the main problem became that there were too few agricultural opportunities altogether – necessitating outward migration to the cities – particularly

⁴¹ Livi Bacci, *La société italienne*, 67–69. ⁴² Da Molin, 'Family Forms,' 520.

⁴³ Franklin, 'Peasant Widows' "Liberation."

⁴⁴ Guinnane & Ogilvie, 'A Two-Tiered Demographic System.'

⁴⁵ Carmichael *et al.*, 'The European Marriage Pattern,' 16.

for women.⁴⁶ This kind of rural–urban movement explains why cities in some areas appeared to be more resilient in the face of mortality spikes than the countryside. Not everyone migrated, however: the capacity for people to stay in, or repopulate, a particular area depended on the economic opportunities that were provided for wage labor, access to property, and institutional forms of welfare such as the commons and poor relief.⁴⁷ The same can be seen in modern times. After the major tsunami in 2004 caused by the Indian Ocean earthquake, many Sri Lankan coastal communities were unable to replenish themselves. This was not necessarily only connected with the casualties of the flood wave itself, but also with the inland relocation of the fishing communities after the disaster. Because of government interventions, coastal villages were demolished and replaced by hotel complexes and tourism, which turned the densely populated coastal zones of Sri Lanka into vast uninhabited stretches of beach.⁴⁸

Population recovery was often highly influenced by migration, which is one of the most common responses during and after disasters of all kinds. During epidemics, a commonly suggested pattern was flight from the cities while the disease was active in its worst phases, and rural–urban migration in the aftermath as people looked to fill vacancies.⁴⁹ Epidemics often occurred during periods of warfare – conflicts that frequently bore heavier consequences for rural communities – and thus may have further heightened movement towards ‘safe harbors’ in the city.⁵⁰ This inward movement of people to the cities is said to be one of the reasons for the establishment of ‘urban graveyards’ – high-mortality urban demographic regimes – in Europe by the early-modern period and thus shows the circular nature of this process: hazards create movement of people, movement of people creates new hazards.⁵¹ However, it must be noted that quantitative empirical evidence to flesh out these arguments still remains scarce – they are often based on abstract modeling, logical intuition, anecdotal evidence, or evidence of a low-resolution macro nature – or the logic behind the mechanisms posited remains conflicted. Elsewhere, during other disasters, many families may have migrated intending an immediate return to their place of origin, but then were prevented from doing so. For example, after the Lisbon earthquake, several previously poor neighborhoods were not rebuilt in the same way, but the land was

⁴⁶ Voigtländer & Voth, ‘How the West “Invented” Fertility Restriction.’

⁴⁷ Curtis, ‘The Impact.’ ⁴⁸ Klein, *The Shock Doctrine*, 8.

⁴⁹ Borsch & Sabraa, ‘Refugees of the Black Death.’

⁵⁰ The ‘safe harbors’ concept is developed in Dincecco & Onorato, ‘Military Conflict’; also Rosenthal & Wong, *Before and beyond Divergence*, 104–105.

⁵¹ Voigtländer & Voth, ‘The Three Horsemen.’

used for more prestigious building projects. Accordingly, the rates of replenishment were quite different – not only across localities, but also across neighborhoods of the same locality.⁵² In other cases, the rebuilding process evolved more freely – with deliberate incentives such as the reduction of mortgages on sold buildings and plots to entice inhabitants back – as seen in depopulated Catania after the 1693 earthquake that hit wide areas of eastern Sicily.⁵³

6.1.2 Land Loss and Capital Destruction

The second-most-important measure of a disaster is capital destruction and how much land is lost or affected. Images of eroding cliffs, mudslides, and inundated coastal estates are often used to show the effects of global warming, as are interactive maps of coastal zones that will be flooded if there is a rise in sea level. This indicator is important not only because loss of land is often traumatic for the affected communities, but also because many disasters cause only minimal human casualties but large amounts of physical destruction.⁵⁴

A case in point is the American Dust Bowl in the 1930s. Although it caused no direct casualties, it has been called the worst human-made environmental disaster the United States has ever experienced. As discussed earlier, the Dust Bowl refers to a decade of extreme soil erosion on the American Plains, stretching from Mexico across the continental United States towards Canada. Owing to the combination of a prolonged and severe drought and the destructive nature of monoculture on the fragile plains, the vegetation cover was reduced fundamentally, allowing wind to sweep away the topsoil. This phenomenon created large dust storms that caused ‘apocalyptic’ darkness during daylight hours and buried houses, roads, and fields with sand dunes. The worst problem, however, was the cumulative loss of the thin layer of productive topsoil. By the 1940s up to 75 percent of that topsoil had been lost in the most severely affected zones, resulting in large permanent declines in land values – somewhere between 17 and 30 percent per acre, depending on the scale of erosion. The total agricultural loss amounted to 2.4 billion dollars (equivalent to 30 billion in 2007 dollars). Migration was the only option for the most affected farmers and tenants, who moved *en masse* from the plains towards economically more viable states such as California.⁵⁵

⁵² Pereira, ‘The Opportunity of a Disaster,’ 487–488.

⁵³ Condorelli, ‘The Reconstruction of Catania,’ 802. ⁵⁴ See also Section 2.1.

⁵⁵ Hornbeck, ‘The Enduring Impact,’ 1478. For the literature on the Dust Bowl, see also Sections 1.2 and 4.1.



Figure 6.1 Dust Bowl farm in the Coldwater District, north of Dalhart, Texas, June 1938. Dorothea Lange/Farm Security Administration via Library of Congress.

Although a modernist approach to land exploitation had contributed to the American Dust Bowl, this type of catastrophic land loss due to soil erosion and sand drifts is not simply a modern phenomenon. For example, during the ninth and tenth centuries, the village of Kootwijk in the Netherlands was buried in a dune several meters deep, forcing the community to abandon the site. This medieval dust bowl was most probably caused by large-scale land clearances and the creation of open fields – in sharp contrast to former land use – incorporating smaller dispersed farmsteads within woodlands.⁵⁶ Up to today, the active dune has not been stabilized. Even swifter than sand drifts was land loss caused by floods. Again in the Low Countries, river floods often caused havoc, including destruction of mills, sluices, ovens, and other capital goods, as well as the loss of livestock, but not permanent land loss since the water usually receded again after a few months.⁵⁷ The fertility of the river clay soils and river valleys often made it

⁵⁶ Heidinga, 'The Birth of a Desert.'

⁵⁷ Van Bavel, Curtis & Soens, 'Economic Inequality.'

worthwhile to reclaim and embank the land again – a sharp contrast to what could be done in less fertile sandy areas hit by sand drifts. However, permanent land losses were more frequent in the case of sea floods caused by storm surges, tropical hurricanes, or tsunamis. Yet, on balance, recovery of land was still the rule, and permanent losses the exception.⁵⁸

Although warfare may have been the most significant destroyer of capital in the past,⁵⁹ arguably the greatest form of capital destruction by specifically nature-induced disasters has been caused by earthquakes – particularly for urbanized areas. The Great Kantō Earthquake of 1923, for example, led to an estimated 204 billion US dollars' worth of damage (2010 HNDECI adjusted).⁶⁰ In the course of time, as societies became wealthier and fixed capital goods costlier and more sophisticated, the possible absolute costs of destruction increased in parallel, and in recent decades these have risen faster than the losses of lives.⁶¹ A prime example is the earthquake, and the ensuing tsunami, which struck Japan in 2011, destroying or damaging almost one million buildings, and triggering a meltdown of the Fukushima nuclear powerplant. Cost estimates vary considerably and show a rising tendency as time progresses, but some of the more recent calculations made by independent research institutes suggest that the total costs may be as high as 500 to 700 billion US dollars.⁶² However, as a share of GDP, it is not always the case that the most highly developed and highly urbanized societies were hit the hardest: the worst two cases in modern history were the 1988 Spitak Earthquake in Armenia (around 360 percent of nominal GDP) and that of 2010 in Haiti (around 120 percent of nominal GDP), both hitting a relatively small and poor country very hard.⁶³ Other disasters cost much smaller shares of GDP. This argument can also be extended temporally: while the absolute costs for pre-twentieth-century societies were lower, in relative shares of GDP, many earthquakes were devastating. The 1755 Lisbon Earthquake, with the ensuing tsunami and fire, for example, made two-thirds of the city uninhabitable, destroyed 86 percent of all church buildings, and resulted in the loss of large sums in gold, silver, diamonds, coins, and furnishings. A recent reconstruction suggests that the damage came to between a third and a half of total Portuguese GDP.⁶⁴

⁵⁸ Soens, 'Resilient Societies,' 154.

⁵⁹ Piketty, *Capital*, 106–109, 146–149; Scheidel, *The Great Leveler*, 146–148.

⁶⁰ Daniell, Wenzel & Khazai, 'The Cost of Historic Earthquakes Today.'

⁶¹ Alexander, 'The Study of Natural Disasters,' 285. See also Section 2.2.

⁶² Behling *et al.*, 'Aftermath of Fukushima,' 414.

⁶³ Daniell, Wenzel & Khazai, 'The Cost of Historic Earthquakes Today.'

⁶⁴ Pereira, 'The Opportunity of a Disaster,' 473–477.

6.1.3 *Economic Crisis*

A final measure of the short-run material effect of disasters is the economic impact. Disasters can trigger a temporary decline in GDP levels leading to economic crisis: Hurricane Maria reduced Puerto Rico's economy by 3 percent in 2018.⁶⁵ The pleas to invest more resources to halt climate change are often based on predictions of dropping economic performance levels and high social and economic costs. Impact on GDP, however, is not always straightforward to measure or analyze. If the destruction is followed by (international) relief, the rebuilding of houses, and the repair and possibly improvement of the damaged infrastructure, the effect may be positive rather than negative. For contemporary disasters, the literature is inconclusive: while some have argued that only disasters followed by political unrest or instability have a negative impact on GDP per capita,⁶⁶ others argue that major nature-induced disasters in low- and middle-income countries unleash significant economic setbacks – up to 6.83 percent of per capita GDP for the top 1 percent of disasters in the period 1979–2010.⁶⁷

The nature and intensity of the disaster, but also its preconditions (see Chapter 3) and the immediate reaction to the disaster, all influence the way it may lead to economic crisis. The historical evidence on this is rather meager, not least because historical GDP data are either absent or available only at aggregate national levels, whereas most disasters affect only parts of countries. The 1755 earthquake, fire, and tsunami in Portugal not only destroyed large numbers of buildings and large amounts of capital, but also caused food prices to surge (by 83 percent for wheat and by 171 percent for barley in 1756–57, compared with pre-earthquake average levels) while wages remained stable, except for those of skilled laborers in the building industry, who for some years received an extra premium due to the extraordinary demand for reconstruction work. In the years following the disaster, the already substantial trade deficit of the country, financed by Brazilian gold, widened, as massive amounts of construction materials such as Swedish iron had to be imported.⁶⁸ At the same time, however, the economic misery forced the Portuguese to reduce their imports of British textiles and other consumables, which in the longer term may have helped, together with the institutional reforms of Pombal, to gain economic independence from Britain and to promote renewed economic growth.⁶⁹

⁶⁵ Source: World Bank data, <https://data.worldbank.org/country/puerto-rico?view=chart>.

⁶⁶ Cavallo *et al.*, 'Catastrophic Natural Disasters.'

⁶⁷ Felbermayr & Gröschl, 'Naturally Negative,' 104.

⁶⁸ Pereira, 'The Opportunity of a Disaster,' 478–481.

⁶⁹ Pereira, 'The Opportunity of a Disaster,' 491–495. See also Section 6.3.3.

While the 1755 earthquake triggered economic disruption through its destruction of capital (including human capital),⁷⁰ other disasters provoked economic crisis because they affected specific economic sectors, especially in so-called ‘mono-product’ economies highly dependent on a limited range of activities. The 1279–80 sheep scab epizootic in England illustrates this. Sheep scab is an acute and contagious form of dermatitis caused by sheep mites and it often occurs during damp and cold winters. At that time in England, sheep were kept in folds, and the survival rate of the mites and their offspring was higher because of the colder conditions. Accordingly, in eight months almost 50 percent of the total sheep population in England and Wales were killed by the disease.⁷¹ Even sheep that remained fit to be shorn provided fleeces of far inferior quality and the unit sale prices dropped significantly. This had economic repercussions, since fine English wool was one of the most sought-after commodities in Northwest Europe: clips of wool could be sold years in advance, despite the risk of murrain or sheep scab. When the disaster struck, many Cistercian abbeys could not provide the wool they were committed to supplying, and were forced into bankruptcy. The epizootic, however, had even more far-reaching economic effects. The 1280s was the single worst decade of the thirteenth century because the implosion of wool production affected wool prices, textile production, and international trade. In the second half of the thirteenth century, GDP per head in England is estimated to have shrunk from \$828 to \$679 because of the sheep scab episode. Between 1277 and 1285 national income contracted by a quarter, showing how crucial the production of wool was for the value of the national economic output.⁷² After 1285 wool production and the English economy as a whole recovered.⁷³

The economic crises resulting respectively from the 1755 Lisbon Earthquake and the 1279–80 sheep scab epizootic were followed by renewed economic growth in subsequent years. But sometimes the impact of a disaster was more lasting, resulting in a full-blown economic depression lasting for decades or even a century. On a regional scale, we could point to the impact of the Dust Bowl in the United States in the 1930s. Because of the loss of up to 70 percent of the productive topsoil, the affected states that were predominantly agricultural producers took a big hit. Even within the time frame of the Great Depression, the Dust Bowl seriously affected the economy, and population and land values took

⁷⁰ Argument for effects on human capital also made for the 1629–30 North/Central Italian plague: Alfani & Murphy, ‘Plague and Lethal Epidemics,’ 335.

⁷¹ Slavin, ‘Epizootic Landscapes.’

⁷² Campbell, *The Great Transition*, 167. The dollar values are 1990 dollars, commonly used in GDP per capita reconstructions.

⁷³ Broadberry *et al.*, *British Economic Growth*, 206–207.

decades to recover (see Section 6.1.2). Some scholars have even argued that terrible disasters in the past have led to lasting economic divergences between regions. For example, the severity and spread of the 1629–30 and 1656–58 plagues in Italy caused major economic setbacks through declines in internal demand and destruction of human capital, and according to Guido Alfani may have been responsible for the shift in economic center of gravity away from the Mediterranean to Northwest Europe.⁷⁴

Of course, explaining economic crisis as well as growth requires us to take into account a whole range of variables, and the examples above merely illustrate that nature-induced disasters can play a role in this process – widening an economic crisis which was already unfolding, temporarily damaging vital industries, and paving the way for competitors to enter the market, or triggering institutional responses which in turn have either a beneficial or a damaging impact on economic growth. In history as well as today, the link between disaster and economic crisis tends to be complex and multi-directional.

6.1.4 *Scapegoating, Blame, and Social Unrest*

Of all types of hazard and shock, epidemics have had the longest tradition of being associated with blame, scapegoating, and even extreme social responses such as violence.⁷⁵ Scholars have claimed that “blaming has always been a means to make mysterious and devastating diseases comprehensible and therefore possibly controllable,”⁷⁶ and an ‘inevitable’ component of a pre-modern *mentalité* with poorly formed understanding of causes and cures. This narrative was well entrenched in the 1980s, at a time when societies themselves became preoccupied with HIV/AIDS, leading in turn to widespread concern about the activities of prostitutes, homosexuals, drug dealers, and a general economic ‘underclass.’ In the 1990s this was further fueled by the ‘cultural turn’ within the field of history, where fascination with the persecution and burning of witches, for example, sparked interest in researching the role of ‘plague poisoners’ or ‘syphilis spreaders.’⁷⁷

A persistent feature associated with the above-mentioned view is the focus on the capacity of epidemic diseases to loosen the bonds of society,

⁷⁴ Alfani, ‘Plague in Seventeenth-Century Europe.’ Similar shocks to demand and long-distance trade via epidemics and famines have been argued for fifteenth-century Europe, ushering in a new age of insular economic practices: Campbell, *The Great Transition*, 17–19.

⁷⁵ See the early literature of Baehrel, ‘La haine de classe’; Baehrel, ‘Epidémie et terreur.’

⁷⁶ Nelkin & Gilman, ‘Placing Blame,’ 362.

⁷⁷ Naphy, *Plagues, Poisons, and Potions*; Sidky, *Witchcraft*, 90–91; Bever, ‘Witchcraft,’ 573; Ross, ‘Syphilis.’

disrupt communities from their 'normal' patterns of life, and create unrest.⁷⁸ For the Black Death of 1347–52, scholars have focused on the amplification of social tensions, where lawlessness, thefts, and violence were on the up.⁷⁹ This is often presented as a 'Boccaccian' breakdown in morals and values – priests, medics, and law-enforcement officials refusing to interact with the afflicted, family members abandoned to their fates, and unscrupulous types waiting around like vultures to appropriate the goods of those who have passed away.⁸⁰ Accordingly, it is also unsurprising that a 'Foucauldian' narrative became dominant – epidemics were seen as a 'tool' for powerful elites and authorities to repress and persecute weaker or disenfranchised members of society.⁸¹ Urban governments often used the plague as an opportunity to crack down on those viewed with suspicion, such as vagrants, beggars, and prostitutes,⁸² while church authorities used epidemics – but also floods and harvest failures – as a sign of divine retribution for ostentation, greed, and display, legitimizing calls for frugality, piety, or general adaptations of societal behavior.⁸³ Some of these aspects of disease psychology are still discernible today, with fears perhaps in some regards even heightened through globalization and the notion that 'exotic' diseases can be transported into 'modern' urban environments.⁸⁴ In recent times we have seen Muslims blamed for poisoning water systems during the 1994 Surat plague in India,⁸⁵ and witnessed the victimization of Asian populations in Chinatowns of various Western cities in the wake of SARS.⁸⁶

Aside from epidemics, a cultural turn within the general field of disaster history also led to increased interest in scapegoating and blame. A notorious example is the wave of witch hunts which appear to coincide with some of the coldest decades of the Little Ice Age: between 1570 and 1650 a remarkable peak in witch trials and convictions occurred in large parts of Europe.⁸⁷ While most cultural historians have pointed to juridical, gender, political, and confessional reasons for this period of mass convictions, Behringer and Pfister proposed a causal link between extreme weather – leading to repeated harvest failures and floods – and witch hunts.⁸⁸ In this period of climatic extremes, cool and wet summers

⁷⁸ Delumeau, *La peur en Occident*, 145–165.

⁷⁹ Shirk, 'Violence and the Plague'; Bowsky, 'The Impact of the Black Death'; and for other plagues: Pastore, *Crimine e giustizia*; Rose, 'Plague and Violence.'

⁸⁰ Biraben, *Les hommes et la peste*, I, 117. ⁸¹ Foucault, *Discipline and Punish*, 195–200.

⁸² Lis & Soly, *Poverty and Capitalism*, 79.

⁸³ Schama, *The Embarrassment of Riches*, 46–48; Akasoy, 'Islamic Attitudes.'

⁸⁴ Covello, von Winterfeldt & Slovic, 'Risk Communication.'

⁸⁵ Barrett, 'The 1994 Plague.' ⁸⁶ Eichelberger, 'SARS and New York's Chinatown.'

⁸⁷ Briggs, 'Many Reasons Why.'

⁸⁸ Behringer, 'Climatic Change and Witch-Hunting'; Pfister, 'Climatic Extremes.'

were commonplace, sometimes with snowstorms, floods caused by glacial melt, and hailstorms destroying entire harvests. Although Le Roy Ladurie claimed that climatic changes had only minor effects on society, Pfister argues that recurring events of this nature have a fundamental impact on the mentality of a society. While urging caution against a deterministic link between the weather events of the Little Ice Age and witch hunts, Pfister makes the point that cross-regional surges in witch hunts cannot be explained simply by confessional issues and juridical laxity in the regions affected.⁸⁹ The causal links between climate and witchcraft can be found in court records and ego-documents, where accusations of ‘weather magic’ were common and included charges such as destroying growing crops, causing harvested crops to rot, and spreading diseases among animals. Before 1570, extreme weather events had urged communities to take juridical action, but most cases were dismissed. After 1589, however, large-scale witch hunts were organized. Local communities – collectives, for example – demanded juridical action against unidentified groups of witches blamed for causing the hazards.⁹⁰ In the famine year of 1649–50 in Scotland, large witch trials were held; the Scottish parliament claimed that the sin of witchcraft had increased daily and issued 500 commissions to try suspected witches.⁹¹

Comparable forms of scapegoating associated with extreme weather events can be found in sub-Saharan Africa, linking up with the practice of rainmaking discussed earlier. In the nineteenth-century Zulu kingdom, for example, severe and protracted drought events were often linked with different forms of social unrest by way of the apportionment of blame by the Zulu leadership.⁹² In the early nineteenth century, rainmakers – special doctors who attempted to influence supernatural forces through the manipulation of rain medicines – were called upon to bring rain in times of drought; however, when this failed during a protracted drought in the 1820s, rainmakers across the region were killed and Shaka, the Zulu ruler, appropriated control of rainmaking rituals to strengthen his position as a link to ancestral spirits. This position was nevertheless a perilous one, as the ruler risked rebellion if he did not deliver rain. Thus, when severe, multi-year drought struck the region again in 1861–63, further forms of social unrest become widespread in the documentary and oral record. In particular, accounts are replete with reports of ‘outsiders’ accused of ‘nailing the ground’ by driving wooden pegs or metal nails into hilltops, apparently to prevent rain. While the origin of this practice is unclear, what is noticeable is

⁸⁹ Le Roy Ladurie, *Times of Feast*, 119; Pfister, ‘Climatic Extremes.’

⁹⁰ Behringer, ‘Climatic Change and Witch-Hunting.’

⁹¹ Parker, ‘Crisis and Catastrophe.’ ⁹² Klein *et al.*, ‘Climate, Conflict and Society.’

that it was used to transfer blame from the leadership to outsiders or minority groups. This gave the Zulu ruler an explanation as to why he no longer controlled the skies to the benefit of his people, while the violent response to these minority groups also generated fear of questioning the authority of the kingdom.

Fear, blame, and scapegoating – perhaps even leading to violence – have, then, been for a long time closely associated with historical disaster outcomes in the short term. However, in recent years, research has also started to slowly revise some of these established views – particularly with regard to epidemics. Some have gone as far as to say that epidemic disease outbreaks could also lead to greater bonds of cohesion and compassion.⁹³ So, while the Black Death of 1347–52 did indeed lead to the most extreme persecution of Jewish families, who were rounded up and burnt to death in the worst cases,⁹⁴ this experience was not necessarily replicated in later recurring plagues of the Second Pandemic. Sixteenth- and seventeenth-century commentators in Europe often displayed pride in the funds they raised in cities to aid the afflicted poor, and festivities and ceremonies developed in some regions as a celebration of solidarity.⁹⁵ Even for the Black Death itself, recent literature has shown examples of continued compassion and professionalism during epidemics,⁹⁶ and quantifiable evidence disputes that there was an increase in criminal activity or a breakdown in legislative institutions.⁹⁷ The same has been said of leprosy: while a long-held view is that this disease brought exceptional stigmatization in the medieval and early-modern periods, recent revision suggests this has been exaggerated and may perhaps derive from nineteenth-century politicians' attempts to justify their own cruel treatment plans.⁹⁸

Furthermore, even when epidemics did draw societies out of their 'normal' patterns, it does not appear inevitable that this manifested itself in targeting of the weak or attempts at social control from above by elites. Some of the literature has instead shown a moderate and negotiated balance between isolation, quarantine, and medical concerns, on the one hand, and the need for maintaining economic and commercial life, and the continuance of ritual engagements, civic freedoms, and customary community ties on the other.⁹⁹ When there was a breakdown in social

⁹³ Cohn, *Epidemics*, 68–92.

⁹⁴ Cohn, 'The Black Death and the Burning of Jews'; Colet *et al.*, 'The Black Death and Its Consequences.'

⁹⁵ Cohn, *Epidemics*, 87–92. In Naples in 1658 there was even an insinuation that collective celebratory festivities had perpetuated the disease: Guarino, 'Spanish Celebrations,' 30.

⁹⁶ Wray, *Communities and Crisis*, Chapters 3 and 5; Wray, 'Boccaccio and the Doctors.'

⁹⁷ Dean, 'Plague and Crime,' 385. ⁹⁸ Rawcliffe, *Leprosy*, 43.

⁹⁹ Wilson Bowers, *Plague and Public Health*; Murphy, 'Plague Ordinances,' 144.

order, generally it went in the opposite direction to the ‘Foucauldian’ narrative, as lower orders used the epidemic as an opportunity to offer either passive or active resistance against visible representatives of elites and authorities – often city officials, medics, or ‘plague workers.’¹⁰⁰ Even more famously, in the nineteenth and twentieth centuries, cholera became associated with mass uprisings and violence from below – elements of which have been mirrored in the twenty-first century.¹⁰¹ A paradox in this context was that disruption from below – although itself constituting a breakdown in social order – originated in an intention to preserve tightly held customs and norms, especially with regard to burial practices. Therefore, it is important to note something persistently linking pre-industrial, modern, and contemporary responses: communal suspicions and distrust of the decisions and actions of ‘elites’, ‘authorities’, ‘experts’, or ‘outsiders’ are seen even today in the wake of serious epidemics – the case of the 2014 Ebola outbreak in West Africa is an obvious example, leading to violent resistance and outcry at the local level.¹⁰² The need to engage local communities and be respectful of their cultural contexts when developing disaster response strategies (such as quarantine) is something that not only runs very deep across different societies, but also goes far back in time.

6.2 Societal Collapse

As mentioned already in this book,¹⁰³ disaster research in recent years has tended to place more emphasis on the resilience of societies, communities, and individuals in overcoming the challenges presented by hazards and shocks. Societal resilience and adaptation – to differing degrees – have become the ‘norm’; even if at the same time certain groups of people within those societies were also differentially vulnerable. Indeed, prolonged crises leading to total societal collapses – with systemic dysfunction – have been shown to have been rare in historical perspective. Nevertheless, these extreme occurrences did happen. Although a commonly accepted definition of societal collapse is hard to come by, many scholars agree that it represents a rapid, fundamental transformation of the social, political, and

¹⁰⁰ Curtis, ‘Preserving the Ordinary.’ A broader thesis on plague as a catalyst for popular social unrest is presented in Cohn, *Lust for Liberty*, Chapters 9 and 10.

¹⁰¹ Snowden, ‘Cholera’; Briggs, ‘Cholera and Society’; also for Third Pandemic plague outbreaks: Lynteris, ‘Suspicious Corpses.’ For the recent social unrest in the wake of post-earthquake cholera in Haiti, which was seen as brought to the country by ‘outsiders’ (the UN): Farmer, *Haiti*, Chapter 7.

¹⁰² Kutalek *et al.*, ‘Ebola Interventions’; Pellecchia *et al.*, ‘Social Consequences of Ebola’; Calain & Poncin, ‘Reaching Out to Ebola Victims.’

¹⁰³ See Section 2.3.4.

economic structures of a complex society for multiple generations.¹⁰⁴ Often these transformations have fundamental effects on the environment, on the population, and on ideology, values, and belief systems.

Although we view societal collapse as being historically rare, older historical literature tended to see the process as something that was almost inevitable: all 'great' societies and civilizations rise but eventually fall. This paradigm arguably began with Edward Gibbon and *The History of the Decline and Fall of the Roman Empire* (1776), connecting this fall with the idea of 'moral decay.'¹⁰⁵ According to the narrative, republican spirit, modesty, and militarism gave way to a decadent society focused on luxury and pacifism, creating fundamental vulnerabilities towards invasions and, in turn, collapse. This belief in moral decay as intrinsic to societal collapse had already been proclaimed by Ibn Khaldun, writing in the fourteenth century, when he described the rise and fall of the Islamic Empire. In the nineteenth century, archaeological discoveries of past civilizations that had collapsed served to enhance these views. 'Egypt mania' and explorations of ancient Babylon and Assyria, and the rediscovery of the Mayan and Inca capitals, showed that historical societies that had blossomed for centuries all ultimately reached a peak and then seemingly abruptly collapsed. The cyclical nature also corresponded to Darwinian insights that all organisms and species go through the stages of growth, maturity, and decline.

Recent literature still discusses societal collapses, but they are no longer explained by moral standards – referred to by Tainter as 'empirically unknowable' or 'unobservable' factors – and instead are commonly linked to environmental hazards, including resource depletion as well as climatic changes and tectonic hazards, and the disasters that can ensue.¹⁰⁶ For example, weather extremes or larger-scale climatic shifts have been central in explaining the multiple 'disappearances' of ancient societies. The sudden and simultaneous collapses of the Ancient Egyptian, Indian, and Mesopotamian societies have been linked with climatic anomalies and extreme drought around 4000 years ago,¹⁰⁷ while a similar occurrence of drought has been linked with the Maya Terminal Classic collapse in 900 CE, and the decline of the states centered around Mapungubwe and Great Zimbabwe during the early to middle part of the second millennium CE in Southern Africa.¹⁰⁸ The collapse of the Western Roman

¹⁰⁴ Definition based on Butzer & Endfield, 'Critical Perspectives'; Luzzadder-Beach, Beach & Dunning, 'Wetland Fields,' 3646; Tainter, *The Collapse of Complex Societies*.

¹⁰⁵ Gibbon, *The History*. ¹⁰⁶ Tainter, *The Collapse of Complex Societies*.

¹⁰⁷ Dalfes, Kukla & Weiss (eds.), *Third Millennium BC Climate Change*.

¹⁰⁸ The classical perspective is described and revised in Luzzadder-Beach, Beach & Dunning, 'Wetland Fields'; Holmgren & Öberg, 'Climate Change,' 185–195; Huffman, 'Climate Change during the Iron Age.'

Empire is nowadays presented as an outcome of climatic instability and the detrimental effects of terrible epidemics such as the Antonine and Cyprianic Plagues.¹⁰⁹ Particular episodes such as the Little Ice Age have also been posited as the explanation for societal collapses – most notably the demise of the Norse society in Greenland, which has been in part attributed to the general cooling and therefore inhospitable conditions of the late fourteenth and fifteenth centuries.¹¹⁰

Nevertheless, environmental explanations of societal collapse have attracted some serious critiques. First, many of these studies have been labeled environmentally deterministic, because of the mono-causal nature of explanations and the simplistic image that is often painted – one that is often driven by the signals of paleoclimate data, the dating of which is often uncertain.¹¹¹ Increasingly, however, emphasis has been placed on the co-agency between weather extremes and societal transformations rather than on direct causality.¹¹² Second, the causal relationship between environmental hazards and eventual collapse is not easily established. Several societies in decline, such as the Ancient Egyptian, Mesopotamian, and Indian civilizations, did not actually collapse simultaneously during a single drought event, but declined over the course of more than two centuries – requiring a more nuanced understanding of the temporal dynamics.¹¹³ This point also relates back to issues with the definition of collapse itself. For some scholars, population numbers and societal complexity outweigh forms of cultural survival such as language and religion, while others may hold art styles and literary traditions as counter-evidence for collapse. Thus identifying cases of ‘collapse’ is as much a value judgement over what one considers as success and failure as an empirical one.¹¹⁴

Equally fundamental is the point raised by Tainter – writing three decades ago – that attempts at explaining collapse have often descended into primarily factual contests around whether particular pieces of historical or archaeological evidence either support or contradict a certain position. In his view, and this is arguably still the case in some of the literature on this topic, this has been at the expense of more careful consideration of the logic of the original proposition around collapse. This involves more basic questions such as “how can environmental or

¹⁰⁹ Harper, *The Fate of Rome*.

¹¹⁰ The classical perspective is described and revised in Dugmore *et al.*, ‘Cultural Adaptation.’

¹¹¹ Middleton, ‘Nothing Lasts Forever.’

¹¹² Warde, ‘Global Crisis’; Degroot, *The Frigid Golden Age*.

¹¹³ Luzzadder-Beach, Beach & Dunning, ‘Wetland Fields.’

¹¹⁴ See arguments in McNeill, ‘Sustainable Survival.’



Figure 6.2 Painting by Thomas Cole, *The Course of Empire – Destruction* (1833–36). Gift of The New York Gallery of the Fine Arts.

climatic factors lead to collapse?” and “can these variables really account for the eventual outcome?” If these questions cannot be answered convincingly, then any discussion of evidence becomes a distraction.

Evidence also suggests that decline usually does not result in complete collapse, but rather in the eventual transformation into a fundamentally new type of society. Total abandonment such as that experienced by the Norse society of Greenland is extremely rare and represents an anomaly in the course of history. Although climate and disease have been linked with the decline of the Western Roman Empire by some authors, others have tried to point to elements of adaptation, transition, and continuity instead.¹¹⁵ In the case of Ancient Egypt, the two intermediate periods were not sudden collapses between periods of grandeur, but were preceded by significant societal transformations, political problems, and social unrest that eventually led to a period of turmoil and a new societal state. This can hardly be called a societal collapse, since some social groups or parts of society showed signs of resilience and adaptation that are masked by the often grand-scale political changes.¹¹⁶ Overall, then, we should make it clear that societal collapse was the exception rather

¹¹⁵ Wickham, *The Inheritance of Rome*; Haldon *et al.*, ‘Plagues.’

¹¹⁶ Butzer, ‘Collapse, Environment, and Society.’

than the rule throughout history – and even some of the so-called ‘classic’ collapses may be conceived of more as transitions and adaptations rather than as the destruction of all social, economic, and political structures. That is not to say, however, that we should downplay the severity and trauma of these reconfigurations – indeed, even though we regard them as transformations rather than collapses, these processes still went hand in hand with large social costs, especially for the most vulnerable segments of those societies.

6.3 Long-Term Effects

Until now we have zoomed in on mitigation strategies and short-term effects and recovery, but as historians we also need to draw attention to long-term effects that are either frequently overlooked or impossible to foresee or measure for very recent disasters. The immediate link is not always that clear, and other societal factors can interfere as well. Nevertheless, these slower processes and long-term effects are critical, especially in cases of recurrent or repetitive shocks. In general three outcomes are possible: recovery, stagnation, or decline. Currently much of the focus lies on societies that adapt after a hazard or shock and therefore are able to recover in the long run, but alternative scenarios are possible too. These different paths are discussed over the course of this section.

6.3.1 *Disasters as a Force for Good? Economic Effects*

In some cases, disasters have been seen as ‘positive shocks’ that stimulate economic changes. Although, as iterated above, adaptation was never inevitable in the aftermath of a disaster, sometimes these events did become a force for good. Earthquakes that destroyed large parts of cities caused significant damage to people and capital, but other, ‘positive’ consequences could be the complete re-planning of the city, making it safer and healthier,¹¹⁷ or the increased demand for employment in the building and laboring industries – also a feature of flooding. Some scholars have pointed to new property reforms, adaptation of antiquated inheritance laws, and modernization of land markets as some of the economic ‘benefits’ to come out of the 1755 Lisbon earthquake.¹¹⁸ As mentioned already, people could learn from disasters, developing new

¹¹⁷ Condorelli, “*U tirrimotu ranni*,” 331–353; Andreau, ‘Histoire des séismes.’

¹¹⁸ Pereira, ‘The Opportunity of a Disaster,’ 467; with a response in Aguirre, ‘Better Disaster Statistics’; and some disagreement in Serrão & Santos, ‘Land Policies.’

policies, institutions, and infrastructures that not only protected societies more securely from future hazards or shocks, but also entailed more widespread gains for overall welfare and development.

What we need to ask, however, is whether short-term reconstruction always equates to long-term economic recovery. Evidence tends to suggest that long-term aggregate economic developments after disasters were quite diverse. In his latest book *The Great Transition*, Bruce Campbell elaborates on the distinct paths that Western Europe and Asia took from the second half of the thirteenth century onwards, as the then known world came to be hit by a series of epizootics, harvest failures, epidemics, and weather extremes within the broad framework of cooler and unstable global climatic conditions. This occurred simultaneously – perhaps causally – with a series of revolts, wars, and mass migrations, one of the most famous being the Mongol invasion of Genghis Khan, which affected different empires and societies all along the network of the Silk Road. While many parts of China were far superior to Europe in technological and economic development before this Great Transition, the aftermath saw China's star wane through repeated wars and environmental distress. According to Campbell, this outcome could not possibly be explained by the economic, political, or social trends that manifested themselves at the start of the fourteenth century. Only by looking at the combined effects of war, disease, and environmental change and the coordinated responses that were taken by the different societies can this divergence be explained. The calamitous fourteenth century, therefore, was pivotal in shaping the long-term economic divergences of East and West.¹¹⁹

With specific regard to the long-term economic impact of epidemic diseases, there has been a lengthy debate – still going on today – as to whether they produced 'positive' or 'negative' development outcomes. For example, a large body of literature has tended to suggest that the Black Death of 1347–52 had positive economic effects, mainly through channels of redistribution described below: a destruction of labor, but keeping capital intact, and therefore improving the lives of the survivors who saw real wages rise and elements of extra-economic coercion subside.¹²⁰ Indeed, some scholars have suggested that the places where the mortality effect of the Black Death was harshest eventually experienced the most favorable long-term economic trajectories.¹²¹ Yet we also have to ask ourselves to what extent these 'favorable' redistributive outcomes were negated by elements of aggregate contraction: smaller

¹¹⁹ Campbell, *The Great Transition*, 19–30. ¹²⁰ Pamuk, 'The Black Death.'

¹²¹ Voigtländer & Voth, 'The Three Horsemen.'

economies with fewer vacancies and more insular and contracted patterns of trade.¹²²

The problem with coming to a coherent answer on the long-term economic effects of epidemics is that, quite simply, these diseases often meant different things to different people. For many city dwellers in Western Europe after the Black Death, credit became easier to obtain and interest rates dropped, yet for many rural people life became more expensive, with only a few exceptions.¹²³ Real wages may have increased after the Black Death in many places, but was it the case that everyone benefited from this? Recent research suggests that women did not do so to the same degree as men.¹²⁴ A further potential limitation is that the economic effects of historical epidemic diseases have tended to be very rigidly measured with ‘traditional’ economic indicators such as GDP, urbanization, wages, property distribution, fertility, and population recovery. Yet many of these indicators are still based on low-resolution macro-level data, sometimes with large chronological gaps between epidemics and economic/demographic markers, and often available only for restricted segments of society – for example, adult males of a certain skill level in an urban environment. The economics and development studies literature also uses these same indicators for contemporary societies, but integrated within a much broader set of economic markers after epidemics that include care, protection, knowledge and skills, health, social networks, and isolation. This is a recognition that epidemics did not just kill people, but killed people of different statuses and skills, and they offered new opportunities and put new pressures on those that survived.¹²⁵ Some of the most vulnerable became more exposed, some workers and care-givers became more burdened, and new responsibilities were sometimes thrust upon those lacking skills and experience. Accordingly, it is not surprising that, while the historical literature still tends to frame disease–economy interactions in a positive light,¹²⁶ almost all of the literature in economics and development studies suggests that disease outbreaks affect economies negatively – particularly with regard to the impact of malaria and HIV/AIDS on productivity and human capital formation.¹²⁷

¹²² Alfani & Murphy, ‘Plague and Lethal Epidemics’; Campbell, *The Great Transition*, 355–373; Álvarez-Nogal & Prados de la Escosura, ‘The Rise and Fall of Spain.’

¹²³ Van Bavel, *The Invisible Hand?*, 109.

¹²⁴ Humphries & Weisdorf, ‘The Wages of Women.’ ¹²⁵ Madhav *et al.*, ‘Pandemics.’

¹²⁶ Acemoglu, Robinson & Johnson, ‘Disease and Development.’

¹²⁷ Bloom, Canning & Fink, ‘Disease and Development Revisited’; Sachs & Malaney, ‘The Economic and Social Burden of Malaria’; Bell & Lewis, ‘Economic Implications of Epidemics.’

Nevertheless, for many other types of disasters, even if the long-term economic impact was negative, the scale was generally local or at best regional. The farm land lost when in the tenth century the village of Kootwijk (the Netherlands) was buried by sand was never recovered. In fact, in the twelfth century changed climatic conditions led to the enlargement of the 'sand desert' that now came to encompass a number of pre-existing drift sand nuclei. Still, the economic effects remained restricted to the area directly affected by the drift sand.¹²⁸ Moreover, there is often a lack of clarity over exact causal links between disaster and economic outcome. One of the most significant economic downturns was connected to the collapse of the water management systems around the Nile in Mamluk Egypt, though at the same time, even the roots of this breakdown were connected in the first place to epidemic mortality.¹²⁹ Similarly, significant floods of the Yellow, Yangtze, and Huai Rivers during the nineteenth and early twentieth centuries have been established as integral facets to the narrative of environmental pressures and Chinese economic difficulties after 1800,¹³⁰ though again it is difficult to separate the economic effects of floods from the famine conditions that also often followed.¹³¹

6.3.2 Long-Term Demographic Changes

As well as varying in terms of their economic recoveries, disasters also showed very different degrees of population recovery. We have seen that the mortality effects of famines could diverge sharply, not only from region to region, but also between localities within regions – according to whether or not famine-related diseases such as dysentery, tuberculosis, or typhus emerged. In fact, long-term recovery after famines was dictated by trends influencing nuptiality and fertility.¹³² In pre-modern times, during the course of the famine people actually tended to delay their marriage, and fertility conditions were understandably sub-optimal. In the aftermath of famines, however, just like with other mortality shocks, there were often spikes in marriages – or rather remarriages. This was a tendency – not a hard-and-fast rule – and so it was neither inevitable nor predictable across pre-modern societies. In some places, remarriage after widowhood was culturally restricted – especially for women, as in the Kingdom of Naples, for example.¹³³ The rates of remarriage also depended on pre-existing

¹²⁸ Heidinga, 'The Birth of a Desert'; see also Section 6.1.2.

¹²⁹ Borsch, 'Plague Depopulation'; Borsch, 'Environment and Population.'

¹³⁰ Elvin, *The Retreat of the Elephants*. ¹³¹ Li, 'Life and Death.'

¹³² Galloway, 'Basic Patterns.'

¹³³ Curtis, 'An Agro-town Bias?'; see also Section 6.1.1.

institutional configurations – inheritance practices, dowry demands, and access to and control of property.¹³⁴ Many families did not want to risk fragmentation of their estates, and thus newly widowed adults, often women, were urged to remain single. Arguments have also been made around the importance of ‘cultural flexibility’ for recovery from demographic disaster – with particular reference to indigenous societies in the Americas following substantial population losses during the fifteenth and sixteenth centuries. The Tapirapé in Brazil, for example, experienced protracted population decline following European contact, partly as they continued to observe marriage rules that acted to control population growth, whereas the more flexible marriage rules of the Tenetehara, which promoted population increase, enabled recovery.¹³⁵ Accordingly, these differential pressures on the rates of nuptiality after famines and epidemics led to differential fertility responses too. This was particularly the case when a large degree of famine migration had taken place, by those in search of resources, food, and work, and especially if this was sex-selective migration. In some rural areas men left women and children behind, and did not return – creating sex-skewed habitation in their places of origin and impacting upon marriage opportunities.

One of the most significant debates on the population effects of disasters remains connected to the Black Death and recurring plagues. Of course, there is no debate that the Black Death killed many people – numbers that have been revised upward in recent years.¹³⁶ However, there were great discrepancies between different regions as to the demographic recovery rates. It is widely accepted in the literature that, in this context, the Low Countries (for example) recovered very quickly and some areas there had already reached pre-Black Death levels at some point in the fifteenth century. Iberia and Italy did not achieve this position until the sixteenth century, and in England the balancing point came as late as the seventeenth century.¹³⁷ A further complication is that recent literature has also questioned some of the empirical evidence for these population recoveries – for example, in the case of the Low Countries, assertions have been made that are based on a paucity of quantifiable information, and often rely on sources that cannot distinguish between population trends and rural–urban migration trends.¹³⁸

¹³⁴ Guinnane & Ogilvie, ‘A Two-Tiered Demographic System.’

¹³⁵ Newson, ‘The Demographic Collapse.’

¹³⁶ Benedictow, *The Black Death*, 383; Alfani & Murphy, ‘Plague and Lethal Epidemics’; Lewis, ‘Disaster Recovery’; Campbell, *The Great Transition*, 306–319.

¹³⁷ Van Bavel & van Zanden, ‘The Jump-Start’; Malanima, ‘The Economic Consequences’; Broadberry *et al.*, *British Economic Growth*, 20, 29.

¹³⁸ Roosen & Curtis, ‘The “Light Touch.”’

Setting aside concerns over the empirics, however, scholars have debated the actual causes of the differential rates of recovery. Some have emphasized mortality: that is to say, the late-medieval demographic context was a high-mortality regime dictated by severe repeat epidemics, and this contrasted with a more favorable lighter-mortality regime in the early-modern period.¹³⁹ Unfortunately, there are three problems with this scenario. First, our empirical evidence to compare mortality regimes between late-medieval and early-modern periods is scarce. Second, it goes against other literature emphasizing the insalubrious nature of the early-modern cities as ‘urban graveyards.’ Finally, it does not explain geographical divergences in recovery rates, unless we suggest that mortality regimes were differential across areas – something difficult to do given the point made above about lack of quantifiable evidence. It has been suggested that the major change was, in actual fact, mortality driven by urban-based diseases, in contrast to the Middle Ages, when epidemics spread more widely: however, again, there is little systematic evidence for this, and recent work has shown territorially pervasive epidemic outbreaks in both late-medieval and early-modern environments.¹⁴⁰

6.3.3 *Reconstruction, Reform, and Societal Change*

As we have seen, the effects of a hazard or shock can differ significantly, depending on the societal response both in the immediate aftermath as well as in the long run. One of the options is not to act at all, because of either the impossibility of responding or an unwillingness to respond. Another option is a societal adaptation that is ill-suited to the type of hazard or to the society itself, which might lead to a societal collapse or prolonged crisis. In this section, however, we focus on types of long-term effects and strategies that often follow after a large-scale disaster: reconstruction and reform, and pushing for societal change.

Reconstruction and Reform One of the ways in which disasters lead to long-term changes is via their capacity to stimulate new forms of reconstruction and reform – either of physical environments or of societal institutions. For example, societies responded in a very structural way to outbreaks of diseases, and this changed over time. Recent literature has shown how medieval societies in Europe were already implementing forms of environmental control in the fourteenth and fifteenth centuries –

¹³⁹ Hatcher, ‘Mortality’; Hatcher, *Plague*, 64; Benedictow, ‘New Perspectives’; Cipolla, *The Economic History*, 77; Flinn, ‘The Stabilisation,’ 286.

¹⁴⁰ Roosen & Curtis, ‘The “Light Touch”’; Curtis, ‘Was Plague an Exclusively Urban Phenomenon?’

especially regulating and sanctioning practices seen to be unhygienic or in contravention of what was seen to be in the interest of public health, or to prevent environmental pollution.¹⁴¹ Still, of course, much of this was based around societies' view that diseases spread through 'miasma' and were linked to bad 'auras,' dampness, or smells. When these environmental controls combined with other public health interventions such as effective quarantine systems, the number of future epidemics could be reduced: Ragusa (Dubrovnik), for example, experienced its very last 'domestic' plague in 1533,¹⁴² comparing favorably with parts of Western Europe which continued to experience Second Pandemic plagues into the seventeenth century, and other parts of Southeast Europe which were not plague-free until the eighteenth century.

After the demographic or epidemiologic transition, mortality rates lowered and life expectancies increased in certain parts of Eurasia and North America – partially testament to the waning or even disappearance of Second Pandemic plagues – but in the nineteenth century, infectious and contagious diseases were still present, especially cholera, smallpox, influenza, and tuberculosis, and often linked to over-populated, industrializing urban environments. As well as instigating short-term mitigation measures such as sanitary cordons and hospitalization – clear links to quarantines of the past – these urban-focused diseases also helped stimulate more fundamental long-term strategies. This went hand-in-hand with developments in scientific and medical knowledge – the so-called 'laboratory revolution' – as miasma theories of contagion were replaced by a better understanding of the role of bacteria and contamination in what became known as 'germ theory.' So, for example, by the 1860s, the link between cholera outbreaks and contaminated water had given rise to sanitary reforms, where water pipes and sewers were replaced.¹⁴³ Antiquated cesspool and privy-vault systems for waste removal were replaced by underground gravity-flow systems – necessitating large-scale capital investments at the same time.¹⁴⁴

Reconstruction and reform policies were, and still are, also a common long-term response to other types of disasters than epidemics. In earlier chapters several examples have come up, such as the introduction of agricultural innovations, early warning systems and food-for-work programs in Ethiopia and Sudan after the famines of the 1970s and 1980s,¹⁴⁵ or the development in the North Sea region of economic strategies that

¹⁴¹ Rawcliffe, *Urban Bodies*, 12–15; Coomans, *In Pursuit of a Healthy City*, 91.

¹⁴² Blažina Tomić & Blažina, *Expelling the Plague*, 62–63.

¹⁴³ Baldwin, *Contagion and the State*, 147–156.

¹⁴⁴ Tarr, *The Search for the Ultimate Sink*, 112–117. ¹⁴⁵ See Section 5.2.1.

allowed communities to live in a tidal landscape with frequent inundations.¹⁴⁶

Pushing for Societal Change Disasters both past and present have been used to make the case for social change – even in some cases revolution. The communist revolutions in Russia (1917) and China (1949) took place during or after periods of serious food crises, which in turn can be connected to the earlier establishment and subsequent growth of new capitals – St. Petersburg and Beijing – in strategically important but food-deficient regions. Feeding those capitals and the rapidly growing armies amassed by both empires became increasingly difficult. In Russia, it required regular transports of very large quantities of wheat from the Black Earth and Volga regions to the North, first by river and later by train. During World War I the combination of wartime requisitions, the German occupation of Ukraine, and transport blockades gave rise to acute food shortages in the North. In China the crisis was drawn out over a longer period of time. The provisioning of Beijing relied on state-organized transports of tribute rice from the South to the North. This state grain supply system increasingly came under pressure from the second half of the nineteenth century as a result of rebellions, wars with the British, silting of the main waterways, and rapid population growth. The severe famines which ensued in the North fed discontent and contributed to the struggles that ultimately led to the communist take-over. Both in Russia and in China the newly established communist regimes considered an escape from the food supply problems in the preceding ‘times of troubles’ as one of their main challenges.¹⁴⁷

In *The Shock Doctrine*, Naomi Klein argues that modern Western societies, and especially capitalistic ones, have used disasters of all kinds, such as war, terror attacks, hurricanes, or tsunamis, to push through fundamental societal changes that could not happen in a ‘normal’ or non-crisis situation. She attributes this way of thinking to one school of thought and especially to one man, Milton Friedman, spokesman of the Chicago School of economics, who stated that “Only a crisis – actual or perceived – produces real change.” According to this theory, the sudden, unexpected nature of a crisis creates a numbness, anxiety, and compliance within the general public that are ideal conditions for the authorities to implement policies that fit their agenda. A case in point is the development of charter schools in New Orleans after Hurricane Katrina in 2005. Friedman used the opportunity of the destruction of most New Orleans schools not only to rebuild the physical infrastructure, but also to change the education

¹⁴⁶ See Section 4.2.1. ¹⁴⁷ Wheatcroft, ‘Societal Responses.’

system at the same time. Referring to a 'clean slate,' Friedman proposed changes from a public-school-dominated policy towards charter schools and individual household education vouchers that could be spent in privately owned and managed schools.¹⁴⁸

While Klein focuses on the contemporary period and neoliberal states, this principle has much deeper historical precedents. After the 1755 Lisbon Earthquake, the Marquis de Pombal took the opportunity to revolutionize the Portuguese economy and policies. Besides clearing the rubble and reconstructing buildings, de Pombal also rearranged property structures, reformed the tax system, and attacked the power of the Church and nobility, in order to modernize the feudal and rural state. It was the shock of the unforeseen earthquake that provided the unlimited power and the ability to break through former resistance both from the nobility and from the rural population.¹⁴⁹ Going further back in time to the early-modern period, it has been suggested that epidemics provided the ideal social circumstances for authorities not only to impose restrictions such as quarantines – but to go much further and extend their influence into the lives of ordinary citizens, urging, for example, other forms of social control around gatherings, meetings, and public spaces, and even criminalizing certain forms of behavior.¹⁵⁰

These shock-induced societal shifts were not uniformly so well planned and organized, however. After the calamitous fourteenth century in Northwest Europe the mortality crisis made labor-extensive policies more favorable than labor-intensive grain production. As a result, in large parts of Europe manorial lords and yeoman farmers switched over to cattle and sheep breeding on extensive pastures, thereby fundamentally altering the medieval economy. Common land was enclosed or redefined, rent systems were altered, and labor conditions were revised. In this case, there was no single identifiable figure – no Friedman or de Pombal – leading the policy shift. The long-term effects and changes were implemented more gradually and were created because of a shift in relative prices.

Shocks did not always lead to significant societal change, however: even in the case of major disasters, resistance might well be too strong to be overcome. In the years before the disaster at the nuclear plant of Fukushima, little weight had been given to the risks connected to the possible occurrence of a tsunami. A number of factors contributed to this culture in which risks were downplayed. They included a perceived lack

¹⁴⁸ Klein, *The Shock Doctrine*, 3–24.

¹⁴⁹ Araújo, 'The Lisbon Earthquake'; Pereira, 'The Opportunity of a Disaster.'

¹⁵⁰ Curtis, 'Preserving the Ordinary.'

of alternatives to nuclear energy, the desire to preserve public acceptance by presenting nuclear energy as inherently safe, and close relations between officials at the Nuclear and Industry Safety Authority (NISA) and the industry – including the *amakudari* system (the custom whereby retired NISA officials took up advisory positions in industries they had supervised during their careers). Research only a few years before the disaster took place had pointed out the need for a higher seawall in this earthquake-prone region – yet was ignored.¹⁵¹ The Fukushima disaster sent shock waves through Japanese society, giving rise to a call for strict safety regulation of the nuclear industry and, in fact, for a complete overhaul of energy policy. But, although new safety legislation has been passed and NISA has made way for the new, independently operating Nuclear Regulation Authority, drastic strategy reforms did not take place. Almost all nuclear plants were temporarily shut down shortly after the disaster, but pressure to restart some of them was, and still is, strong. The ‘Innovative Strategy for Energy and Environment’ formulated shortly after the disaster, aimed at substantially reducing dependency on nuclear energy, met with fierce opposition from businesses and the nuclear industry: the high costs, it was argued, would erode Japan’s competitive position on international markets and its eminence in nuclear technology. New plans formulated afterwards were much more ambivalent about the future of nuclear energy, and Japanese society is still deeply divided over the issue.¹⁵²

6.3.4 *Economic Redistribution*

Hazards and shocks can lead to redistribution of economic resources. This view has recently been supported in grand theses by World Bank economist Branko Milanovic, who suggests that “epidemics and war alone can explain most of the swings in [pre-modern] inequality.”¹⁵³ Elsewhere, in a best-seller in its field, Walter Scheidel has argued that throughout history socio-economic inequalities have leveled themselves out only during episodes of either mass mortality or intense violence and accompanying mass mobilization.¹⁵⁴ These views are important because they downplay the egalitarian effects of active societal intervention and progressive welfare. Reducing inequality by peaceful means appears harder than ever,¹⁵⁵ and is left to the vagaries of sudden events often outside our control.

¹⁵¹ Kingston, ‘Mismanaging Risk.’ ¹⁵² Duffield, ‘Japanese Energy Policy.’

¹⁵³ Milanovic, ‘Income Inequality,’ 480. ¹⁵⁴ Scheidel, *The Great Leveler*.

¹⁵⁵ Scheffer *et al.*, ‘Inequality.’

While major wars are said to reduce inequality through the destruction of capital or the implementation of welfare policies, the logic behind a more 'equitable' redistribution for epidemics tends to be the obliteration of people while keeping capital intact, thereby realigning the economic balance back in favor of labor.¹⁵⁶ So, according to this line of reasoning, in the aftermath of the Black Death, the gap between 'elites' such as lords and aristocrats and the 'lower orders' such as peasants and laborers was narrowed through higher wages, easier mobility, reduced extra-economic impositions, and greater opportunity to purchase property. Another element of this logic, with specific regard to property redistribution after epidemics, is that sudden mass mortality could have some equitable effects, at least in the short or medium term, because in certain conditions of partible inheritance, property was more likely to be divided up and fragmented between different heirs. Furthermore, high epidemic mortality led to cases where elderly adults had nobody to pass their property on to, creating families unable to maintain or consolidate estates for more than one generation.¹⁵⁷ In turn, many post-Black Death societies became less 'unequal' with improved living standards for 'ordinary' survivors.¹⁵⁸

Although these hypotheses are highly stimulating, we should still approach them with a level of caution. First, it might be said that, although the 'leveling' thesis connecting shocks to capital and labor has popular fascination, it also diverts our attention from general long-term inequality trends. That is, despite the almost constant sequence of epidemics and wars across history, the general rule that wealth is almost always accumulating in the hands of elites has become more and more confirmed. Recent research into pre-industrial inequality levels in the Low Countries, Italy, and Spain has demonstrated that, regardless of the short-term redistributive effects of disasters, the long-term trend of inequality from the fifteenth century onwards was rising.¹⁵⁹ Even the Black Death, proclaimed as one of the most redistributive shocks, only led to heightened equality for less than a century, which was quickly reversed thereafter,¹⁶⁰ and many other severe epidemics had egalitarian effects only for a number of years rather than decades.

¹⁵⁶ Milanovic, 'Income Inequality'; Scheidel, *The Great Leveler*, 304–305; Pamuk, 'The Black Death.'

¹⁵⁷ Razi, 'The Myth,' 30.

¹⁵⁸ Dyer, *An Age of Transition?*, 128–139; Cohn, 'Rich and Poor.' Bioarcheological evidence suggests people were healthier after the Black Death: DeWitte, 'Health in Post-Black Death London.'

¹⁵⁹ Alfani & Ryckbosch, 'Was There a "Little Convergence" in Inequality?'; Furió, 'Inequality and Economic Development.' Such a continuous rise in inequality was not matched in Portugal: Reis, 'Deviant Behaviour?'

¹⁶⁰ Alfani & Ammannati, 'Long-Term Trends in Economic Inequality.'

Second, it might also be said that much of this focus on the redistribution of wealth, property, and income after epidemics and wars has tended to obscure other elements of (in)equality. For example, the old view that the Black Death led to a 'golden age for women' in Northwest Europe has been contradicted by new evidence: whatever long-term benefits occurred in the form of rising real wages for men after the Black Death, women did not share in these benefits.¹⁶¹ Bioarcheological evidence, furthermore, supports the contention that women did not share in post-Black Death health benefits in the same way as men.¹⁶² Put simply, then, to what extent can we describe a redistributive effect of mortality shocks as 'equitable,' when half the population never shares in the benefits of such redistribution? This argument can be extended to other dimensions outside of gender: for example, regardless of the effects of the Black Death and recurring epidemics in the Kingdom of Valencia, it is clear that Muslims could not scale the feudal hierarchy of the Christian Kingdom, despite comprising a third of the population and exhibiting their own internal social stratification.¹⁶³

Third, there are some issues with the causal mechanisms often invoked. The Black Death is a well-cited example, but also potentially an anomaly in its redistributive effects, or at the very least an extreme case. We should not just assume that all socio-economic responses to shocks mirrored those of the Black Death in a universally applicable model.¹⁶⁴ There was a broad spectrum behind the ratio of capital to labor damage, and this diverged from historical case to historical case. In fact, rather than an 'inevitable' form of redistribution after hazards and shocks, what we tend to see in the pre-industrial period are redistributive outcomes that are not uni-linear, vary in intensity, and do not always last the same amount of time – that is to say, are not always structural changes.

While shocks did, of course, produce some equitable outcomes, this was not always the case – sometimes certain groups were better able than others to buffer these events,¹⁶⁵ testament to their pre-existing resource and power advantages, instrumentalizing the shock to their benefit and in

¹⁶¹ For an outline of the debate on the 'golden age of women' see Rigby, 'Gendering the Black Death,' 745–754; with updated historiographical references also in Kowaleski, 'Gendering Demographic Change.' New male–female disaggregated wage data can be found in Humphries & Weisdorf, 'The Wages of Women.'

¹⁶² DeWitte, 'Stress, Sex, and Plague'; Lewis, 'Work and the Adolescent.'

¹⁶³ Baydal Sala & Esquilache Martí, 'Exploitation and Differentiation,' 61, 64.

¹⁶⁴ Alfani & Murphy, 'Plague and Lethal Epidemics.'

¹⁶⁵ For floods: Curtis, 'Danger and Displacement'; For wars and famines: Alfani, *Calamities and the Economy*, 76; Galloway, 'Basic Patterns,' 288; Campbell, 'The Agrarian Problem,' 43.

the process exacerbating inequalities.¹⁶⁶ For example, recent research has shown that an epidemic in 1570s Mexico, which reduced the indigenous population by 70–90 percent, facilitated a process of elite concentration and increased the amount of land farmed through large estates. Where collapse was less severe, indigenous villages were better able to maintain control of communal lands, hindering colonist encroachments.¹⁶⁷ This is yet another important point to make, because the wealth of pre-industrial communities was not always tied up in what the individual or the household owned, but could also be located in collective or common-pool institutions.¹⁶⁸

The role of taxation is a case in point, and may reveal some key differences between the redistributive effects of modern disasters and those of the pre-industrial period. Discussing the effects of the two World Wars, Piketty has pointed out the significance of the policy shifts immediately afterwards. Thanks to progressive taxation, the accumulated wealth of the elites, that had been steadily growing until the nineteenth century, was redistributed fundamentally during the 1940s and 1950s. At the same time, the poorer classes could climb the social ladder because of rising wages, public services, and new social security systems.¹⁶⁹ This redistributive effect of taxes is, however, a contemporary phenomenon. In pre-industrial societies, taxes were not designed to finance public services and redistribute wealth to provide for the poorer social classes in society.¹⁷⁰ A continuous and recurrent tax regime developed only from the sixteenth century in most centralized states of Europe, and prior to this, governments could levy a tax only in case of war or other extraordinary circumstances.¹⁷¹ These taxes were then re-used for making war, rather than to provide welfare systems or protect people. Perhaps the only exceptions were poor relief, alms, or specific taxes such as for the repair of the dikes. Many of these special taxes and funds were indirect, however, such as excises on beer, peat, grain, and wine, with fixed sums on consumption. Accordingly, these taxes became a much larger burden on the less fortunate members of society and did not function as a redistribution of wealth from the elites to the poor – actually on the contrary.¹⁷² Similarly, although the ‘disaster’ tax of the water boards did tax landownership and therefore excluded the poor and landless, it was still felt very unequally. Since

¹⁶⁶ Conceded by Scheidel, *The Great Leveler*, 313.

¹⁶⁷ Sellars & Alix-Garcia, ‘Labor Scarcity.’

¹⁶⁸ Di Tullio, ‘Cooperating in Time of Crisis.’ ¹⁶⁹ Piketty, *Capital*, 368–375.

¹⁷⁰ Alfani & Di Tullio, *The Lion’s Share*, 165–169.

¹⁷¹ Thoen & Soens, ‘The Social and Economic Impact’; Dyer, ‘Taxation and Communities.’

¹⁷² Haemers & Ryckbosch, ‘A Targeted Public.’

the money had to be paid in a very short time span in cash, it hit the lower-to-middling groups hard, while large landowners could easily oblige.¹⁷³

The same diversity of redistributive outcomes during environmental hazards can be seen during other types of disasters such as famines. On the surface at least, it would appear that famines had the capacity to heighten inequalities more often than to reduce them. Financial buffers ensured that the wealthy could ride out periods when food prices went high, and thus were not forced to sell goods or even land like the poor.¹⁷⁴ However, socio-institutional factors could also conspire to limit this move towards social polarization in times of food crises. Scholars have shown that, rather than complete societal collapse, peasants relied on a combination of reciprocal networks and relationships between individuals and groups at a local level – being offered credit, insurance, charitable sustenance, and capital to ease the burden and avoid having to alienate property as an act of last resort.¹⁷⁵ During some medieval famines, scholars have even suggested a heightened communal sociability – trade switching to restricted local groups based on personal networks of trust and reputation.¹⁷⁶ Sometimes the wealthiest and most powerful segments of pre-modern society had no desire to exploit those further down the social hierarchy because their actual wealth and power was entirely predicated on the maintenance and continued perpetuation of the community as a status quo, thereby satisfying the principles of conservation, defense, and reproduction.¹⁷⁷

To conclude then, although the views of scholars such as Scheidel and Milanovic about the largely egalitarian effects of terrible shocks such as epidemics appear logical – and are supported in some cases – we still lack a real quantity of empirical examples to fully prove this for the pre-industrial period, or at least to offer this as a definitive universal principle characterizing much of human history. This is not down to a basic lack of interest or material on pre-industrial inequality – a field which has taken off in recent years – but more down to (a) the difficulties of finding source material that can systematically show redistribution outcomes directly connected to a hazard closely before and closely after the shock, (b) the restricted nature of redistributive outcome indicators that are currently used, and (c) the fact that the social groups capable of instrumentalizing the hazard for their own ends were extremely diverse across historical contexts.

¹⁷³ Soens, 'Explaining Deficiencies.' ¹⁷⁴ Galloway, 'Basic Patterns,' 277.

¹⁷⁵ Vanhaute & Lambrecht, 'Famine.' ¹⁷⁶ Slavin, 'Market Failure.'

¹⁷⁷ Di Tullio, *The Wealth of Communities*, 152.