# 9

# Leaning forward: What can be

> Urban warfare is a key trend that will define combat for years to come.[1]
>
> —Yaakov Lappin, *The IDF's momentum plan aims to create a new type of war machine*

> Cities and Thrones and Powers
> Stand in Time's eye,
> Almost as long as flowers,
> Which daily die:
> But, as new buds put forth
> To glad new men,
> Out of the spent and unconsidered Earth,
> The Cities rise again.[2]
>
> —Rudyard Kipling, 'A Centurion of the Thirtieth'

Our definition of megacity tells us that large-scale catastrophes have the potential to devastate a country and wreak havoc regionally if not planet-wide. More than one-third of Bangladesh's urban-dwellers live in Dhaka.[3] Not a megacity, perhaps, but the urban area is fundamental to the social, economic and political welfare of the country. In the richest country in the world, one urban area (New York City) nonetheless accounts for 8

1 Yaakov Lappin, *The IDF's momentum plan aims to create a new type of war machine*, Perspectives Paper No. 1497, Ramat Gan, Israel: Begin-Sadat Center for Strategic Studies, 22 March 2020.

2 In Rudyard Kipling, *The Works of Rudyard Kipling*, Ware, UK: Wordsworth Poetry Library, 1994, 487.

3 Islam et al., 'Urban slums of Bangladesh'.

per cent of its total economic output.[4] The shock of a catastrophe beyond a 9/11, Hurricane Sandy or Covid-19 would reach far beyond Wall Street, lasting for months if not years. Thankfully, post–Hurricane Sandy New York City did take steps to plan for future flood threats. In the future, according to its *PlaNYC*:

> water that makes its way inland will find hardened and, in some cases, elevated homes, making it more difficult to knock buildings off their foundations or knock out mechanical and electrical systems … Power, liquid fuels, telecommunications, transportation, water and wastewater, healthcare, and other networks will operate largely without interruption, or will return to service quickly when preventative shutdowns or localized interruptions occur.[5]

New York City has dramatically enhanced preparations for interdicting the worst other calamities can impose, though Covid-19 reminds us that readiness is never an end but rather an ongoing activity. Planning is good. Planning tied to rehearsals and exercises challenging specious assumptions and dubious policies is better. Effective preparations put into effect are better yet, especially if the interval is short.[6] Mother Nature won't wait.

---

4 Oliver Schelske, Lukas Sundermann and Peter Hausmann, *Mind the Risk: A Global Ranking of Cities Under Threat from Natural Disasters*, Zürich: Swiss Re, 18 September 2013, 5, available from: www.researchgate.net/publication/329450315_Mind_the_risk_-_A_global_ranking_of_cities_under_threat_from_natural_disasters.

5 NYC Special Initiative for Rebuilding and Resiliency, *PlaNYC*, 'Foreword'.

6 Several conferences, publications and other initiatives have had varying degrees of influence on the approaches to addressing megacity disasters and those more generally urban. Valuable for raising consciousness and inspiring action, observations from these range from the general to a focus on specific communities. Readers interested in further investigating the history of urban disaster policy or particular initiatives might find the following interesting: Yuki Matsuoka and Rajib Shaw (eds), *Hyogo Framework for Action and Urban Disaster Resilience*, Community, Environment and Disaster Risk Management Vol. 16, Bingley, UK: Emerald Publishing Limited, 2014, doi.org/10.1108/S2040-7262201416; William J. Mitchell, *e-topia: 'Urban Life, Jim—But Not as We Know It'*, Cambridge, MA: MIT Press, 1999, doi.org/10.7551/mitpress/2844.001.0001; Rockefeller Foundation 100 Resilient Cities initiative, available from: www.rockefellerfoundation.org/100-resilient-cities/; Juhan I. Uitto, 'The geography of disaster vulnerabilities in megacities: A theoretical framework', *Applied Geography* 18(1) (1998): 7–16, doi.org/10.1016/S0143-6228(97)00041-6; the United Nations' Making Cities Resilient 2030 (MCR 2030) and related initiatives, such as the Sendai Framework for Disaster Risk Reduction 2015–30; Wenzel Friedemann, Fouad Bendimerad and Ravi Sinha, 'Megacities: Megarisks', *Natural Hazards* 42 (2007): 481–91, doi.org/10.1007/s11069-006-9073-2.

# Tomorrow's megacity catastrophes: Context

> The Bosphorus … was a stretch of water that in c. AD 1506 Leonardo [da Vinci] would come to include in his 'Gaia Scheme'—a prescient theory about the danger of rising sea-levels and subsequent global, environmental destruction.[7]
>
> —Bettany Hughes, *Istanbul*

> Everyone has eyes, young man. Not everyone can see.[8]
>
> —Greg Iles, *Deep Sleep*

Looking back on her duties during the period 16 October 2016 to 20 July 2017, Lise Grande recalled how the UN Office for the Coordination of Humanitarian Affairs worked closely with the Iraqi Government, approximately 270 NGOs, Kurdish representatives, US military and many other parties during the evacuation of Mosul. The task was carried out during what was, in the words of the senior US general in Iraq at the time, 'the most significant urban combat to take place since World War II'.[9] Even so, Grande recalled that 'protection of civilians in Mosul was the central strategic aim for the Iraqi security forces. Civilian infrastructure was second. Destruction of the enemy was third.'[10] Far from a megacity in terms of our definition, Mosul's population of 1,905,000 people was still nearly twice that confronted by the US and its allies either in 1945 in Manila (1.1 million) or in 1950 in Seoul (1 million).[11] The challenges related to humanitarian assistance during combat operations in Mosul therefore provide some degree of understanding about similar operations in a megacity. Reinforcing the value of drawing on such historical offerings, Iraqi Security Force operations in Mosul 'benefitted from the lessons learned in Ramadi and Fallujah' during previous months.

7 Hughes, *Istanbul*, 416.

8 Greg Iles, *Deep Sleep*, New York, NY: Penguin, 2002, 160.

9 Jim Michaels, 'Iraqi forces in Mosul see deadliest urban combat since World War II', *USA Today*, 29 March 2017, [Updated 30 March 2017], available from: www.usatoday.com/story/news/world/2017/03/29/united-states-mosul-isis-deadly-combat-world-war-ii/99787764/.

10 United States Agency for International Development (USAID), 'Iraq: Complex Emergency', Fact Sheet #4, Fiscal year 2017, Washington, DC: USAID, 9 June 2017, 1, available from: www.usaid.gov/sites/default/files/2022-05/2021-09-30_USG_Iraq_Complex_Emergency_Fact_Sheet_4.pdf.

11 Mosul population taken from *Demographia World Urban Areas*, 15th edn, 27. Not surprisingly given recent and ongoing security challenges in Iraq, estimates of Mosul's population vary considerably, from just above 1.6 million to more than 2 million.

Though casualties inflicted on Iraqi Security Force units in East Mosul would result in greater reliance on firepower when attention turned to the city's western environs:

> in Mosul, the Iraqi military constrained the use of airstrikes and artillery fire; limited the role of PMF [Popular Mobilization Forces, which had been accused of abusing Sunni members of the population in Fallujah]; and put in place a 'humanitarian concept of operations' intended to ensure that internally displaced persons (IDPs) received life-saving assistance and respectful treatment.[12]

Nearly 531,000 of the city's residents had already been displaced as the battle continued in its final weeks.[13] Removing these urban refugees from danger was only the first step. Months of abuse and deprivation under the ISIS regime meant children had to be screened for malnutrition and the population in general checked for and vaccinated against disease, provided safe drinking water and protected from personal violations such as forced evictions, arbitrary detention, collective punishment and restricted freedom of movement as various parties sought to pursue their political and ethnic agendas.[14] Most NGO personnel worked in IDP camps somewhat distant from the fighting. We know willingness to cooperate varied considerably. Médecins Sans Frontières was among the organisations that reportedly refused to assist in trauma centres on the front lines because they would have had to rely on military transport or otherwise work with armed forces' assets. They did support relief efforts elsewhere. Other individuals and organisations fortunately recognised that military assets were insufficient to address the massive scale of IDP needs and understood the value of closer civil–military cooperation. Medical personnel from New York City hospitals were notable for their service at Mosul's front lines. Grande reflected that most such frontline medical personnel were not from traditional or legacy NGOs but from those formed explicitly for responding to the disaster at hand.

Relief activities during the fighting ultimately included construction of 19 emergency camps on the outskirts of the city. Establishing and maintaining routes between the camps and Iraqi combat forces were essential to safe evacuations. Coordinating with military officials to reduce the chances the tempo of battle would overwhelm screening, medical

12 SREO Consulting, 'Lessons Learned Study on UN Humanitarian, Civil–Military Coordination and Stabilization Efforts in Mosul', January 2019, 4.
13 USAID, 'Iraq', 1.
14 ibid., 3–4.

care or camp capacity meant dealing with a system of many parts. Camps were more than merely places of refuge, shelter, medical assistance and sustenance. Additional services included preventative healthcare, education and jobs. Yet, the distance between these locations and the front lines meant anyone wounded or injured would exceed the 'golden hour' threshold deemed vital to timely treatment if they awaited completion of their move to camp facilities. Civilian providers staffed stabilisation and triage points closer to the fighting, providing interim care. These medical nodes moved when necessary to stay as close as feasible to advancing fighting forces.

Grande highlighted three factors underlying this approximation of successful orchestration. First, UN civil–military officials directly embedded with Iraqi Security Force civil affairs cells. They additionally worked closely with Iraqi Security Force planners and representatives from units in the field to ensure combatant and aid provider efforts were synchronised in terms of timing, movements and allocation to facilities with available capacity. Second, early establishment of personal connections with Iraqi Security Force and other personnel helped smooth the wrinkles that are inevitable when many organisations work together—an end accomplished even under the intense pressure of ongoing combat and mass IDP movements. Finally, military representatives and civilian humanitarian providers shared a concept of how to conduct operations—an exceptional situation that demonstrated the extent to which the various parties sought to meld their very different functions. Unfortunately, the number of casualties among the better-trained units fighting in East Mosul meant those committed to the twisted-street, hyper-dense urban environment of West Mosul were less prepared for urban combat. Though the Iraqi Prime Minister's Office repeatedly called for its armed forces to prioritise noncombatant protection, including restraint in the use of heavy weaponry, these calls were not accompanied by rules of engagement specifying which weapons the Iraqi Security Forces should restrain from using. The result, articulated by an Iraqi colonel in his army's 15th Division, was that those doing the fighting 'were told to reduce civilian casualties but [were] not told how to achieve that'. The lack of training in some units committed to West Mosul meant their members were also unaware of the effects of various munitions on urban structures, further complicating estimates of damage before calling for support.[15]

15 Center for Civilians in Conflict (CIVIC), *Policies and Practices to Protect Civilians: Lessons from ISF Operations against ISIS in Urban Areas*, Report, Washington, DC: CIVIC, 1 October 2019, available from: civiliansinconflict.org/publications/research/policies-practices-to-protect-civilians/.

Despite these variations during combat operations, civil–military cooperation continued during post-fighting recovery. The conditions encountered merit recalling in some detail given the likelihood of them being confronted again. Pehr Lodhammar's experiences while a UN mine-clearing manager reinforced Lise Grande's description of the mutual support between NGOs, IGOs and members of the Iraqi Security Forces while providing a vivid description of the conditions under which he and his colleagues worked:

> Mosul was my first urban experience. It was a shock given the amount of debris … It was very different than what we had seen and the industry at large had seen. Mine-detecting is normally flat, two-dimensional. In Mosul, we were working with debris, human remains and many devices we had never seen before, mostly improvised explosive devices … Let me focus on Al Shifa Hospital. It used to be the second most modern hospital in Iraq. It was actually a hospital complex with a blood bank, teaching hospital and other facilities. It was initially used as a hospital by ISIS for its warriors and their families only, then as a headquarters as it could look from the old city in Western Mosul into Eastern Mosul. That is the first time we encountered human remains. When we first started clearing debris, we found the remains of ISIS fighters, often with suicide vests still on … There were a lot of technical challenges with debris … We had to use armoured machinery. We are very conservative in the mine-clearing community and I had to force contractors to use it. Now we use it everywhere. And we had to use hook-and-line sets to move doors, furniture [as a precaution against booby traps]. It was extremely time-consuming. Highrise buildings [were another challenge]. Normally you clear by square metres. How do you do it in a building like the nine-storey Al Shifa Hospital?
>
> There were also technology challenges. I wanted to use drones with cameras to look around corners and buildings. Because ISIS had used explosives dropped from the air, I couldn't get permission. People began to twitch when they saw drones. The government didn't allow them to be imported because they might be misused, though ISIS also built their own. The Iraqi Government didn't want drones flying along filming everything. The Iraqi Government is very cautious about how they manage information.
>
> I would come back and shower and would still stink. I had seen bodies before, but never to that extent … Mosul was apocalyptic.[16]

16 Lodhammar, Skype interview.

These collective efforts represent a far cry from that comment 10 years earlier when a fellow conference attendee declared that achieving a comprehensive approach during an operation is impossible. Maybe it's the passage of time. Maybe it's recognition after missteps in Iraq and Afghanistan that pursuing such an approach is no longer optional. Then again, maybe the effort at orchestration in and around Mosul was a one-time achievement rather than an emerging trend.

Both the frequency and the severity of urban catastrophes will worsen. We can blame Mother Nature's cruel streak for Hurricane Sandy, the Fukushima Daiichi nuclear disaster or the devastation Covid-19 wrought on urban areas, but we'd be fooling ourselves. In the first case, it was a failure to recognise (or admit) that the consequences of climate change are already on us, that sea levels are rising, will continue to rise and thus will make bad storms worse. It is unquestionably a red flag given the United Nations tells us 14 of the world's most populous 19 cities are on the coast.[17] In the case of Fukushima, we saw the all-too-common shared neglect of not recognising that generators, electrical power panels and other features key to flood prevention or mitigation are an invitation to failure when not positioned well above historical 100-year flood levels. In the third case—the devastation wreaked by Covid-19—evidence suggests that acting on exercise recommendations, awareness of historical events such as SARS and better leadership could have saved thousands if not tens of thousands of lives nationwide, many in urban concentrations.

The developing world's urban populations grew by an average of 1.2 million people a week in the first decade of this century. That's just a tad less than Europe's urban growth for an entire year.[18] And while declarations that megacities in these countries exist on the razor's edge of chaos may be overstated, there are undoubtedly challenges. It took the United Kingdom 120 years to see its population go from 17 per cent to 39 per cent urbanised. The United States took 80 years. China took 40, reaching that mark in 2003;[19] by 2019, it was 60 per cent urbanised.[20] Many of the developing world's megacities have had similarly frantic rates of growth compared with the gradual development of Tokyo or Europe's largest urban areas. Though the newly arrived may not suffer from

17 UN-Habitat, *State of the World's Cities 2012/2013*, 90.
18 ibid., 28.
19 ibid., 44.
20 Joel Kotkin, 'China's urban crisis', *City Journal* (Spring 2019), available from: www.city-journal.org/chinas-urban-crisis.

deliberate and official exclusionary policies as do urban immigrants in China, they are likely to share that country's unemployment (or frustrating underemployment) of educated youth. Real estate costs and the inability to secure confirmation of landownership are other potential sources of friction. More an issue in China's larger cities than in most countries is the fact that a severe drop in property values could precipitate unrest in years to come (as Chinese tend to invest in property in lieu of stockmarkets). China's exceptionalism in this instance is again extreme, with roughly one in every five housing units in some cities owned but unoccupied. A potential upside: as in London, New York and other investment-popular megacities, those vacant properties could house the displaced were disaster to strike.

## Parts to wholes: The future megacity as a system and subsystem

> Megacities add an incredible layer of complexity to all operations.[21]
>
> —General Robert B. Brown, US Army

> When you build a thing you cannot merely build that thing in isolation, but must also repair the world around it, and within it, so that the larger world at that one place becomes more coherent, and more whole; and the thing which you make takes its place in the web of nature.[22]
>
> —Christopher Alexander et al., *A Pattern Language*

Megacities are growing ever more complex. Links within and between them span the spectrum from individual ties to those involving international conglomerates and heads of government. It was but a few decades ago that communications supporting these interconnections were measured in terms of days, the exceptions being pricey telephone calls, couriers and a few other means of communication limited by inconvenience or cost. Now the world's billions communicate one-on-one, one-on-many (think Twitter, Zoom or Teams) or many-on-many formally and informally—with information factual or fabricated, legitimate or criminal—all

21 Robert B. Brown [General, US Army], Presentation to Current and Future Operations in Megacities Conference, US Army Pacific Command, Tokyo, 18 July 2019.

22 Christopher Alexander, Sara Ishikawa and Murray Silverstein, *A Pattern Language: Towns, Buildings, Construction*, New York, NY: Oxford University Press, 1977, 13.

but instantaneously. Economic, social and diplomatic ties promote interdependency even as they inform, inspire, misinform or mislead. Increasing societal complexity has complements in the physical arena that are sometimes hidden from view and thus less recognised. Recall the previous description of underground features in Tokyo, which has an uninterrupted 4 kilometres of commercial and public facilities beneath the megacity's surface.

Improved and expanded ways of communicating can ease disaster preparations. Other evolutions are not as helpful. Those subterranean features add another dimension to post-calamity recovery. When breaks occurred in those waterlines that remained largely intact after World War II bombings, it tended to be where the lines joined buildings rather than long stretches elsewhere. Urban areas' outward spread means megacities are likely to be built on—and through—many soil types. Features spanning these differences are especially vulnerable to tearing or twisting as shock waves affect unalike materials differently. Flooding will have its own varying effects, devastating underground commercial spaces while having less effect on many aboveground properties.

Viewing recovery from a systems perspective should ease calamity's costs. Tokyo's massive flood-control system north of the city has dramatically reduced the risk of damage in the megacity's low-lying areas even as buildings, streets and sidewalks seal more ground with impermeable materials such as concrete and asphalt. The Metropolitan Area Outer Underground Discharge Channel, as it is known, routes excessive rainwater away from the downtown area via 6.3 kilometres of underground channels with pumps that can evacuate the equivalent of a large swimming pool every second, eventually dumping the water into the Edo River.[23] Hong Kong has a similar underground system, with one of its subterranean drainage tunnels running for 10.5 kilometres—roughly half the length of Manhattan.[24] But the impressive flood-control system cannot completely undo the local effects of humankind ignoring the need for rainwater runoff. Localised events known as 'guerilla rainstorms' still submerge parts

23 David Wogan, 'This massive underground complex protects Tokyo from floods', [*Plugged In Blog*], *Scientific American*, 29 October 2013, available from: blogs.scientificamerican.com/plugged-in/this-massive-underground-complex-protects-tokyo-from-floods/; and 'Floods in Tokyo and safety tips and preparation', *realestate-tokyo.com*, 28 February 2020, [Updated 18 May 2022], available from: www.realestate-tokyo.com/living-in-tokyo/emergency-disaster/flood-in-tokyo-japan/.

24 James Griffiths, 'Hong Kong's vast $3.8 billion rain-tunnel network', *CNN Style*, 26 July 2020, available from: www.cnn.com/style/article/hong-kong-tunnels-climate-crisis-intl-hnk-dst/index.html.

of Tokyo when heavy downfalls overwhelm drainage. Miami is among the other cities similarly suffering from these severe microbursts, which are defined by one source as extreme rainfall totalling between 50 and 100 millimetres (2 to 4 inches) falling in a concentrated area within an hour.[25]

## The future of control in megacities

> Polarized politics also reproduce the power of the *mastans*. Motiar Rahman, a police officer, describes the *mastans* as 'thugs committing a wide range of crimes such as taking meals in restaurants without payment [and] forcible extraction of tolls and subscriptions … Some of them have made [a] fortune by grabbing real estate property, shops, buses and trucks … [They] extort huge amount[s] of money from businessmen, contractors and others [and] no one dare[s] to oppose [them] or to lodge complaint[s] with the law enforcement authorit[ies] for fear of retaliation.' The power of *mastan*s … mainly comes from their impunity … Politicians make constant use of the *mastans* to enforce conformity or obedience within parties.[26]
>
> —Imtiaz Ahmed, 'Dhaka'

> The young consume.[27]
>
> —Darrell Bricker and John Ibbitson, *Empty Planet*

The income gap between rural and urban residents in the United States is 4 per cent, with those living in urban areas being that much richer.[28] In China, the difference is 63 per cent. When you read of the rise of the Chinese middle class, you are reading overwhelmingly of those who possess the highly desirable urban *hukou* ('household registration', or residence permits) that allows them to take full advantage of city living. If you are reading of the country's millionaires, chances are nine in 10 that the person mentioned has a senior family member occupying a high-level government position. The best Chinese universities (the top 1 per cent) are in the country's largest and wealthiest cities such as Shanghai and Beijing. They provide those with local *hukou* a disproportionate number

25 Ariza, *Disposable City*, 43; Kumagai and Nojima, 'Urbanization and Disaster Mitigation in Tokyo', 67; and realestate-tokyo.com, 'Floods in Tokyo and safety tips and preparation'.
26 Ahmed, 'Dhaka', 19.
27 Bricker and Ibbitson, *Empty Planet*, 82.
28 Material in this paragraph is primarily drawn from Kotkin, 'China's urban crisis'; and 'Worlds apart: Hukou reform', *The Economist*, [London], 23 August 2020, 35–36.

of places. In general, only 0.3 per cent of rural students are accepted by those top 1 per cent of institutions while 2.8 per cent of those with urban papers get a slot.[29]

Internal migration brings Chinese to cities in search of fame and fortune, or simply survival, and those not granted urban *hukou* are not legal residents of their chosen urban area. They can expect to be denied healthcare, housing subsidies and unemployment insurance. They and their families are unlikely to have access to formal education. Children adopted from the countryside can be denied education even if the adopting family has urban *hukou*.[30] Only a little more than one in every four of these disenfranchised has insurance should they be injured—despite them tending to be less likely to be able to afford care and often being employed in dangerous jobs like construction or manufacturing as other work is denied them. Of the estimated 850 million urban-dwellers in China, more than one-quarter (roughly 230 million) lacks *hukou* for the city in which they reside. Others might live in a town or city but hold *hukou* for a different urban location. Overall, an estimated 376 million Chinese live in a location other than that listed on their paperwork.[31] Yet, the allure of urban living is popular even for those handicapped by national policy. A decades-long research effort measured rural Chinese youngsters' cognitive development and found more than half were delayed due to undernourishment, anaemia (impacting concentration) or intestinal worms (which can make the victim lethargic). Intellectual development can also be impaired in life's earliest stages. Whereas urban infants and toddlers have frequent and substantive interaction with adults, the very young in rural areas are often strapped to their grandmother's back as the adults toil all day, allowing little intellectual stimulation. The combined result: many of the cognitively delayed 50 per cent are unlikely to achieve an IQ of 90 (only 16 per cent score as poorly in typical populations). Other obstacles compound these disadvantages further. One-third of children aged 11 or 12 with poor vision did not wear glasses. The fact that schools in rural areas are often second class in terms of quality exacerbates the problems. Private schools in cities (often the only alternative for children lacking urban *hukou*) tend to be expensive and substandard compared with both public facilities available to urban *hukou*-holders and those in rural areas, meaning children are left behind in rural areas when

29 'Serve the rich: Inequality in education', *The Economist*, [London], 29 May 2021, 36–37, at 36.
30 Chaguan, 'Crossing blood lines', *The Economist*, [London], 6 June 2020, 34.
31 Chaguan, 'New life for an old tradition', *The Economist*, [London], 22 May 2021, 36.

one or both parents moves to take advantage of better-paying urban work or seeks employment when none is available rurally.[32] National officials have tried to lure many of these 230 million to lesser cities with promises of *hukou* there. Their efforts have met limited success. Megacities like Beijing and some provincial but booming larger urban areas such as Xi'an (population 13 million) and Chengdu (more than 16 million) offering big-city amenities are the ones that instead attract. China's nosedive from 'highly egalitarian' to equality ratings lower than for almost all of Europe, the United States, Brazil and Kenya is by and large an urban-based phenomenon.

Efforts to control aspects of urban life are rarely so heavy-handed in the developed world's megacities. The largely voluntary nature of attempts to control abuses on social media provides a case in point. Despite the potential benefits of social media as a source of understanding and guidance, its use in post-Fukushima Tokyo and confusion during US efforts to inform about Covid-19 remind us of the challenges that remain in providing consistent guidance if public and private authorities fail to coordinate their messaging. There are steps that can be taken to improve consistency—for example, designating a single point of contact in a city's emergency operations centre as the purveyor of information. Without consistency from trusted sources, rumours will be believed as fact, criminals will manipulate audiences for profit or political or diplomatic gain and simple irresponsibility will undermine effective responses. This misinformation and disinformation are potentially far more damaging than crying 'Fire!' in a crowded theatre. Yet, both laws and effective means of controlling irresponsible communication lag the tools available to protect the naive or ignorant and rein in the malicious. Fellow social media users—including those from traditional media—constitute the first line of defence. Akin to *first* first responders in neighbourhoods, responsible platform users need to step (or finger) forward and draw attention to falsehoods or other misuse. They can also serve fellow residents by spreading rebuttals or corrections to information found to be untrue. Such reactions cannot hope to completely undo the damage, but they will

32 'Trouble in the country: Human capital', *The Economist*, [London], 23 January 2021, 66–67; Ai Yue, Yaojiang Shi, Renfu Luo, Jamie Chen, James Garth, Jimmy Zhang, Alexis Medina, Sarah Kotb and Scott Rozelle, 'China's invisible crisis: Cognitive delays among rural toddlers and the absence of modern parenting', *The China Journal* (78) (2017), doi.org/10.1086/692290; and Scott Rozelle and Natalie Hell, *Invisible China: How the Urban–Rural Divide Threatens China's Rise*, Chicago, IL: University of Chicago Press, 2020, 8–9, 156–57, doi.org/10.7208/chicago/9780226740515.001.0001.

help to mitigate misinformation having far longer and faster legs than its less-intriguing truthful companions. (A Hong Kong newspaper drew on an article in *Practical Preventative Medicine* to report that 'coronavirus can travel twice as far as official safe distance'. The journal retracted the article the day after it appeared in the newspaper. Only 1,000 readers re-sent the newspaper's immediate publication of the *Practical Preventative Medicine* retraction versus the original information having been shared 53,000 times on social media.)[33]

Traditional media representatives still reach audiences social media does not. Unfortunately, they too often fall victim to 'if it's on the internet it must be true' gullibility no less than wrong-headed smartphone re-broadcasters. The challenge is not to control social media. Rather, it is to make it as much a power for good in times of crisis as it is day to day in providing a way for individuals to reconnect with friends and relatives. A bit of good news: younger smartphone users tend to be more discerning than those in older age groups. They should thus be able to act as a brake on social media misuse if they so choose—or be convinced of the importance of doing so by urban officials.

Success in controlling corruption in the aftermath of a megacity calamity remains an unmet challenge. Medusa's head has fewer snakes than the serpents that sprout post catastrophe. Measuring success by the number of dollars spent, as was the case in Iraq and Afghanistan, was fundamentally flawed, just as was the United States measuring progress in Vietnam by counting the number of enemy killed. Both inspired behaviours that were counterproductive to strategic objectives. Measures of effectiveness are great motivators—for ill or good. Humans want to be recognised. They therefore find ways to stand out in meeting their seniors' standards of excellence. Unfortunately, for some, this encourages deliberately misleading actions like counting civilian deaths in addition to those of the enemy when the measure is body-count or being less discriminating than should be the case when it is dollars spent. Zero corruption is an unattainable goal even in more honest societies, but there is a need to set limits on what is tolerated.

33 'Reaping from the whirlwind: How Covid-19 is changing science', *The Economist*, [London], 9 May 2020, 62–63, at 63.

The preceding pages suggest that prevention of another sort can reduce the number of megacity disasters and the consequences of those that cannot be avoided. Jakarta's maximum rate of ground subsidence in the mid-1990s nearly tripled from that of the decade before, from 9 centimetres a year to 25 (from about 3.5 inches to 10 inches). Little wonder the national government is looking to move its capital. Yet, Jakarta has been Indonesia's strongest attractor of foreign investment in part due to higher-quality infrastructure, access to local and international markets, concentration of skilled labour and its spirit of entrepreneurship in addition to the presence of the country's decision-makers. Duplicating all but the last will not be easy. Foreign investment goes where there is money to be made. Perhaps it is too late to recover from bad decisions in Jakarta (the capital's green space went from more than 35 per cent of the city in 1965 to less than 10 per cent in 2011).[34] Some of the most important lessons one megacity can offer another are mistakes to avoid.

## The future of the megacity comprehensive approach

> Cities have been perceived as the 'engines' of national economies and there is no reason to depart from that view.[35]
>
> UN-Habitat, *State of the World's Cities 2012/2013*

> Support of noncombatants can divert resources from mission-related activities. For instance, a combat operation that displaces a significant number of residents, or disrupts critical public works functions, might necessitate redirecting unit resources away from their originally intended recipients, as it did when Allied Forces liberated Paris in 1944. During that operation, fuel supplies and supply aircraft scheduled to be used for an Air Transport Command training exercise had to be diverted in order to haul necessary commodities to the city.[36]
>
> —Jamison Jo Medby and Russell W. Glenn, *Street Smart*

34 Hasanuddin Z. Abidin, Heri Andreas, Irwan Gumilar, Yoichi Fukuda, Yusuf E. Pohan and T. Deguchi, 'Land subsidence of Jakarta (Indonesia) and its relation with urban development', *Natural Hazards* 59(1753) (December 2011), doi.org/10.1007/s11069-011-9866-9. Also see Sausan Atika, 'Amid shortage of land, Jakarta eyes more green spaces', *The Jakarta Post*, 21 October 2019, available from: www.thejakartapost.com/news/2019/10/21/amid-limited-land-availability-jakarta-eyes-more-green-spaces.html.

35 UN-Habitat, *State of the World's Cities 2012/2013*.

36 Medby and Glenn, *Street Smart*, 34.

Cities—and megacities in particular—hold our attention, sometimes to the detriment of other areas that are in greater need of assistance. NATO forces focused their early relief efforts on Sarajevo during the violence that wracked Bosnia-Herzegovina after it broke away from the former Yugoslavia during the late 1990s. The same characteristics that motivated the new capital receiving much of the early disaster support made it attractive to the media: a high concentration of people, better lodging, the density of newsworthy stories, communications superior to those in more remote areas and other features or comforts. A prominent television reporter from a US network positioned herself in front of a cemetery and spoke of the city's depravations. The problem was that Sarajevo was by that point in better shape than Bosnia-Herzegovina's smaller cities, towns and other regions. Priorities for aid delivery had already begun to shift to those more in need. The pressures resulting from the news broadcast nevertheless saw the redirected aid redirected again—this time, back to the capital.

There was likely good reason to give Sarajevo initial primacy. That time had passed. The first quotation opening this section rightly notes that a nation's welfare is closely tied to its dominant urban areas. That should not mean ignoring the larger system of which the urban area is a part. Media sources are ideally part of efforts to create a comprehensive approach when dealing with the consequences of a megacity disaster. Responsible members of that community should adapt their reporting to conditions on the ground just as will other instruments in the response orchestra. Their representatives travelling within and beyond the urban area are potential sources of information that could benefit aid allocation.

## Future megacity capacity

> Success in a campaign and victory over one's enemies are great things. It requires much greater skill and caution to use such successes well. Accordingly, you will find that those who have gained victories are many times more numerous than those who have made good use of them.[37]
>
> —Polybius, *On Roman Imperialism*

37 Polybius, *On Roman Imperialism*, trans. Evelyn S. Shuckburgh, Lake Bluff, IL: Regnery Gateway, 1987, 268.

> Brilliance attracts brilliance.[38]
>
> —Garth Gibson, Toronto Vector Institute

*Jeopardy* answer no. 1: 'This European megacity is the continent's most prone to tidal flooding.' Correct question: 'What is London?' We have already noted that by 2030, the Thames Barrier's ability to protect the UK capital against extreme surges will be dubious.[39]

*Jeopardy* answer no. 2: 'Two million of this Indian megacity's current population is exposed to coastal flooding.' Correct question: 'What is Kolkata?' By 2070, that number is projected to increase sevenfold.[40]

A partial list of megacities similarly threatened by sea-level rise: our already-mentioned New York City, Tokyo, Dhaka, Lagos, Shanghai, Bangkok and Jakarta. Ho Chi Minh City is another.[41] We know it's not sea-level rise that kills you (not yet for any megacity anyway). It's when the effects of those skulking parts-of-a-millimetre increase over time and combine with a typhoon, hurricane, micro-storm, tsunami or earthquake that nature and humankind's missteps bring the full brunt of devastation to bear. The 'sea-level rise effect' might be thought of in the same light as the butterfly effect. Those millimetre rises in ocean levels year to year help to flood your second floor during a storm, but the link between those millimetres and your floating furniture is far more direct than that between insect and tornado. How much of a megacity is on higher ground is a factor. So, too, is how much lies below sea level. Sea-level rise is not equally distributed around the globe; some places will see dramatic increases in the decades to come while others will experience but a fraction of what the less lucky suffer.[42] Previous estimates of which megacities will see how much rise cannot be trusted. Changes in the rate of global warming combine with other factors, meaning estimates (and any plans based on those estimates) need to be checked and rechecked to ensure the original assumptions

38 As quoted in Clive Thompson, 'North Star: The American dream is alive and well—in Canada', *WIRED*, September 2020, 16–17, at 17.

39 Parker, 'Disaster Response in London', 214.

40 Williams and Selle, *Military Contingencies in Megacities and Sub-Megacities*, 23.

41 ibid., 23.

42 For one analysis of variable sea-level rise affecting the United States, see W.V. Sweet, Robert E. Kopp, Christopher P. Weaver, Jayantha Obeysekera, Radley M. Horton, E. Robert Thieler and Chris Zervas, *Global and Regional Sea Level Rise Scenarios for the United States*, NOAA Technical Report NOS CO-OPS 083, Silver Spring, MD: National Oceanic and Atmospheric Administration, January 2017, vii, available from: tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf.

remain valid.[43] Nine of the top-20 urban areas thought to be vulnerable to the greatest economic losses due to flooding have populations that exceed 10 million: Guangzhou (1), New York City (3), Mumbai (5), Shenzen (9), Osaka (10), Tianjin (12), Ho Chi Minh City (13), Kolkata (14) and Jakarta (20).[44] Several of these qualify for our definition of megacities. Knowing the extent of a threat can help the responsible official deny building permits for vulnerable land and take other precautions before the combination of sea level's slow rise and a sudden shock of nature's choosing next occur. Adding to the risk: we expect global warming to worsen the consequences of future hurricanes and cyclones as well as the number and severity of future rainstorms generally.[45] Tie this to ageing populations and the expected extent of harm starts climbing. The fact that Covid-19 disproportionately ravaged the old and underserved in the United States is well known. It should not have been shocking news; three-quarters of those dying in conjunction with Hurricane Katrina were aged over 60; half were over 75 years of age.[46] Pre-existing health issues and limited mobility account for most of that vulnerability. Human nature plays a role as well. As with Tokyoites who claim they will ready their homes for an earthquake after the next one comes, individuals worldwide tend to believe that because they survived the last disaster they will do so during the next.[47]

Residents refuse to leave for many reasons in addition to the 'it won't happen to me' syndrome. One is the justified fear that their vacant home will become a magnet for thieves—another form of a vacuum attracting humankind's bottom-feeders. Pre-disaster exercises should reveal how long the mobilisation of the National Guard or international equivalents will take such that evacuated neighbourhoods are not left open to criminals. Those rehearsals are also opportunities to identify relevant laws that will affect tough decisions. Rules of engagement allowing soldiers to shoot armed looters suppress the problem as the unarmed fear the consequences of continuing. Some will surely find this solution extreme. Failing to deal

43 ibid., 9.

44 Stephane Hallegatte, Colin Green, Robert J. Nicholls and Jan Corfee-Morlot, 'Future flood losses in major coastal cities', *Nature Climate Change* 3 (2013): 802–6, at 803, doi.org/10.1038/nclimate1979.

45 Union of Concerned Scientists, *Overwhelming Risk: Rethinking Flood Insurance in a World of Rising Seas*, Report, Cambridge, MA: UCSUSA, August 2013, [Revised February 2014], available from: www.ucsusa.org/global_warming/science_and_impacts/impacts/flood-insurance-sea-level-rise.html#.WZsrCXeGO8o.

46 Ripley, *The Unthinkable*, 28.

47 Miles, *Super Storm*, 187.

with looting that resulted in setbacks to recovery measured in months and sometimes years in 2003 in Iraq suggests that such harsh measures may be justified in the interest of longer-term stability and lives saved thanks to preserving essential public services. The decisions will always be difficult. Crisis-savvy leaders know that at times even the best course of action available is a poor one.

Well-written plans and other preparations mean leaders make these tough judgements armed with better information. Being savvy means avoiding mistakes based on misguided assumptions. Sending ambulances and other full-size vehicles to an urban area where motorbikes and bicycles rule the roads finds aid providers sitting in traffic as those in need expire. Getting there quicker with less could be the better choice. Rehearsals and plans must consider how to handle evacuations. Estimates are that only about 10 per cent of residents go to shelters. The rest head out of a city—another argument for keeping megacity populations informed so that some can opt for early departure, hopefully reducing the worst traffic jams. One estimate suggests roughly 24 hours is a 'safe clearance time' for New York City residents relying on cars or mass transit. The time needed for the city's hospitals, assisted care facilities and other facilities to evacuate the less mobile is more like 72 hours.[48] Actual times for New York and other megacities will depend on the extent of notice given, the portion of the population owning cars, the quality of public transportation systems and the day of the week (workday, weekend or holiday). Preparing a megacity population for no-warning or short-warning events such as tsunamis, earthquakes or volcanic eruptions is equally important but more difficult. Pre-event rehearsals are not for officials alone. Schoolchildren in one community were not evacuated to nearby high ground despite early warning of the approaching tsunami that struck communities north of Tokyo in 2011—with tragic results. In contrast, those practise evacuations of highrise apartment buildings in Mexico City mean residents know how to exit their building and where to go to reduce the chances of injury. Similarly, initiatives like that of forming and regularly holding meetings of key emergency planners and responders promote common understanding and standards across many of the authorities that together make up the megacity. The governor of New Jersey directed evacuation before Hurricane Sandy's landfall. We noted that the mayor of New York City was less timely with his

48 ibid., 271.

decision, undermining rather than underlining the decision made by an authority whose area of responsibility (the State of New Jersey) included parts of what is the megacity of New York.[49] A further caution: simply providing information is no guarantee that those on the receiving end will know what to do with it. A study into Tokyo's excellent and potentially very valuable disaster hazard maps revealed that 9 per cent of residents had a copy posted on their wall at home, while 11 per cent often checked their map. The remainder had a map but never looked at it, had not bothered to get a copy but knew they could or—despite public awareness campaigns—had never seen or heard of this resource.[50] Efforts to keep a megacity's population in the know about how to respond to disasters must be a constant process.

## Technology: Part of the solution … but not the solution

> After a devastating earthquake rocked Haiti in January 2010, a Canadian woman trapped in rubble … was rescued after her text message for help reached Canada's Foreign Affairs Department and was relayed back to Canadian authorities on the ground. The Canadian Foreign Affairs minister in his daily briefings told reporters, 'We know where this woman is, exactly.'[51]
>
> —American Red Cross, *The case for integrating crisis response with social media*

> Ion mobility spectrometry (IMS) is used to sniff swabs taken from baggage, clothing, and personal items in searches for those carrying drugs or explosives … In theory, IMS could quickly determine from a sample of breath if someone had an illness such as tuberculosis or diphtheria … If airport trials prove the technology to be reliable, they hope to close the loop by offering it back to hospitals and clinics for the rapid analysis of infectious diseases.[52]
>
> —'Grounding bugs', *The Economist*

49 ibid., 261.

50 Junko Sagara and Keiko Saito, *Risk Assessment and Hazard Mapping*, Learning from Megadisasters Knowledge Note 5-1, Washington, DC: Global Facility for Disaster Reduction and Recovery, 1 July 2012, 12, available from: www.gfdrr.org/en/publication/learning-megadisasters-knowledge-note-5-1.

51 American Red Cross, *The case for integrating crisis response with social media*.

52 'Grounding bugs: Public health', *The Economist*, [London], 20 October 2018, 73.

We know urban areas conspire to defeat technology. Structures break lines of sight, making it hard for rescuers, aid providers or security personnel to see a building only a block away or a passageway but a few inches below their feet. Intersections swirl with channelled breezes, making UAVs vulnerable to drafts that can drive them into the ground or nearest wall. Summer heat can cook the innards of earthbound or flying robots. The variety of materials in walls, ceilings and floors not only cripples voice communications, but also disrupts signals between operators and those UAVs and unmanned ground systems, defeating efforts to overcome the urban blindness caused by visual barriers. Warmer days saturate layers of clothing and fog face shields for humans draped in firefighting or protective gear guarding against hazardous materials or disease. Sweat that cannot be wiped runs into eyes. Add post-quake tumbled-down structures or collapsed subsurface features and even the most sophisticated of human or robot finds the going hard if not impossible.

Technology can help first responders find, get to and save victims' lives regardless of the handicaps. Despite their limitations, ground-based or flying robots can go where no human can go. Should war impose itself, the innocent benefit from weapons able to strike only the target in the fifth window from the left on the eighth floor of a building, unlike during previous conflicts in which the entire structure would have to come down. Increasingly, rescuers and soldiers alike can 'see' through walls or beneath tonnes of debris thanks to x-ray, acoustic, chemical-detection or other technology designed to overcome building materials' efforts to deny rescuers information. Software already helps filter data to separate information-rich wheat from irrelevant chaff. AI will soon make that software even savvier. Which parts of the megacity will be worst hit by the ash plume from the volcano? Which parts are downwind from a drifting radiation cloud? How might damage to the water supply be overcome to supply neighbourhoods currently deprived? Being able to quickly compile information during or after a catastrophe and mine the ore contained therein mean not only having the hardware and software in place before it is needed but also knowing what questions to ask.

Getting the information to the right audiences will be tougher yet. Even a large chemical release will not threaten an entire megacity. It could be deadly for thousands in its path, however. Timely guidance to the potentially exposed will be vital. The panic following a blanket warning to an entire megacity population could result in more injuries and deaths than suffered among potential downwind victims. Recalling the roughly

80 per cent of sympathetic casualties during the Tokyo nerve agent attack, population-wide messaging could also cause an overwhelming of medical facilities, depriving the truly needy of care. The IDF works with telecommunications companies to provide pinpoint messaging to individuals or neighbourhoods,[53] but not everyone has a mobile phone. Some people do not use Facebook, Twitter, Instagram or other platforms (I know, Gen Xers; it's hard to believe). Others will be deaf or blind. Touching select audiences means using multiple ways of getting the word out when power and mobile phone services are up and otherwise (the 'how' of messaging). It will also require the expertise needed to design effective message content (which is fundamental to maintaining control, avoiding panic and distributing aid burdens across available assets) and determine who gets what information and when they need to get it. Political advisors and marketers will have a role. Michael Bloomberg's 2001 run for mayor of New York City demonstrated:

> a much finer level of detail in his telephone survey than most campaigns can afford. In turn, the team could develop direct mail pieces targeted to small demographic groups with very specific concerns [to include] pamphlets and fliers with carefully considered images and messages to individual voters chosen to receive them.[54]

Social media and more sophisticated use of data now provide new ways of reaching out to chosen audiences—ways that might complement or replace those tried and true from previous generations. The future holds possibilities already under consideration but thus far only the stuff of movies or television: holograms able to wander neighbourhood streets providing guidance—perhaps featuring national or local personalities pertinent to local demographics or changing depending on the age, gender or other audience features as the hologram walks its beat. Elsewhere it might be police using flawless portable voice translators or 'god voice' area delivery of information. Theme-park experts and others used to dealing with multicultural audiences have insights regarding effectively addressing both individuals and mass gatherings. As Fukushima again reminds us, achieving (and maintaining) consistency in those messages and defeating deliberate misinformation and disinformation efforts adds to the challenges.

53 Glenn, *Short war in a perpetual conflict*, 15, 53.
54 McNickle, *Bloomberg*, 35.

We are able only to dip a toe into technology's future in these pages. Some capabilities will be adaptations of those already on hand. The use of binary explosives (where two separate components need to be combined to cause an explosion but neither by itself is combustible) minimises the chances of accidental detonation as occurred in the Port of Beirut with the devastation wrought by ammonium nitrate on the Russian-leased ship MV *Rhosus* on 4 August 2020. Binary vehicle fuels would offer obvious benefits.[55] Driverless supply and passenger vehicles, ambulances (air and ground), information collectors and other means of transport will reduce manpower demands and accidents. They might also make finding parking locations more difficult for relief providers as previous lots and garages needed when everyone was driving give way to buildings with better profit margins. These vehicles could be—should be—multipurpose. 'Patrolbots' have already established themselves as security guards;[56] the robots' 'eyes' and 'ears' provide information that reduces dependence on humans. Linking security cameras to ways of communicating with the public (to include, possibly, commercial GPS systems such as Waze or Google Maps) will permit responders and city leaders to cut down on traffic jams during emergencies while routing vehicles and pedestrian traffic away from dangerous hotspots. Capitalising on mobile phone location signals and other real-time data feeds could likewise aid in steering people away from fires and areas known to pose disease or contamination risks or instead direct them to aid distribution points.

AI linked to weather sensors might instantly update chemical or radioactive plume movements and generate warning messages (putting our opening pages' Haruki Akamatsu at ease should the radiation be negligible). Linked to additional sensors, AI's calculations could also account for urban micro-weather phenomena that impact plume direction and potency. Studies in Singapore found that urban vegetation, proximity to water, shade in the lee of tall buildings and other factors determine an urban area's localised heat-island effect and air movement.[57] AI should eventually be able to help in maximising the value of residents' post-disaster inputs that provide information such as the location of individuals

55 Glenn et al., *Urban Combat Service Support Operations*, 77.

56 Jeremy D. McLain, 'Match made in heaven? Or hell?: Megacities and autonomous systems', *Small Wars Journal*, 25 August 2018, available from: smallwarsjournal.com/jrnl/art/match-made-heaven-or-hell-megacities-and-autonomous-systems.

57 Winston T.L. Chow and Matthias Roth, 'Temporal dynamics of the urban heat island of Singapore', *International Journal of Climatology* 26(15) (December 2006): 2243–60, at 2255–56, doi.org/10.1002/joc.1364.

in need of medical care, looting or other crime, fractures in waterpipes or other infrastructure, loved ones or friends looking for lost people or pets and suspicious activities, all while filtering out inputs seeking to deceive. AI to date is better at focusing on single tasks (monitoring and directing water allocation or automobile traffic, for example) than taking into consideration multiple systems' considerations. The potential to take on other tasks is there. Those concerned about access to personal data even for the greater good should find comfort when looking at Barcelona, Spain. Residents in that city have control over what personal information the city government can hold.[58] Participation in Singapore's Ministry of Health–sponsored Bluetooth contact-tracing TraceTogether software (part of a wider epidemiological monitoring system) is likewise voluntary.[59] We earlier noted that Virginia, US, residents can voluntarily download the COVIDWISE app that notifies them if they have been exposed to someone who has tested positive for the virus.

It might be surprising to read that Los Angeles, New York City and other US urban areas lag cities in Japan, Taiwan, China, Mexico, Italy and elsewhere when it comes to earthquake early warning. Reminiscent of the 'Yo!' app used in Israel to warn citizens of an incoming missile or rocket, Japanese mobile phone users are sent text messages warning of impending quakes. California, Oregon and Washington State have a similar but limited system in place that will eventually include smartphone early warning notices via the MyShake app for everyone in potentially affected areas.[60] This is progress, but progress that needs to be shared beyond its current reach. One of the potentially most devastating earthquake zones on the North American continent is that along the New Madrid Fault in the US Midwest. It has a particularly disturbing history. During the eight weeks after an initial quake on 16 December 1811 that struck near Blytheville, Arkansas, the epicentres of subsequent shakes crept progressively north-eastward over a distance of 89 kilometres to New Madrid, Missouri.[61] Currently, MyShake services none of the states or cities along that path.

---

58 'Digital plurality: Are data more like oil or sunlight?', *The Economist*, [London], 22 February 2020: [Special report] 4–6.

59 Gideon Lewis-Kraus, 'Trust fails', *WIRED*, July–August 2020, 62–67, at 65–66.

60 'Ten per cent: Earthquake preparedness', *The Economist*, [London], 3 February 2018, 26; and United States Geological Survey, *ShakeAlert: An Earthquake Early Warning System for the West Coast of the United States*, Reston, VA: USGS, 2016, available from: www.shakealert.org.

61 Barrett K. Parker and H. Quinton Lucie, 'Secondary earthquakes: New Madrid Seismic Zone response during an ongoing emergency', *HDIAC Journal* 4 (Spring 2017): 23–27, at 23–24.

## How bright is the future? Megacity disasters to come

> Mexico's populist president, Andres Manuel Lopez Obrador, is doing little to prepare Mexicans for what is coming [during the Covid-19 crisis]. He continued to travel and hug supporters and encouraged families to visit restaurants, as 'this strengthens the economy.' Other officials are taking the virus more seriously. On March 22nd the mayor of Mexico City shut bars and banned large gatherings.[62]
>
> —'Distancing neighbors', *The Economist*

> Even though danger signs abound in the environment, we believe that no harm can come to us … Our best method for combating drama is to think it already happened … This strange collective delusion allows us to think that we're beyond the apocalypse.[63]
>
> —Juan Villoro, *Horizontal Vertigo*

> History suggests that it is foolish to bet against big cities.[64]
>
> —'Microbes and the metropolis', *The Economist*

We are at a fork in the world's road as I pen these words. Globalisation took one on the chin with Covid-19. SARS had cast a light on the path ahead. That light was apparently too dim to catch the attention of any other than the more astute such as leaders in Taiwan who learned from and adapted policies thanks to history's offerings. That both diseases had their origins in China is not lost on the world. Some believe it is time to reconsider dependency on a country from which promises can prove hollow and partnership dangerous given faulty personal protective equipment, less-effective pharmaceuticals and disrupted supply lines. Ties won't be severed, but near-complete reliance on a partner proven to be less than reliable suggests that the once white-hot vehicle of globalisation might need a tune-up.

Does the world continue business as it was in late 2019 or turn down the thermostat to lend regional rather than global relationships a bit more influence, if not primacy?[65] It's unwise to bet against megacities either

62 'Distancing neighbors: Mexican–American relations', *The Economist*, [London], 28 March 2020, 30, 32.
63 Villoro, *Horizontal Vertigo*, 276.
64 *The Economist*, 'Microbes and the metropolis', 79.
65 'The global list', *The Economist*, [London], 26 January 2019, 19–22, at 22.

way. While ties with select fellow global influencers might fade, others will remain if not strengthen. Covid-19 did not undermine Tokyo's, London's or New York City's status as world financial hubs—though it may have made their stock markets more wary of that in Shanghai as it has with Hong Kong's economic system given recent political machinations there. Regional relationships look more attractive amid the pandemic, but regional isn't what it used to be when it comes to sustainment and access to goods and services. For megacities and other influential urban areas in the coming years of the twenty-first century, 'regional' may imply less in the way of nearby geography and more in terms of partners among the world's primary urban players. New York and London will remain regional partners with the European Union (Brexit notwithstanding). Singapore's region will include much of Asia, Africa and a good part of the world beyond thanks to its dominant role as an international maritime fuel provider on one of the globe's most travelled shipping routes. While South Korea and Japan may warily circle each other on the diplomatic front, their megacities will continue to provide much of what Manila, Ho Chi Minh City and South Asia's most influential urban areas require. Some residents and governing officials in Rio de Janeiro, São Paulo, Buenos Aires, Bogotá and Lima will see less value in dependence on national ties than on those farther reaching. These physically separate but more or less economically, socially and diplomatically linked urban areas often have more in common than they do with other urban areas in their own countries. Plato observed that Greek city-states were scattered along the Mediterranean's shores 'like frogs on a pond'[66] with ties less ethnic than urban and cultural.

Physical dispersion does have its advantages. Where national leaders made (and often mishandled) decisions as they tried to find the balance between protecting their citizens and controlling economic losses during the 2020 pandemic, a global strengthening of ties between megacities—something akin to international urban treaties—offers the possibility of communal support during disasters to come. Cities less affected at one point in time might lend a hand to others during a crisis, knowing those now suffering are likely to return the favour when Mother Nature or humankind turns pandemic, earthquake, flooding, tsunami, terrorism, war or some other screw on their residents and economies. You may say I'm a dreamer, but existing interurban ties show I'm not the only one. Those ties also have

66 Reader, *Cities*, 238.

much to offer in addressing the creeping threats that have taken only a supporting role in the preceding pages. Sea levels are rising. Developed nations' populations are ageing. Pollution and water shortages threaten. Closer ties should reduce the costly learning of lessons already in hand in other megacities. Another rebalancing may be needed to take full advantage of these lessons—one addressing what binds those urban areas to their nation-states.

## Going it alone … sort of: Megacities as semiautonomous substates

> [A]dministratively it would be good for the country's development (to) create city-states and give them the power to undertake development. They should not be under the state governments but rather under their own chief minister or chief administrator or whatever you want to call the position.[67]
>
> —Sheila Dikshit, chief minister of Delhi

> In the world of independence, sovereignty works; in the world of interdependence, it is dysfunctional.[68]
>
> —Benjamin R. Barber, *If Mayors Ruled the World*

New York City, Los Angeles and other large US cities received little aid and even less guidance from Washington during the spread of Covid-19. The federal government was more competitor for resources than facilitator, less a source of insight than of confusion and delay while urban leaders dealt with the crisis. Countries are suffering a loss of productive workers due to low birthrates and ageing populations. Megacities suffer less given their populations are younger than the national average and their attractiveness to educated workers from both their own countries and—immigration laws allowing—others. But those laws too often impede rather than promote megacity (and, by extension, national) progress. Why, then, does Tokyo remain part of Japan, Shanghai of China or London of the United Kingdom—the last, in particular, given its residents strongly favoured remaining in the European Union only to be forced out due to so many non-Londoners favouring Brexit? Given the wealth they generate, the expertise they possess and their role locally, nationally and globally,

67 As quoted in Barber, *If Mayors Ruled the World*, 238–39.
68 ibid., 147.

many megacities could flourish with less interference by state, provincial or national governments. It's not like their country is going to give birth to another megacity that will steal their thunder. On the contrary, as a separate—or semi-separate—city-state, a megacity could control the price of goods and services flowing through its ports, airfields and railyards enough to make any ambitious lesser city fear for its existence. City-states in the Middle Ages worked with power bases such as the Catholic Church and the aristocracy to limit monarchs' power.[69] Some in New York City, including its mayor, contemplated becoming an independent urban republic in 1861 as the Civil War loomed—one that would favour neither North nor South but remain open for business with both and the rest of the world.[70] Singapore was not originally granted independence. The British expected it would remain part of newly freed Malaysia after World War II. Singapore instead opted for separation. When the US Congress refused to fund a Port of Los Angeles expansion and adaptation, City of Los Angeles mayor Antonio Villaraigosa flew to China and received funding not only for the port but also for other infrastructure, casting doubt on those who think megacities rely exclusively on their state or national governments in times of need.[71] As the US population became more urban than rural between the two world wars, historian Arthur M. Schlesinger noted that 'these urban provinces, new to the American scene, possess greater economic, social, and cultural unity than most of the states'.[72] We've already seen that many major urban areas have city-to-city ties independent of the countries of which they are a part. Major urban areas across the United States, disgusted by a White House that backed out of the Paris Agreement on climate change, declared they would ignore federal back-peddling and uphold the agreement's standards. Nor is this assertiveness limited to US mayors. Anies Baswedan, Jakarta's governor, sought to lockdown the world's second-largest urban area despite Indonesia's president refusing such action.[73] While Colombia's capital of Bogotá struggled with Covid-19, the mayor of Medellín, its second-largest

69 Francis Fukuyama, *The Origins of Political Order: From Prehuman Times to the French Revolution*, London: Profile, 2012, 125–26.

70 Timothy Egan, *The Immortal Irishman*, Boston, MA: Mariner Books, 2016, 171. It was not the first time New York City had contemplated leaving New York State. While in 1861 the separation envisioned the city 'becoming a free and open port city', some in 1857 suggested breaking away to become a separate state in the United States to escape Republicans stripping the Democratic mayor of his power. See John Strausbaugh, *City of Sedition: The History of New York City during the Civil War*, New York, NY: Hachette, 2016, 137–38.

71 Barber, *If Mayors Ruled the World*, 97.

72 As quoted in Katz and Bradley, *The Metropolitan Revolution*, 41.

73 'Viral marketing: Indonesian politics', *The Economist*, [London], 6 June 2020, 30–31, at 30.

city, collected data to provide residents with aid and protect communities by denying anyone exposed to the virus use of the subway. The mayor also relied on such information to decide when shops could reopen. Medellín's Covid-19 performance proved exceptional even in a country that initially excelled in its response and despite protests about the data collection.[74] Urban areas' bondage to nation-states can seem more burden than benefit. Preparing for, responding to and recovering from disaster could be better served were megacities more the masters of their own fates. Why not fracture the tie—at least in part? It should not surprise that talk of New York City as a state has again merited consideration in years since the Civil War.

Sure, there would be obstacles. Though the risk of civil war were New York or Los Angeles to declare itself semiautonomous is all but zero—at least in the military sense—the same might be less true in other countries. But negotiations could identify benefits for both megacity and nation-state when ties are not completely severed. Rich as they are, megacities could afford to pay a fee to their former national government for military support when threatened by foreign powers rather than trying to create militaries of their own (though a citizen volunteer corps might be able to handle some of what militaries provide now, including emergency response capabilities). A sufficiently professional law enforcement system would address all but the most extreme challenges from internal or external threats. The megacity–country relationship would ultimately be something like that of cities centuries ago when capitalist merchants provided money that their countries used to raise and maintain armed forces. These agreements benefited the urban wealthy both in terms of interest paid and in the security status provided them as a national banker.[75] Intelligence could be another arena for sharing. We have noted that such exchanges already exist both between megacities themselves (New York and London, for example) and with the countries of which they are a part, though at times the urban area believes it gives more than it receives.

Breaking away, even partially, will sometimes not be an option. The national governments of West Africa's Côte d'Ivoire and Senegal took direct control of their largest urban areas on independence, fearing the

74 'Medellín's medical marvel: Colombia', *The Economist*, [London], 6 June 2020, 25–26.
75 Charles Tilly, 'Cities and states in Europe, 1000–1800', *Theory and Society* 18 (1989): 563–84, at 571, doi.org/10.1007/BF00149492.

cities would de facto replace the state government as the primary hub of power.[76] The same would surely be true of totalitarian governments. China is not about to allow Shanghai or Hong Kong to go it alone (as Beijing's increasingly authoritarian subjugation of the latter shows). Not too far from the control exercised by Côte d'Ivoire and Senegal, China is a country in which party or state authorities appoint mayors (France, interestingly, is another).[77] Despite Moscow's mayors occasionally flashing a bit of in-your-face to the country's plutocrats, the Red Army would be unlikely to stand by as the Republic of Moscow asked for UN recognition or semiautonomy.

More subtle forms of coercion also constrain megacity opportunities to flex independent muscles. Much of how New York City's budget is spent lies not within the purview of its mayor or city council but within the state legislature and the governor in Albany.[78] The city's education system and many other functions are funded (and therefore in great part controlled) not by officials elected by the city's residents but by others answerable to a far broader set of voters—voters unlikely to tolerate the megacity breaking away given the tax revenues they receive from the cash cow that is the five boroughs and other nearby urban authorities. Given the role of the state, it is not surprising that the private Police Foundation of New York pays for the NYPD's international liaison and similar programs while London receives funding from the national government that supports such activities.[79] In both instances, the officers are, in a sense, law enforcement ambassadors to other cities around the globe.

There would be other obstacles making partial autonomy rather than complete independence the logical alternative—for example, tariffs and border controls and the newly semi-free urban government's swollen payrolls as it assumes responsibilities currently paid for by state or country. Probably toughest of all: getting the many (many, many, many in some cases) parts that together make up the whole of a megacity to agree on the character of the semi-separate replacement government. Some of the subauthorities within the megacity will be less attractive than others to the whole of a semiautonomous urban state. Taxes paid will not always equal

76 Warren Smit and Edgar Pieterse, 'Decentralisation and Institutional Reconfiguration in Urban Africa', in *Africa's Urban Revolution*, Susan Parnell and Edgar Pieterse (eds), New York, NY: Bloomsbury Academic, 2014, 148–66, at 150, doi.org/10.5040/9781350218246.ch-008.

77 Barber, *If Mayors Ruled the World*, 83.

78 McNickle, *Bloomberg*, 45.

79 Nussbaum, 'Protecting global cities', 223.

taxes returned to better-off communities, but the binds that tie will likely be closer than those elsewhere in a state or halfway across a country. It is true the various parts are not likely to find themselves singing 'We Are the City-State', but they'll be better at humming the tune once they are part of a larger urban whole offering benefits that give them more bang for their tax dollar. The result might be a city-state in which its parts agree to key functions such as diplomacy (for example, treaty-making) and military security remaining with the federal government while assuming rights to retain more tax revenue, dictate select regulatory authorities and enhance professional licensing requirements. City-states would then capitalise on their megacity interconnectedness, ensuring initiatives such as those licensing requirements promote commercial and professional intercourse.

Additional benefits in increasing a megacity's autonomy include luring multinational (and national) companies via tax agreements unhindered by state governments, creating burden-sharing agreements with other independent or semiautonomous cities to mitigate the consequences of major disasters (a 'shared pot' insurance scheme to cover recovery, for example) and control over their own budgets by administrators better able to predict future cash flows as tax income goes directly to the urban area's coffers. As urban–rural political divides deepen throughout the world, megacity folk will be able to elect governments more in keeping with urban priorities and social norms such as infrastructure development and gun control while knowing that their basic needs such as food and water from outside sources are virtually guaranteed given their purchasing power. (Pittsburgh approved strict restrictions on military-style assault weapons and high-capacity magazines after killings at its Tree of Life Synagogue despite threats of a challenge in state courts. Pennsylvania forbids urban authorities from establishing gun regulations. Philadelphia has joined Pittsburgh in challenging the state's restrictions. As I write, a lawsuit challenging the two cities' right to establish independent gun-control policies is pending a hearing in the state supreme court.)[80]

80 Ramesh Santanam, 'Pittsburgh approves gun restrictions; lawsuits expected', *Associated Press*, 3 April 2019, 20, available from: apnews.com/article/3f4ffc8f307d46499b824dbf47467fe3; Associated Press, 'Pittsburgh appeals ruling that blocks gun violence prevention measures', *CBS Pittsburgh*, 4 May 2020, available from: pittsburgh.cbslocal.com/2020/05/04/pittsburgh-appeals-judges-rejection-of-firearm-restrictions/; and Angela Couloumbus and Stephen Caruso, 'Pennsylvania's highest court could give cities the go-ahead to craft their own gun laws', *Spotlight PA*, [Harrisburg], 1 June 2022, available from: www.spotlightpa.org/news/2022/06/uvalde-shooting-pennsylvania-gun-laws/.

Urban areas' willingness to uphold Paris Agreement climate standards reminds us that cities have also chosen to chart their own path in the face of national policies thought to be flawed. These stricter urban regulations need not cause businesses to flee thanks to urban wealth, increasing public support for greater accountability and the more autonomous urban area granting tax or other benefits to individual commercial entities. Several decades ago, the United Nations tagged the Japanese city of Kitakyushu as one of the world's worst pollution hubs. Kitakyushu spent a good part of the latter half of the twentieth century addressing the challenge—without significant national involvement. It was local housewives who motivated the turnaround. Major commercial players like Hitachi, Nippon Steel and Mitsubishi voluntarily entered into agreements. By the early 1990s, Kitakyushu had come back from the grey and could brag of air and water quality among the country's best. Residents worked with city officials to support the return of pollution-ravaged firefly populations. Success led to the reintroduction of a former cultural icon: the annual children's firefly festival.[81]

Differences in urban and national priorities are becoming more pronounced in many developed countries. Whether it was accurate or not, America's rural areas were long perceived as the country's moral bastion. Recent evidence suggests many such areas have failed to keep pace with social change, with communities taking on a reactionary character in the face of socially progressive and increasingly accepted norms regarding human rights and common-good standards. When California refused to pay for nonessential state-employee travel to states thought to have anti-gay policies, the mayors of Lexington and Louisville, Kentucky—one of the states so judged—requested exception to the policy. 'It does not fit us,' the mayor of Lexington wrote, 'We're a university city, open, welcoming, inclusive.'[82] The pair was not alone. In the face of state legislatures passing anti-LGBTQ bills in 2017, 68 American cities were putting strong LGBTQ guarantees in place[83]—more evidence that the champions of human rights tend to reside in the country's urban areas. Pressures for more equitable representation than that provided by US gerrymandering and Electoral College distortions may increase as

81 Brugmann, *Welcome to the Urban Revolution*, 245.
82 'The longest flush: California against the rest', *The Economist*, [London], 8 July 2017, 26.
83 Susan Miller, 'Record number of cities advance LGBT rights this year', *USA Today Weekend*, 20–22 October 2017, 4A.

America's urban majority flexes its economic and social muscles to redress the artificialities of disproportionate influence by select states and rural communities generally.

It would be expected that the world's megacities will be a part if not the leader of this transition. Carrying the banner for social initiatives like women's voting has long been an urban phenomenon. New York City already has preschool for four-year-olds and is expanding the offering to include those a year younger. Less populous cities are similarly assuming social leadership. Texas as a state does not provide full-day preschool; the City of San Antonio does.[84] Such forward-looking inventiveness is not limited to US or developed-world urban areas. The negative consequences of tribal, clan and other cultural ties have undermined sectarian African political processes for decades. Urbanisation offers hope of a brighter future in that regard. Ethnic ties tend to weaken in larger urban areas. Even in Kenya, where tribal ties have long dictated voting preferences and underlain brutal, often fatal, election violence, voting by Nairobi residents suggests tribal links are loosening within the city.[85] Late twentieth-century predictions of Mexico City becoming the world's most populous urban area have fallen by the wayside as declining national birthrates and the attractiveness of other cities slowed growth. Others instead prophesised Lagos as the population champion come the middle decades of the new century, but as we have seen, women living in urban areas tend to have lower birthrates than those in the countryside. Further, fertility rates in larger cities are apt to fall more sharply than those in smaller ones.[86] Some megacities being among the most expensive places to live worldwide acts as an additional suppressor of family size. From social norms to cultural impact to political standards and ethnic tolerance, urban areas—once considered dens of iniquity—are in many cases doing much to change the world for the better.

With increased control over their own destinies and in a world in which multinational companies, IGOs such as the United Nations and the European Union and even some NGOs dramatically influence or even make policy, these urban areas could negotiate agreements securing priority of recovery assistance before disaster strikes. A Londoner or resident of Rio de Janeiro might agree with standards that do not

84 'Young Americans: Early education', *The Economist*, [London], 26 January 2019, 23–24, at 24.
85 'First we take Nairobi: Democracy in Africa', *The Economist*, [London], 24 June 2017, 44.
86 'Baby bust: The birth rate', *The Economist*, [London], 24 November 2018, 23–24.

recognise a Chinese medical licence in their country. That reticence could fall by the wayside were Shanghai to join those two megacities in establishing mutually agreeable regulatory policies based on interurban standards rather than less rigorously designed or loosely enforced national ones.[87] Relationships already exist for the exchange of urban-specific innovations. Mayors' interest in the CoolRoofs initiative, which involves painting urban roofs with reflective white paint to lower cooling costs and related carbon emissions, resulted in the founding of a nonprofit that is now part of Bloomberg Philanthropies.[88] Cities have demonstrated that they can bring relevant parties together both before and during crises to outperform federal and state endeavours. Our example of the Los Angeles TEWG is one. Another reaches back to 2013 when San Francisco created a partnership with BayShare—an organisation committed to facilitating the sharing of goods and services—that seeks to address the three phases of preparing for, reacting to and recovering from the Bay Area's next major earthquake.[89] BayShare does so through its network of regional businesses, among them Airbnb (which could coordinate shelter for those who lose their homes), RelayRides (which facilitates privately owned car rental), Trove (an online site previously named 'Yerdle', where individuals can sell unwanted items for a credit to acquire other Trove offerings) and nonprofit media outlets.[90] With great potential for coordinating these resources across the San Francisco Bay Area's many towns and cities, the connections that BayShare (and the San Francisco–Oakland–San Jose urban aggregation) has with national ventures make them an obvious point of contact for other major urban areas nationwide.

Further insights regarding the challenges and benefits of increasing megacity autonomy can be found when considering several such urban areas around the world. We've mentioned Singapore with its striking growth but limits on social freedoms and political representation. Might the residents of more autonomous urban areas suffer increased restrictions on social freedoms given wealthy plutocrats dominating the government—

87 *The Economist*, 'The global list', 20.

88 Ben Paynter, 'Why Bloomberg Philanthropies' James Anderson tops our list of the most creative people in business 2017', *Fast Company*, 15 May 2017, available from: www.fastcompany.com/40412383/why-bloomberg-philanthropies-james-anderson-tops-our-list-of-the-most-creative-people-in-business-2017.

89 Sarah Rich, 'San Francisco embraces sharing economy for emergency preparedness', *Government Technology*, 14 June 2013, available from: www.govtech.com/public-safety/San-Francisco-Embraces-Sharing-Economy-for-Emergency-Preparedness.html.

90 Rodin, *The Resilience Dividend*, 274.

or would they see political liberalisation instead? Hong Kong once gained much and now stands to lose much since rejoining China (including, possibly, megacity status by our definition). By early 2020, it ranked third among the world's financial centres. It was a climb reliant on the former colony maintaining excellent fiscal credentials that provided exceptional access to developed-world financial systems.[91] China's coercive influence threatens to curtail that access. Others stand ready to step in. While urban areas might assist one another in times of calamity, their political and commercial leaders are ever ready to take advantage of weakness. Singapore understandably is already looking to capitalise on Hong Kong's diminishing status as a global financial hub; it was in hungry pursuit of the territory's arbitration lawyers as of mid-2020.[92] Germany's Berlin, Hamburg and Bremen represent the other end of the autonomy scale. Each can introduce legislation as a separate representative at the federal level while remaining very much part of the country.[93]

What are the risks for megacity residents should theirs seek greater autonomy? There is no guarantee that a city government will be superior to those of states, provinces or nations. Several twentieth-century US mayors succeeded in adding themselves to prison populations. Detroit, for example, had three mayors sent to prison and one recalled after less than a year in office between 1930 and 2008. Atlanta's mayoral office was tainted with a similar number of scandals during a like period. Mayoral performance during the Covid-19 crisis varies considerably (so, too, of course, has that of governors and various federal officials). That megacities are magnets for the very wealthy's real estate investments means there are those who would use the full potential of their resources to protect those interests at the expense of the less well-to-do. Nor are mayors or city board members immune to uninspired thinking. While a more enjoyable cure than injecting disinfectant as suggested by Donald Trump,[94] Nairobi's governor distributed equally useless (but less dangerous) bottles of Hennessy cognac as what he called 'throat sanitizer'.[95]

91 'Electrical storm: Hong Kong's future', *The Economist*, [London], 6 June 2020, 58–60, at 58–59.
92 'The darkness behind: Hong Kong's companies', *The Economist*, [London], 18 July 2020, 32.
93 Emanuel, *The Nation City*, 234.
94 Dartunorro Clark, 'Trump suggests "injection" of disinfectant to beat coronavirus and "clean" the lungs', *NBC News*, 23 April 2020, available from: www.nbcnews.com/politics/donald-trump/trump-suggests-injection-disinfectant-beat-coronavirus-clean-lungs-n1191216.
95 'Leaders and misleaders', *The Economist*, [London], 2 May 2020, 36. Since 2010, Kenya's constitution has replaced local governments such as mayors with county authorities.

Increased autonomy could threaten access to essentials from nearby regions of the country despite a megacity's economic influence. Climate change, swelling world populations and a generally increasing demand for resources mean some megacities would have new competitors for food, water and other necessities now procured from nearby (and not so nearby) communities. Roughly 40 per cent of Singapore's water comes from outside its borders.[96] Lagos already suffers continuous water shortages.[97] Increased autonomy could also make it difficult for urban areas to expand outward rather than the more expensive upward or below ground. Mexico City expanded its geographic area by an average of more than 7 per cent annually in the two decades spanning the end of the past and the beginning of this century.[98] Delhi, India, more than doubled its spread across the landscape in only 14 years, from 67.71 square kilometres in 1998 to 181.97 square kilometres in 2011 (that expansion provides insights into just how much urban terrain acts as a heat island. What was primarily agricultural land in 1998 is now part of Delhi's north. The surface temperature of the area ranged between 20°C and 30°C that year; by 2011, the variation was between 30°C and 35°C. The increase is greater in the centre of another Indian megacity, Mumbai, which saw average surface temperatures increase 15–20°C between 1998 and 2009).[99]

There is a financial risk as well for megacities considering going it alone. The US federal government pays from 75 to 100 per cent of disaster response bills when FEMA issues a disaster declaration.[100] Increased control over taxation would cast this dependency in a different light, but supplemental 'insurance' such as the aforementioned megacity cooperative for such contingencies would probably still be necessary for the worst disasters—and even then recovery funding could fall short. Nor can megacities rely on their countries as fountains of youth. Current demographic trends suggest those wells have already begun to dry. It is estimated that the administrative entity that is the City of Tokyo will lose half its 2010 population by 2100—a point at which the portion of that population over the age of 65 will be approaching the 50 per cent mark

96 Zahra Jamshed, 'How Singapore is using technology to solve its water shortage', *CNN*, 25 September 2019, available from: www.cnn.com/2019/09/25/tech/singapore-water-technology-innovative-cities/index.html.
97 UN-Habitat, *State of the World's Cities 2012/2013*, 50.
98 ibid., 30.
99 Richa Sharma and P.K. Joshi, 'Rapidly urbanizing Indian cities: The problem of local heat but a global challenge', *UGEC Viewpoints*, July 2013, 28–32, at 29, 30.
100 Bucci et al., *After Hurricane Sandy*, 2.

(assuming current population trends continue. These estimates saw 2020 as the peak for Tokyo's population—the last year before the decline was to begin).[101] As for Shanghai, it has had negative growth in terms of birth and death rates for two decades but has managed annual double-digit growth during that same period except for the recession years of 2008 and 2009.[102] How? The stream of immigration into Shanghai has made it a growth dynamo despite the already apparent effects on ageing of China's One-Child Policy and refusal to grant rights to many migrating from rural areas. But how long can that last? It is a challenge Chinese Government officials seem to be aware of given their 2015 objective of moving 260 million people from rural to urban areas after years of attempting to hamstring the influx. 'Domestic demand is the fundamental impetus for China's development', the relevant government plan states, 'and the greatest potential for expanding domestic demand lies in urbanisation'.[103] On the other hand, many are the Chinese cities that have seen far lower growth rates since 2010 than had been projected.[104] For both Japan and China, looking to new sources of workers will require significant changes in immigration policies and cultural norms. The two countries see only a small percentage of newcomers from other ethnic groups coming to settle permanently. With greater autonomy, megacities might maintain their youthfulness by casting aside national government dictates like those that have limited China to only 0.22 foreign immigrants per 1,000 population and South Korea and Japan to ratios of 0.03 and 0.02, respectively.[105]

As most of the world ages, Africa will not.[106] The majority of today's Africans were born in the twenty-first century; most of those in European Union countries were born before 1978.[107] The once Dark Continent might turn out to be the source of new light as young migrants spur innovation via immigration, their education funded by international

101 World Population Review, 'Tokyo Population 2020', [Online], Walnut, CA: World Population Review, 2020, [Updated 2022], available from: worldpopulationreview.com/world-cities/tokyo-population/.

102 World Population Review, 'Shanghai Population 2020', [Online], Walnut, CA: World Population Review, 2020, [Updated 2022], available from: worldpopulationreview.com/world-cities/shanghai-population/.

103 Chris Weller, 'Here's China's genius plan to move 250 million people from farms to cities', *Business Insider*, [New York, NY], 5 August 2015, available from: www.businessinsider.com/heres-chinas-big-plan-to-move-a-population-the-size-of-the-phillippines-from-farms-to-cities-2015-7.

104 *Demographia World Urban Areas*, 15th edn, 2.

105 Bricker and Ibbitson, *Empty Planet*, 88.

106 ibid., 237.

107 'Generation game: Democracy in Africa', *The Economist*, [London], 7 March 2020, 46.

megacities hungry for promising and ambitious youths. (Africa's young urban-dwellers are better educated and have access to more sources of information than their rural counterparts. Their countries' economies are also proving unable to provide many of them with the employment opportunities they seek.)[108] Countries with high birthrates have at least two pressures working to encourage emigration. First, the once common phenomenon of children dying before the age of five is increasingly rare.[109] Second, education and healthcare in major urban areas tend to be better than in smaller cities, towns or rural areas. More educated youth unable to find work means more people looking to emigrate to more welcoming pastures (or, perhaps we should say, streets)—or looking for ways to challenge national governments that deny them their ambitions.

## Readying for the 'Big One': Not if, but when

> The morning of December 16th, 1707 there arose from Mount Fuji a column of what looked like belching black smoke to an altitude of some 20 kilometers accompanied by loud sounds of explosions … [What is] present-day Tokyo was covered with several centimeters of fallout and the population suffered from the noxious fumes of the eruption … Since then Fuji has been dormant for longer than during any period in recorded history. Volcanologists predict an eruption during the next fifty years and are studying the events of 1707 to assess the damage this might cause.[110]
>
> —'The 1707 eruption of Mount Fuji as blueprint for events to come'

> Our founder perceived that a site on the seacoast is not the most desirable for cities founded in the hope of long life and extended dominion.[111]
>
> —Cicero, *The Republic*

108 ibid.

109 Bollyky, *Plagues and the Paradox of Progress*, 2.

110 Beatrice M. Bodart-Bailey, 'The 1707 eruption of Mount Fuji as blueprint for events to come', Flyer for Beatrice M. Bodart-Bailey presentation, The Australian National University, Canberra, 6 October 2015.

111 Cicero, *The Republic*, as quoted in Piero Boitani, *A New Sublime: Ten Timeless Lessons of the Classics*, trans. Ann Goldstein, New York, NY: Europa, 2020, 215.

> No one apparently had thought that an event fierce enough to damage a reactor might also disrupt basic communications.[112]
>
> —David Lochbaum et al., *Fukushima*

Dense concentrations of people and buildings; reliance on consistent flows of power, water, food and money; locations among the most vulnerable on the planet—what could go wrong?

Japan's three largest urban areas are at risk from floods, earthquakes, high winds, storm surges or tsunamis. Those five hazards—in that order—are what inflict the greatest harm on humankind when Mother Nature plays a significant role. The three cities and their immediate surrounding areas—Tokyo (57.1 million population), the Osaka–Kobe area (32.1 million) and Nagoya (22.9 million)—are, respectively, first, fourth and sixth in terms of the number of people in danger according to a recent insurance analysis,[113] which means a total of 112.1 million in a country with a population of 127 million at the time these numbers were calculated. Large urban areas at risk in terms of being near significant volcanoes include Tokyo, Mexico City and Manila.[114] The last eruption of Mount Fuji described in the above passage came 49 days after an earthquake of magnitude 8.7 that badly damaged Nagoya, reminding us that the 2011 earthquake–tsunami–nuclear reactor failure isn't alone as a potential multiple-disaster threat to Tokyo.[115] Popocatépetl ('Smoking Mountain'), approximately 80 kilometres south-east of Mexico City, remains active. Like Mount Fuji and Tokyo, it can be seen by those in Mexico's capital on clear days. About 20 centimetres (approximately 8 inches) of ash could blanket the entire city should a major eruption occur and winds blow towards Mexico City, making air unbreathable, poisoning water supplies, clogging drainage and damaging power generation facilities.[116]

---

112 Lochbaum et al., *Fukushima*, 16.

113 Schelske et al., *Mind the Risk*, 11. Note that Schelske's numbers include significant portions of the population beyond our definition of urban area.

114 Jean-Claude Thouret, 'Urban hazards and risks; consequences of earthquakes and volcanic eruptions: An introduction', *GeoJournal* 49 (1999): 131–35, at 131, doi.org/10.1023/A:1007118027266; and Chester et al., 'The increasing exposure of cities to the effects of volcanic eruptions', 94, 97.

115 Beatrice M. Bodart-Bailey, 'Pyroclastic Rivers: The Hôei Fuji Eruption (1707)', in *Local Realities and Environmental Changes in the History of East Asia*, Ts'ui-Jung Liu (ed.), London: Routledge, 2015, 157–80, at 158, available from: www.taylorfrancis.com/books/edit/10.4324/9781315695655/local-realities-environmental-changes-history-east-asia-ts-ui-jung-liu.

116 Mark Oprea, 'What will Mexico do when its deadliest volcano erupts?', *Pacific Standard*, [Santa Barbara, CA], 30 October 2018, available from: psmag.com/environment/what-will-mexico-do-if-its-deadliest-volcano-erupts; and Patrick J. McDonnell, 'As it recovers from earthquakes, Mexico City looks nervously at its (very) active volcano', *Los Angeles Times*, 27 September 2017, available from: www.latimes.com/world/mexico-americas/la-fg-mexico-volcano-20170927-story.html.

Though the 'after' period of a megacity disaster is a time of considerable opportunity, recovery and rebuilding, plans too often focus on speed in returning to the pre-event situation rather than balancing those demands with taming the impact of the next disaster to come. Sir Christopher Wren proposed improvements to London in the wake of the 1666 Great Fire. City leaders dragged their feet rather than acting. Others with more initiative rebuilt the capital along its medieval roads before Wren's and others' proposals could be brought to bear.[117] Perhaps London today would be gridlock-free had that opportunity not been forgone, with cars flowing smoothly through roundabouts and along wide, tree-lined avenues with nary a pause. Or perhaps not.

Recovery considerations ought to be organic to disaster plans. A poll of readers who manage to make it through this book might choose 'system' as the word that mercilessly beat them about the head and shoulders throughout its pages, yet repeated references to backup generators and circuit-breaker panels installed beneath flood lines and recovery plans that look backward in time rather than towards the future also remind us that both government and commercial representatives repeatedly forget (or choose to overlook) the interconnected consequences of threats yet to come. Author Jeff Goodell found that New York City utility Consolidated Edison (ConEd) was ready to spend $1 billion after Hurricane Sandy without taking the effects of climate change into account.[118] This need not be the case. I was told that my Virginia licence had reciprocity in most other states when I passed my professional engineer examination. There were exceptions. California's licensed engineers had to have exceptional expertise in earthquake design. Professional engineers in New York had to be especially proficient in dealing with wind loads and other features of skyscrapers; I was told it was part of their licensing examination. The events of 9/11 suggest that building standards in that city and elsewhere need to include surviving more than what nature might throw at them. Designing to allow for partial failures would probably have done nothing to reduce the losses on that fateful day. Yet, constructing a bridge so that spans fail individually rather than the entire structure collapsing catastrophically should the bridge be struck by a ship or tremor seems a good idea. 'Failure' in such cases would mean buckling rather than complete collapse barring the most cataclysmic of incidents. Designing for such 'graceful failure' has parallels in other disaster preparedness

117 'The great land grab: Transport', *The Economist*, [London], 23 May 2020, 45.
118 Goodell, *The Water Will Come*, 160.

arenas. The decentralisation of water or power supply systems would offer the additional benefit of limiting the number of those going without in a crisis. New standards and common sense on the part of architects and builders need to account for the seemingly little things. Those placements of backup generators and related components provide only one example of details repeatedly overlooked—or in need of looking at again given climate change's adroitness in magnifying nature's effects. Just as some professions require continuing education to make sure those licensed stay up-to-date, cities should require that buildings and other infrastructure are inspected and reinspected with an eye to new threats such as the second and higher-order effects of sea-level rise. Meeting revised standards should not be voluntary. Voters would be wise to consider alternatives to political ostriches who refuse to face realities like climate change and the value of vaccines. Urban residents are already key to the security of their cities thanks to their recognition and reporting of 'absence of the normal or presence of the abnormal'. They are the *first* first responders who save tens if not hundreds and thousands of lives because of both their reporting of the unusual to authorities and their service in the immediate aftermath of catastrophes. Megacities' men, women and children are the first line of preparedness much as was Dr Stella Ameyo Adadevoh, the physician who stood firm in the face of pressure to release Lagos's Ebola patient zero.

Cities continue to attract our planet's best, brightest, most ambitious and most forward-looking. More than one-third of New York City's population is foreign-born.[119] Chicago in 1880 could claim that almost nine of every 10 residents were first or second-generation immigrants.[120] The rapid growth that can accompany influxes of either domestic or international arrivals is not without its challenges. A full third of Dhaka's residents either rely on surface latrines or have no sewage disposal at all. They also must deal with political neglect, as is evident in the lack of concern shown for clothing labourers during the Covid-19 pandemic. As ably said by one of my former students, cities 'are about the people'. Those fleeing serfdom in Middle Ages towns or cities that offered freedom to anyone not retaken in a year and a day did so not only to escape servitude. They, like their successors today, also pursued the irresistible lure of economic opportunity and a life offering more than drudgery. The magnet has not weakened with the passage of centuries. A Pakistani arriving in 1950s Karachi revelled in a 'city of free hard work', unlike elsewhere in the

119 Katz and Bradley, *The Metropolitan Revolution*, 24.
120 Rybczynski, *City Life*, 121.

Province of Sindh, where bonded labour was regularly practised, or the Frontier and Punjab provinces, in which tribal ties dictated social interactions. Karachi belonged to 'the workers and the middle classes'. Women, too, could experience 'their first opportunity to breathe freely'.[121]

## Learning from the past, preparing for the future: Making megacities safer

> Particularly in an urban context, exposure to disaster risk and to violence is more closely interrelated than is often assumed.[122]
>
> —Elizabeth Ferris, 'Urban disasters, conflict and violence'

> We are reminded that training of private sector security personnel and first responders is an essential element of securing our nation's critical infrastructure. As many possible soft targets are controlled by private organizations, the private sector must be a full partner in efforts to protect the homeland.[123]
>
> —Charles E. Allen, under secretary for intelligence and analysis, US Department of Homeland Security

It would be too obvious at this point to relate that 'an ounce of prevention is worth a pound of cure'. Better even than preparations when misfortune visits are capabilities that also provide routine value. State-of-the-art megacity operations centres fall into that category. The United Nations raved that in Brazil:

> Rio de Janeiro's newly established operations centre offers a glimpse of the way cities might be managed in the future. Conceived as a city-wide decision-making mechanism for emergency situations based on real-time information, the centre integrates information from multiple departments and government agencies; visual displays of data from various urban systems, including surveillance cameras; together with maps, news updates, information about incidents and even simulations [to] facilitate real-time monitoring and analysis. Although initially designed for forecasting floods and other emergencies, the centre is also used for day-to-day management of urban functions.[124]

121 As quoted in Gayer, *Karachi*, 17–18.
122 Ferris, 'Urban disasters, conflict and violence'.
123 Quoted in US Senate, *Lessons from the Mumbai Terrorist Attacks*.
124 UN-Habitat, *State of the World's Cities 2012/2013*, 42.

Public information programs can likewise serve daily functions while also helping an urban population prepare for that coming storm, blackout, quake, flood or otherwise less-than-everyday event. Designing and trialling various ways of getting word only to targeted groups (the elderly, those with a specific illness or a particular neighbourhood or community, for example) put the pieces in place for when those muscles need to be flexed during an emergency. History can help in readying both authorities and citizens. Several US cities studied the challenges of Seattle, Washington, during the 1999 World Trade Organization gathering—later referred to as the 'Battle of Seattle' due to the extent of anarchist-inspired violence—and adapted their pre-event crowd-control plans to deal with manipulated demonstrations that might come to their own streets. Chechens fighting Russian invaders during the last decade of the twentieth century are said to have studied Germany's World War II defence of Berlin before badly bloodying the invader's nose in Grozny.[125]

We hear much about 'smart cities' and their high-speed surveillance cameras, ubiquitous internet and AI-assisted functions to save energy, control traffic flow and otherwise improve efficiency, lower costs and enhance quality of life. We posited that maybe the smartest of urban areas will in the future be thought to merit that status less because of their technologies and more because of how they meld these capabilities with those of humans working together to serve the public good. A megacity's internal towns, cities and agencies will have to sacrifice a bit of autonomy in the interest of the totality of which they are a part. Such is the goal behind the New York area Regional Plan Association seeking 'to improve the prosperity, sustainability, and quality of life in the New York–New Jersey–Connecticut metropolitan region through work in transportation, economic development and real estate, environment and open space and more'. It does so by working with 31 counties spanning those three states 'to recommend the best outcomes for individual communities and the region as a whole'.[126]

Individual residents, too, will have to find that sweet spot between self-service and sacrificing for the greater good. Personal information-sharing and public surveillance have been sore rather than sweet spots in that regard. It is admittedly disturbing to know your movements are tracked

125 Knezys and Sedlickas, *The War in Chechnya*, 51.

126 Regional Plan Association, 'Our work', [Online], New York, NY: RPA, 2022, available from, www.rpa.org/programs.

and personal contacts recorded, even when those doing the collecting insist the data remain separate from identities. Covid-19 is among the emergencies demonstrating the value of tolerating what some consider treading on privacy. Tracking smartphones can save lives, mitigate the worst of unemployment and reduce the negative economic impacts of a pathogen's rampage. Perhaps an opt in – opt out option as exists in Barcelona would be satisfactory for lesser contingencies, but when some future Patrick Sawyer fails to conveniently collapse on arrival in a megacity airport, being able to track his phone and that of those with whom he came in contact (and those with whom they come in contact …) could mean the difference between mere hundreds being exposed with tens of deaths and a far worse exposure of millions and proportional loss of life. At some point, even opting out should be pushed aside in the interest of the greater good, if only temporarily.

Information collection, monitoring and data-mining will continue. The extent to which that is true, the benefits gained or unacceptable costs accrued will depend on many factors. They include the authoritarianism of the using government, the willingness of urban residents to share (Barcelona), links to locations beyond the megacity itself (New York and highway toll collection cameras) and the sophistication of information analysis technologies.

Less sure is the continued growth of megacity populations. Those in sub-Saharan Africa are likely to continue growing for years, likely decades. Tokyo's will shrink thanks to Japan's combination of ageing and limited immigration. Shrinkage in several other megacities was already in progress before the arrival of Covid-19. Occurrences like that virus can speed emigration. The pandemic caused a surge in New York City residents looking to rent or buy in surrounding communities, though most searches were for locations close enough that the megacity of New York would not lose numbers. How many leave, whether the relocations are permanent and the significance of the migration remain to be seen. Los Angeles sees a swell of departures to Arizona, Utah or other more distant, less quake-threatened locations after its occasional major-ish tremors but not enough to have a noticeable long-term effect on its population. Among other reasons for megacity shrinkage are those declining birthrates and greater willingness to support cybercommuting (working from home). Previous improvements and better-quality emergency services in some megacity communities might act as attractors after a future disaster. Writing for *GeoJournal*, author James Mitchell observed:

> The locus of hazard is shifting, often rapidly. For example, in Tokyo the inner and outer suburbs are now increasingly at risk both because of rapid expansion of the city's periphery and lack of attention to hazard-sensitive design in the newer developments. By contrast, the central city and adjacent neighborhoods have been the focus of major investments in emergency preparedness, hazard mitigation, and other disaster reduction alternatives.[127]

Disaster readiness will continue to vary dramatically not only within megacities but also between them. Mitchell continues:

> Some cities (e.g., Tokyo) have adopted multiple reinforcing public adjustments involving sophisticated technologies backed up by high levels of training and self-reliance on the part of civilian populations that together are designed to address all parts of the disaster cycle (i.e., preparedness, emergency management, recovery, mitigation). Others possess no effective formal programs for natural hazard management (e.g., Dhaka).[128]

How bad can it be? Dhaka, it turns out, is not only hyper-vulnerable to frequent flooding. Two other authors reveal that:

> Dhaka is one of the most vulnerable cities to earthquake … In some areas, construction according to official building codes was followed for less than 10 per cent of buildings … 78,000 out of 326,000 buildings in Dhaka are vulnerable to collapse … There are concerns regarding the city's readiness to respond to disaster. Though there are contingency plans for the threat of earthquakes, there are none for floods or fires. Which parts of the city government have which responsibilities is also a question … [On a more positive note,] the nonprofit Oxfam facilitates interaction between a wide range of partners including civil society organizations, NGOs, media organizations, foreign and local universities.[129]

Nearly one in five of the migrants living in Dhaka moved there to avoid catastrophes elsewhere.[130] There will be plenty of work for Oxfam and its partners in the years ahead.

---

127 James K. Mitchell, 'Coping with natural hazards and disasters in megacities: Perspectives on the twenty-first century', *GeoJournal* 37 (1995): 303–11, at 305, doi.org/10.1007/BF00814009.
128 ibid., 305.
129 Stott and Nadiruzzaman, *Disaster Risk Reduction in Dhaka City*, 15, 33, 43.
130 Asif Ishtiaque and Nurul Islam Nazem, 'Household-level disaster-induced losses and rural–urban migration: Experience from world's one of the most disaster-affected countries', *Natural Hazards* 86 (2017): 315–26, at 324, doi.org/10.1007/s11069-016-2690-5.

Mother Nature cares no more for the poor than do some megacity administrators. Yet, with wealth comes an ability to ensure greater security against her unladylike whimsies. We have noted that most megacity growth is not in the city core but in its suburbs or slums. Manila's downtown in 1950 had something less than 1 million of the larger urban area's population of just over 1.5 million—about 60 per cent of the total. Sixty years later, the core's population had increased by 700,000 while the rest expanded by almost 20 million residents.[131] The megacity of Jakarta saw 75 per cent of its overall growth in its suburbs between 1971 and 2000 and 84 per cent in the decade that followed.[132] Similar growth in other megacities means that many of the additional millions are in slums where formal building standards may be unheard of and other-governing authorities reign. It is in these areas that outsiders offering post-disaster relief are likely to find themselves most needed, rather than in posh neighbourhoods or among skyscrapers. A further reason aid providers are unlikely to be rubbing shoulders with a megacity elite (despite political pressures to favour wealthier neighbourhoods): not only are the better off more likely to be able to pay for needed services once they have built their homes and businesses; they also probably built on land more suitable for the structure's survival. Such is true even in megacities where massive expanses of slums are not an issue. Tokyo's Ministry of Construction promoted the building of wide, flat-topped 'super banks'—berms with excellent earthquake resistance and flood protection. Real estate developers greeted the initiative with open arms, seeing the raised land as both highly survivable and providing views where otherwise there would be little to see beyond the building across the street.[133]

Re-envisioning disaster response relationships would constitute another stride in the right direction. National governments tend to view coalitions only in terms of governmental organisations. The US Army, for example, views a coalition as 'an ad hoc arrangement between two or more nations for common action'.[134] This definition fails to recognise an inevitable truth: governments will find everything from nonprofits to fortune-seeking companies to IGOs such as the United Nations competing for

131 Wendell Cox, 'The evolving urban form: Manila', *New Geography*, 24 April 2011, available from: www.newgeography.com/content/002198-the-evolving-urban-form-manila.
132 Cox, 'The evolving urban form: Jakarta'.
133 Kumagai and Nojima, 'Urbanization and Disaster Mitigation in Tokyo', 83.
134 Department of the Army, *Terms and Military Symbols*, ADP 1-02, Washington, DC: Headquarters, Department of the Army, August 2018, 1–18, available from: irp.fas.org/doddir/army/adp1_02.pdf.

space, funds, bandwidth, local political attention and other resources during crises. It would be better to delimit our understanding of coalition, defining it instead as 'an ad hoc arrangement between two or more organisations in the interest of supporting a common action', as suggested previously.[135] This broadened understanding promotes incorporation of local and more far-flung governments, but also NGO, IGO, faith-based, industry, neighbourhood and individual volunteers and other resources in the service of sought-after ends during not only execution but also planning and preparation for megacity disaster relief.

How much reasons to leave will ultimately affect megacity populations remains to be seen. Even as some cities shrink, the lure of the world's greatest urban areas will continue to entice. Commercial symbiosis (the benefits of being close to other organisations possessing valuable talent or expertise), 'coolness' factors (cultural offerings, access to better restaurants, concerts, theatre and professional sporting events) and the value of physical proximity for social life (online dating only takes a guy or gal so far) will maintain their allure. The continued existence of megacities is not in doubt, but flight during Covid-19's ravages tells us that ignoring the potential for disaster will cause some existing or potential residents to reconsider whether these attractions are worth the risks. Cyberattacks on urban power distribution, water supply or internet connectivity could cause loss of services for days or weeks. The devastation in terms of millions affected will be needlessly high until city leaders and utility providers question the wisdom of relying on only a few mutually dependent infrastructure nodes. Focusing on quicker recoveries and designing for partial versus catastrophic failures could be key to keeping urban residents in their cities should these assaults transpire.[136] The same is true if a city suffers a nuclear or large-scale chemical, biological or radiological terrorist attack. Ultimately, however, whether a megacity begins to age or continues to drink from the fountain of youth, whether it grows or trims its numbers, depends on leadership and the dynamism of its residents, government and commercial ventures. Unfortunately, the destiny of megacities is only partially in the hands of those living and working within their bounds. Seeing opportunity, much as does Singapore in the erosion of Hong Kong's economic legitimacy, Toronto has quietly emerged as one of North America's premier tech centres. It added more

135 Glenn, *Band of Brothers or Dysfunctional Family?*, 41.
136 Andy Greenberg, *Sandworm: A New Era of Cyberwar and the Hunt for the Kremlin's Most Dangerous Hackers*, New York, NY: Doubleday, 2019, 134, 305.

technology jobs in 2017 than Seattle, Washington, DC, and the San Francisco Bay Area combined. Only the last outhired it in the tech sector the following year. Toronto's secret? It is in part a willingness to welcome those with talent. Almost half of the city's residents are foreign-born.[137]

## Glimpses of possible futures

> More than any other trace we will leave behind … our cities will form the most concentrated and revealing archive of who we were and how we lived.[138]
>
> —David Farrier, *Footprints*

> Two-thirds of the world's population growth in the next thirty years will occur in just fourteen large, lower-income nations: India, Pakistan, Nigeria, Indonesia, Bangladesh, Ethiopia, Democratic Republic of the Congo, the Philippines, Tanzania, Uganda, Sudan, Afghanistan, Iraq, and Kenya.[139]
>
> —Thomas J. Bollyky, *Plagues and the Paradox of Progress*

Seven of the 14 countries mentioned in the previous quote have one or more cities of over 10 million in population, some of which meet our definition of megacity. Virtually all those urban areas are under threat of catastrophes singly or in combination. One (Lagos) used to be its country's capital. Another (Jakarta) has a national government that wants to move that status elsewhere due to the challenges nature and humankind have cooperated on to cause frequent disasters of increasing scale.[140] Egypt hopes to do the same, fleeing Cairo's narrow, twisting passageways and compressed masses of impoverished slums by creating a city with an expanse all but matching that of Singapore.[141] Like picnickers climbing into their car and leaving their waste behind, those wealthy enough to abandon a mess largely of their own making believe they can solve problems simply by departing—except in these cases, they abandon millions less able to depart the waste they lacked the care or wisdom to address.

---

137 Thompson, 'North star', 16–17.

138 David Farrier, *Footprints: In Search of Future Fossils*, New York, NY: Farrar, Straus & Giroux, 2020, 62–63.

139 Bollyky, *Plagues and the Paradox of Progress*, 105.

140 Bianca Britton, 'Indonesia plans to relocate its capital from Jakarta', *CNN*, 29 April 2019, available from: www.cnn.com/2019/04/29/asia/indonesia-relocate-jakarta-intl/index.html.

141 'An elephant in the desert: Egypt's new capital', *The Economist*, [London], 26 January 2019, 40.

Relocating Indonesia's capital will do nothing to halt the sinking landscape that worsens the severity of Jakarta's floods any more than Lagos or Cairo has or will escape the more gradual challenges to security and welfare when national authorities run from rather than confront the challenges facing their largest urban areas. National governments are not alone in failing to recognise that urbanisation is not the pending trend; it is already the defining characteristic of human expansion. The urban future is already here and has been for some time. Humanity has 145 million of its members living on coastlines less than 1 metre above sea level. Most of those are residents of the world's most populous urbans areas—New York City, Jakarta, Mumbai, Lagos and suffering Dhaka among them.[142] This reality will not be solved by moving capitals or averting one's eyes by gating wealthy communities. Relocating a capital is likely to result in some of the most qualified people leaving government service. Even decades after the move, the purpose-built capitals of Brasília and Canberra remain small in comparison with their countries' long-established and more cosmopolitan urban centres. The same is true of South Korea's new administrative capital of Sejong, a city created from a few rural buildings that now claims about 300,000 residents. Many choose to remain in the more vibrant, larger urban areas that offer a higher—and more interesting—quality of life. The challenges in creating anew what already exists elsewhere are evident in a plaque at the base of Canberra's National Carillon bell tower installed in celebration of the fiftieth anniversary of the capital's founding. The inscriptions provide three popular early descriptions of the capital, one of which is 'a cemetery with lights'.[143]

There are many futures in terms of what should be just as today's megacities are victims or beneficiaries of what could have been. Reducing the negative consequences and seizing the opportunities offered by

142 Farrier, *Footprints*, 59, 63.

143 When my wife and I lived in Canberra, residents frequently stated that it was a great place for families with children though it admittedly lacked the vibrancy and breadth of offerings of life in Melbourne or Sydney. The same might well be true of South Korea's Sejong, the administrative city not far south of the national capital. With a population comparable with Canberra's (roughly 300,000), its fertility rate is significantly higher than the national average and higher yet than that in Seoul—in the country with the lowest reported fertility rate in the world. Unsurprisingly, Sejong's population also has the youngest average age of any administrative district in the Republic of Korea. Maybe there's something to be said for less vibrancy and fewer urban distractions for countries suffering ageing populations. See Yonhap News Agency, 'S. Korean population slightly grows, becomes older in 2019', *Yonhap News Agency*, [Seoul], 15 August 2020, available from: en.yna.co.kr/view/AEN20200814002200315; 'Cradle to desk: Sexual politics in South Korea', *The Economist*, [London], 17 October 2020, 31–32; and World Bank, 'Fertility rate, total (births per woman)—Korea, Rep.', *Data*, [Online], Washington, DC: The World Bank, 2018, available from: data.worldbank.org/indicator/SP.DYN.TFRT.IN?locations=KR.

future disasters will inevitably clash with economic and political goals. Recent rather than more distant history will tend to dominate decisions. Preparing for the next pandemic rather than readying for Mount Fuji's pending eruption better suits those with short-term memories, unlike the wiser with an understanding of history's arbitrariness. Just as soldiers are often accused of preparing for the last war, humankind tends to pay less attention to what are sometimes more likely future calamities than others fresher in the mind.

M. Mitchell Waldrop's well-written *Complexity* uses the analogy of a sandpile to describe how hard it is to predict events in a complex system (hopefully, we all agree at this point in the book that megacities are complex systems). It is a useful metaphor when thinking about the difference between predicting and forecasting. Waldrop's sandpile builds on a tabletop as a container of sand above drops one grain at a time. The pile grows tall and wide in the shape of a cone. Eventually, a grain will cause a part of the cone to slough like a mini avalanche. Some amount of sand will cascade from some location on the pile at some point in time. It will be impossible to *predict* how much of, where and when the sand will slip downward. Yet, based on the history of sandpiles and the size of our pile, we can *forecast* how much, where and when with some degree of accuracy and give a range of probabilities for the event. We're unlikely to be exactly correct (in fact, the probability of that is zero, but never mind; it's the former maths instructor in me trying to assert itself). Megacities are, to be sure, more complex than sandpiles. That makes prediction even more impossible—an impossible on top of an impossible. The greater complexity does not make forecasting any easier either. But histories of a megacity's storms and their frequency and ferocity tell us that our forecasts need to reflect growing chances that storms will be bigger, more damaging and cause greater suffering than in past decades if little is done to diminish the effects of sea-level rise. Preparations ought to go far in making sure future sand-slides on the pile are smaller. In the case of acts of terrorism and even some nature-triggered events, they could also be fewer in number.

'Not going to happen in my neighbourhood', you might reply regarding the chances of multiple disasters occurring simultaneously—unless you live in Tokyo. You might also be a believer if you hail from Utah, where communities found their pandemic hotline knocked out when a 5.7 magnitude earthquake struck on 20 March 2020 just as Covid-19

was hitting its stride in the United States.[144] Students of history could refrain from such belief as well if they fail to recall that Athens was ravaged by plague for three years just as the city-state began the decades-long Peloponnesian War with Sparta in the fifth century BCE. You might remember Constantinople's double whammy of earthquakes in 557 and 558 CE followed by a Hun attack in early 559 that took advantage of the resultant damage to the city's walls.[145] An offshore earthquake estimated at magnitude 9.0 or more devastated Lisbon, Portugal, on 1 November 1755. It was at the time one of the world's wealthiest cities. Thousands not killed by the quake died when the accompanying tsunami washed ashore, then receded, dragging its victims out to sea much as would happen two and a half centuries later in Fukushima Province. Misery's visit was not over; an ensuing firestorm raged in the city's ruins for weeks afterwards, killing thousands more and burning much of what the earthquake and sea had spared.[146]

Utah's example involving Covid-19 is particularly relevant to larger urban areas. Believe it or not, the air and water pollution that plague many megacities can offer an advantage when it comes to holding some diseases at bay thanks to their reducing the reproduction of mosquitoes and other vectors. Perhaps for similar reasons, malaria infection rates tend to be lower in sub-Saharan urban than rural areas. The flipside of the sickness coin is less encouraging. Dengue fever is primarily an urban problem. We need only look at New York City, Wuhan, London, Los Angeles and other major urban locations during the Covid-19 pandemic to realise that megacities' concentrations of humans make them attractive hosts for other forms of disease as well.[147]

The world's most connected urban areas are mega-creators of positive synergy. The future of the world *is* an urban one, and megacities will be at its centre in terms of influence. They will continue to offer what the less connected cannot. Other urban areas will provide select top-echelon, cutting-edge offerings. Megacities will have them in great numbers. They are what push the edges of cultural, intellectual and economic envelopes.

144 Steven Levy, 'Has the Coronavirus killed the Techlash?', *WIRED*, 20 March 2020, available from: www.wired.com/story/plaintext-has-the-coronavirus-killed-the-techlash/.

145 Hughes, *Istanbul*, 252.

146 A book-length review of Lisbon's disaster is available in Mark Molesky, *This Gulf of Fire: The Destruction of Lisbon, or Apocalypse in the Age of Science and Reason*, New York, NY: Alfred A. Knopf, 2015.

147 Alirol et al., 'Urbanisation and infectious diseases in a globalized world', 134–36.

Chinese sports footwear maker Anta concentrates its shops in medium-sized urban areas. It finds it can better compete there than in richer Shanghai or Beijing where the allure of global (and more expensive) brands like Adidas and Nike makes them more popular.[148] Just as medieval urban areas granted freedom to the serf and were richer soil for women's rights, today's larger cities are where India's caste system breaks down in addition to being where Africans find sanctuary from tribal and clan narrow-mindedness. 'No one knows who you are in the city,' observed Mumbai factory worker Tawwai Ali, 'so there's less conflict.' His fellow countryman Chinmay Tumbe agreed: 'Strict rules about "untouchability" are impossible to enforce in a jam-packed Mumbai train.'[149]

## The future of megacity combat

> According to our analysis, the likelihood of interstate conflict drops sharply (to around one-quarter to one-third below the peak values) once countries reach the following thresholds: (1) a median age above 30 years, (2) a youth-bulge ratio below 20 percent of the adult population, (3) a fertility level below two births per woman, and (4) a life expectancy above 75 years … China … will be one of the very oldest societies on Earth in just a few decades … It is also true that much of the developing world, including the Middle East, is likely to be more conflict prone in the next few decades given the currently youthful profiles of countries in their region.[150]
>
> —Deborah Jordan Brooks et al., 'The demographic transition theory of war'

> Rising levels of urbanization and education … have been associated with the spread of more doctrinaire forms of Islam in other countries.[151]
>
> —'A long shadow', *The Economist*

148 'Upping the Anta: Chinese brands', *The Economist*, [London], 16 May 2020, 54.

149 Quoted in 'City air makes you free: Domestic migration', *The Economist*, [London], 16 November 2019, 10–11, at 10; and 'Melting pots', *The Economist*, [London], 21 December 2019, 63–65, at 63, 65.

150 Deborah Jordan Brooks, Stephen G. Brooks, Brian D. Greenhill and Mark L. Haas, 'The demographic transition theory of war: Why young societies are conflict prone and old societies are the most peaceful', *International Security* 43(3) (2018–19): 53–95, at 94, 95, doi.org/10.1162/isec_a_00335.

151 'A long shadow: Islam and politics in Bangladesh', *The Economist*, [London], 3 June 2017, 31–32, at 32.

> The attack jumped off at 0715 on 24 January [1945] following a fifteen-minute preparation by the 25th Division artillery … The right company failed to reach the edge of town because of sniper fire … The left company reached the north edge of town under the artillery preparation. This company was halted about fifty yards into town by machine gun crossfire and then driven back out of town by a prompt counterattack led by three tanks … For the succeeding four days the operations consisted of a block-by-block advance south through the town … On 27 January a coordinated attack on a two-battalion front was made against the southern half of the town. It was preceded by a 105-mm preparation of two battalions and supported by a similar concentration advanced by time schedule. Though several tanks were eliminated, no more than 100 yards was gained along the front. Casualties were heavy. Fatigue was becoming apparent in attacking units.[152]
>
> —Colonel James L. Dalton II, 'Commentary on Reduction of Strong Point San Manuel, Luzon, P.I.'

As with so much in this consideration of megacities, the possibility of future combat presents a mixture of challenge and opportunity, concern and—dare it be said—promise. The first quotation above lends hope for reduced chances of war given worldwide ageing (with exceptions such as sub-Saharan Africa and portions of the Middle East) and the lower birthrates in urban areas. The second suggests that other trends creating educated but less enlightened youths unable to find employment have an opposite effect. Finally, quotation three reminds us that the costs promise to be high should warfare come to these urban areas. The loss of noncombatant lives during fighting in 1945 in Manila was more than five times that of the combined deaths among the combatants, forcibly reminding us that the penalties are far greater than a focus on military casualties alone suggests.

We recall that an underlying premise of this book has been that urban disasters brought about by war can provide lessons for responses to disasters with human-aggravated natural or other humanmade causes and that the reverse is likewise true. War it was not, but reviewing the findings from the previously mentioned exercise in which the emergency operations centre was left outside the notional area affected by a nuclear attack reinforces the above lessons or presents others:

152 Colonel James L. Dalton II, Commander, 161st Infantry Regiment, 25th Infantry Division, 'Commentary on Reduction of Strong Point San Manuel, Luzon, P.I.', 8 February 1945. 'P.I.' refers to 'Philippine Islands'.

- Focus on the urban system, not just its individual parts.
- Rehearsing for disaster relief along pristine streets or in empty training buildings instead of roads and rooms strewn with debris and the scattered residue of daily life is like playing T-ball and hoping to make the major leagues.
- Inviting only cooperative organisations to planning and rehearsal sessions means failing to include all those with necessary capabilities and potentially missing out on their resources in times of need.
- Though having all relevant parties involved makes planning, rehearsing and the possibility of agreeing to a single orchestrating authority more difficult, gaining the cooperation of as many of those parties as possible for at least part of the orchestra's performance beats the chaos of noncooperation. If creating a single orchestra is impossible, consider forming quintets, quartets, jazz ensembles or several smaller orchestras. It beats everyone playing their instrument on their own.
- The same can be said for an orchestra's string, brass, woodwind and percussion sections. The conductor succeeds only if the sections know and play their parts effectively. The same applies to new arrivals; community volunteers add a fifth section to the orchestra's normal four. Outside aid and service providers expand it further yet. Without music (the plan) and practise (rehearsals), the result is noise rather than a symphony. Unfortunately, there will be those who prefer cacophony to music as it better suits their taste (criminals, enemy forces, purveyors of misinformation).
- Megacities can be more like sports stadiums than concert halls during disaster responses. Chance, friction and (in time of war) enemy actions will work to disrupt the orchestra. Good plans, mutual familiarity and rehearsals that include improvisation-ready responders give conductor and orchestra a shot at prevailing.
- Terrorists will place second, third or more bombs to kill first responders or innocents fleeing from initial attack locations. Calls for help unrelated to an attack such as those on the World Trade Center or Taj Mahal Palace Hotel are also inevitable in a city of millions. Over-response to attention-grabbing events threatens lives and a megacity's general security. Mission command plays a role here.
- Having some grasp of probable initial priorities is better than starting from scratch amid the wreckage. Plan. Rehearse. Learn from other megacity disasters. Revise plans. Rehearse again. And again.

The crawl–walk–run approach to disaster response will tend to be most effective. Simple or routine activities are a good place to start when preparing. Parts perfecting their roles (crawl), then gradually coming together and cooperatively adapting those near perfection (walk), so that their orchestration better serves the collective effort (run), take advantage of individual capabilities while never losing focus on the readiness of the whole.

This text is taken from *Come Hell or High Fever: Readying the World's Megacities for Disaster*, by Russell W. Glenn, published 2023 by ANU Press, The Australian National University, Canberra, Australia.

doi.org/10.22459/CHHF.2023.09