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Disasters' challenges and opportunities

> A single blast in Colombo has more value psychologically than full-scale conflict in the north and northeast … The war had always been 'invisible' to most Sri Lankans.[1]
>
> —C. Christine Fair, *Urban Battle Fields of South Asia*

> Cities are the crucible of civilization, the hubs of innovation, the engines of wealth creation and centers of power, the magnets that attract creative individuals, and the stimulant for ideas, growth, and innovation. But they also have a dark side: they are the prime loci of crime, pollution, poverty, disease, and the consumption of energy and resources.[2]
>
> —Geoffrey West, *Scale*

> Tragedy always teaches us something.[3]
>
> —Yuguo Li, University of Hong Kong

All urban areas—megacities in particular—can be daunting beasts. Mayor, police officer, soldier, awestruck visitor—all can be forgiven for feeling overwhelmed as they look down on a city from atop its tallest building or nearby peak, as in Seoul and Rio de Janeiro. Where to start planning for the devastating earthquake or cyclone that is only a matter of 'when'?

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1 C. Christine Fair, *Urban Battle Fields of South Asia: Lessons Learned from Sri Lanka, India, and Pakistan*, Santa Monica, CA: RAND Corporation, 2004, 47–48, doi.org/10.7249/MG210.

2 West, *Scale*, 214–15.

3 Quoted in Megan Molteni, 'Fatal flaw', *WIRED*, July–August 2021, 62–73, at 72.

How to find the lurking terrorist hidden among a (mostly) unwitting population? What can be done to oust an enemy imposing its horrors on those living in the city without further adding to their suffering?

How do we account for the extraordinary social, physical or economic complexity that is part and parcel of any megacity in those plans? Density is one way—a way that can be surprisingly helpful in getting a grip on the seemingly ungrippable. Understanding the megacity as a system and subsystems is another. Recognising the character of the connections within and between these systems is a third.

Urban density

> Five days later, on October 22, second platoon rolled out of the gate of Loyalty to again patrol Adhamiya [Iraq]. Immediately, they sensed that something was wrong. No one walked the street or gathered at the corner to chat. No children played. Dead quiet. And then, too much noise … [Company commander Captain Mike] Baka wanted to better the odds of survival, and decided to start putting soldiers used to living in the city—the kids who grew up with street smarts—in the first vehicles out on patrol. They picked up on unusual activity the others had missed—a shifty glance, an odd posture, out-of-place clothing—but didn't necessarily know why someone was suspicious. Baka learned to trust it when someone said, 'That guy's just bad. Let's stop him.' Inevitably, they'd be right.[4]
>
> —Kelly Kennedy, *They Fought for Each Other*

> They forget that sometimes a cop on a beat likes it that way. The street is his. He knowns everyone on it. He knows who and what they are and where they spend their time.[5]
>
> —Private eye Mike Hammer in Mickey Spillane, *My Gun is Quick*

Density has special meaning for those who must live, protect, govern, assist or fight in an urban area. An aid organisation that might provide relief to several villages and towns in an otherwise rural area can find its resources fully committed to merely a single city block. A company

4 Kelly Kennedy, *They Fought for Each Other: The Triumph and Tragedy of the Hardest Hit Unit in Iraq*, New York, NY: St Martin's Press, 2010, 59, 132.

5 In Mickey Spillane, *The Mike Hammer Collection. Volume 1*, New York, NY: New American Library, 2001, 285.

of a hundred soldiers could expect to defend several hundred metres of frontage in rolling plains or farmland, and a good deal more in the vacuum of the desert or the Arctic. That same company might be responsible for no more than a modest apartment or office building of which every room requires clearing of enemy, and it must secure each passageway to guard against infiltrators attempting to sneak behind its soldiers. The density of rooms and walls, windows and doorways, poses problems of visibility and vulnerability. A barrier between oneself and the foe is no guarantee the latter's fire will not be lethal. Today's bullets can travel through two or more rooms of modern construction. That same projectile might hardly betray its passage through the flimsy materials making up some slum dwellings before inadvertently striking a man, woman or child unfortunate enough to be its final resting place. Ceilings or floors are likewise dubious shields. Knocking a small hole in a building's exterior and a yet smaller one in the wall where a sharpshooter awaits across a street means an ambusher can remain virtually undetectable as they lie in wait for a victim's entry into their site picture. A terrorist, insurgent, gang member or enemy soldier might instead choose to avoid exposing themselves at all, relying on booby traps or readying an entire building for demolition. The dangers are magnified for police, soldiers or other security officials constrained by concerns about the safety of the innocent. These densities in space have company in greater densities of activity per unit time. More infrastructure, people and action in less space mean situations change more rapidly than in other environments.[6]

The densities of humanmade structures and human populations are the two most obvious traits of urbanisation. Unfortunately, more buildings and more people in less space translate to more damage and more injuries when disaster visits. Urban space is better measured in volume than area. Megacity folk often live and work less at ground level than in storeys above or levels below. More floors mean more windows, balconies or other features from which an ambusher can shoot and more rooms that need to be cleared of a foe or searched for someone in need post disaster. Hallways, streets, subway tracks, utility conduits or shopping mall passageways mean more directions from which an adversary can attack. Concern for innocent life and preserving that of fellow police or soldiers can become a zero-sum game. US Marines put their lives at additional

6 Russell W. Glenn, *Heavy Matter: Urban Operations' Density of Challenges*, Santa Monica, CA: RAND Corporation, 2000, 2, 5.

risk when clearing rooms in Iraq, opting to not rely on fragmentation grenades—'frags', which disperse hundreds of lethal metal shards on exploding and would kill innocents within—after their supply of nonlethal stun grenades ran out. They instead had to risk fire from a waiting and unsuppressed enemy when entering each room. Room-clearing means contacts with those trying to kill you are sudden and close. Quickness as much as marksmanship determines who survives. It is not by accident that shorter-barrelled rifles are the order of the day for a special weapons and tactics (SWAT) team member or urban warrior. Reduced length means less chance of catching the muzzle on debris or doorsill. The rifles are also just that discriminating millisecond faster to bring to bear on a target.

More buildings and people mean more streets, tunnels, tracks, bridges and vehicles to get residents and workers to and from their destinations. The same is true for police, soldier or another responsible for protecting, defending or providing aid to a city. Pro-Russian forces and the Russian Army learned this to their regret when Chechen forces entered Grozny in March 1996. Russian commanders set up blocking positions along only 22 of the nearly 100 streets leading into the Chechen capital. Their insurgent enemy was only too happy to take advantage of the unguarded routes as they moved to attack.[7]

Fortunately for those rendering aid, what can be challenges for the SWAT team and soldier instead offer benefits. Urban density means more medical professionals, hospitals, rescue personnel and others with needed expertise within reasonable proximity. The role of cities as shipping nodes and transportation hubs suggests warehouses or docks containing essential needs beyond those hospitals, food banks or other critical aid providers have on hand. That the introduction of Ebola into Lagos in 2014 was interdicted so quickly and had so limited an effect was in considerable part thanks to the density of presence in the region's largest urban area of those with essential talents (this, we will recall, even though many doctors were on strike when Lagos's patient zero collapsed in the city's primary airport). The concentration of upper-tier economic jobs also provides opportunities for those less educated or talented. One economist concludes that two additional professional positions and three nonprofessional job opportunities follow every new high-tech job into an urban area.[8]

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7 Stasys Knezys and Romanas Sedlickas, *The War in Chechnya*, College Station, TX: Texas A&M Press, 1999, 258.

8 Bruce Katz and Jennifer Bradley, *The Metropolitan Revolution: How Cities and Metros Are Fixing Our Broken Politics and Fragile Economy*, Washington, DC: Brookings Institution Press, 2013, 33.

Less fortunately, a greater density of users of social media, radio and other bandwidth or frequency in less space means communications can be inconsistent during times of crisis. In addition, a megacity's many providers of information make separating truth from rumour more difficult. A routine downside can occasionally offer a crisis upside; rush-hour traffic hinders movement and frustrates drivers, but vehicle availability is a benefit when emergency responders need to augment their own sources of transportation.

A different kind of density burdens disaster response managers: the assortment of authorities that together manage a megacity. Working with even the many parts of a single city's officialdom—the mayor's office, city council, police, fire, health inspectors, courts and so many others—can keep those lending assistance up at night. We have noted that a megacity is an urban area of many smaller cities, towns and other incorporated (and often unincorporated) authorities. Los Angeles County is home to 88 incorporated urban governments, ranging from the City of Los Angeles (population 3.9 million) to the collection of buildings and land making up Vernon, population 76. One can find 42 police departments (not including school police and other purpose-specific forces), 30 fire departments and 80 school districts in that county alone (the county has its own sheriff's department to boot).[9] That is daunting enough for an organisation trying to assist in the aftermath of the 'Big One'—the promised earthquake yet to come. But the megacity long ago cast aside any thought of restricting itself to Los Angeles County. Today, it also embraces all or parts of Ventura, Orange, San Bernardino and Riverside counties. Tokyo is no different with its 23 wards and 26 recognised cities, seven towns and eight villages within just the city 'core' that was Tokyo Prefecture in 1943.[10]

The United Nations acknowledges that density makes urban areas more productive, innovative and greener as people can cycle, walk or use public transportation in lieu of relying on automobiles to cover the greater distances inherent in less-dense community living.[11] Those same civilians whom police, soldiers and other authorities struggle to protect

9 'Less than the sum of their parts: Municipal limits', *The Economist*, [London], 22 December 2018, 41; and John Sullivan (Los Angeles County Sheriff's Department, retired), Discussion with Russell W. Glenn, Los Angeles, CA, 20 October 2021; 'Municipal Police Departments Los Angeles County', *Los Angeles Almanac*, 2022, available from: www.laalmanac.com/crime/cr69.php.

10 Kumagai and Nojima, 'Urbanization and Disaster Mitigation in Tokyo', 57, 88.

11 UN-Habitat, *Urbanization and Development*, 38.

each possess two eyes and two ears—invaluable assets when residents are willing to provide information. The same is true for day-to-day routine security that can prevent a disaster from occurring. Urban terrorists may live close to their targets for fear that ranging too widely while purchasing food, other necessities and the materials needed for their nefarious actions will increase the chances of detection. Citizens reporting 'the absence of the normal or presence of the abnormal' have prevented terrorist attacks. Failing to do so has had the opposite effect. Shouldn't the doctor treating a patient who is missing fingers after what seems to be an explosive-related traumatic amputation report the case to authorities—a responsibility that aces any concerns about the Hippocratic Oath? Might seeing men hauling three or four refrigerators into a small neighbouring apartment be worth mentioning to the police (for reasons we will cover later)? Does the reduced number of children approaching relief agency vehicles mean kids have found better things to do or might cholera be infiltrating the community? Virtually every individual in a city is a potential source of information, a two-eyed, two-eared 'sensor' in military-speak, albeit one who needs to be convinced (and regularly reminded) of the value their reporting of suspicious activities could offer to fellow urban residents and themselves.

Several of the world's largest urban areas are decreasing in density even as their populations grow thanks to construction spreading outward from more expensive and congested inner-city environs. A UN report estimates that the area consumed by urbanisation in developing countries will, by 2050, be four times what it was in 2000.[12] Military leaders in Seoul were shocked to find previously open terrain on the megacity's outskirts—land that had serviced training and other important roles in the past—occupied by highrise apartment buildings after only a few years.[13] Istanbul's government designated 470 parks and other open spaces as assembly areas after a 1999 earthquake killed 17,000 people; only 77 of these had not been consumed by new construction two decades later—construction that often failed to meet tremor-resistant standards.[14]

12 ibid., 28.

13 Remarks by US Army Lieutenant General Michael A. Bills at US Army Pacific LANPAC Conference Panel 5, Honolulu, May 2018.

14 'Picking up the pieces: Turkey', *The Economist*, [London], 5 December 2020, 52.

The megacity as system and subsystem

> The economy and population of medieval Europe were rapidly expanding after Dark Age centuries, with unprecedented growth in travel and trade between cities and regions. For all these reasons, the disease was able to spread rapidly—two kilometers a day along major routes, with ships allowing the fleas to hopscotch into northern Europe almost immediately.[15]
>
> —Darrell Bricker and John Ibbitson, *Empty Planet*

> Kings and emperors dressed up in armour, led armies and made treaties—but it was banking houses … that in effect paid those armies and kept kings and emperors in the business of looking and sounding magnificent.[16]
>
> —Stephen Alford, *London's Triumph*

> Delhi is drying out the country for hundreds of kilometres around which creates more refugees from the land, who come to Delhi, who require more water, so Delhi takes even more—and so it goes on. Not only this, but we do not have the capacity to treat such large quantities of sewage.[17]
>
> —Rana Dasgupta, *Capital*

Just as kings, emperors and armies relied on bankers to wage their wars (or look good on parade), banks relied largely on urban income-generating systems for the money they loaned. Cities ran the world then much as they do today. Additional urban systems provided—and continue to provide—water, power, streets, trains and other essentials of city life while also removing the many forms of waste both enterprises and humans constantly generate. Just as Venice was one of various nodes in the Mediterranean commerce system, urban areas today rely on resources beyond their boundaries to feed operations and operators. The greater the city, the more extensive and complex are its internal systems and those of which it is a part.

Baghdad during the 1991 Persian Gulf War provides an example of this tangled complexity. Coalition commanders conducting the pre-invasion bombing of Iraqi targets ensured hospitals were spared. Medical facilities

15 Bricker and Ibbitson, *Empty Planet*, 11.
16 Alford, *London's Triumph*, 45.
17 Rana Dasgupta, *Capital: The Eruption of Delhi*, New York, NY: Penguin, 2014, 430.

were left undamaged for reasons of decency and adherence to international law—decency in the form of concern for noncombatants who relied on those facilities. There was no such relief for features with possible military roles: fuel supplies, power generation plants, bridges and other key transportation nodes suffered damage or destruction while hospitals stood uninjured. Yet, gone was the power essential for the medical facilities' lighting, equipment, airconditioning, heating and other functions. The fuel necessary to power backup generators quickly ran out. Doctors, nurses and cleaners found streets leading to their places of work blocked[18] (similar problems hindered civilians attempting to flee cities in World War II; refugees made homeless during German bombing of London, for example, found much of the city's public transport destroyed, making escape all but impossible).[19] These and other second and higher-order effects of striking other-than-medical targets were fully obvious only in retrospect. The same facilities surely lacked water given the pumps necessary for its distribution would also have had no power—nor would those needed to remove human waste. It takes little imagination to recognise possible additional after-effects were the situation to last long: diseases caused by drinking unpurified water, embryos' growth hindered by diseases contracted by their mothers and the long-term effects of underdevelopment when those babies were born.

Some higher-order effects are straightforward regardless of a disaster's underlying cause. An enemy will be delayed if denied a river crossing when a defender destroys a bridge. Secondary effects for soldier and citizen alike are easy to imagine if that bridge has water, power, sewerage or other lines running under it. This tension between two considerations—denying an adversary opportunity and protecting the civilian population's welfare—spurred arguments as Soviet forces entered Berlin in 1945. German defenders readied bridges and highway overpasses for demolition with the goal of stopping the attackers. However:

> [B]itter quarrels subsequently arose between those who, like the Commander of the Defense Area, advocated military necessity, and those who wished to prevent the demolitions in the interest of the population. Reich Minister Speer, especially, did his

18 The author thanks Yuna Huh for the example of Baghdad's medical facilities being handicapped by the coalition bombing strategy in 1991.

19 Aaron William Moore, *Bombing the City: Civilian Accounts of the Air War in Britain and Japan, 1939–1945*, Cambridge, UK: Cambridge University Press, 2018, 121, doi.org/10.1017/9781108552479.

> utmost to moderate the extent of the destruction. The question was vitally significant not only because of the need for traffic routes, but above all because the water and sewerage mains lay under the bridges. Speer succeeded in obtaining from Hitler an order whereby a number of particularly important bridges were to be saved.[20]

Urban complexity can also result in greater bang for the buck, providing the opportunity for multiple benefits from single actions. Many reading these pages are sure to be familiar with Baron Georges-Eugène Haussmann's charter from Emperor Napoleon III (Louis-Napoléon Bonaparte) to beautify Paris during the later decades of the nineteenth century—a task he pursued with both vigour and more than one objective. In turning narrow streets into wide boulevards, replacing the dwellings of the impoverished with more visually attractive public and private structures and paving the capital's streets with asphalt-like surfaces instead of cobblestones, Haussmann made Paris more secure for its political authorities. Marching infantry, cavalry with horses abreast and cannon requiring long ranges for their fire found the new avenues more amenable to fast movement and the disruption of demonstrations thanks to both the width of those streets and the absence of stones that could be worked loose and cast at the government's protectors. The new routes fragmented notorious hotbeds of militancy. Haussmann additionally had aqueducts and pump stations built, overhauled the sewerage system, straightened crooked passageways and opened deadends so that a walk that took 90 minutes in 1840 could be made in one-third the time a decade or so later. It is said that pre-Haussmann carriage travel was even slower than walking. So convoluted were those streets that the well-to-do might need two hours for a trip the less wealthy could walk in far shorter time.[21] Were the changes for the good of all? Certainly not for those ousted from their homes or who suffered the military's greater efficiencies. They also led to a phenomenon new to the age—one Parisians continue to suffer today. In another of those hard to determine higher-order effects, travellers used to the capital's twisted streets and jammed alleyways had learned to tolerate

20 Wilhelm Willemer, *The German Defense of Berlin*, trans. R.D. Young, Historical Division, Headquarters, United States Army, Europe MS No. P-136, 1953, 33–34.

21 Twain, *The Innocents Abroad*, 101; Sennett, *Building and Dwelling*, 31–32, 89; Adrian Tinniswood, *Visions of Power: Ambition and Architecture from Ancient Times to the Present*, New York, NY: Steward, Tabori & Chang, 1998, 144–45; and Colin Jones, *Paris: The Biography of a City*, New York, NY: Penguin, 2006, 319.

a journey's inevitable delays. The baron's improvements bred impatience. Parisians discovered road rage thanks to newly born expectations of rapid movement between points.[22]

An excellent pair of briefings given during a 2019 conference in Tokyo provides a more recent example of the complexity of megacity systems and subsystems.[23] Analysing the consequences of a notional 7.3 Richter scale earthquake during what would have been the 2020 Summer Olympics (later postponed a year due to Covid-19), the presenters described Tokyo in terms of flows into, within and out of the megacity. Seeking to keep their discussions manageable, those at the podium limited consideration of those flows to five types: power, water, people, goods and services, and waste. They took on the task in two parts. The first described how those five flows influenced daily city functions and one another. A second turned to the specific challenge of how such a disaster might rend Tokyo's fabric during the Olympics. Even limiting the consideration to five factors quickly showed the far-reaching character of the megacity's interconnecting tentacles. Pondering only power, for example, if Tokyo loses electricity supply: elevators stop, traffic lights go out and subways cease operating. Pumps that deliver water to upper floors of the capital's many tall buildings no longer accomplish that vital task—a first-order effect with second-tier consequences such as toilets no longer flushing and taps failing to provide drinking, washing and bathing water. Pursuing those higher-order effects further reveals just how complex are a megacity's relationships. Even those living at ground level soon find they, too, have access only to unclean water as treatment plants cease operating and stocks of bottled water are exhausted. As would have been the case in Baghdad had the consequences of bombing been long term, going without power for long sees the risk of disease spike dramatically as residents consume, bathe in or clean with unsanitary water. Literally millions who rely on subways are stranded—no small problem when we remember that Tokyo's workday commuters using public transport outnumber the total across the entire United States. Airconditioners stop functioning, which is more than an issue of comfort in those same highrises during Tokyo's

22 Sennett, *Building and Dwelling*, 36.

23 To see the briefing slides and video recordings of presentations about Tokyo's systems and subsystems, access the virtual terrain walk files (numbered 1.02, 1.021, 1.022, 1.03, 1.031 and 1.032) from the 16–18 July 2019 Current and Future Operations in Megacities Conference, available from: community.apan.org/wg/tradoc-g2/mad-scientist/m/tokyo-megacities-conference-2019. The author thanks Caleb Dexter, Jesse Geyer and Jheaniell Moncrieffe for their excellent work in preparing and presenting the material underpinning the discussion here.

infamously hot and humid summers, particularly if windows cannot be opened. Other higher-order effects of a power loss include deaths among those chronically reliant on medical equipment or moderate temperatures to survive—an increasing risk as populations age.

A step away from exclusively urban examples reveals that social connections within systems are just as complex as the physical. Efforts to establish effective law enforcement often fail to view systems as a whole rather than merely in terms of their component parts. Leaders in Malaya (now Malaysia) just after World War II, those in East Timor in the late 1990s and others in Iraq and Afghanistan during the first decades of this millennium recognised that their fledgling governments were simply not viable without the rule of law. But the rule of law cannot exist without a functioning legal system. Police—the most obvious component of the whole—received the bulk of attention while other components were sometimes given short shrift. Even an ideal police force cannot protect its community if the evidence it collects is mishandled; if citizens view judges, lawyers and trials as illegitimate; if the corrupt manage the prisons, allowing the convicted to bribe their way out; or the laws, policies and training guiding these and other components of the legal system are flawed. Failure to address the legal system as a whole means good police delivering those arrested to courts become frustrated when the guilty go free as lawyers and judges are found to be in the pockets of gangs, local officials or the wealthy. Laws themselves may be legacies of previous regimes now deemed illegitimate. Even if convicted, the sentenced soon return to the streets thanks to bribes or orders from corrupt politicians. Residents refuse to support legal authorities when those criminals seek revenge on their accusers after avoiding conviction or gaining early release. The young buck (or doe) fresh from the academy cannot save a system rotten at its core; like a child's sandcastle that disappears with the high tide, the sea of corruption quickly erodes its integrity.

Systems are akin to chains: they are only as strong as their weakest links, and the links in a megacity system are many. Understanding those links extending outside the urban area is as important as determining the connections within the city. Aid providers delivering free food to Mogadishu, Somalia, discovered their actions had twofold negative consequences. First, free food drove down the prices of that sold in the

capital's markets, undermining locals' earnings and economic stability. Second, people in the surrounding countryside flooded into the city to take advantage of the availability and zero cost.[24]

Urban complexity means even those best at governing cannot completely escape the lurking spectre of hidden effects. As megacities grow, so does the pressure to expand the area from which they draw water. This is acceptable when the resource is plentiful, perhaps, but what will be the reaction in times of drought or when demand routinely exceeds capacity? The megacity of Los Angeles has long been able to provide itself with water thanks to sufficient funds and political influence allowing it to purchase rights in the Owens Valley and more remote northern and central portions of California. The robbing-Peter-to-pay-Paul approach is one reason talk of separating the state's north from the water-hungry south refuses to die.

Water is only one controversial resource sucked from the seemingly ever-increasing expanse of megacities' reach. Recall that the United Nations and the International Energy Agency estimate that urban areas account for between 60 and 80 per cent of the planet's energy use while being responsible for similar proportions of greenhouse gas emissions.[25] Attacks by locals on the south-eastern Iraqi powerlines supplying electricity to distant Baghdad in the aftermath of coalition operations in 2003 provide an example of what can happen when some become fed up when their needs go wanting as city folks benefit. Such tensions will intensify as urban areas grow larger in population, wider in territory and extend the area influenced by their self-induced climates—the last being one of many effects we are only beginning to fully appreciate. Building materials such as asphalt and concrete absorb heat, later radiating it outward (think of trying to walk barefoot on your summer driveway as a kid before you fled to the much cooler grass). On top of that, refrigerators, airconditioners, cars and human body heat add to the mercury's rise.[26] Larger urban areas have their own climates—hotter and wetter than adjacent rural terrain.[27] Models of rainfall and airflow in and around New York City and Tokyo suggest this heat island effect influences cloud formation, fog events and

24 Ben Rawlence, *City of Thorns: Nine Lives in the World's Largest Refugee Camp*, New York, NY: Picador, 2017, 59.

25 UN-Habitat, *Urbanization and Development*, 8; and Engelke, *The Security of Cities*, 27, 38.

26 Manuel De Landa, 'The Nonlinear Development Cities', in *ECO-TEC: Architecture of the In-Between*, Amerigo Marras (ed.), New York, NY: Princeton Architectural Press, 1999, 23.

27 Schilthuizen, *Darwin Comes to Town*, 36.

precipitation while raising internal urban temperatures by 10°C or more[28] (that's 18°F—the difference between a comfortable 72°F summer day and a sweltering 90°F). The effects can be almost immediate and devastating. Studies of Europe's 2003 heatwave unsurprisingly found that temperature increases in urban microclimates were strongly associated with increased numbers of deaths. Fatalities went up by 21 per cent for each 1°C rise (about 1.8°F). Shelters with fans or airconditioners should help reduce the number of deaths. Experts believe planting more trees could also help. The temperature of shaded asphalt or concrete is 11–25°C (20–45°F) cooler than unshaded areas, where the surface can be 28–50°C (50–90°F) hotter than the surrounding air.[29] As for precipitation, while increases of up to 25 per cent are most common, communities downwind of a major urban area can experience rainfall more than twice that of those upwind.[30]

A natural response to complexity is to break the seemingly incomprehensible into parts so the brain can—as I corrupt the metaphor—digest the elephant one bite at a time. The challenge is by no means a trivial one: maintain sight of the whole, of the system and of how its parts not only fit together but also complement one another for good or otherwise. Turning once again to Baghdad for an example, US military commanders and city residents were often well served by Commander's Emergency Relief Program funds during the opening decade of the twenty-first century. The US-funded program provided money for smallish local projects. It worked well for wisely considered standalone undertakings but less well when there was no overarching coordination of how the dollars were spent. In at least one instance, a well-intentioned commander invested in providing sewerage services to a neighbourhood (sewerage being the pipes and other parts of a system through which sewage flows). The system of pipes and intermediate pumps unfortunately ended at the boundary that marked the unit's extent of responsibility. The sewage treatment facility was in another organisation's area, leaving the newly installed pipes unconnected to the capital's wastewater treatment system. There could have been many reasons behind the failure. Perhaps it was simply a lack of one unit talking to another. Perhaps it was a joint plan involving the

28 IPCC, 'Urban Areas', 551; and J. Marshall Shepherd, Harold Pierce and Andrew J. Negri, 'Rainfall modification by major urban areas: Observations from spaceborne rain radar on the TRMM satellite', *Journal of Applied Meteorology and Climatology* 41(7) (2002): 689–701, at 689, doi.org/10.1175/1520-0450(2002)041<0689:RMBMUA>2.0.CO;2.

29 Robert McDonald, *Conservation for Cities: How to Plan & Build Natural Infrastructure*, Washington, DC: Island Press, 2015, 126–27, doi.org/10.5822/978-1-61091-523-6.

30 Shepherd et al., 'Rainfall modification by major urban areas', 689.

two units but one rotated out of the country before the other and the new commander chose to spend their funds differently. Perhaps they were unaware of their predecessor's commitments. Lest we judge too harshly, the numerous demands on a commander and staff combined with tours of duty of rarely more than a year often saw projects span two or more leaders' tenures. Constant concerns about securing the safety of both soldiers and residents in addition to monitoring such projects meant some oversights were inevitable. The complexity of an urban area increases the risk of such lapses.

A megacity's interconnectedness tends to magnify the consequences of bad decisions. First, there are the immediate consequences of the error itself. Then there are those related to any actions taken to correct the misstep. Both send first and higher-order ripples throughout the system. Some will be minor in consequence, such as a fire department from a jurisdiction distant from New York City responding to a disaster in the Big Apple only to find that while the threads on its engine hoses meet National Standard Thread dictates, the city's do not. In that case, the result might be no more than a few more buildings lost as the visitors await delivery of adapters or another pump truck. Hose connection size and thread incompatibility are a more common problem in the United States than one might think. The problem plagued San Diego firefighters arriving in Oakland during a major fire several years ago—this in addition to the language terms being used by the receiving city's firefighters being different to those from San Diego[31]—with echoes of police and Marines during the 1992 Los Angeles riots. Even just across the bay from Oakland, San Francisco's 3-inch (8-centimetre) hose connections differ from almost all other departments in California—not a good situation should a major earthquake or other fire-inducing disaster strike.[32] Fortunately, 9/11 spurred jurisdictions to identify problems before future events revealed such shortcomings. Key to these early discoveries are exercises in keeping with the Federal Emergency Management Agency (FEMA) Incident Command System that address how to mould personnel, communications, command procedures, equipment and other parts of disaster response systems into a cooperative whole.[33]

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31 Janell Myhre (Regional Program Manager, Bay Area Urban Areas Security Initiative), Interview with Dr Russell W. Glenn, San Francisco, CA, 13 April 2016.

32 Stacy Finz, 'HOSED/S.F. hydrants don't fit equipment from other fire departments. In a disaster, the city could be …', *STGate*, [San Francisco, CA], 21 September 2005, available from: www.sfgate.com/news/article/HOSED-S-F-hydrants-don-t-fit-equipment-from-2568046.php.

33 Federal Emergency Management Agency (FEMA), *National Incident Management System, Third Edition*, Washington, DC: Department of Homeland Security, October 2017, available from: www.fema.gov/sites/default/files/2020-07/fema_nims_doctrine-2017.pdf.

Other shortcomings can have greater impact. Coalition planners were aware of this when providing guidance for bombing strikes on Baghdad's power facilities during the 1991 Persian Gulf War. Air units used chaff—strips of metal that shorted out power facility equipment without long-term damage—to reduce the time and cost of post-fighting recovery. Alternative bombing methods such as striking generators would have meant months, perhaps years, of delay before electricity generation could restart. The higher-order effects on Baghdad's economy, healthcare, disease control and other physical and social infrastructure are obvious. The same would be true for a megacity. Consider the financial links between London, Tokyo, New York and Singapore. Returning to our imperfect but hopefully still helpful pool table metaphor, several of those numbered balls leap off the table that represents Tokyo. Some drop to the floor without consequences. Some crash on to other pool tables where numbered balls were already colliding in more ways than the human mind can grasp. The extent and character of the disruption these airborne arrivals deliver depends on the nature of the connections linking the megacities (the several pool tables). Decisions made in the aftermath of an earthquake of magnitude 7.0 or greater striking Tokyo will influence not only that city's and Japan's recoveries, they also will favourably or otherwise impact distant nodes in the world's economic system. The extent of disruption will also affect individual shopowners, impact supply lines, influence whether an interconnected city's government officials or company executives hold on to their positions and have other consequences for the countries of which those urban areas are a part.[34] Supply chain challenges during the ongoing Covid-19 pandemic as I write reflect the fact that earthquakes are not the only possible culprits of concern for megacity leaders.

This widespread systems complexity means that even seemingly positive initiatives can have a dark side that is hard to foresee. In October 2002, Colombian president Álvaro Uribe Vélez sent his country's army into the drug and crime-ridden city of Medellín to rein in the country's most

34 The 2011 trifecta of 9.0 earthquake, tsunami and Fukushima Daiichi nuclear reactor failures revealed mismanagement in Japan's largest power provider, Tokyo Electric Power Company Holdings (TEPCO), and motivated questions about Japan's prime minister at the time. The consequences of lost trust, prestige and position paled in comparison with the thousands of lives and billions of yen lost. While not insignificant, the disaster's direct impact on Tokyo was far less than on communities to its north. The local, national and international implications when Tokyo or Los Angeles suffers the 'Big One' are difficult to comprehend and nearly impossible to forecast beyond generalities, as is the case with any megacity regardless of a disaster's cause.

notorious criminal and insurgent group, the Revolutionary Armed Forces of Colombia (FARC). The suppression of the FARC left a vacuum that paramilitary crime lord Diego Fernando Murillo Bejarano (aka Don Berna) was only too happy to fill as he successfully sought to expand his influence. The immediate consequences included positives: Berna's control of the city's poorest areas brought a drop in murders that in turn allowed the mayor's office to expand public services into communities previously not receiving official attention. Berna was arrested later in the same decade. His departure created new voids that were filled by not one but 'tens of criminal groups' fighting for the spoils of extortion, prostitution, drug dealing and other crimes.[35]

The provision of disaster aid can similarly have negative consequences despite good intentions. Relief aid is big business. Drawing on another example with potential application to future megacity disasters, Sierra Leone's leader during its late twentieth-century civil war declined aid when its Canadian providers refused to funnel the money and goods through corrupt government officials because the donors recognised that it would never reach those for whom it was intended. Similar concerns caused Lise Grande, UN Resident and Humanitarian Coordinator for Yemen late in the second decade of this century, to cut off aid to areas controlled by Houthi fighting factions after repeated warnings failed to halt the group's misappropriation. There will always be those willing to see suffering continue as long as outside support lines their pockets or otherwise serves their interests. Poor aid management fuels rather than relieves residents' misery. On the other hand, effective aid orchestration has the potential to swell collective benefits. Too often, however, that orchestration falls victim to participating organisations wanting to play their own tunes rather than creating collective harmony.[36]

35 Vanda Felbab-Brown, *Bringing the State to the Slum: Confronting Organized Crime and Urban Violence in Latin America—Lessons for Law Enforcement and Policymakers*, Latin America Initiative at Brookings, Washington, DC: Brookings Institution, December 2011, 3, available from: www.brookings.edu/wp-content/uploads/2016/06/1205_latin_america_slums_felbabbrown.pdf.

36 Such management, if attained, would ideally not limit itself to coordination in the service of avoiding redundancy and misuse. It would also provide some manner of central oversight to reduce secondary but no less popular (among the corrupt reaping the economic benefits) practices of paying premium rates for housing, vehicles, food or other resources, the results of which are local population members being ousted from their homes and disruption of an economy already suffering due to whatever disaster plagues the city (and country) in question. NGOs and IGOs are not the only culprits here; governmental organisations external to the affected region are often equally guilty of these practices.

Benefits of cooperation

> When city leaders cooperate, rather than compete, in a number of areas (crime, poverty, social inequalities, transport systems, infrastructure), a more effective type of regional governance emerges that has direct implications on the quality of life both inside and outside the large urban configuration.[37]
>
> —UN-Habitat, *State of the World's Cities 2012/2013*

> We inhabit a city size XXL that contains cities size S.[38]
>
> —Juan Villoro, *Horizontal Vertigo*

There is no guarantee that the many authorities whose cities, towns, departments, legislatures or councils are part of a megacity will see the benefits of working together. Minneapolis–St Paul provides an example, albeit from a smaller urban area. During the 1960s, many of its municipalities competed against one another to attract businesses and the revenue that followed. Minnesota finally legislated that a portion of all commercial tax income must go into a common account. This (admittedly coerced) cooperation stood the Minneapolis–St Paul region in good stead. Today, residents benefit from increased wealth and home prices that have remained affordable.[39] The many jurisdictions now cooperating suffer less from dog-eat-dog tactics. Municipalities in effect expanded their boundaries by joining forces as all profited (literally) from the arrival of new enterprises. A subsequent study unsurprisingly found that such cooperation made these municipalities less vulnerable to commercial organisations' manipulation. The effect of this urban growth without physically expanding boundaries put a new twist on findings from other studies: urban areas unable to expand beyond fixed boundaries tend to remain poorer and more segregated. They experience less growth, suffer lower municipal bond ratings and have less-educated workforces.[40] Cooperation such as that in Minneapolis–St Paul provides virtual growth—a possible remedy when physical expansion is infeasible.

37 United Nations Human Settlement Programme (UN-Habitat), *State of the World's Cities 2012/2013: Prosperity of Cities*, World Urban Forum edn, Nairobi: UN-Habitat, 2012, 32–33, available from: sustainabledevelopment.un.org/content/documents/745habitat.pdf.

38 Juan Villoro, *Horizontal Vertigo: A City Called Mexico*, New York, NY: Pantheon, 2021, 32.

39 *The Economist*, 'Less than the sum of their parts'.

40 ibid.

Minneapolis–St Paul is not alone in its history of regional competition. The Denver Water Board for years wore a black hat in this regard. Its post–World War II policies made Denver's growth a matter of intimidation at the expense of nearby communities needing access to water the board controlled. Being outside the water board's self-defined boundary beyond which it would not serve customers meant the requestor either agreed to be annexed by Denver or found an alternative water source. Resulting fights to deny the bully soured relationships and undermined cooperative growth. A similar temptation is there for the dominant government in a megacity, which can blind it to long-term harms to both it and the communities on which it depends. It may be that the smartest aspect of today's and tomorrow's smart cities will prove to be more the result of interjurisdictional collaboration than new technologies. Somewhat but not too centralised cooperation should avoid the worst effects of harmful competition, especially when it is combined with decentralised management of day-to-day activities tailored to each city's or community's unique requirements.

A revealing example comes in comparing Mumbai's more successful handling of Covid-19 than Delhi's. Both are megacities. Accounting for the population difference, Mumbai's Covid deaths were only one-fifth of Delhi's. The relative success is in part attributed to Mumbai's centralised municipal corporation, while Delhi 'is a morass of overlapping authorities'. The problem is worsened because Delhi overlaps two states while Mumbai remains in and is the capital of Maharashtra State. Finally, Delhi contains the national capital—a status that can bring benefits but can also reap interference and incompetence and exacerbate corruption.[41]

Economic benefits aside, cooperation will also show value in readying for disaster. The US Government's early failure to provide the leadership needed during the Covid-19 crisis reflects the fact that the same is true not only within a single urban area, but also across several areas. Not having overarching guidance or effective management created polarising struggles, needlessly inflated prices and resulted in locations most in need going without in lieu of an equitable parsing of goods that kept a lid on costs. Officials in post-9/11 New York recognised that their security relied on others. They dispatched undercover teams to stores hundreds of miles distant from the five boroughs to figure out how hard it would be for

41 'Urbs prima in Indis: City administration in India', *The Economist*, [London], 8 May 2021, 38–39.

a terrorist to buy bombmaking ingredients such as nitrate fertilisers or hydrogen peroxide and the means to detonate a resulting weapon. Alert to the danger and aware of whom to call, officers found most store managers and shopkeepers reported suspicious purchases. Nevertheless, members of city law enforcement recognised the importance of developing programs for sharing such information and training with police departments throughout the region.[42] They are among megacities' officials who recognise international connections are also vital to disaster readiness. New York and Los Angeles count themselves among US urban areas with international engagement offices linking them to distant cities and countries.[43] Both also join other megacities and urban areas as members of the C40 collective of cities that banded together to share information, ideas and initiatives in the face of climate change—even when some of their national governments are less enlightened. Ironically, it may be easier for US cities to share with international partners than with each other. Janell Myhre of San Francisco's Bay Area Urban Area Security Initiative noted that city-to-city cooperation in setting standards (those thread counts on fire hydrants, for example) can look to California's Standardized Emergency Management Systems guidance if they are in the same county. If not, urban leadership must work through state authorities.[44] When Bay Area officials wanted to assist New York City after Hurricane Sandy, for example, requests had to go through the state capitals of Sacramento and Albany, respectively, 'instead of local to local, which really overcomplicated things'.[45]

New York City officials also realised that social systems within and beyond their megacity are just as complex and connected as the physical systems. That the social and the physical are intimately intertwined only enhances the complexity of preparing for disaster (as our example of Baghdad's hospitals demonstrated). There is a further quality of complexity when dealing with the social part of systems that is largely lacking in the physical: the tempo of change in social systems is faster. Economic relationships,

42 Chris McNickle, *Bloomberg: A Billionaire's Ambition*, New York, NY: Skyhorse, 2017, 81.

43 Joseph Bogan and Aimee Feeney, *Future Cities: Trends and Implications*, Fareham, UK: Defence and Security Analysis, Defence Science and Technology Laboratory, 17 February 2020, 129, available from: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/875528/Dstl_Future_Cities_Trends___Implications_OFFICIAL.pdf.

44 Myhre, Interview.

45 Cory Reynolds (Regional Project Manager, Whole of Community and Communications, Bay Area Urban Area Security Initiative), Interview with Russell W. Glenn, San Francisco, CA, 13 April 2016.

political alliances and fissures between criminal groups change week to week, day to day or even hour to hour. Community, ethnic, gender, age, religious and financial characteristics are slower to change but still do so more rapidly than the houses in which their residents live or the buildings in which they work. Understanding the nature of social systems is therefore a vital underpinning of security planning and crisis response.

Brooklyn's Red Hook neighbourhood and others nearby house both wealthy and poor. Loss of power and water that would last for more than two weeks after Hurricane Sandy began on 29 October 2013, putting some of those residents at greater disadvantage than others. Some 9 per cent of the residents of the City of New York's five boroughs were diabetic at the time. Only 6 per cent were so afflicted in that part of the Brooklyn 11231 zip code area just north of Red Hook. Red Hook itself had three times that percentage. The difference in asthma sufferers was even starker: 8 per cent for those in the wealthier zip code neighbourhood and 28 per cent in Red Hook. While the wealthier could afford to leave their homes until some sense of normalcy returned or pay for services to compensate for the storm's damage, Red Hook had residents unable to obtain essential medicines (pharmacies were closed), living without water (given no electricity to pump it to upper-floor apartments) and risking hypothermia during a time when temperatures averaged in the mid-40s Fahrenheit (approximately 7°C).[46]

Understanding the state of play in a megacity's communities before a crisis allows for faster and more effective responses. Knowing where vulnerable residents live and the nature of their challenges can mean the difference between demise or survival. Hospitals, clinics, pharmacists, family members, building superintendents and others have bits and pieces of the essential information. Tax records, drivers licence databases and further sources containing age, health, next of kin, religious and other information could be filtered to quickly identify those in the over-65 age group who proved especially vulnerable both in the aftermath of Sandy and during the Covid-19 crisis. This was the same demographic among whom four of every five deaths occurred during France's 2003 heatwave and which the US Centers for Disease Control (CDC) reports account for 40 per cent of heat-related deaths in the United States. (This seems a good time to remind ourselves of the increased temperatures in many

46 Schmeltz et al., 'Lessons from Hurricane Sandy', 800–1, 803.

US cities due to climate change, in addition to large cities' heat island effects.)[47] What is too often lacking is a medical information system (yes, another system) that compiles, maintains, protects and can make available essential data when required by those assisting residents in need.

Israel's 2014 Operation Protective Edge saw that country's armed forces battling with Hamas and other groups in densely packed Gaza. The initial weeks of fighting disproportionately affected the poor while leaving portions of the Gaza Strip's middle and upper classes largely unaffected. Israeli officials contacted wealthier residents living in a complex of apartment buildings, warning them to depart. Planes then levelled the structures. Within days, the conflict ceased. Some of the occupants had made it known to Hamas leaders that the costs of the struggle had become unacceptable. *One* factor in bringing the fighting to an end? Likely. *The* factor in doing so? Perhaps. Understanding an urban area's social connections reveals relationships of influence, including who can bring pressure to bear on whom.[48] Knowing who key influencers were and how to communicate with them required an understanding of Gaza's intermingled physical and social infrastructures.

The special case of primate (or primary) cities

> Istanbul is so vast a city that if a thousand die in it, the want of them is not felt in such an ocean of men.[49]
>
> —Bettany Hughes, *Istanbul*

> Metropolitan London is not merely the largest city in the world; it is more than seven times as large as Britain's second city, Liverpool, and thereby stands out alone in a different order of magnitude and significance from those of all other cities in its country. The finest wares are always to be found there, the rarest articles, the greatest talents, the most skilled workers in every science and art. Thither flows an unending stream of the young and ambitious in search of

47 Rodin, *The Resilience Dividend*, 77.

48 Russell W. Glenn, *Short war in a perpetual conflict: Implications of Israel's 2014 Operation Protective Edge for the Australian Army*, Army Research Paper No. 9, Canberra: Australian Army, 2016, 53–54, 61–62, available from: researchcentre.army.gov.au/sites/default/files/arp9_glen_short_war_in_a_perpetual_conflict.pdf.

49 Hughes, *Istanbul*, 524.

> fame and fortune, and there fame and fortune are found. London is the kingdom's market for all that is superlative in intellectual and material productions. Its supereminence as a market runs parallel to its supereminence in size. It is the primate city of the United Kingdom. In Denmark the less-than-a-million capital, Copenhagen, has won greater relative primacy. It is nine times as large as Denmark's second town.[50]
>
> —Mark Jefferson, 'The law of the primate city'

In 1939, Mark Jefferson defined a 'primate' city as 'a country's city that is at least twice as large as the next largest city and more than twice as significant'.[51] It is an interesting concept—a combination of the objective (either a city has at least twice the population of a country's second city or it does not) and the subjective (just what constitutes 'twice as significant'?). Many megacities dominate their countries in terms of Jefferson's dual factors. The megacity of Bangkok, for example, has 14 times the population of Thailand's next in line. It is no less dominant in economic, political and other influences. Disasters there have disproportionate impacts nationwide; city floods in 2012 were one of the country's worst disasters given the US$45.7 billion cost to Thailand's economy.[52] Nor is this overwhelming dominance limited to Bangkok. Manila is 15 times larger than the Philippines's second most populous urban area and similarly influential. London is now much as it was when Jefferson wrote in terms of its relative importance to the United Kingdom (the megacity's population today exceeds that of Scotland and Wales combined).[53] Paris has primate position in France as do Lagos in Nigeria, Cairo in Egypt, Moscow in Russia and Tokyo in Japan (despite Japan having urban areas with populations close to or exceeding 10 million). Yet, just as not all primate cities are megacities (note Jefferson's citing of Copenhagen), not all megacities qualify as primate. Shanghai and Beijing are arguably megacities—the first given its economic influence, the latter its political and diplomatic impact. Shanghai is China's most populous urban area (given our definition of urban area rather than China's), but at 22 million, it has only 2 million more than China's next in line (Guangzhou–Foshan) and 3 million more than Beijing.

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50 Mark Jefferson, 'The law of the primate city', *Geographical Review* 29(2) (April 1939): 226–32, at 226, doi.org/10.2307/209944.

51 ibid., 227.

52 World Vision, *Cities Prepare!*, 49.

53 Bagehot, 'England speaks up: A radical new force is reshaping the country', *The Economist*, [London], 20 March 2021, 52.

This lack of perfect overlap between the definitions of megacity and primate city merits a deeper look. Jefferson's primate cities require only *national* impact. Our megacity definition demands broader regional or even global *wasta* (an Arabic term for the sway or influence a leader commands, often due to control of resources). The wealth of urban areas—particularly megacities—means they are also affluent in their relevance to the daily lives of those local, national, superregional and planet-wide populations. The disaster implications are even more obvious. Urban events are far more likely to have local, regional, national and international impacts than is the case in any but the most exceptional rural incidents. Terrorists find megacities attractive targets because of the attention attacks there receive. The 11 September 2001 attack on the World Trade Center had financial and commercial after-effects that permeated distant economies, kept people from flying and touched emotions in even the planet's most remote regions. While there is some redundancy in world financial and commercial systems, there is also great interdependence (the 'interconnectedness' in our megacity definition)—relationships that ensure a blow against one point crosses borders to be felt throughout these broader systems. By comparison, the redundancy and relative isolation of rural systems come with a lesser degree of interdependence; chances are a disaster has only local consequences. Less-prominent cities attract less attention. The horrors of 9/11 touched rural Pennsylvania and the US capital, but the Twin Towers of New York from moment one became the symbol of the tragedy. Author Laurent Gayer concluded his in-depth study of Karachi and its seemingly endless struggles with violence and competitions for power with an observation revealing how greatly a single megacity can impact the welfare of the country of which it is a part. That megacity accounts for 70 per cent of Pakistan's income tax revenue, is responsible for 95 per cent of the country's international trade, 30 per cent of its manufacturing, 50 per cent of its bank deposits and approximately 25 per cent of its GDP.[54] Little wonder that Gayer concludes:

> Because of Karachi's enduring centrality in the national economy but also because of the city's increasingly complex ethic mix, the country will not pull itself back from the brink without bringing Karachi on board. Among many others, Karachi bears the nickname 'mini-Pakistan' for its ethnic, linguistic, and religious diversity. [It has] become a microcosm of the multiple fault lines running across the country.[55]

54 Gayer, *Karachi*, 5.
55 ibid., 282.

The very size and heterogeneity of a megacity's population provide social concealment: one hides merely by being among others and not drawing attention. The many resources found in megacities—sustenance, sympathetic population segments, concealment in plain sight, ubiquitous transportation, difference being commonplace and those seemingly innumerable interconnections beyond the urban area—ensure that megacities will continue to attract the attention of those with malevolent intentions. Preparation is crucial to prevention.[56]

Slums

> UN HABITAT estimates that by 2050, over 5 billion people will be living in cities, with an average of 30% living in slums.[57]
>
> —Karen Hudson-Edwards and Noah Raford, *Humanitarian Crisis Drivers of the Future*

> Cairo's population has nearly doubled since 1996, to 23m … Almost 1m Cairenes live in slums the government considers unsafe, without basic amenities like sewerage and water. Thousands of people live in cemeteries … Others were moved to al-Asmarat, a new public-housing complex 15km south-east of Boulaq. They received two-bedroom flats and a year of free rent. After that they will pay a 30-year mortgage at 300 pounds per month. But the neighbourhood has almost no entertainment or retail, except for a few army-run shops. The commute to downtown Cairo can take an hour or more. It might be affordable, but it is not a place many Egyptians want to call home.[58]
>
> —'Villas and slums', *The Economist*

Slums are another way megacities tend to differ from other urban areas. That is not to say other cities don't have slums. The largest in the world might be Kibera, part of Nairobi, Kenya, a city of about 6 million people

56 Russell W. Glenn, 'Terrorism and Cities: A Target Rich Environment', in *Blood and Concrete: 21st Century Conflict in Urban Centers and Megacities*, Dave Dilegge, Robert J. Bunker, John P. Sullivan and Alma Keshavarz (eds), A Small Wars Journal Book, Washington, DC: Xlibris, 2019, 2–3. Also appears in Russell W. Glenn, 'Terrorism and cities: A target rich environment', *Small Wars Journal*, 1 April 2005, 8–12, available from: smallwarsjournal.com/documents/swjmag/v1/glenn.htm.

57 Karen Hudson-Edwards and Noah Raford, *Humanitarian Crisis Drivers of the Future: Urban Catastrophes—The Wat/San Dimension*, Humanitarian Futures Programme, Report, London: King's College London, 2009, 2, available from: www.humanitarianfutures.org/wp-content/uploads/2013/06/Humanitarian-Crisis-Drivers-of-the-Future-Urban-Catastrophes-the-WatSan-Dimension.pdf.

58 'Villas and slums: Housing in the Middle East', *The Economist*, [London], 16 June 2018, 37–38.

with some regional but little global influence ('might' is the operative term. Determining the number of a slum's residents is notoriously difficult, particularly when those communities are officially ignored by city or national governments, as we noted is often the case in India).

Slum living is frequently difficult. Many residents do not own their homes. Even renting is tenuous as tenant–landlord agreements are often verbal and can end in forced evictions with property owners turning to heavies to oust the unwanted. There have been reports of fires that destroy entire blocks being deliberately set when dwelling-by-dwelling evictions were not thought expedient enough to clear land wanted for other purposes.[59] Though slum residents tend to suffer tenuous water supply and live without adequate sanitation and where crime is commonplace if not ubiquitous, such unexpected displacements nevertheless disrupt economic status and lives more generally. Loss of dwelling terminates what little support residents have available to them. City and state governments frequently do not service slums (a reason they are prone to being 'other-governed'—something we will address in the next section). Any newly homeless are separated from charities or other forms of private support that might be their only recourse should medical attention be needed or children's education desired.[60]

Nor does Mother Nature grant her favours to those exposed to these humanmade risks. Slums tend to form on land no-one else wants because it is prone to flooding, landslides or other hazards. They are often on urban fringes, meaning the trip to and from places of work can take hours. Yet, despite the potential for ouster, vile sanitary conditions, exposure to violence and other disbenefits, there are reasons so many people choose the megacity and its slums over available alternatives.[61] As one observer noted:

59 Simone Haysom, *Sanctuary in the City? Urban Displacement and Vulnerability: Final Report*, HPG Report 33, London: Humanitarian Policy Group, Overseas Development Institute, June 2013, 15, available from: cdn.odi.org/media/documents/8444.pdf.

60 'The great urban racket: Africa's slums', *The Economist*, [London], 22 April 2017, 39–40.

61 See Robert Neuwirth, *Shadow Cities: A Billion Squatters, A New Urban World*, New York, NY: Routledge, 2005, 81: 'At 3 shillings per jerry can, Kibera residents pay 10 times more for water than the average person in a wealthy neighborhood with municipally supplied, metered water service. And that's when water is plentiful. When there's a shortage, metered rates don't go up, but the prices in Kibera do. So at those times people in Kibera pay 30 or 40 times the official price of water.'

> [D]espite the excess rain that kept sousing and rotting its foundations … for the people on the streets it was a haven. They were in Calcutta by choice, victims of starvation or persecution elsewhere, and would rather be here, living rough, than in the places from which they had fled.[62]

Estimates of more than 50 per cent of a city's residents living in slum conditions are not unusual. Ethiopia and Republic of Congo are thought to have three-quarters of their countries' city-dwellers living in slums; for Kenya, Tanzania, Nigeria and Bangladesh, the value is half. The estimate for sub-Saharan Africa is nearly two-thirds (62 per cent). For Pakistan, it is roughly 40 per cent.[63] Some 700 million urban residents worldwide do not have adequate sanitation facilities.[64] That's roughly twice the population of the United States.

Why do these people come? Some of the reasons are not that different to why others of nature's creatures leave one habitat for another: escaping drought or other disasters, to improve access to food or because they are forced out of their previous living places. These basic Maslowian causes are not the only reasons. Other animals migrate to survive. They are less likely to consider doing so to improve their quality of life or self-actualise. Rarer yet would be bird or beast choosing to move so it can send resources back to family members remaining in the old ecosystem (the hesitancy of some urban-dwellers notwithstanding). Regardless of the reason, we need to remember that much of the inflow to megacities is not rural-to-urban but rather urban-to-urban as the 'big city' appeals in ways smaller

62 James K. Mitchell, 'Natural Disaster in the Context of Mega-Cities', in *Crucibles of Hazard: Mega-Cities and Disasters in Transition*, James K. Mitchell (ed.), New York, NY: United Nations University, 1999, 24. The quotation is from Alexander Frater, *Chasing the Monsoon*, New York, NY: Alfred A. Knopf, 1991.

63 *The Economist*, 'The great urban racket', 39.

64 World Economic Forum (WEF), *Global Risks 2015: 10th Edition*, Insight Report, Geneva: World Economic Forum, 2015, available from: www3.weforum.org/docs/WEF_Global_Risks_2015_Report15.pdf. As with many urban statistics, particularly those involving slums and the poor, the values in this paragraph differ depending on the source or are presented in ways that make comparisons between them virtually impossible. Like definitions of 'urban', what constitutes a slum differs from city to city and writer to writer. That said, those sources generally agree that the number of urban-dwellers living in tenuous conditions lacking many basic services is in the hundreds of millions worldwide. For a small sample of relevant sources, see Ferris, 'Urban disasters, conflict and violence'; Barber, *If Mayors Ruled the World*; Teng et al., 'Urban food security'; Christopher O. Bowers, 'Future megacity operations: Lessons from Sadr City', *Military Review* (May–June 2015): 8–16, at 10, available from: www.armyupress.army.mil/Portals/7/Primer-on-Urban-Operation/Documents/MilitaryReview_20150630_art006.pdf; and Hudson-Edwards and Raford, *Humanitarian Crisis Drivers of the Future*.

cities do not. The source of migrants differs depending on the region in question. While those moving to Dhaka from rural areas account for just under three-quarters of that megacity's growth, urban-to-urban movement is the more likely cause in South America, where rates of urbanisation are already among the highest on the planet. (Not all this in-migration goes to slums—though a fair amount certainly does when the megacity is in the developing world.)

Claims that today's developing-world megacities grew at previously unseen rates do not pass muster. Yes, Democratic Republic of Congo's Kinshasa grew fiftyfold between 1950 and 2015.[65] Estimates are that Lagos saw its population increase by 45 times between that mid-twentieth-century mark and 2019. But Chicago, long the United States' second city, swelled almost sixtyfold between 1850 and 1900.[66] London lags these numbers, its population expanding 'only' sevenfold in the nineteenth century—still impressive, until one considers New York City's population increasing more than 100 times in roughly the same period.[67] But the numbers within the numbers hint at an obvious difference between Western cities' population expansion and that of more recently emerged megacities: rates of growth alone cannot tell the story. The number of individuals constituting the growth reveals where the real difference lies. Chicago's unprecedented growth totalled a mere 1.7 million during the period above, starting from 30,000 people. New York City's impressive leap saw an increase from 30,000 to 3.5 million between 1790 and 1900. Lagos, home to 325,000 in 1950, had a population of 14,630,000 in 2019.[68] Unlike the explosive growth of Chicago, London and New York City that encompassed the Industrial Revolution and its aftermath, Lagos's growth differs not only in population numbers. Its formal economy lacks the ability to absorb anything close to its number of migrants. That alone does not explain the presence of slums. Chicago, London and New York City had theirs. It does, however, explain the size and number of these features in many twenty-first-century developing-world megacities.

65 Statistic for Kinshasa from Williams and Selle, *Military Contingencies in Megacities and Sub-Megacities*, 13.

66 Stephen Malpezzi, Urban growth and development at six scales, Second draft, University of Wisconsin James A. Graaskamp Center for Real Estate, 29 January 2008, 10.

67 'Cleanliness is next to growth: Hygiene', *The Economist*, [London], 1 August 2020, 69–71, at 70.

68 Lagos's 2019 population from *Demographia World Urban Areas*, 15th edn, 23; 1950 population from 'Lagos Population 2020', [Online], Walnut, CA: World Population Review, 2020, [Updated 2023], available from: worldpopulationreview.com/world-cities/lagos-population/; and other sources.

Rio de Janeiro's slums posed a special concern during the 2016 Summer Olympic Games. Concerns about crime meant US athletes were told entering those areas would cause them to be sent home. Some unsuspecting tourists were shocked to find that a bed-and-breakfast that looked so attractive online was in one of the many Rio *favelas*. The US Department of State diplomatic security special agent for the event, Peter Ford (and author of this book's foreword), recalled how the location for the Olympic archery competition was between two slums that routinely exchanged gunfire at night. Expended rounds could be found on the turf in the days after such exchanges.[69]

Not all security risks associated with slums are so dramatic. The more frequently seen have their roots in a combination of living conditions and lack of services. An estimated one in six of Kenya's slum-dwellers suffers from either hypertension or diabetes but is unable to access screening services or medications.[70] It is part of a wicked cycle: many slum residents work in the informal economy. They therefore do not pay taxes, so the government sees little reason to provide services—or recognise their existence. No funding was allocated for those living in slums after the 26 July 2005 flooding in Mumbai, India,[71] which killed more than 1,000 and displaced hundreds of thousands from low-lying ground.

Yet, not all is darkness. Slum residents may find informal authorities provide them with essential services when the officially recognised government cannot or will not. These areas, and at times other parts of a megacity as well, are what we will refer to as 'other-governed' areas.

69 Peter Ford, 'Best practices for securing a megacity during a major world event 2: The 2016 Rio de Janeiro Summer Olympics', Presentation to Current and Future Operations in Megacities Conference, Tokyo, 18 July 2016.

70 D. Sanderson, P. Knox Clarke and L. Campbell, *Responding to urban disasters: Learning from previous relief and recovery operations*, ALNAP Lessons Paper, London: ALNAP, 2012, available from: www.alnap.org/help-library/responding-to-urban-disasters-learning-from-previous-relief-and-recovery-operations.

71 Emily Boyd, Aditya Ghosh and Maxwell T. Boykoff, 'Climate Change Adaptation in Mumbai, India', in *The Urban Climate Challenge: Rethinking the Role of Cities in the Global Climate Regime*, Craig Johnson, Noah Toly and Heike Schroeder (eds), Abingdon, UK: Routledge, 2015, 221.

Alternative authorities in megacities

> Most telling was an American request in August 2009 for the extradition of a leading drug 'don,' Christopher 'Dudus' Coke. For months, the prime minister [Bruce Golding] stalled, reluctant to take on a gang leader who ruled the streets in Mr Golding's own Kingston Westerns constituency, handing out schoolbooks and hosting Christmas parties. When the government finally moved against Mr Coke in May 2010, arresting and extraditing him, the confrontation left 83 dead. But it has been followed by a fall of more than 40% in the murder rate.[72]
>
> —'Golding goes', *The Economist*

> After [police] confiscate the weapons in one favela, they keep some and sell the rest to a gang in another favela … Some are swapped at the border of Paraguay for drugs.[73]
>
> —Janice Perlman, *Favela*

> It is more likely that the emerging places of the world will follow quite different paths and produce different realities. It is probable, in such places, that the formal will never defeat or even rival the informal. Large portions of their cities will continue to be self-administered by communities who are little known to authorities or to each other.[74]
>
> —Rana Dasgupta, *Capital*

Dudus Coke's de facto governing of a Kingston, Jamaica, slum has plenty of company. Rio de Janeiro's Rocinha *favela* is the only one of the megacity's some 1,000 slums with a public road running through it. Even so, it is like others there: a city unto itself where security forces enter at personal risk. Yet commercial enterprises, legitimate and otherwise, go where others fear to tread when money can be made. State security might hesitate to enter, but the state-run Caixa Econômica Federal bank established a branch in Rocinha and offered residents credit cards.[75] The bank is by no means the only business venture known to residents.

72 'Golding goes: Jamaica's prime minister', *The Economist*, [London], 1 October 2011, 40.
73 Janice Perlman, *Favela: Four Decades of Living on the Edge in Rio de Janeiro*, New York, NY: Oxford University Press, 2010, 180.
74 Dasgupta, *Capital*, 435.
75 Neuwirth, *Shadow Cities*, 42, 44.

Until his arrest in 2011, Antônio Francisco Bonfim 'Nem' Lopes commanded 120 thugs who helped run an organisation responsible for more than 60 per cent of Rio's cocaine.

Rocinha's government was government by Nem. As was the case with Coke in Kingston and Pablo Escobar in Medellín, Colombia, Nem's enterprise was not only tolerated but also assisted by community members. The number of murders and other acts of violence declined during Nem's rule, with homicide rates dropping from 60 per 100,000 before he took over to about 20 per 100,000 once his regime was firmly in place. There was still violence, but it was by and large related to Nem's men conducting the business of trafficking or maintaining peace. Thefts also fell.[76]

Again, like Coke and Escobar, Nem provided a range of public services, including support for sporting, medical and other amenities the formal city authorities failed to bring to the slum (though, admittedly, electricity, television and other services were often pirated). (This aid by criminals can also be found in the developed world. Organised crime groups known as *yakuza* established soup kitchens when Japanese government authorities took too long to provide relief after the 1995 Kobe earthquake.)[77] Though there is no universal formula for other-governed success, alternative authorities in Brazil's largest cities provide services also found in slums elsewhere: handing out food and other goods, sponsoring NGOs doing the same and offering upward mobility to youths via gang membership—this where other employment opportunities are rare.[78] There may be a degree of benevolence in this provision of goods and services, but gang or other leaders understand that their benevolence garners early warning protection just as their thugs keep outsiders who seek to take advantage of slum-dwellers at arm's length. Services provided to residents are often a source of revenue. Those living in Nairobi slums pay for the 'privilege' of using shared toilets. Taxes ensure property is not stolen and the streets and alleys are 'policed'. Residents pay for water and

76 Misha Glenny, 'Cocaine, sex and social media: The untold story of Rio's most notorious cartel boss', *WIRED*, 26 October 2015, available from: www.wired.co.uk/article/rocinha-brazil-drug-cartel-antonio-lopes-nem.

77 'Flu jabs: Japan may have to cancel the Olympics', *The Economist*, [London], 7 March 2020, 36.

78 David C. Becker, 'Gangs, netwar, and "community counterinsurgency" in Haiti', *PRISM: The Journal of Complex Operations* 2(3) (June 2011): 137–54, [Washington, DC: National Defence University], available from: cco.ndu.edu/Portals/96/Documents/prism/prism_2-3/Prism_137-154_Becker.pdf.

electricity, the latter charged by the bulb, whether it is pirated or not.[79] Provision of goods and services is also a means of recruitment. Lopes, who became lord of Rocinha and its estimated 200,000 residents under the street name Nem, joined the *favela*'s other-governed establishment because he needed money to treat his daughter's illness, becoming one of the hundreds who acted as lookouts to warn of approaching police or opposing gangs, transported drugs, provided armed security or performed other tasks essential to the other-government ensuring control. The services provided in such cases are selective, however, with leaders making the choices about what is on offer. Those services provided by the frequently changing Rocinha leadership (thanks to murders and imprisonment) do not include addressing Rocinha's status as a community with one of Brazil's highest tuberculosis rates.[80]

Urban areas tend to have higher rates of tuberculosis than rural areas. Karachi, Pakistan, for example, has nearly twice the prevalence of the disease as the rest of the country. Mumbai and Dhaka are also among the megacities with high rates of tuberculosis. That newly emerging diseases tend to originate in or quickly become urban phenomena is apparent in recent outbreaks of severe acute respiratory syndrome (SARS), H1N1 influenza epidemics and, of course, Covid-19. High population densities ensure exposure. Tests conducted between June and July 2020 found 54 per cent of Mumbai's slum residents had Covid-19 antibodies; the rate in the city's formal housing was reportedly 16 per cent.[81] Some urban populations have better immunity to specific diseases given their greater exposure. The population of Afghanistan's capital, Kabul, tends to become infected with cutaneous leishmaniasis early in life as the disease is endemic to the city. Older rural Afghans are vulnerable, however, having not been exposed. Migrations promoted by the recent years of war have seen the disease achieve epidemic status in the capital as a result. Knowing which segments of a megacity population are at greater risk of exposure to maladies could be vital to aid providers. The greater vulnerability to Covid-19 of the aged, certain ethnic or labour groups and those with pre-

79 Antonio Sampaio and Eleanor Beevor, *Urban Drivers of Political Violence: Declining State Authority and Armed Groups in Mogadishu, Nairobi, Kabul and Karachi*, IISS Research Report, London: International Institute for Strategic Studies, May 2020, 13, available from: www.urban-response.org/system/files/content/resource/files/main/Urban%20drivers%20of%20political%20violence%20-%20IISS%20Research%20Report.pdf.

80 Misha Glenny, *Nemesis: One Man and the Battle for Rio*, New York, NY: Alfred A. Knopf, 2016, 15, 65–66.

81 'Rich slum, poor slum: Poverty', *The Economist*, [London], 19 June 2021, 57–58.

existing conditions is another example. Being aware of second and higher-order effects helps here, too. Though an obvious case, lack of access to potable water would forewarn of those urban residents likely to have higher rates of intestinal parasites, diarrhoea and cholera. On the upside, urban types are generally more exposed to education campaigns and act accordingly. City folk trend lower than their rural cousins in rates of AIDS and HIV due to greater condom use. Slums, which tend to have lower literacy rates than even rural regions of a country, can be an exception.[82] On a positive note: cities may provide a means of quickly detecting the origin of a disease or biological agent as well as its spread. Each year, 21 June is the day representatives of the International Metagenomics and Metadesign of the Subways and Urban Biomes (MetaSUB) International Consortium collect samples of local microbes. Though MetaSUB is far from being able to identify all collected bacteria, much less parse samples that are threatening, the 'vast majority' of identifiable species are narrowly distributed geographically, suggesting a possible future in which swabbing public areas might be a powerful tool in combating diseases before they reach pandemic status.[83]

Other-governed slums and their recruiting methods take on a different character in Nairobi than is the case in Rocinha. Fundamentalist religious leaders are among those who provide what the state will not. Among these extremists was Ahmed Iman Ali, whose links included the Somali insurgent group al-Shabaab, the crimes of which include terrorist attacks in the Kenyan capital. The Pakistani Taliban is among the several other-governing authorities in Karachi. Services provided by these informal governors include electricity (again, stolen), internet and water. Maintaining exclusive control over supply sometimes involves violence and coercion. Residents in one community were forced to drink only one brand of bottled water—presumably, a means of protecting the other-governing authority's monopoly.[84]

Interfering with these other-governors could be risky for outsiders unaware of the complex relationships that involve contacts external as well as internal to the communities in question. São Paulo's and Rio's slum

82 Emilie Alirol, Laurent Getaz, Beat Stoll, François Chappius and Louis Loutan, 'Urbanisation and infectious diseases in a globalized world', *The Lancet* 11(2) (1 February 2011): 131–41, at 132–34, doi.org/10.1016/S1473-3099(10)70223-1.

83 'A midsummer bug hunt: Microecology', *The Economist*, [London], 19 June 2021, 76.

84 Sampaio and Beevor, *Urban Drivers of Political Violence*, 15, 20–21.

governors include retired or off-duty police and fire department officers.[85] In other cases, outside businesses and elected politicians both capitalise on and legitimise other-governed authorities for financial gain or as a means of securing large blocks of votes assured by deals with slum governors.[86] Police, politicians and other officials are often complicit even when not integrated with slum management. Bribes or coercion buy complacency and, when necessary, direct support. Imprisonment is no guarantee of separating other-governors from their constituency. Though in prison, leaders of the First Capital Command gang ordered members to attack police and other public targets in 2006 in São Paulo, Brazil. They struck more than 100 police stations and additional government installations, burned over 50 buses and all but shut down the megacity's transportation system. More than 40 police officers were killed in the seven-day 'war' while gang safe havens in the city's *favelas* remained undisturbed.[87]

The situation was similar in the opening years of the twenty-first century across the Atlantic, though the businesses controlled by criminals and corrupt officials again differed in type and scope. Nairobi's *Mungiki*—essentially a banned cult—stepped into areas lacking sufficient police or other formal authorities, as was the case in Brazil, but the organisation also took over key functions throughout the city. Drivers of the Kenyan capital's many *matatu* minibuses are forced to pay *Mungiki* members protection money or risk physical violence—violence that includes beheadings, skinning and removing other body parts. Outlawed in 2002, the organisation remains as an undercurrent in Nairobi and elsewhere in Kenya, with members and supporters including security officials and politicians.[88] In the case of the *Mungiki*, 'other-governed' refers less to a place than to an alternative authority that permeates sectors of the economy or aspects of Kenyan social life much as organised crime has in other major cities' dock operations, refuse removal and other economic

85 Or at least such was the case less than a decade ago. See 'Conquering Complexo do Alemão: Organised crime in Brazil', *The Economist*, [London], 4 December 2010, 49.

86 Glenny, *Nemesis*, 15, 46.

87 Richard J. Norton, 'Feral cities: Problems today, battlefields tomorrow', *Marine Corps University Journal* 1 (Spring 2010): 50–77, at 67; and 'A magic moment for the city of God: Security in Brazil', *The Economist*, [London], 12 June 2010, 42–43.

88 Jacob Rasmussen, '"We Are the True Blood of the Mau Mau": The Mungiki Movement in Kenya', in *Global Gangs: Street Violence Across the World*, Jennifer M. Hazen and Dennis Rodgers (eds), Minneapolis, MN: University of Minnesota Press, 2014, 213–35, at 226, doi.org/10.5749/minnesota/9780816691470.003.0011; and Immigration and Refugee Board of Canada, 'Responses to Information Requests (RIRs)', Document KEN103225.E, Toronto: IRB, 16 November 2009, available from: www.refworld.org/docid/4b20f048c.html.

sectors. The *Mungiki* offers several lessons to those who might find themselves responding to a megacity disaster. Among them is the point that 'other-governed' need not be space-constrained. Like the insurgent, the cooperative official or friendly citizen by day can be a coercive other-governor at night (though in this context, 'day' and 'night' have little to do with time and much to do with intentions). History can help us in understanding these forces, but any outsider planning to conduct relief or recovery operations in a megacity would be wise to update what they know about the environment. Criminal enterprises evolve over time, adapting to changed conditions and new opportunities as does any beast of prey. *Mungiki* started out in the 1980s as an ethnically based group seeking to raise the economic status of the Kikuyu people, Kenya's largest tribe.[89] Over time, its members filled or created criminal niches in Nairobi and elsewhere—an unfortunate evolution in the capital's and the country's ecosystems—one fed by what an outsider will very likely find is among the greatest obstacles to their organisation's efforts to support those in need after a disaster: corruption.

The eternal virus: Corruption

> They who give straight judgements to strangers and to the men of the land, and go not aside from what is just, their city flourishes, and the people prosper in it … But for those who practice violence and cruel deeds far-seeing Zeus, the son of Cronos, ordains a punishment. Often even a whole city suffers for a bad man who sins and devises presumptuous deeds, and the son of Cronos lays great trouble upon the people, famine and plague together, so that the men perish away, and their women do not bear children, and their houses become few.[90]
>
> —Hesiod, *Works and Days*

> For the poor of a country where corruption thieved a great deal of opportunity, corruption was one of the genuine opportunities that remained.[91]
>
> —Katherine Boo, *Behind the Beautiful Forevers*

89 Rasmussen, 'We Are the True Blood of the Mau Mau', 215.

90 Hesiod, *Works and Days*, trans. Hugh G. Evelyn-White, 1914, lines 225–26, 238–45 [line numbers are approximate], available from: people.sc.fsu.edu/~dduke/lectures/hesiod1.pdf.

91 Boo, *Behind the Beautiful Forevers*, 28.

At this point, we understand that 'other-governed areas' refers not to locations alone, but includes segments of a population or economic sectors controlled by illegitimate authorities. What is legitimately governed and other-governed rarely lends itself to crisp delineation; the line between legitimate and otherwise is often hard to discern when police, politicians and others have a foot in both camps. The two can and frequently do coexist. We have also noted that those seemingly being imposed on are often strong supporters of the other-governors. No few of Kingston's residents killed during the seizure of Dudus Coke were defending his realm at the time.

Megacities feature varieties of unofficial or semi-official parties in addition to those identified above. Neighbourhood associations, service groups and unions or other work-associated organisations are among those who wield considerable influence both day-to-day and in extremis. These groups can be permanent in nature, spontaneous, periodic or ad hoc. Adding to the possibilities are single individuals who come forward in the aftermath of a disaster to help organise volunteers, collect and disperse scarce resources and emergency supplies or otherwise step up when formal government representatives prove incapable or overwhelmed. In short, 'other-governed' need not imply bad. Nor is the situation a case of either/or; a sector might not be completely governed by formal authorities or those otherwise. Many are legitimately committed to the welfare of residents; others—like the *yakuza* in post-earthquake Kobe—not so much. Political organisations in Dhaka, Bangladesh, are better managed than is the formal city government. Patronage in Dhaka determines who gets which job, who and which communities receive public benefits, which companies win construction and other contracts and who has access to lucrative functions such as licensing rickshaw pullers or receipt of electricity.[92] Corruption seemingly has no limit in the number of forms it can take. Elsewhere around the world, the hyper-influential include the overly rich who buy exemptions from burdens suffered by common folk and use their money to ensure legislation favourable to their interests.[93]

92 Institute of Governance Studies, *State of Cities: Urban Governance in Dhaka*, Report, Dhaka: BRAC University, May 2012, 7, available from: www.academia.edu/35811593/STATE_OF_CITIES_Urban_Governance_in_Dhaka.

93 For more on this phenomenon, see Robert J. Bunker and Pamela Ligouri Bunker (eds), *Plutocratic Insurgency Reader*, A Small Wars Journal Book, Bloomington, IN: Xlibris, 2019.

Regardless of their character, identifying other-governed or less-formal authorities will be helpful when seeking to ensure a megacity's successful recovery from a catastrophe. It could be so in preventing one as well. The US Office of Naval Intelligence (ONI) worked with the Manhattan District Attorney's Office to establish relationships with organised crime leaders controlling New York City dock workers during World War II. Those leaders' firm guidance ensured union members reported any suspicious activity while keeping their own tongues tied so as not to release information beneficial to the enemy. ONI expanded these ties, reaching into Sicily with the assistance of mafia leader Lucky Luciano, who arranged for criminal elements on the island to cooperate with Allied forces when they later invaded.[94] Such Dark Side links exist in many megacities today, and could have significant implications for organisations providing crisis relief. Leaders seeking to influence the behaviour of one or more of an urban population's ethnic, religious, labour, social, youth or other groups may find other-than-elected or formally appointed officials more effective conduits of influence than politicians. Less-formal leaders can also provide important information about the resources a community can offer in the aftermath of a calamity. Resources could range from the provision of food, building supplies or other goods to volunteer or paid labour, with these leaders assisting by organising workers, setting wages and—if deemed sufficiently noncorrupt—dispersing pay for work done.

If deemed sufficiently noncorrupt. 'Corruption is the single largest obstacle to [urban] development. [It] acts as a deterrent to direct (and even indirect) foreign investment, as it will influence foreign firms' decisions to locate in a particular country or city.'[95] So wrote UN authors in the opening years of the twenty-first century. Not long after, I was part of a multinational team analysing the effectiveness of the US Agency for International Development (USAID) Community Stabilization Program in Iraq. Corruption was so rife that the initiative was terminated roughly $100 million short of its planned spending limit largely thanks to inadequate supervision of expenditures. The inadequacy was not entirely the fault of USAID inspectors but rather due in part to absurd constraints precluding the organisation's inspectors from visiting construction sites. US State Department dictates prohibited USAID personnel riding in military vehicles. Senior coalition leaders feared any

94 John Strausbaugh, *Victory City: A History of New York and New Yorkers during World War II*, New York, NY: Hachette, 2018, 274–75.

95 UN-Habitat, *State of the World's Cities 2012/2013*, 98.

hint of coalition military presence would undermine efforts to portray the Iraqi Government as the agent responsible for a project—this even though local Iraqis were aware of who was providing the funding. Inspectors were also prohibited from riding in contractors' vehicles. As USAID had insufficient vehicles of its own, there was no practical way to inspect sites given the high-risk security environment. One enterprising Irish USAID contractor arranged for US military representatives to fly unmanned aerial vehicles (UAVs) over construction sites for which he was responsible—an innovative but exceptional solution dependent on the fortuitous proximity of UAV-equipped units.[96]

Karachi public officials deluded themselves into thinking their formal positions allowed them to control their criminal partners. Those believing themselves the puppet masters soon found the puppets free of their strings. Criminal enterprises are thought to have been behind the burning of the megacity's Bolton Market in 2009—an effective way of removing long-time shopkeepers paying low rents. Elsewhere, city land barons seized control of Karachi's edge land for their own profit thanks to political connections. At times, the corrupt authorities and criminal enterprises were one and the same. One aid provider—later murdered—railed against the 'mafias', accusing them of the megacity's rampant land theft and exorbitant water prices, declaring 'there's no land mafia. The land mafia is the government itself.'[97] Whether criminals, politicians, city authorities or some combination of the three, real estate manipulators provided another twist on corruption by creating their own other-governed areas. Residents found themselves virtual captives of those controlling the land. The property masters exercised virtually unrestricted command over homes and commercial enterprises, including access to amenities such as roads, water, sewerage and power that the formal city government failed to provide.[98] The European Union–funded research organisation ENACT found the same was true in Kenya, where:

96 For more on the problems with the Community Stabilization Program (many of which were later replicated in Afghanistan), see Russell W. Glenn, Colin Holland, Alasdair W.G. Mackie, Brenda Oppermann, Deborah Zubow Prindle and Myra Speelmans, *Evaluation of USAID's Community Stabilization Program (CSP) in Iraq: Effectiveness of the CSP Model as a Non-Lethal Tool for Counterinsurgency*, Washington, DC: United States Agency for International Development, 2009, available from: pdf.usaid.gov/pdf_docs/PDACN461.pdf. Regarding corruption in Afghanistan, see Special Inspector General for Afghanistan Reconstruction, *Corruption in Conflict: Lessons from the US Experiences in Afghanistan*, Arlington, VA: SIGAR, September 2016, available from: www.sigar.mil/pdf/lessonslearned/SIGAR-16-58-LL-Executive-Summary.pdf.

97 Samira Shackle, *Karachi Vice: Life and Death in a Contest City*, London: Granta, 2001, 167.

98 Inskeep, *Instant City*, 29–36, 108.

> drug-traffickers are small fry compared with criminal landlords. 'Land allocation, real estate and property development … may be the largest type of organized criminal activity in Africa.' In Kibera, a slum in Nairobi, more than 90% of residents rent their homes from absentee landlords [of whom, reportedly, 42 per cent] 'had associations with state and political actors' while 41% were government officials and 16% were politicians.[99]

There are less obvious but no less damaging consequences of corruption that potentially interfere with preparations for and responses to disaster. That corruption undermines trust in formal authorities is obvious. Any outsider naive or foolish enough to associate themselves with such officials is delegitimised. These misguided associations close the mouths of city residents who would otherwise provide valuable information. The Iraqi Security Forces found themselves tainted in this manner as they sought to retake Mosul from the Islamic State of Iraq and Syria (ISIS) in 2016–17:

> Even if you had the courage to report to the police or the governor's office that you were being threatened by ISI [the Islamic State of Iraq, one of several monikers used when referring to ISIS] into say, handing over the details of a government contract, there was no way to know whether the administrator or cop you went to wasn't himself compromised … For Moslawis, the [formal] government became morally indistinguishable from the insurgency, and then worse than the insurgency.[100]

Humans as bringers of disaster: War and terrorism in megacities

> City centers and residential areas are now the battlefields and frontlines of our century.[101]
>
> —Willem Oosterveld et al., *Resilient Cities, Safe Societies*

99 'Parcels, plots and power: Property rights', *The Economist*, [London], 12 September 2020, 37–39, at 39.

100 James Verini, *They Will Have to Die Now: Mosul and the Fall of the Caliphate*, New York, NY: W.W. Norton, 2019, 69–70, 71.

101 Willem Oosterveld et al., *Resilient Cities, Safe Societies: How Cities and States Can Cooperate to Combat the Violence Nexus and Promote Human Security*, The Hague, Netherlands: Centre for Strategic Studies, 2018, 3.

> LTG Harold G. Moore, commander at LZ (Landing Zone) X-Ray in November 1965 and co-author of the Vietnam [War] classic *We Were Soldiers Once … and Young*, writes that 'a commander in battle has three means of influencing the action: fire support … his personal presence on the battlefield, and the use of his reserve.' Urban areas conspire against all three of these.[102]
>
> —Russell W. Glenn and Gina Kingston, *Urban Battle Command in the 21st Century*

Humankind is often crueller than Mother Nature. While the latter's punishments can be catastrophic, the duration of her violence tends to be quick in comparison with that wrought when humans choose to fight their fellows on city streets. War leaves physical devastation no less severe and often far worse than disasters due to natural events. The social damage can be much worse. The upside is that a city readying itself for natural disaster can also take steps helpful in preparing for humankind's brutality.

Pause a moment to remember what makes targeting urban areas attractive. Bigger, better connected, more influential urban areas—megacities—garner even more attention. This goes a long way towards explaining why city-dwellers make up some four-fifths of terrorism's deaths.[103] Urban density means not only more targets to attack but also more places to secrete bombs, less chance of terrorists' detection before their attack and a multitude of ways to escape after perpetration. The 2008 Lashkar-e-Taiba strikes in Mumbai included two massive hotels among other targets. Such structures are more common in larger cities than elsewhere. Such is also the case in terms of the numbers and types of media representatives on hand to cover the act. Lucrative targets tend to be close to others (think of CBDs) and along routes where individuals fleeing one explosion can be caught with a second or third well-placed bomb or ambush. Emergency responders have proved particularly popular targets as they come to assist those injured in an initial attack.

The Irish Republican Army recognised the value of London in this regard. Attacks in Belfast and Londonderry/Derry were not getting the attention the organisation sought. Bombing London's financial district and attempting to mortar the prime minister's residence at 10 Downing Street were among several attacks that succeeded in achieving notoriety

102 Russell W. Glenn and Gina Kingston, *Urban Battle Command in the 21st Century*, Santa Monica, CA: RAND Corporation, 2005, available from: www.rand.org/content/dam/rand/pubs/monographs/2005/RAND_MG181.pdf, 23.
103 Oosterveld et al., *Resilient Cities, Safe Societies*, 17.

well beyond the physical damage produced (which in the former case was considerable). That London is the United Kingdom's capital gave the events more *political* impact than would have been the case in any other city in the country. That the megacity is an economic and banking centre for Europe and the world meant there was potential to cause planet-wide *financial* distress. London's attractiveness as a tourist city offered potential to undermine *local economic* wellbeing. That it is the United Kingdom's primate city provided a magnifying glass, further inflating the *domestic social* drama associated with the performance. It is also home to major media headquarters and offices, ensuring attention for days and weeks after an event. The same size stone thrown into Liverpool, Chicago, Perth or Marseilles strikes a semi-large pond in which other-than-local ripples quickly disappear.

The media offers terrorists treasure in addition to broadcasting their performances: information. Live television provides otherwise blind perpetrators with real-time insights into the impact of their attacks and authorities' responses. Such was the case for the remote handlers guiding terrorist actions in 2008 in Mumbai. Mobile phones are obviously another source of information if terrorist managers assign reporting duties to some of their agents. Testifying before the US Congress about the lessons from those dark hours in India, former New York City police commissioner Raymond W. Kelly observed:

> [T]he other issue that we examined in our exercises last month … is the ability of the terrorist handlers to direct operations from outside the attack zone using cell phones and other portable communications devices. With this comes a formidable capacity to adjust tactics while attacks are underway. We also discussed the complications of media coverage that could disclose law enforcement tactics in real time. This phenomenon is not new. In the past, police were able to defeat any advantage it might give hostage takers by cutting off power to the location they were in. However, the proliferation of hand-held devices would appear to trump that solution. When lives are at stake, law enforcement needs to find ways to disrupt cell phones and other communications in a pinpointed way against terrorists who are using them.[104]

104 Raymond W. Kelly, 'Testimony by Raymond W. Kelly, Police Commissioner, City of New York', in *Lessons from the Mumbai Terrorist Attacks: Parts I and II*, Hearings before the Committee on Homeland Security and Governmental Affairs, United States Senate, 111th Congress, 1st Session, 8 and 28 January 2009, Washington, DC: US Government Printing Office, available from: www.govinfo.gov/content/pkg/CHRG-111shrg49484/html/CHRG-111shrg49484.htm.

Bringing media representatives into planning sessions and exercises held in preparation for future crises will not prevent all irresponsible reporting. It could reduce its frequency by making the consequences of reporting clear and establishing guidelines for the timing of releases as has long been common when reporters accompany units in combat.

In addition to megacities' political and cultural symbolism, concentrations of attractive targets and shelter from prying eyes, their extensive interconnectedness means attacking well-chosen targets can achieve ends far beyond the urban area in which terrorists operate. A perpetrator could conceivably influence their ultimate target by striking one many miles and nations distant, thus taking advantage of international second and higher-order effects. Recalling our pool table metaphor, the effect in the initial city could be minimal—even unnoticeable—while the objective urban area suffers the desired consequence.

It pays to play the biggest venues if a terrorist, insurgent or other armed group seeks rockstar impact. The populations, structures and functions of the world's largest and most influential cities have been and will continue to be the favourites of those with malicious intentions. These groups may turn to the biggest urban area a local environment offers when no megacity lies within reasonable reach. Baghdad's residents suffered nearly half of all deaths during this century's first decade of fighting in Iraq.[105]

105 David Kilcullen, *Out of the Mountains: The Coming Age of the Urban Guerrilla*, Oxford, UK: Oxford University Press, 2013, 26.

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