

Healthy Pandemic Resilient Cities

SHELTER COVID-19 SUPPORT - 2020



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World Urban Campaign

The World Urban Campaign (WUC) is an advocacy and partnership platform to raise awareness about positive urban change in order to achieve green, productive, safe, healthy, inclusive, and well-planned cities. Its goal is to place the Urban Agenda at the highest level in development policies. It is coordinated by UN-Habitat and driven by a large number of committed partners – currently 210 partners and networks – from around the world



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Contents

Introduction

- 4 Priorities for the post-COVID-19 world: build back better
- 4 What is health resilience and what is a health resilient city?

Inclusive Health Resilience

- 5 Introduction
- 5 Vulnerable groups
- 7 Pandemic variables: environmental, social, and governance
- 7 Introduction
- 7 Urban Planning and Density
- 7 Urban Green Spaces
- 7 Water-Energy-Food Nexus
- 7 Food Security
- 8 Water, Sanitation, Hygiene (WASH)
- 8 Waste Management
- 9 Compounding Factors
- 10 Inclusive Communication
- 10 Governance
- 11 Settlement Typologies

Environmental: urban planning for health resilience

- 12 Pandemic resilience strategy – how to avoid transmission
- 13 Urban Planning
- 14 Urban Density
- 15 Urban Green Spaces
- 18 Air Quality
- 18 Ventilation
- 19 Community Development
- 19 Transportation
- 19 Public Transit and Safety (prevent)
- 20 Adapting to support Pandemic needs
- 21 Sustainable transport
- 21 Freight and Cargo
- 22 Water, Sanitation, and Hygiene (WASH)
- 25 Energy

- 26 Telecommunications
- 26 Food Security
- 27 Food Security
- 28 Land Tenure
- 29 Healthcare facilities

Social: Communications and community engagement

- 31 Communications
- 33 Community Engagement
- 33 Stakeholders Sharing Information
- 34 Stakeholders Receiving Information

Governance: guiding pandemic resilience in informal settlements

- 36 Leadership for building back better
- 37 Institutional Policy Planning
- 38 Planning for Migrant Workers
- 40 Disaster Management and Pandemics
- 41 Economic Resilience
- 42 Point of view: The Community at the Core

Conclusion

Appendices

- 44 Appendix I Pandemic Resilience Case Studies
- 44 Appendix II Rapid Response Answers
- 44 Appendix III Healthcare facilities Checklist
- 44 Appendix IV Solid Waste management graphics
- 45 Appendix I: Cases Studies
- 46 Appendix II: Rapid Response Answers
- 47 Appendix III: Healthcare Facilities Checklist and Resources
- 48 Appendix IV: Solid Waste Management

Introduction

Priorities for the post-COVID-19 world: build back better

Most of the world's cities have spent considerable time and effort enhancing their resilience against a whole host of threats and risks, particularly relating to climate change, extreme weather events and rising sea levels. But until now, the potentially devastating impact of a pandemic had not played a large role in collective thinking about planning, designing, building, and operating urban spaces.

As the world comes to terms with the impact of the COVID-19 pandemic, many questions are being asked to understand what it means to 'build back better'. The Arcadis Shelter Programme has been commissioned by UN-Habitat to contribute to this conversation in the global community with thought leadership considerations for urban planning, buildings, water, and mobility. UN-Habitat focuses on four pillars in the COVID-19 response long term and short term. This report mainly addresses these pillars through an urban planning perspective.

- Rethinking the state, reorganising local governance mechanisms
- Addressing the increase of poverty and the exacerbation of inequalities in cities
- Rethinking urban morphology, creating new evidence on density and compactness
- Reducing the risk of failure of the current urban economic business model

This report harnesses knowledge gained and collected through technical queries fielded by the Shelter Rapid Response Helpdesk. Further work has been undertaken to compile urban case studies, included in the appendix, that provide specific information on the effectiveness of responses within cities. We have applied these insights with urban planning knowledge to understand their implications on long-term resilience planning, with special consideration for informal settlements. We understand



that as the world opens up, we will continue to learn lessons and further understand the outcomes to apply best practices. Therefore, this report is not a summary of conclusive guidance on pandemic resilience but a coordinated synopsis of our findings relative to the knowledge and experience in pandemic response and design principles for healthy cities current to its writing.

What is health resilience and what is a health resilient city?

In 2015 the United Nations Member States adopted the 17 Sustainable Development Goals, targeting progress by 2030. Particularly relevant to this paper is Goal 11: 'Make cities and human settlements inclusive, safe, resilient and sustainable'. Resilience being the 'ability of any urban system to maintain continuity through all shocks and stresses while positively adapting and transforming towards sustainability' (<https://unhabitat.org/resilience>). A health resilient city, then, is an urban system able to maintain adequate protection of its population, economy and environment that enables it to continue to grow sustainably in response to a health crisis.

Health resilience requires a plan. It should be widely accepted, understood, and actively implemented by local governance and, where appropriate, the population. The plan does not start with the arrival of a health crisis;

it should highlight key priorities for local and city planners to incorporate throughout the development and implementation of urban policies and guide the direction of investment.

The aim is to identify all of the critical aspects of cities – including citizens, communities, systems and organizations that absolutely need to function, no matter what shock or stress hits the city – and to ensure that they are robust (strong enough to withstand varied and significant stress and shocks) and adaptable (being able to change in response to new circumstances or information, and learning from it to be better prepared next time). This requires constantly monitoring and analyzing activities in order to make smart decisions, earlier, to avoid costly disruptions.

¹ UNHCR Guidance Note - Connectivity for Refugees COVID-19, 2020

² IASC - COVID-19: How to include marginalized and vulnerable people in risk communication and community engagement

³ Reuters: Murders of women in Mexico rise amid fears of lockdown violence, 2020

⁴ The Conversation: Gender matters in responding to major disease outbreaks like Ebola, 2019

Inclusive Health Resilience

Introduction

The stakeholders possessing higher risks of contracting the virus are marginalised, vulnerable people and persons-of-concern (POCs), according to the Interagency Standing Committee (IASC) and the United Nations High Commission on Refugees (UNHCR)¹ Marginalised people become more vulnerable in emergencies. This is due to factors such as their lack of access to effective surveillance and early-warning systems and health services. The populations most at risk are those that:

- Depend heavily on the informal economy,
- Occupy areas prone to shocks,
- Have inadequate access to social services or political influence, have limited capacities and opportunities to cope and adapt, and
- Have limited or no access to technologies.²

Vulnerable groups

From a socioeconomic perspective, women, the elderly, youth and children, persons with disabilities, indigenous populations, refugees, migrants, and minorities experience the highest degree of socioeconomic marginalisation.

From a pandemic perspective these groups are likely to have most impact both with respect to susceptibility to the contagion and the economic backlash because of the pandemic measures.

Women

The largest vulnerable group are women. As they make up large parts of the healthcare workforce and are often primary caregivers to the ill, they are in higher risk of infection and do not always receive adequate protection. In many countries, women are economically more vulnerable as they are often more dependent on the informal sector and therefore most impacted by pandemic health and safety measures. Women experience increased risks of domestic violence when lockdowns or curfews prevent them



from leaving an unsafe home situation. The Mexican government reported an 8% increase in the number of murders of women for the first quarter of 2020 compared to the same period last year.³ During a pandemic the reallocation of resources and personnel to cope with the pandemic disease can result in reduced resources for care and support for gender-based violence survivors, which are predominantly women.

Cultural factors may also exclude women from decision-making spaces and restrict their access to information on outbreaks and availability of services. Women's access to information on outbreaks and available services are severely constrained when community engagement teams are dominated by men. In some cultural contexts, gender roles may dictate that women cannot obtain health services independently or from male service providers.

Previous epidemics illustrate the value of engaging with women when communicating about health risks. As they are a large part of the healthcare workforce and primary caregivers to children, the elderly, and the ill, women are an essential part of pandemic response. The Ebola Response Case Study provides grassroots examples on engaging women in the Ebola outbreak response in Sierra Leone.⁴

Elderly

Isolation can be a large factor in vulnerability and in many societies elderly people are isolated or have limited social and support networks. In a pandemic scenario, elderly people will generally be classified as having a higher risk of infection and lower rate of recovery due to weaker immune systems or a higher rate of pre-existing health conditions. The combination of these factors means that elderly people need to be connected to support and provisions while their exposure to people is reduced. In societies where multi-generational living is common, elderly people may have more frequent exposure to people coming in and out of the home, particularly in lower-income families where earners are obligated to continue working to sustain the household. Education about the level of risk to different demographics and appropriate mitigation is key to ensure that families and caregivers are equipped to protect individuals and areas while providing support.

¹ UNHCR Guidance Note - Connectivity for Refugees COVID-19, 2020

² IASC - COVID-19: How to include marginalized and vulnerable people in risk communication and community engagement

³ Reuters: Murders of women in Mexico rise amid fears of lockdown violence, 2020

⁴ The Conversation: Gender matters in responding to major disease outbreaks like Ebola, 2019



Disabled

Access to information is often a barrier for persons with disabilities who have specific communication needs. They are often excluded from decision-making spaces and have unequal access to information on outbreaks and availability of services. They can be socially isolated if they are not connected in the community regularly through employment or education, for example. Access to medical facilities for disabled people is a concern when creating temporary hospitals and quarantine and recovery facilities during a pandemic. They may have specific needs when engaging with health or social services in unfamiliar environments and should be particularly considered where the distribution of food or other resources is planned to occur in a public or crowded area. For many people with disabilities, their perception of risk and a lack of assurance that equal access will be provided may prevent them from initiating engagement with response efforts.

People in slums or informal settlements:

Special attention should be paid to the populations of slums and informal settlements, as they are historically settled in physically vulnerable areas, characterised by high population density, precarious housing, restrictions to road access and insufficient supply of essential public services. Further, informal settlements tend to concentrate populations that already have unfavourable health conditions. It is important to note that in the last decade the populations living in these communities have increased; it is estimated that 1 billion people live in slums or informal settlements today.⁵

According to the FIOCRUZ Foundation⁶, such populations already have high rates of diseases such as tuberculosis, hypertension, heart disease and diabetes, in addition to the consequences of violence, expressed by high homicide rates. Additionally, this population is often working at the frontline of essential services, such as cleaning, transportation, property security and civil construction; when they are not affected by redundancy, they are forced to work in situations of high exposure to the virus.

A compounding factor for pandemic resilience for these groups is a general lack of accurate social data and generally lower education levels, which increases the spread of misinformation, making it more difficult for community leaders to govern the communities. The key social protection measures that can reduce the impacts of the pandemic in these communities focus on strategies to systemise health information and to offer trustworthy and factual communication, healthcare, and social assistance in accordance with the context of the pandemic.

Migrant workers, asylum seekers, internally displaced people (IDPs) and stateless persons

Migrant workers, asylum seekers, IDPs and stateless persons have unique vulnerabilities which are often compounded by living in slums or informal settlements. Where populations are not adequately recorded it is challenging for government bodies to develop and track delivery strategies for pandemic responses for these groups.

Refugees and migrants with unrecorded legal statuses within a region may not be included in the national strategies/plans/interventions. Their mobility may also make them difficult to reach, including during cross-border movement. Where families or communities travel irregularly, they may inadvertently circumvent health screening and services at border points. Legal status, discrimination, and language barriers may limit their access to otherwise publicly available protective resources or sustenance, healthcare, and social services. This can be due to a lack of legal documentation or financial resources. Similar barriers may reduce their access to health service information and government announcements.

Poor income protection and legal representation of migrant workers leaves them vulnerable in situations of lockdown and business closure. During the COVID-19 lockdown in Ahmedabad, India, migrant families sought to return to their homeplaces when income was exhausted, forcing families to take long, often chaotic, journeys with little access to basic resources. There are concerns that employers in the construction industry influence authorities to restrict migrant workers returning to their homeplaces, in order to retain a cheap workforce; migrant workers who remain in the city generally secure resources through informal arrangements, and as these are cut off, they are exposed to helplessness and starvation.

People in politically unstable areas or war zones with damaged infrastructure often reside in cramped conditions without proper sanitation. Access to adequate shelter, food, clean water, protective supplies, healthcare, family, or community support may not be adequate or be disrupted. This can lead to weakened immune systems and heightened risk. Timely and accurate information may also be a problem, which may hinder access to life-saving health services.⁷ Basic services like health, social protection, and education are of course critical in themselves, but they are also the main ways that people interact directly with the state, including local institutions. They are the primary vehicle to create trust and confidence in governments. Ensuring equal access to services, and avoiding the perception of exclusion of certain groups, reduces competition among groups and helps maintain the popular trust that is key to mobilising society-wide efforts to combat the virus.⁸

⁵UN HABITAT – SDG 11

⁶Technical Note: COVID-19 and vulnerabilities: Considerations for Social Protection in Slums

⁷IASC - COVID-19: How to include marginalized and vulnerable people in risk communication and community engagement

⁸COVID-19 in Fragile Settings: Ensuring a Conflict Sensitive Response, 2020.

Pandemic variables: environmental, social, and governance

Introduction

To understand the context of the recommendations for urban planning, buildings, water, and mobility we need to understand the variables of a pandemic. What are the challenges that cities, particularly informal settlements and slums, face in maintaining access to basic needs? What are the main compounding factors for these? Here we describe the social, structural, and environmental challenges.

Urban Planning and Density

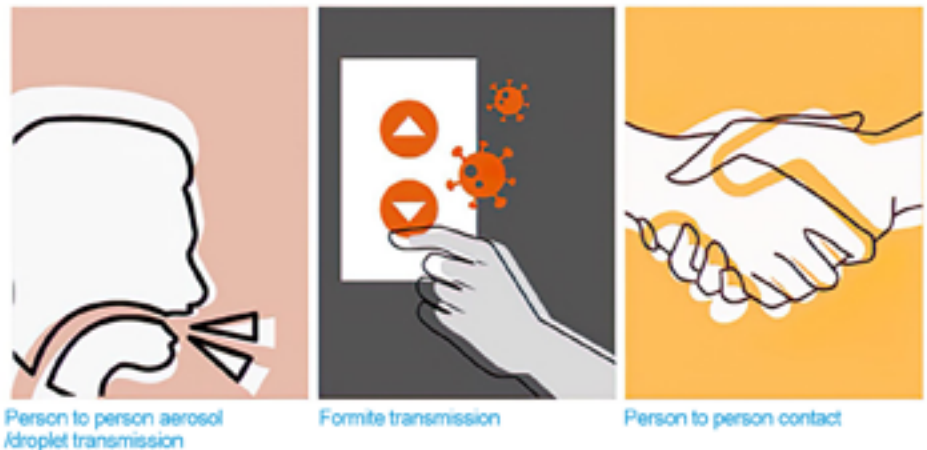
Population and its distribution are the basis of urban growth both with respect to a city's geographical boundaries and its high density compact urban fabric. With more than half the world population expected to live in urban areas, making a city liveable, inclusive for all is the greatest challenge, especially when a substantial part of this population is living in informal settlements.

This is magnified during the COVID-19 pandemic, where urban areas have had the greatest spike in cases. This has been a wakeup call and Planning and zoning regulations will need to focus on improving liveability standards and develop sustainable models for reducing travel times and provide maximum capacities for public areas.

Urban Green Spaces

Urban greens spaces are integral to a city's liveability, health, and wellness. However, funding for municipal parks and recreation departments are often cut first during challenging financial times in cities, and even with full funding, urban greenspaces are inadequate in size and disproportionate in distribution. Since urban green spaces are ingrained in nature, though, they offer communities built-in health benefits by proximity (e.g. improved air quality) and are structured to be recreational. Thus, within a pandemic scenario these spaces have been adapted to support disaster response measures. To enable a health resilient future, communities,

Principal Transmission Routes for SARS-CoV-2



and municipalities by improving their quantity and quality in a cohesive campaign against climate change, social inequity, and health disparity.

Water-Energy-Food Nexus

The water-energy-food nexus is central to sustainable development. Demand for all three is increasing, driven by rising populations, rapid urbanisation, changing diets, and economic growth. The inextricable links between these critical domains require a fully integrated approach to ensure water and food security and sustainable agriculture and energy production, particularly during a pandemic crisis when water resources are particularly stretched and demand for agricultural efficiency increases due to blockages in the food supply chain.

Food Security

Many countries have shut down their economies to keep the COVID-19 pandemic at bay. A protracted crisis could quickly put strain on supply chains and logistic hurdles could cause disruption in the coming weeks and months. To avoid food shortages, it is imperative to keep food supply chains going. In many cases, food scarcity is not a problem. However, labour shortages

(due to morbidity, movement restrictions, and social distancing rules) are starting to impact producers, processors, traders, and trucking/logistics companies in food supply chains – particularly for food products that require workers to be in close proximity. Any barriers to trade may hurt both producers and consumers and cause panic in the markets. Countries must strike a balance between the need to keep labour-intensive production going and the need to protect workers.

A combination of impacts could deepen the already high vulnerabilities of severely food-insecure populations and threaten recent development gains in food crisis contexts. The impact on food security may lead vulnerable households to resort to negative coping strategies, which will have long-term impacts on their lives and livelihoods.

Water, Sanitation, Hygiene (WASH)

Some existing hygiene and sanitation systems and behaviours commonly practiced in slums and informal settlements are not currently adequate to defend against a pandemic. Existing systems and practices are identified below, as well as how these situations might be complicated further during a viral outbreak.

Potable water

- Water rationing in slums and informal settlements can result in social paranoia (fear of catching the disease because people cannot wash their hands frequently enough) and increased transmissions (due to infrequent handwashing).⁹
- Handwashing and other personal hygienic practices (bathing, for instance) become difficult for people living in slums when suppliers, utilities, and aid agencies deploy inconsistent water supply chains and networks.⁹
- Social distancing is nearly impossible in many low-income areas because residents are likely to queue to access, buy, or collect water.⁹

Hygiene

- Water needed for slum-dwellers to engage in frequent handwashing is limited, especially when considering barriers to sourcing it. Water, particularly for urban slums, is often collected from springs, communal piped water points, swamps, or through rainwater harvesting.
- Existing water supplies are currently used sparingly for other hygiene purposes, including cleaning shared sanitation facilities, where often, shared keys to toilets provide access for multiple households.
- Soap, hand sanitiser, and other hygiene commodities are generally scarce, and especially at risk for hoarding during a public health crisis. Local supply chains and distribution networks are often unreliable and costly for both governments to maintain and populations to pay for, and thus lack accountability from the communities they serve.

Sanitation

- Urban and rural slums often use inexpensive pit latrines and at the same time may draw domestic water from nearby wells. Overcrowding in slums limits the adequate distance between wells and pit latrines so that microorganisms migrate from latrines to water sources.
- Shallow drinking water wells are most likely to be contaminated with faecal coliforms.
- Since wastewater from pit latrines can easily seep into wells used for drinking water, treatment of the water at community or household level and intensive behavioural change in sanitary practices are recommended.

Waste Management

Most top-down strategies to arrest an infectious disease will likely ignore the often-robust social groups and knowledge that already exist in many slums. As such, community leaders, trusted partners, and residents of slums and informal settlements should create informal emergency planning committees to communicate information about COVID-19 and focus on sharing effective WASH and Smart Water Management (SWM) strategies.

Urban slums largely lack municipal waste collection, so residents, youth groups, and/or organised cartels often fill the void. When households are forced to remain in place, additional solid waste will be generated. When refuse is removed, it is often landfilled near other informal settlements, shifting the waste and related disease burdens to another group of urban informal settlements.¹⁰

Solid waste recycling can also be an income-generating activity for some slum dwellers. However, intermittent waste collection in urban slums contributes to the regular burning of waste and related unhealthy particulate air pollution and dump sites that act as breeding grounds for other disease vectors (i.e., mosquitos, rats, etc.) known to make urban slum dwellers susceptible to dengue, leptospirosis, and other communicable diseases. A key lesson from the Ebola outbreak in 2014 was that quarantines, which were used as a response measure in Guinea, Liberia, and Sierra Leone, resulted in large waste disposal burdens that put an even greater strain on the health of residents of informal settlements.¹¹



Of great concern in certain communities is the role of waste-pickers in local economies, as there may be economic incentive to continue picking activities even with the health risks. A marking system can inform street-level pickers not to attempt to collect at certain residences or bags because of increased health and safety risks. Where formal networks of pickers exist, outreach through educational programmes, text messages, and announcements can inform pickers of the health and safety risks.

In some locations, pickers work on open dump landfills. It is suspected that waste from households disposed of at landfill sites poses potential risks depending on the time between last contact with households and disposal at the landfill site, especially from freshly dumped truck loads. Where possible, pickers should be encouraged not to collect from freshly dumped loads and should wait to pick until at least the duration when most of the live virus naturally degrades. This communication may be enforced through formalised networks.

⁹COVID-19 and 'Chasing for Water' – Water Access in Poor Urban Spaces, 2020

¹⁰UN - Turning waste into a business in the slums of Yaoundé, Cameroon, 2019.

¹¹UNEP - Environmental pollution and impact to public health: Implication of the Dandora Municipal dumping site in Nairobi, Kenya, 2007.



Compounding Factors

Drought

In areas where water is scarce, water conservation efforts should be viewed as essential. If a COVID-19 outbreak occurs, escalation can be rapid, leaving little room for further planning and reducing opportunities for water conservation. Therefore, establishing a relationship of collaboration and trust with residents is important to enable effective control measures.

The stakeholders most affected by a drought situation compounded by a pandemic will likely be residents of migrant camps and informal settlements due to their densities and often rural locations away from centralised water networks. In addition, low-income populations living in rural areas of developing countries in general lack access to drinking water due to their distances from large urban centres. Urban slums, which serve as shelters for higher-density communities, are mostly serviced by municipal utilities but lack the capacity for social distancing measures to truly be practical.

Flooding

Risk of flooding greatly complicates the measures that countries can take to fight the COVID-19 pandemic. Community preparedness is more difficult when people are practicing social distancing and are self-isolating. The virus has already produced economic damage and job instability, limiting people's financial welfare and their ability to absorb unexpected costs from flooding. People are unlikely to sit idly in their homes if water levels are rising, regardless of public health orders, as flooding poses a more immediate threat to a household.

Forest Fires

COVID-19 causes a respiratory disease, thus any activity that negatively impacts air quality must be monitored and controlled to avoid overlapping these conditions with affected or at-risk populations. Among the occurrences that have the most potential to degrade air quality quickly, the occurrence of forest fires certainly deserves attention. In addition to the related physical damage, the particles generated during the fire cause great concern for health, even more so for those who are already in poor conditions.

In many places around the world the occurrence of forest fires is part of the natural environment, but in others they are caused or aggravated by human activities. In Brazil, researchers are pointing to the risk that fires in the Amazon may contribute to increasing the pandemic crisis in the country. According to researchers, during the fire season, large areas of the Amazon have worse air quality than urban centres like São Paulo. This has a strong effect on health, especially in children and the elderly, who are the most vulnerable populations¹².

Clearly, this situation may occur in different parts of the world.

Therefore, the response capacity to prevent, control, and mitigate forest fires cannot be set aside during the management of pandemic crisis.

Fragility, Conflict and Violence:

COVID-19 has caused destabilising and lasting health and economic impacts in many of the world's most developed and stable nations. Its impacts are greatly exacerbated in countries impacted by fragility, conflict,

and violence (FCV). Even without a pandemic, the capacity of governments to ensure basic health services in these settings was constrained. Testing, contact tracing, social distancing, and many other measures found to be effective by richer countries in the fight against coronavirus are difficult in crowded informal settlements, refugee camps, and situations of active conflict. Handwashing is a challenge when only 38% of people in FCV settings have access to clean water.

Lockdowns and other movement-restricting measures have caused large-scale job losses, especially in the informal sector. Social division, inequalities and exclusion are rife, fuelling conflict. This all limits health workers' abilities to reach insecure areas to perform surveillance functions and to carry out community awareness activities. Many countries have reported a rise in gender-based and domestic violence as well as social unrest, and several extremist groups are thought to be viewing the pandemic as an opportunity to exploit.

The World Bank has put together a Group Strategy for Fragility, Conflict and Violence 2020-2025, which can be found [here](#).

¹²Burning season will bring more respiratory diseases in hospitals already overloaded in the Amazon by COVID-19-19, says IPAM



Inclusive Communication

Concerted efforts should be made to directly reach vulnerable people; establishing a two-way dialogue between vulnerable populations and community leaders is essential to ensure their basic needs and human rights are not neglected during the pandemic while still providing necessary messaging about COVID-19. For instance, in Kerala, India, officials are conducting awareness workshops in multiple languages to ensure all migrant workers receive current and accurate information about the virus and its effects.

The multiple vulnerabilities of these disadvantaged and discriminated groups make a communication and awareness strategy complex. Means of communication must be inclusive and accessible to people of all ability levels. To avoid stigmatising COVID-19, it is recommended to include other messages that increase empowerment of these groups. According to the UN, important messages to consider during the pandemic, in addition to the virus itself, include:

- Protect human rights and focus on inclusion
- Communicate safe labour standards
- Support and emphasise consistent

education even if schools are closed

- Prioritise social cohesion measures – “We’re all in this together, and we’re going to get through this together.”

Free access to educational and cultural resources can be used to overcome social isolation.¹³

Governance

COVID-19 has tested the best of governments, and leaderships that have triumphed have been quick to respond, consistent in their approach and clear in their communication. This is seen from the Taiwanese President Tsai Ing-Wen letting people know the gravity of the situation, to Angela Merkel reminding people to look out for each other.

Dealing with a pandemic cannot be done by governance alone and depending on the community, non-profits and individual volunteers cannot be over-emphasised, especially in developing nations where the vulnerable demography is dominant. Creating a framework to support such interdependencies is essential to effectively using the resources. This has been illustrated in Kerala where a robust network between government and NGOs, controlled distribution of food resources, and training of volunteers, mitigated depletion of manpower and supplies.

Countries are now adapting their Disaster Management Plans to include for pandemic resilience, allowing those with robust plans to tap into the existing network. While disaster management typically services the most vulnerable, a pandemic resilience plan needs to extend across all strata of society.

Vulnerable sections of society are at maximum disadvantage, and in countries like India where the informal economy plays a substantial role in employment, country-wide lockdown and limited transport for migrant workers has been the greatest challenge. Neglecting this challenge in the short term and long term will have a crippling effect, and comprehensive policies that function vertically through governance and horizontally through formal grass root engagement are the need of the day.

¹³Shared Responsibility, Global Solidarity: Responding to the socio-economic impacts of COVID-19



Urban Density in Tokyo, Short/Medium temporary shelters in India, Planned Urban Fabric in Barcelona and, Informal Settlements in Cape Town

Settlement Typologies

Faced with a health crisis scenario like COVID-19, the conditions in which people live play a fundamental role in the spread and control of diseases. It is no coincidence that the development of sanitarium (or hygienism) as a doctrine originates with the great epidemics survived by humanity that have influenced other areas of knowledge such as civil engineering and architecture.

In order to address the issue globally in the context of the COVID-19 pandemic, we can highlight some main aspects about the organisation and formation of settlements that have a direct influence on the way of conducting public policies for the management of a pandemic. Here we avoid labelling forms of occupation in mental models, such as slums, urban areas, and country houses, as the diversity of patterns and forms expressed globally requires a different look for the formulation of medium- and long-term policies. Some of the main aspects for the classification of settlements are:

Occupation (Planned / Informal)

The way in which a settlement is designed plays a fundamental role in its development. Planned forms of occupation impose technical

parameters on buildings and thus guarantee minimum sanitary conditions for their occupation. For informal occupations, buildings are forged in the socioeconomic reality of the population and generally lead to the degradation of their sanitary quality.

Legal Status (Regular / Irregular)

The regularity of land ownership plays a fundamental role in the establishment of medium- and long-term policies, especially in urban regularisation and in the formal provision of public services, such as sanitation, lighting, and heating. In this way, regular settlements present better conditions and generally comply with sanitation standards, while irregular settlements commonly lack infrastructure and standards compliance.

Location (Urban / Rural)

The surrounding environment also changes the form of occupation of the settlements. Rural environments tend to have a lower rate of construction and bigger green areas, promoting adequate ventilation and lighting, while the occupation in urban areas tends to be maximised, generating vertical and overlapping spaces. On the other hand, infrastructure, goods, and services are more accessible in urban than in rural areas.

Density (Concentrated / Dispersed)

The density of buildings is a fundamental factor for aspects such as ventilation and lighting and, consequently, of sanitary conditions. The concentration of buildings also promotes the concentration of people and generally implies a less ventilated and lighted environment.

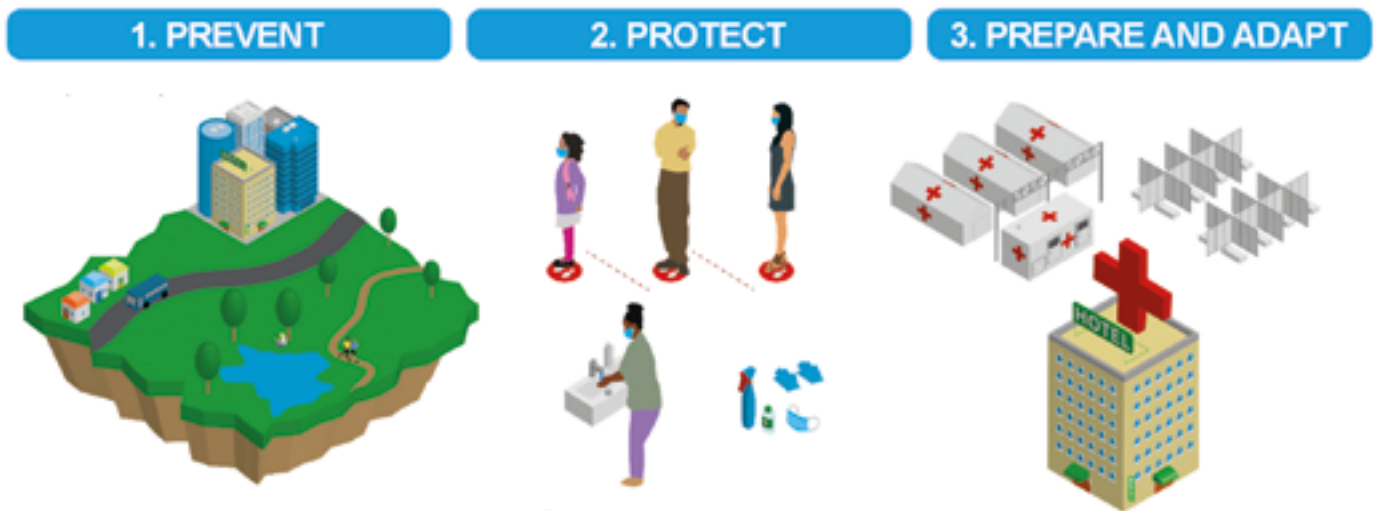
Duration (Short / Medium / Long)

The period for which the settlement is planned also significantly changes its formation, especially the provision of infrastructure and quality of constructions. In refugee camps, all infrastructure is generally improvised, while urban subdivisions have water and sewage networks designed to serve for decades. The shorter the planning period, the more rudimentary the quality of infrastructure and the constructions of this settlement tends to be.

Clearly, this is not a strict classification and authorities around the world adopt different criteria, but the adoption

of such frameworks can facilitate decision makers in the process of mapping vulnerable communities and designing public policies according to settlement characteristics.

Environmental: urban planning for health resilience



Pandemic resilience strategy – how to avoid transmission

In this paper we focus on healthy pandemic resilience that centres on the question of how to avoid transmission from an urban planning perspective. For this we are proposing a multilayer approach that is based on the strategy for climate resiliency in cities. The strategy works from larger scale approach to smaller scale intervention and from long-term planning to short-term actions during a pandemic. We define three levels.

Level 1. Prevent

The foundation to a city's health resilience will be the health of its population, economy, and environment. Planning for healthy cities means promoting and maintaining accessible green spaces, safe and attractive public travel networks, good air quality, and reliable basic services. Healthy citizens will individually be more resilient to any disease, and as a group, a pandemic will spread more slowly through a city population, leading to more time to adapt and less pressure on the healthcare system.

Level 2. Protect

During a pandemic like COVID-19, the measures to protect individual people from catching the disease are mainly lockdowns on different levels (from houses to cities, regions, and countries), social distancing, handwashing, and wearing face masks. This has consequences for the urban infrastructure like transport (how to transport as many people as possible while maintaining social distancing?) pedestrian areas (how to route groups of people in narrow streets?), and water infrastructure (how to provide access to water and soap for handwashing for all people in informal settlements?).

Level 3. Prepare and Adapt

A pandemic often causes an urgent need for more or different healthcare facilities. This third level is about adapting and increasing the healthcare facilities, like hospitals, quarantine, and recovery facilities. Permanent and temporary conversions of non-medical buildings require a focused management system.

In the next paragraphs we discuss long-term recommendations for all urban planning issues relevant to pandemic resilience.



JAGA Missions - Puri slum redevelopment (source: Norman Foster Foundation)

Urban Planning

Planning and public health have complementary skill sets. Likewise, health conditions related to housing – such as poor access to water, poor indoor environmental quality, and exposure to dangerous substances, hazards, or infectious diseases – present an important health burden. Historically, pandemics and their severity have incentivised a cohesive approach to urban planning, engineering, and public health.

The urban fabric of dense metropolises makes city residents vulnerable to communicable diseases, and measures such as self-isolation, staying indoors, and practicing social distancing are more difficult in a very compact city setting. However, more compact cities can also help deal with contagion because residents have easier access to better healthcare facilities and their proximity to essential services during lockdown condition limits the spread of contagions. The benefits of a well-planned compact city include shorter commute times, cleaner air, and reduced noise and consumption of fossil fuels and energy.

In megacities, informal settlements have brought the economies to a grinding halt, forcing them to have a more focused and inclusive approach to improving the quality of life with respect to critical components of quality of housing, livelihood, sanitation, and access to essential services.

Prevent: Zoning regulations

Zoning regulations determine how and where new growth occurs by controlling land use, density requirements, and other building specifications within a specific jurisdiction thus having a critical influence on urban grain, land use, and building design and its occupancy limits. Besides revising physical planning of urban areas, a review and refinement of building codes is required to make a building health resilient.

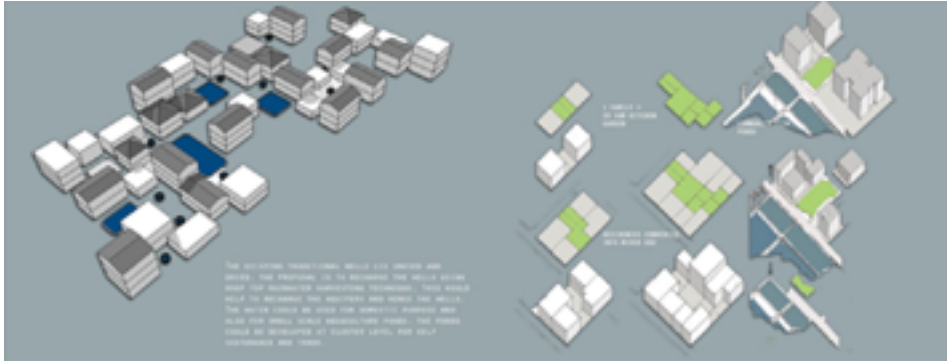
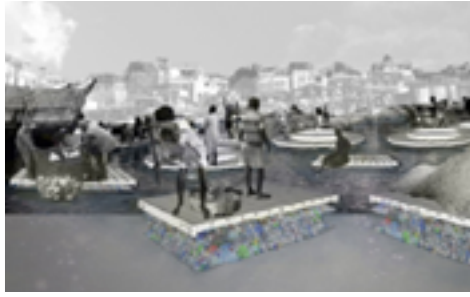
In the short term, zoning regulations will need to focus on maximum occupancy within commercial, recreational, and leisure facilities and permissibility of activities such as outdoor dining and disinfection protocols. These planning policies will need to be more flexible and may consider the following:

- Regulate buildings and spaces to be reorganised to enable people to return to work safely while COVID-19 is still present.
- Permit uses to be repurposed in response to sectoral impacts caused by the pandemic (e.g. changing depreciated retail centres to new residential uses).
- Encourage the development of multi-use buildings and areas to reduce the need to travel between traditional single-use districts.

- Encourage the provision of health and essential services in all neighbourhoods to make them self-sufficient.
- Integrate citywide use of smart technology to monitor thermal scan data, maximum users per establishment, and air quality.
- Incorporate digital infrastructure and technological innovations to support the growth of cities,
- as well as make them safer, which will lead to tracing potentially infected patients' movement (the general data protection regulations will need to be considered).

Prevent: Informal settlement development

Slum redevelopment and land ownership are often the subjects of great debate around informal settlements. However, the fact that settlements are left in situ for decades and generally stem from necessity of employment opportunities, strategies for integrating urban fabric can be explored. This is visible through the approach adopted by the JAGA Mission, and its CSR partners Tata Trust and Norman Foster Foundation, that is involved in the land title of the slums and development of similar permanent structures for housing and community areas for more than 10,000 slum dwellers at a special programme in Puri, Odisha.



Versova Koliwada creek restoration project (source: Bombay61)

Prevent: Inclusive planning

Adopting a sustainable, holistic approach to community redevelopment requires a participatory approach to identify the source of issues and develop viable solutions. Versova Koliwada, Mumbai is one of the many fishing villages (classified informal settlements) degraded due to neglect and environmental pollution affecting their livelihood. Bombay61 along with Tapestry is adopting a participatory approach with the residents to identify the issues and solutions. Joint solutions being developed are the installation of nets to prevent plastic pollution, recycling the plastic to create fishing pontoons, and studying the reuse of defunct wells for aquaculture of ornamental fish.

Developing indigenous built form

The largest cause for concern in informal settlements is the housing quality, where 4-6 stories are precariously perched. However, the conversion of horizontal informal settlements to vertical compact formal settlements does not resolve the development issues as they often misdiagnose the users' needs, which have developed as homegrown neighbourhoods. URBZ developed The Ideal Home, a Dharavi Contractor project asking local builders to design their dream house, specifying a typically narrow 12-by-15-foot site. Then local artisans built models of the designs in wood, steel, clay, plastic, and glass developing a built form with design safety considerations, but true to the settlement typology.¹⁴



Urbz -Dharavi Contractor Project- involving local contractors to design based on existing needs.

Urban Density

By 2050 urban populations are expected to reach 68% globally, with an estimated 2 billion people expected to live in slums. The spread of COVID-19 has been exponential in highly dense urban areas, with slums being the hotbeds, consequently resulting in a fear of cities which could lead to a suburbia trend. Ironically, many highly dense countries like Hong Kong, Taiwan, states like Kerala and even slums like Dharavi, have been role models for prevention and/or control.

High density and pandemic response

Besides border control, extensive testing, and other preventive measures, Hong Kong and Taiwan have not required a lockdown despite their densities. Hong Kong's public awareness and individual accountability included randomly selected persons to survey on a regular basis to gauge awareness levels amongst the public. Taiwan ran simulation models within different areas of the city to simulate a lockdown scenario to assess impacts on essential services to plan for the future, while determining where to focus preventive measures.

Planning for sustainability

Most people experience a city at the scale of a neighbourhood or district, rather than the scale of metropolitan regions. There is a need to focus on these statistics towards understanding the everyday realities of population density. Increasingly European cities like Paris and Madrid are radically overhauling the mobility culture to embrace a "15-minute City". To improve quality of life, you need to reduce the access radius of essential functions, bringing them to each neighbourhood or city block. While this is adopted to transform the city's character from car-centric suburban-style zoning to one of "hyper-proximity", for a pandemic situation, this approach would allow for localised lockdowns without impeding self-sufficiency and proximity to healthcare.

Density and data-driven planning

Understanding how people use travel networks, public spaces, and private spaces can inform an approach to planning that increases density without hindering quality of life. Higher levels of density create a positive agglomeration of economy that produces efficiencies in the layout of basic services and transport infrastructure. This can improve the sustainability of an area, and if data on people movements and service provision is understood, this can aid in pandemic response strategies as well as their implementation.

¹⁴ In Mumbai, a Push to Recognize the Successes of 'Informal' Development



Paris- 15 Minute City Concept (source: <https://www.fastcompany.com/90456312/pariss-mayor-has-a-dream-for-a-15-minute-city>).

Public realm provision

A city's focus on motorised transport has resulted in car-centric cities with streets having reduced and overcrowded sidewalks. This is compounded by commercial activities within the public realm which further reduce the areas for movement of pedestrian and cyclist.

Understanding the nuances of carrying capacity within the public realm, Madrid has undertaken an exercise to analyse the sidewalk and monitor its demographic profile and usage while providing guidance towards a post-lockdown scenario. The recommendations suggest an ideal scenario in which 55% of the sidewalk would be relegated to the pedestrian zone, with the rest reserved for store frontages, street furniture, and building front porches. To adhere to the minimum social distancing requirement, the municipality recommends 14-29sqm of pedestrian zone per users, stating anything less than 3.6sqm/person has a high probability of spread of contaminants. As standards like these cannot necessarily be implemented in highly dense or informal settlements, other precautionary measures such as random testing or thermal scanners can be adopted in high footfall zones, as seen in public transit across the world.

Urban Green Spaces

Urban green spaces include all public open spaces and largely consist of recreational spaces like parks, event grounds, plazas, urban development

spaces, greenbelts, city edge buffers, and natural and urban parks such as urban forests, botanical gardens, and zoos. Their role in the health and liveability of a city and wellbeing of its citizens are essential and are often underfunded with respect to the city's other development priorities. Existing green spaces take on a heightened importance during a pandemic and should be reconsidered as vital social and public health infrastructure in planning for pandemic resilience.

While pre-pandemic uses of urban green spaces primarily have existed for recreational activities, these spaces can be quickly transitioned to accommodate essential services that might experience heightened levels of usage during a public health crisis. Urban green spaces are also included in municipal disaster management plans extended to the pandemic crisis.

Through devising a pandemic plan for urban green space to alleviate spatial burdens experienced by essential services and through adapting these spaces for resilience in a post-pandemic community, urban green space usage can shift from supporting linear recreation to embodying dynamic, community-driven health and environmental outcomes.

Health and well-being

Significant evidence supports urban green spaces as spaces that provide health benefits, especially



Taiwan Lockdown simulation to manage COVID-19prevention (source: <https://qz.com/1841177/taiwan-contained-covid-10-but-simulated-a-lockdown-anyway/>).

when addressing health risks due to environmental factors (air and water pollution, WASH factors, etc.) and non-communicable disease risks (NCDs, such as obesity, diabetes, mental health, etc.)¹⁵ Four aspects open spaces, which provide a conducive environment for health and well-being are improved air quality, enhanced physical activity, engagement with nature and relaxation, and social activities and interaction. Specific positive health links associated with these pathways include strengthened immune systems, improved fitness and reduced obesity reduction of the urban heat island effect, and improved sleep, among other benefits.

In pandemic situations where social distancing measures are recommended, open access to all public spaces should be restricted to larger spaces such as public parks. Spaces that do permit public access during a pandemic should be analysed to accommodate essential services, control capacity of users, identify safe distancing, permitted demography, and set guidelines for limiting types of activities. These are seen adopted across many European countries such as Germany and the Netherlands. While restricting entry to public parks, in Singapore they are now allowing vulnerable demographics such as the elderly and children (including pre-schoolers) to use playgrounds and community parks with a maximum capacity of 10 users.

¹⁵ WHO: *Urban green spaces and health – A review of evidence, 2017.*



and cool micro-climates. The designed green infrastructure enhances the value of public open spaces, identifying their potential contribution to ecosystem services. It prioritizes the quality of green spaces over the quantity by focusing on upgrading existing green spaces so that they more effectively cool urban environments that are becoming increasingly hotter due to global warming.

The system is based in using landscape infrastructure as a multi-functional system, contributing to making a city more environmentally conscious, pandemic resilient and creating a culture in which the residents positively impact their natural environment and actively participate in the global movement towards low-carbon development. More impact is achieved when infrastructure is consolidated, working in synergy with spatial structures, natural geographic features, and socio-economic aspects.

Additional health-focused recommendations include strengthening water, hygiene, and sanitation (WASH) infrastructure and increasing the frequency of surface and facility sanitation (especially in public bathrooms, on benches, and on playgrounds) are simple, low-cost retrofits that would protect visitor health.

To further extend the availability of urban green space, current trends of mandating roof gardens and terrace farming and encouraging recycling of grey water at a building level will help improve the existing dense fabric, reduce the heat island effect, and improve air quality.

Blue-green networks

In line with the evidence that urban green spaces provide benefits to health and well-being, such spaces also help tackle climate change as well as other environmental issues through planning by a comprehensive blue-green infrastructure approach. Blue and green open spaces are understood as a structurally performing system, developing new ways to conceive and shape the organization of the human/natural environment for the future transformation of urban regions.

The key point is using nature as infrastructure. Within this (new) paradigm, the system of open spaces between buildings in cities offer a catalyst for urban regeneration. This illustrates how multi-value benefits can be achieved to meet the major urban challenges related to climate and pandemic resilience. The system



Vertical forest-greening the urban scape in Milan (source: snapwidget.com) and Urban roof terrace farming, adopted through many cities (source: roof to table.com)

is used to structure the ecological and hydrological connectivity within the city landscape at different spatial scale levels, incorporating nature into highly urbanized areas.

Therefore, blue-green infrastructure planning creates a network of blue and green open spaces and corridors within urban environments that provides sustainable drainage infrastructure

Adaptive use of open spaces

Appropriating large urban green spaces (particularly parks) for use by essential services should be temporary and clearly communicated. Any alternative use in a large urban green space should also be confined to a distinct section, thus allowing some public access for recreation on a limited basis. An example of a mixed-use application in a large urban green space during a pandemic is in the healthcare sector – the most vital essential service during any public health crisis. Hospitals and medical centres can ease overflow in dedicated facilities by constructing mobile clinics in large urban green spaces. The spaces can also be used for temporary shelters for the homeless and general quarantine and isolation facilities. In worst case scenarios, large urban green spaces can be used for temporarily interring deceased individuals.



Green-blue infrastructure (source: ArchDaily)



Emergency Field Hospital in Central Park New York (source: Gabby Jones/Bloomberg)

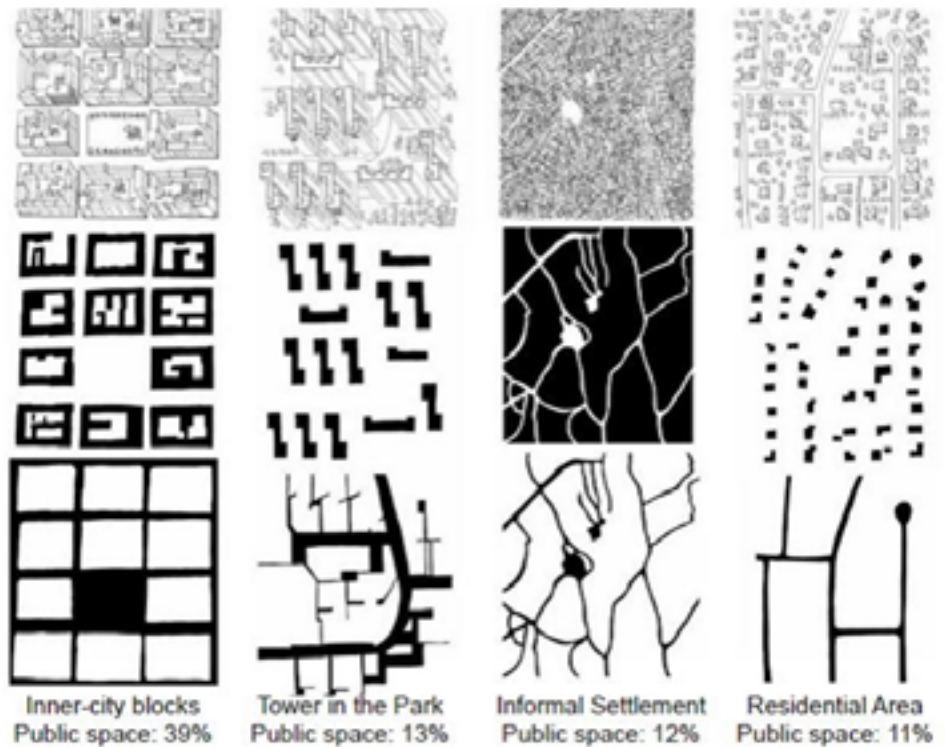
Central Park in New York can be used as a case study for a field hospital in a park; a 68-bed facility run by Mt. Sinai Hospital was constructed there. Additionally, while not enacted, the New York municipal government issued a plan to dig temporary interment trenches in Central Park if the number of deceased individuals due to COVID-19 overwhelmed hospital and medical centre capacities.¹⁶

Open spaces in informal settlements

Open spaces and public spaces in informal settlements are one of the lowest land allocations and are predominately reserved for roads and alleyways. This, along with the dense built-form fabric and high population density, renders its poor liveability standards.

Public spaces are the workplaces for many informal workers; they use streets, local public markets, and public open spaces to sell commodities and necessities and often are an extension of the indoor space for washing, cooking, and other chores. The larger common areas function as gathering nodes for food ration and centralised water collection points.

The immediate needs of vulnerable populations living in slums and informal settlements become more complex with the arrival of a public health crisis. In a pandemic, existing environmental, social, governmental, and economic vulnerabilities are compounded in these communities, as public spaces here are linked with necessities during a pandemic, even if social distancing and quarantine measures are not achievable. The following approaches are recommended:



#11 Public Space (source: Habitat III Issue Papers)

- Installation of low-cost temporary infrastructure and interventions (e.g. mobile handwashing stations) in public spaces to minimise contact with potential transmission points.
- Emphasis on basic WASH practices such as handwashing and existing water points should be repaired, and adequate supply ensured; areas should be used to create awareness.
- Self-regulation of open spaces by community leaders, allowing different age groups and number of households to access open areas in a controlled group (this approach is being used in Versova Koliwada).
- Clean and clear the unoccupied spaces edging slums (areas often used as dumping grounds) and encourage use of the space as community urban farming zones to create a sense of ownership.

Prioritising open spaces in disadvantaged neighbourhoods

Concerns about safety and perceived threats have been considered responsible for lower use of urban green spaces in high poverty urban neighbourhoods and communities. Other contextual factors influencing low usage urban green space include poor pedestrian/street connectivity and land use and built form, especially at the human scale.

During a public health crisis or pandemic situation, these perceptions and concerns are elevated due to accessibility restrictions imposed on available urban green spaces. The recommendations outline alternatives, as creating new spaces could be unfeasible:

- Focus resources on park programming for vulnerable section of society in existing, accessible parks to encourage outdoor engagement and reduce being targets perceived threats.
- Use community volunteers, NGOs, and public-private partnerships to fund revitalisation of open spaces/parks and consequently, neighbourhoods. This is illustrated through the Marvin Gaye Park in Washington, D.C., which was transformed from a decrepit crime hotspot to a public park, rededicated to the community. The park also includes healthcare and sports centres, both of which can provide support during a pandemic crisis.

¹⁶The Guardian: US coronavirus deaths rise as New York City braces for park burial possibility, 2020.



Marvin Gaye Park (source: NRPA- rejuvenating neighborhoods through parks)

- Identify small parcels of vacant land which can be converted to corner community nodes and tot-lots. Often a smaller open space upgrade has a larger impact on the psychology of community building.
- Enforce CPTED (Crime Prevention Through Environmental Design) principles to mitigate perceived threat and improve walkability.

Air Quality

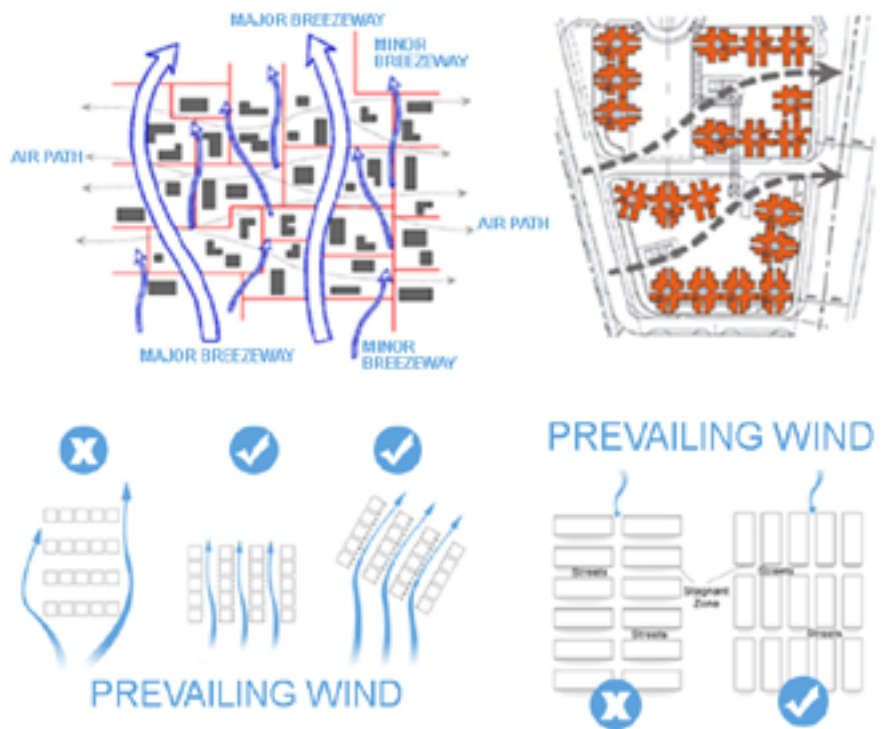
Like COVID-19, major epidemics are commonly related to the emergence of new forms of the influenza virus, which mainly attack the respiratory system. However, around the world billions of people are already living in environments where air quality is unfavourable for their health and the arrival of a new respiratory disease can mean the collapse of their health systems, economy, and also their lives. To avoid overlapping these conditions, conscious planning of air quality related activities is essential.

According to WHO, human activities that are major sources of outdoor air pollution, include:

- Fuel combustion from motor vehicles (e.g. cars and heavy-duty vehicles)
- Heat and power generation (e.g. oil and coal power plants and boilers)
- Industrial facilities (e.g. manufacturing factories, mines, and oil refineries)
- Municipal and agricultural waste sites and waste incineration/burning
- Residential cooking, heating, and lighting with polluting fuels

Pre-pandemic planning:

In most metropolitan areas identified as violating national air quality standards, automobiles are responsible for 50%



Breezeways

or more of the problematic emissions. Therefore, policies to reduce the use of automobiles are needed to improve air quality.¹⁸ Poor urban planning often leads¹⁶ to an overreliance on private vehicle transport (because of sprawl) and is a major factor in accelerated pollution emissions. Frameworks for equitable urban planning and management, such as unbiased zoning laws, can contribute to transport demand reduction and the isolation of pollution-generating industries. Recommendations on planning infrastructure for alternative transport can be found in section 4.4.

Poor air quality additionally increases the heat island effect. According to the United States Environmental Protection Agency (EPA), the term “heat island” describes built up areas that are hotter than nearby rural areas, and can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water pollution. High-density urban areas, and heat and pollution producing activities, such as means of transport and industries, accelerate this effect. When the heat island effect is present, the air is often inserted in a cycle of circulation between the city and the urban periphery that creates a cell, where the air is trapped, and pollution is concentrated.¹⁹ Increasing green areas in the city can reduce the heat island effect, which is discussed in section 4.4

Ventilation

Low air velocity can increase the accumulation of pollutants. Natural ventilation in urban spaces is a low-cost, organic method to circulate air in buildings, particularly high-occupancy structures located in high-density urban areas. In addition, WHO maintains that natural ventilation can be one of the most effective environmental measure to reduce the risk of spread of infections.

Micro air ventilation assessment

The Feasibility Study for Establishment of Air Ventilation Assessment System was initiated soon after SARS in Hong Kong. It led to a Technical Circular in 2006 and now is a new chapter in Urban Design Guidelines regarding air ventilation assessment. Unlike many countries with guidelines dealing with strong wind conditions, it is a guideline for micro-wind condition in high density and congested urban environments.

¹⁷ WHO Ambient air pollution: Pollutants

¹⁸ Land Use Planning for Public Health: The Role of Local Boards of Health in Community Design and Development. Atlanta Regional Health Forum (ARHF) and Atlanta Regional Commission (ARC).

¹⁹ Urban Form and Air Quality: the case of Rio de Janeiro. Maia, J.L.M.; Netto, V.M.; Oliveira Junior, J.F.; Goes, G.

In a dense mega-city, breezeways along major prevailing wind directions are considered essential to improve air movement. Detailed guidelines are studied and designed to create and enhance these air paths in the city, such as street orientation, pattern and widening, continuous open space, building height, disposition, and form. The Guideline is well adopted in both new development and regeneration.

Community Development

Creating compact communities keep essential services close and leads to less auto dependence, decreases segregation by age, income, and race and thus develops social and cultural capital. This balanced with building standards which promotes improve air quality and ventilation would help create better communities. This type of planning can contribute to residents spending less time traveling for work or leisure. A safe and inviting environment encourages walking, promotes local development, and consequently improves air quality and well-being.

Transportation

Transportation is critical to the functioning of a city; because it connects people and places it is a key factor in the health of any urban place. The world around us is transforming rapidly, changing the way people and goods travel within and across cities, regions, and countries. By 2030, annual passenger traffic will exceed 80 trillion passenger-kilometers—a fifty percent increase from 2017.²⁰ Mobility and public transit plays a key role in achieving the Global Sustainable Development Goals for sustainable cities and communities and climate action directly and indirectly to a host of others namely , access to health and wellbeing, quality of education.

During a pandemic, the use of public and private transport may be reduced for a time, however there will be a need to maintain a basic level of service for workers of essential services. Improving the level of safety across transit modes during and after the pandemic is critical to control contagion and regain user confidence in public transit. A strategy should be in place that reduces the possibility of infection during all stages of the journey: planning, booking, waiting, boarding, travelling, and disembarking. Consideration should also be made for how transport networks transition

from stages of high infection rates, particularly if a lockdown is in place, to the full reopening of services.

Public Transit and Safety (prevent)

Authorities and transport providers should ensure that public transport continues to operate safely and efficiently to meet the demand for essential services during a pandemic, while planning new and reviewing existing strategies that will ensure public transport is sustainable over the long term. This can be challenging financially with ridership reduced. However, it is essential for the health of the public and operators.

Safe urban public transport is critical in a crisis. Many lower-income earners and workers in essential services utilise public transport in cities and need to be provided with a safe and reliable connection to places of work. Where a lockdown has been enforced, the reinstatement of services needs to align to how and when businesses return to on-site working. Considerations for the safe continuation of services should be made:

Adjusting public transport service routes and schedules²¹ – This is an inevitable consequence of a reduction in passenger numbers. Rerouting and rescheduling strategies need to consider adequate coverage to urban areas across different modes, considering peak travel times and directions. A good understanding of population distribution and density in different areas is key to implementing this effectively, which can be aided by the use of GIS mapping and access to centralised data pools on urban mobility factors.

Social distancing and safety on public transport: Strategies should focus on protecting passengers and transport operators. Monitoring temperature before passengers board and wearing face masks on public transport is adopted in London and many city transit systems, along with controlled boarding to buses to bypass and thereby protect the driver.²² The recommendations towards preventing spread of the contagion are:

- Working with businesses to stagger working hours is beneficial to allow people’s commuting hours to be spread over a day.



Sanitisation within Dubai Metro and Buses (source: gulfnews).

- Stations and terminals need to be reconfigured to allow social distancing. Appropriate warning measures for passengers should be considered, as well as access for people with special needs. For example, Manchester Piccadilly station in the United Kingdom has installed guides in the form of floor markings to enable monitoring of passengers’ social distancing during the COVID-19-19 pandemic.
- Use of big data to Identify other points of congestion in networks such as stops, stations and terminals and address mitigation measures.
- Prioritise natural ventilation, however, when this is not possible, especially in hot climates, ensure that air conditioning systems are serviced and frequently cleaned
 - Provide training for transport professionals, ensuring they have adequate protective equipment,
 - Install station or stop guides and floor markings to increase public consciousness of distancing and enable monitoring by station staff.

²⁰ Sustainable Mobility for All: Global Mobility Report 2017

²¹ Streetsblog: Muni Cuts Back Service to Core Route, 2020

²² Independent: Face masks should be compulsory on public transport, says Sadiq Khan, 2020.

Passenger confidence using public transport

– Demand for public transportation has plummeted during the pandemic—by as much as 75-85 percent in cities such as Washington, Copenhagen, and Buenos Aires.²³ Where people are wary of public transport, cities may see an increase in private vehicle usage or active travel, depending on the infrastructure available. Fear of transmission through public transit systems could be the greatest drawback to urban mobility plans. It is important that the public is informed about measures in place to protect themselves and operators so that they feel confident in their choice of travel and behave in line with guidance whilst on route. Visibility of measures, such as cleaning and sanitisation, can make a significant difference in public perception of safety. Providing public information of additional transit times should be adopted to avoid gathering around station entrances. Further contact tracing apps should be utilised and will play an essential role in recovering the public's confidence in utilising public transport

The Mass Transit Railway (MTR) in Hong Kong has published a COVID-19 Precaution report accessible on their website²⁴ that illustrates all measures implemented; these include: regular disinfection, deployment of vaporised hydrogen peroxide robots, enhanced ventilation and installation of disinfection points.

Transport services to informal settlements

– In dense, informal settlements road networks are often haphazard and low width so that access for public transit and emergency services is challenging or impossible. Consideration should be made for people needing to walk through densely populated areas in order to access public transport (who may be experiencing a health emergency) and for the distribution of emergency provisions within an informal settlement. In Dharavi, Mumbai high streets are people centric with very little vehicular movement. Emergency vehicles and deliveries have restricted accessibility. With only 2 wider roads within the entire area, the rest of the “streets” are 1-2m wide barely allowing people movement. Further, having small homes mean areas beyond the home become spaces to cook and clean – meaning domestic activity spills into the already limited street zone. During a pandemic, while



Dharavi network of narrow streets.

social distancing cannot be achieved, the narrow alleyways need to be kept clear of encroachment and EVA routes identified based on catchment analysis. Further GIS heat mapping can help monitor footfall and congestion, which can be tied to the community watch.

Adapting to support Pandemic needs

While Transit systems have been hardest hit with respect to ridership, most of city services have adapted to supporting the situation. Some examples for consideration are:

Prioritising transit for essential services workforce

– In particular, safe travel for healthcare workers should be considered, as is proposed strategy in Bogota that focuses on the need to have a dedicated service for them from e-bikeways and emergency bikeways for staff to hospital and dedicated routes.²⁵ Similarly, in Dubai and Abu Dhabi free ridership with refreshment kits were provided to healthcare and essential service workers through the lockdown while movements were restricted.²⁶

In Wuhan during the lockdown, many health workers were transported by volunteers using private car; however, this does provide risks if unmonitored. To alleviate risks presented through travel in private vehicles, Uber launched Uber Medics globally in to support healthcare workers at discounted rates or tied up with healthcare systems to transport their staff for free.²⁷

Supporting the Vulnerable

– Through the Pandemic several public transits systems are supporting the community through the lockdown. Examples for consideration are:



- In North Michigan Charlevoix County Transit has been delivering of groceries, food pantry packages, meals provided by senior centres, and prescription medications to the elderly.
- US transit system have partnered with local healthcare system to provide homeless and poor families with transportation to testing facilities and quarantine locations.
- The plight of the migrant workers can be alleviated, if public transit -trains, buses can be prioritised to villages prior to lockdown, which is further elaborated in section 6.2 on migrant workers.
- In India, the railways have converted many bogies into quarantine facilities, which particularly serve informal settlements along their route.



Conversion of train coaches to quarantine facilities (source: The financial express).

²³ How public transportation provides key lifelines during COVID-19

²⁴ COVID-19 Precaution Report

²⁵ Bogotá Company Deploys 400 Free E-Bikes to Help Health Workers Respond to COVID-19

²⁶ Covid-19: Via launches free ride-sharing service for medical workers in Abu Dhabi

²⁷ Uber Provides UberMedic Service to Assist Healthcare Providers

Sustainable transport

The most unexpected consequences from the crisis have been on the environment, with the sudden drop in carbon emissions due to the closedown of transport networks and businesses. Compared with this time last year, pollution in New York City has fallen by nearly 50% because of measures to contain the virus, mostly from the decline in road traffic. In Europe, satellite images of northern Italy have revealed an impressive decline in nitrogen dioxide (NO₂) emissions, which come primarily from combustion of fossil fuels used in cars, trucks, and buses.²⁸ The impact of transport on the planet has reinforced the need to reduce the environmental footprint of the sector. Some long-term recommendations are:

- Encourage and invest in low-polluting vehicles for bus fleets and rail stock, as well as air travel, to reduce the occurrence of health problems caused by poor air quality in cities.
- Enable active travel to improve public health and increase physical activity. This needs to be supported by planning strategies that:
 - Reallocate road space to reduce cars
 - Provide basic/enhanced facilities to make walking and cycling convenient and safe.
 - Promote development that incorporates active travel distances between homes, places of work, and retail.
 - Implement bike-sharing schemes. This would need to incorporate a strategy for sanitation during a pandemic.
 - Temporary bike lanes. Many cities have implemented temporary cycling infrastructure, which is an effective way to test routes and enable people to cycle in the short term whilst planning for the long term. In Paris, 20 miles of temporary bicycle lanes have been installed to enable safe travel during COVID-19.²⁹
 - Increase connectivity to allow for shortest pedestrian routes and provide pedestrian and bicycle safety Master plans.



Freight and Cargo

The COVID-19 crisis has greatly undermined the reliability and efficiency of transport networks, particularly in sectors like trucking or air cargo. Because freight transport operations, logistics, and the production of goods are so tightly synchronized, these disruptions have quickly had a ripple effect on global commerce, exposing the fragility of the entire supply chain. There are resultant shortages in the availability of medical supplies, raw materials, sub-assemblies, and finished goods, as well as logistical issues and inventory build-up. To address this, it is imperative that transport stakeholders find solutions to enhance the resilience of their networks³⁰, some considerations may be:

- Use of big data solutions to adapt their operations with respect to monitoring volumes;
- Planning for contactless delivery and enhance precautionary measures;
- Accounting for quarantine time and essential services for truck drivers;
- Planning for airfreight during lockdown scenario for continuity of emergency supplies and medications.³¹

²⁸ *Transport and COVID-19: short-term chaos could bring long-term transformation*

²⁹ *Cleaner and greener': Covid-19 prompts world's cities to free public space of cars*

³⁰ *Transport and COVID-19: short-term chaos could bring long-term transformation*

³¹ *Air cargo, logistics crucial in mitigating pandemic impacts*



Water, Sanitation, and Hygiene (WASH)

2.3 billion people lack access to basic sanitation facilities and services. Diarrhoeal diseases are a leading cause of child mortality and morbidity and are estimated by WHO ³² to dramatically increase in proportionally with rising temperatures in low income countries. Changing weather patterns and rising temperatures are expected to proliferate faecal-environmental-oral contamination routes, which will add increasing stress on already fragile health systems.

Investment in SDG 6 (“Ensure availability and sustainable management of water and sanitation for all”) can have many beneficial impacts across a number of other SDGs, including health and education. It has been estimated that 26% of childhood deaths and 25% of the total disease burden in children under the age of five could be lifted through the reduction of environmental risks, such as improving access to safe water, sanitation and hygiene. WASH access also leads to better nutrition, reduces maternal mortality, and increases school attendance for girls. These benefits expand well beyond the water and sanitation sector.

Water management

Local water management interventions should be determined by coordinating with government, community leaders, and aid agencies. This information may also be available in places where governments or agencies have already mapped and studied local conditions. These actors can then initiate appropriate water management responses in coordination with regional water plans and regional pandemic responses.

Water supply responses during a pandemic should focus on how larger agencies – governments, utilities, and aid workers – deploy, construct, and install new systemic interventions. Pandemics generally heighten public anxiety, so agencies should work to gain community trust. Once the structural interventions are complete, that trust will provide a backbone for organising access to any new or revitalised systems.

According to the World Bank, providing quick, just-in-time community water access points/water kiosks (including provision of soap) in unserved urban and rural areas, and for unserved healthcare facilities and schools is critical.³³

Systems and Data Management

Use GIS to map scarcity by recording available data on water point distribution and density, as well as current system functionality.³⁴

- Focus on maintaining the functionality of existing systems and repairing broken ones.
- During a pandemic, traditional water management programmes, which were informed by an understanding of a drought as a water scarcity problem, may not be the most appropriate use of time and resources because controlling the spread of the disease is the main priority at this moment, rather than water scarcity.³⁵
- Establish a rapid-response hotline for water-specific issues.

Provision and Treatment

- Provision and operation of compact water treatment plants (if existing potable water sources are nearby).
- Construction and operation of water points and sanitation facilities to deliver water in strategic urban or rural points.
 - An effective system to install in sanitation facilities are dry/composting toilets:
 - They conserve water and electricity in dry regions and eliminate the need for sewage treatment plants and maintenance of sewer networks.
 - Such systems are practical in desert areas, in rocky terrain (where excavation for pits and sewers is difficult and expensive), and in areas subject to coastal

flooding. They have also been successfully implemented in India over the past decade.

- Any sewage generated can be transferred to septic tanks. However, handling/disposal will need particular care if affected by COVID-19.³⁶
- Provision and operation of trucks for water delivery (bottled, sachets) and water tankers, including adequate water storage to service operators. Logistics for trucks include:

Mobilisation and Distribution

- Truck in water for consumption and soap/sanitiser for hand cleaning.
- Stagger and cycle water distribution; create a water distribution plan that includes input from community members for when tanker trucks arrive, so crowding is minimised, and social distancing is enacted.
- To keep water distribution areas around tankers safe from becoming hot spots for outbreaks or transmission, design social distancing nudges on the ground (similar to what supermarkets in some countries are employing).³⁷ These can be simple interventions like red dots painted on concrete. If the surface is uneven, stones, wood, or any stable, makeshift marker available could be buried in the soil and painted. This only works if the markers can be clearly seen and their purpose is understood universally.¹⁷

³² WHO: *Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s.*

³³ World Bank: *WASH (Water, Sanitation, & Hygiene) and COVID-19, 2020*

³⁴ *Will the water still run during a pandemic?, 2006.*

³⁵ *Institute of Development Studies: COVID-19 in informal urban settlements, 2020.*

³⁶ WHO: *Water, sanitation, hygiene, and waste management for the COVID-19 virus, 2020.*

³⁷ *Water and HIV/AIDS: Some strategic considerations in Southern Africa, 2002.*

Personnel

- Equip drivers and distributors with standard PPE, according to guidelines issued by the WHO.¹⁶
- Several measures can improve water safety and should be considered when planning the provision and operation of trucks for water delivery. Starting with protection of the water source, treating water at the point of distribution, collection, or consumption; and ensuring that treated water is safely stored at home in regularly cleaned and covered containers. Further guidance is provided in the WHO interim Water, Sanitation, Hygiene and Waste Management for COVID-19 Virus interim guidance.¹⁶

Population behavioural changes will also have to occur daily in order to limit transmission in slums and informal settlements. Local water points are spaces of social interaction. However, long queues at communal water sources can often lead to fights over water and access to it, compounding the stress and conflict associated with the pandemic. Ultimately, this also influences how particular water sources are used – and in this case, whether that water is used for handwashing or not.³⁸ Regardless, members of each community should be mobilised to inform aid actors (governments, humanitarian agencies, utilities, etc.) on community water issues and have an opportunity to take ownership in stemming the spread of the disease.

Strategies to mitigate disrupted water management and water scarcity impacts on community members include:

- Promote basic water treatment interventions at community or household levels by chemical disinfection using chlorine (in accordance with WHO guidance dosages), filtration using simple household filters, and boiling.⁸
- In less-than-ideal circumstances, non-potable water (for instance, water already used to clean dishes or do laundry) paired with soap can be effective for washing hands at home.⁵
- Filter domestic water by using available disinfection techniques, such as solar water disinfection (SODIS), chlorination (in accordance with WHO guidance dosages), ceramic water filtration, and slow sand filtration.³⁹

Solutions, whether built, procured, or delivered, should be simple, should maximise time and accessibility, and should be clear in their purpose. If community members can utilise locally found objects and materials readily available to implement the solutions and interventions discussed, the solutions will likely be more sustainable, and a pandemic will likely be more survivable.

Sanitation

- According to World Health Organisation (WHO) guidelines, E. coli or thermotolerant coliform bacteria should not be detectable in any water intended for drinking.⁴⁰
- If a community generally uses pit latrines and drinking water wells for sanitation and drinking water, respectively, the ideal solution is to first decommission the existing systems. Then, install distinct, separate, structurally sound sanitation systems apart from potable water sources.⁴¹
 - In the absence of complete decommissioning of existing systems and installing new systems, covering the shallow wells, and possibly installing hand pumps or mechanical pumps at the wells could improve the situation.⁸
- In areas where existence of pit latrines is necessary, all surrounding shallow drinking water wells should be immediately covered. When possible, deep drinking water wells should also be decommissioned. Wells should be relocated a safe distance away from the pit latrines.⁸
 - Evidence shows that increased lateral separation between the source of pollution and groundwater supply reduces the risk of faecal contamination.⁴²
 - Improving water quality had no recognisable health impact if the sanitation was not improved; rather, improving both water and sanitation together were synergistic in producing larger impacts than either alone.⁸
- Basic water treatment interventions at community or household levels by chemical disinfection using chlorine, filtration using simple household filters, and boiling should also be promoted.⁸
 - Chlorination guidance from the WHO (2002) states that at doses of a few mg/l and contact times of about 30 minutes, free

chlorine generally inactivates >4 log₁₀ (>99.99%) of enteric bacteria and viruses.⁴³

Hygiene

- Water that is safe enough to drink is the best option for handwashing – ideally both hot and running.⁵
- In less than ideal circumstances, other types of water can be used to wash hands. Non-potable water (for instance, water already used to clean dishes or do laundry) paired with soap can still be effective.⁵
- To keep handwashing stations safe from becoming hot spots for outbreaks or transmission, design social distancing nudges on the ground (similar to what supermarkets in some countries are employing).
 - These can be simply interventions like red dots painted on concrete. If the surface is uneven, stones, wood, or any stable, makeshift marker available could be buried in the soil and painted. This only works if the markers can be clearly seen and their purpose is understood universally.¹¹
- Effective measures that respond to the constraints of the local context, in slums and informal settlements, may call for innovative use of urban natural assets for water access (such as springs and swamps), and partnerships that create a safe and affordable system for sourcing clean water using locally-made water pumps.⁹

³⁸ *The difference a day can make: the temporal dynamics of drinking water access and quality in urban slums, 2019.*

³⁹ *How are water treatment technologies used in developing countries and which are the most effective? An implication to improve global health, 2018.*

⁴⁰ *Global access to handwashing: implications for COVID-19 control in low-income countries, 2020.*

⁴¹ *Quality of Water the Slum Dwellers Use: The Case of a Kenyan Slum, 2007.*

⁴² *Understanding the different characteristics of African cities will be crucial in responding effectively to COVID-19 on the continent, 2020.*

⁴³ *Managing Water in the Home: Accelerated Health Gains from Improved Water Supply, 2002.*



Wash Sector Institutional Interventions

The right national policies can make a significant difference to water and sanitation service coverage in low-income communities. The pandemic has highlighted that the WASH sector lacks the relevant policies, laws and regulations to govern response to crisis. Policies and legal frameworks will need to be made responsive in order to enable WASH institutions to be in a better place to respond to emergencies and sustain services at a reasonable level. Structured coordination between sanitation and hygiene institutions is critical in emergencies and is lacking in most countries.

Further, WASH sector policies should consider the crucial part that hygiene interventions play in saving lives during pandemics and must place this as a key responsibility of service providers. Hygiene has hitherto been a silent component of WASH service provision and has mainly taken the form of short-term campaigns without sustainability mechanisms – this should be reviewed to reposition its place in the sector.

In terms of the response to COVID-19, many utilities have been providing free water to the unserved in the short-term to allow handwashing for coronavirus prevention. These utilities lack mechanisms for deferring non-customer payments and revenue collection during lockdowns (as many people in informal settlements are

unbanked and pay in person at utility offices). Frameworks need to be developed to enable cost-recovery support mechanisms for WASH service provision institutions while undertaking acts of emergency response (sometimes under political pressure). This is already done for many other sectors that intervene during humanitarian crises.

Thus, governments and trusted aid agencies should install emergency safe drinking water and handwashing facilities in key locations in informal settlements and high-density public places.⁴⁵

- They should provide direct support to cover water service fees, provide policy and financial support to water utilities to safeguard regular operations, and maintain or expand consistent access and quality across communities.⁴⁶
- Larger emergency preparedness efforts include providing water tanks, standpipes, handwashing facilities and sanitisers, along with hygiene messages – particularly in crowded areas (markets, train, and bus stations, etc.).¹
- They should encourage groundwater extraction in places where water is scarce or improper for human consumption (e.g. due high salinity characteristics), especially through financial incentives and subsidies for treatment.

Governments should also ensure previously established drinking water points remain open and secure.⁴⁷

- Water and sanitation service providers (small scale providers, utilities, and local authorities) are instrumental in stalling the spread of disease in informal settlements. Encourage utilities to maintain water and sanitation service continuity and in ensuring affordability is not a barrier to access for the urban poor.⁴⁸
- Reclaim illegal pipelines (primarily present in large agriculture operations) and use for increased municipal water distribution. Explore imposing irrigation limits and include penalties for non-compliant community members.
- Mobilise resources and personnel to increase groundwater pumping in safe, uncontaminated areas.
- Avoid water rationing policies. Water rationing in slums and informal settlements can result in social paranoia (fear of catching the disease because people can't wash their hand frequently enough) and increased transmissions (due to not washing hands frequently enough).⁴⁹

⁴⁵ *Managing Water in the Home: Accelerated Health Gains from Improved Water Supply, 2002.1*

⁴⁶ *Combating the Coronavirus Without Clean Water, 2020.*

⁴⁷ *Water access critical to beating back COVID-19 spread in slum areas, 2020.*

⁴⁸ *World Bank: Latin America moving fast to ensure water services during COVID-19, 2020.*

⁴⁹ *COVID-19 and 'Chasing for Water' – Water Access in Poor Urban Spaces, 2020.*

Energy

Currently, about 1.2 billion people in emerging economies lack access to electrical power and traditional centralised grids are not cost-effective at providing basic electrical service to underserved populations in a reasonable amount of time. The adoption of distributed grid technology and energy storage systems will provide resilience against threats such as natural disasters and will enable better use of new and existing resources. Microgrids which can service the needs of small towns or cities can also connect or disconnect from primary power grids. Isolated communities that rely on remote power systems primarily fuelled by diesel generators have become some of the first communities to adopt energy storage.

In an emergency, the two most important uses of electrical power are usually lighting and pumping water. Simple electrical lighting systems may be used in facilities providing night-time services, such as hospitals and clinics, or for security lighting. Power is also required for charging mobile phones which allows people to receive health notifications from the government or healthcare providers, particularly important during a pandemic.

Electricity System Selection

System selection will typically need multiple inputs to feed decisions but simply the key points will be summarised in the following areas:

- Understanding demand and capacity requirements.
- Understanding the local network.
- Supply philosophy (e.g. grid supply, grid supply with back-up generation, generator in parallel with grid, islanded generation).
- Connection options for customers.
- Management and governance of the system.

Consideration of the above will allow the evolution of a solution which will be bespoke to the specific area. Temporary camps or hospitals, for example, provide an opportunity for standardisation using a modular approach. The selection of solution would effectively be a decision tree with a number of inputs and the appropriate answer for the solution needed will be conditioned by either local constraints or preferences.

Engineers, utilities, and governments should work together to find solutions to these issues. Local communities should be engaged extensively during the electrification planning and implementation process. Local electricians, including in displaced communities, can be consulted to provide works, allowing them to generate an income while their opportunities for work are decreased during a pandemic.

Electricity in Informal Settlements

Informal settlements, due to their unrecognised status, are often excluded from electrification efforts. In these areas, “illegal” connections may flourish and are generally ignored by utilities and electricity distributors until the system deteriorates too much, at which point repressive measures such as disconnections, fines and/or imprisonment may be engaged.

Many municipalities do not want to legitimise informal settlements by electrifying them, and do not want to increase a low-income customer base who are expected to have low payment rates. The proliferation of illegal connections comes with a range of problems, including overload of networks, fire hazard risks and economic exploitation of the poorest by informal resellers of electricity.

After the end of apartheid, South African municipal electricity and distributors and Eskom, the national utility, developed innovative approaches to low-income household electrification which were extended to informal settlements over time. Cape Town has been particularly successful at this and has spread electricity to almost all households. The following key approaches were followed:

1. Demarcation of areas where electrification is materially possible

The municipal distributor adopted broad criteria to define areas where electrification was technically feasible, which include a maximum number of inhabitants. While densely populated informal settlements can restrict access to vehicles and equipment, aerial electrification can reach most parts of a settlement. Settlements on privately-owned land are not electrified due to laws preventing this. Floodplains are considered unsuitable, though some experts consider that these areas can be electrified if the network is kept out



of reach of water and disconnection points enable operators to isolate specific areas during times of flooding.

2. Appropriate electrification techniques

A ‘maypole’ approach was taken in which houses are connected from a central pole. External pole-mounted meters are used which communicate with in-house displays, making it easy for officials to disconnect, check for faults and identify tampering. These technologies have proven themselves to be safe and cost-effective. Using technologies, standards and approaches imported from the developed world was initially taken as the approach in South Africa but by removing this as a requirement of new electrification schemes, such constraints on access have been removed.

3. Adapted tariffs

Small connection fees are not collected up-front but paid over an extended time. Prepaid meters allow low-income households to purchase small amounts to suit their variable budgets, while protecting the utility’s revenue.

4. Community engagement

The utility put in time and effort, beyond a superficial survey, to identify the concerns of and interact on a regular basis with community-chosen representatives and worked directly with the inhabitants to be electrified. This extensive engagement during the planning and implementation phase has increased the success of the schemes.



Telecommunications

During the COVID-19 pandemic, educational establishments worldwide were forced to close, putting pressure on parents and caretakers to offer home-schooling. This situation may widen social inequalities, as it may restrict access to quality education for the poorest populations - who generally already face structural disadvantages. Telecommunications is incredibly important in this aspect, for ensuring the continuation of education, as well as for communication between key workers and public health messaging.

Partnerships with Private Sector

During the COVID-19 pandemic, many ministries of education worked with mobile operators, telecoms providers and internet service providers and other companies to address issues of connectivity and increase access to digital resources which schools are closed. Potential measures include zero-tariffing (cost-free access to certain online materials); lifting data caps; distribution of free SIM cards; and provision of public Wi-Fi hotspots.

Funding for Infrastructure

Universal service funds (USFs) or access funds are a mechanism by which a national regulatory authority mandates,

oversees and/or coordinates a set of subsidies and fees designed to promote access to telecommunication services for all of a country's population.⁵⁰ In practice, this could mean that telecoms companies are required to extend access to their services to places (e.g. rural or isolated communities) and groups (especially low income or disadvantaged groups) as a condition of their licence to operate. Ordinarily, there is little or no commercial incentive to do connect these people. Traditionally, this has involved running telephone lines out to remote villages, but increasingly is focussing on mobile and internet connectivity also.

When administered ineffectively, USFs may actually serve to raise the affordability barrier by effectively taxing communications customers.⁵¹ However, there have been a few positive experiences. In Colombia, for example, the USF has been structured to be financially autonomous and projects are awarded in a highly transparent manner via a public bidding process. This can be an excellent source of quick funding in some countries which can be used to meet universal access objectives, providing the right conditions exist.

Some advocate for alternative solutions to USF policies, such as promoting private network sharing and public-private partnerships or introducing

service obligations into new spectrum licence awards. These approaches should be paired with incentives to help stimulate demand and carefully considered taxation and spectrum fees.

Solid Waste Management

The [Sphere Handbook](#) (Humanitarian Charter and Minimum Standards in Humanitarian Response) details the minimum humanitarian standards in four vital areas of response: Water supply, sanitation, and hygiene promotion (WASH); food security and nutrition; shelter and settlement; and health.⁵²

Standard 5 details the solid waste management standards, which includes those for solid waste that may be contaminated:

- **Environment free from solid waste:** *Solid waste is safely contained to avoid pollution of the natural, living, learning, working and communal environments.*
- **Household and personal actions to safely manage solid waste:** *People can safely collect and potentially treat solid waste in their households.*
- **Solid waste management systems at community level:** *Designated public collection points do not overflow with waste, and final treatment or disposal of waste is safe and secure.*

Standard 6 details WASH in healthcare settings "All healthcare settings maintain minimum WASH infection prevention and control standards, including in disease outbreaks" and key actions.

Appendix IV provides detailed recommendations for solid waste management.

⁵⁰ *Universal Service Funds & connecting schools to the Internet around the world*

⁵¹ *Are Universal Service Funds an effective way to achieve universal access?*

⁵² *The Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response, 2018.*

Food Security

During a pandemic crisis, securing nutrition and the access to food is crucial to save lives. As such, it is imperative to manage agricultural production and supply chains to increase the resilience of production and jobs. The following topics summarise some of the best practices found in the literature.

Food Assistance and Social Protection Programmes

It is essential that sufficient measures are put in place to help the most vulnerable people comply with stay-at-home regulations during a pandemic, which leads to many informal and daily-wage workers losing their jobs and wage.

Emergency assistance needs to be provided to as early as possible to contain the spread of the virus and to protect livelihoods during recovery. Food banks and volunteer groups should be mobilised to deliver food and other required needs (such as medicines and hygiene packages) to facilitate full compliance with stay at home orders, especially for people in high-risk groups. For vulnerable households, one-off or multiple cash transfers can soften the blow of the crisis, especially as disruption to social services occur. Mobile payment systems are ideal to reduce human contact and ensure quick delivery. Moratoriums on rent or taxes may be considered to enable those most vulnerable and without incomes to afford their basic needs without defaulting to negative coping mechanisms. Social protection programmes should be extended to those who did not previously have coverage and the most vulnerable.

Decentralise the Food System

In the last five decades in many developed countries, most signs of resilient food systems have disappeared to be replaced by a highly centralised commodity-based supermarket sourcing. Centralised food systems are very vulnerable as they rely on all links being in place. This can be tackled from a bottom-up approach, as well as a top down approach. Citizens can commit to sourcing local and sustainable food consistent with household needs and capacity and put pressure on shops to source from sustainable and local producers. Farmers and growers could also approach independent food shops to stock their products or collaborate with other farmers to establish farmers



markets or run online platforms. The government could establish a national or municipal umbrella website which holds all the constellations of regional and local food websites and provides an opportunity for all producers and all citizens to explore the means by which they could identify and secure supplies of sustainable and local food (e.g. [Compra Local in Medellín](#)).

Agroecology and Sustainable Farming

Agroecology is farming that “centres on food production that makes the best use of nature’s goods and services while not damaging these resources”⁵³. Agroecological systems are more resilient as they have a greater capacity to recover from drought, floods and other extreme weather events, and to resist pest and disease attack. Agroecological approaches can also enhance socio-economic resilience. Through diversification and integration, producers reduce their vulnerability should a single crop, livestock species or other commodity fail. By reducing dependence on external inputs, agroecology can reduce the economic risk. Enhancing socio-economic and ecological resilience go hand-in-hand. The FAO has outlined a transition process from regular farming to agroecology in the Proceedings of the FAO International Symposium 2014.

Support for Smallholder Farmers

During a pandemic, food loss may occur as a result of fresh produce accumulating at farms, labour shortages may be experienced as migrant seasonal workers are unable to travel, and restrictions on movement may curb access to markets. These factors combined with local factors can threaten the food supply in many regions.

Stimulus packages with clear incentives for farmers may be required. A capital injection in the agricultural sector can help small and medium businesses to continue operations. Governments may subsidise the basic energy, water and fertiliser needs of smallholder farms and rural households. However, excessive subsidisation may exacerbate market volatility. Any constraints to domestic trade should be removed in order to link smallholder farmers to markets.

Governments can purchase non-perishable products from smallholder farmers to establish strategic emergency reserves, which can be used to deliver safety net programmes and school meals when schools are closed. Improving storage can help to reduce post-harvest crop losses. Seasonal foods should be prioritised. Support to develop livestock and agricultural activities is an opportunity to tackle gender equality.

⁵³ *Agroecology Fund* (<https://www.agroecologyfund.org/what-is-agroecology>)



Land Tenure⁵⁴

There is a growing body of evidence to suggest that securing land and resource rights has a positive impact on food security and broader development outcomes. Secure land and resource rights provide incentives to invest in and conserve valuable resources, a widely documented phenomenon. When land rights are secure, household participation in land markets increase, positively impacting agricultural productivity and food security by allocating land more efficiently to the most productive users and allowing less productive farmers to migrate or work in other sectors. Access to land should take into account gender considerations.

Evidence suggests that there is no one “right” model for agricultural development. Research suggests that large-scale acquisitions of agricultural land in countries where land markets are constrained, and the rights of small-scale producers are insecure can lead to harmful effects on local livelihoods. It is important to take the time to get investments right as this can lead to positive outcomes in food production and safeguard the property rights of local communities. USAID has published [Operational Guidelines for Responsible Land-Based Investment](#), which provides more information.

Tackle Logistical Bottlenecks

The food value chain can be broadly divided into two groups: staple commodities (wheat, soybeans, maize) and high-value commodities (fruits, vegetables, fish). High-value

commodities are particularly labour-intensive in production and are affected when employees become ill or labourers are not able to travel to work due to lockdowns. These disruptions are particularly bad due to the commodities’ perishability. To meet the labour demand, migrant workers’ visas should be expedited, even if counterintuitive. Healthcare and testing should be made available to workers and social distancing should be practiced. In the case of a pandemic, key staple commodities-exporting countries need to find solutions to minimise logistics disruptions so that major staple commodities can move across countries. The logistics components of supply chains need to be properly tested and supported to bring stability to international markets.

Keep Global Trade Open⁵⁵

Countries that rely heavily on imported food become vulnerable during a pandemic when countries shut their borders to trade. Food prices are likely to rise in most countries. Sudden and extreme food price shocks could occur during drawn-out lockdowns.

In the case of a pandemic or worldwide border shutting, countries should immediately review trade and taxation policy options and their likely impacts to create a favourable environment for food trade. The Agriculture Market Information System⁵⁶ (AMIS) is an inter-agency platform to enhance food market transparency and policy response for food security and provide up-to-date data on stocks and prices of key staple

crops. Lessons learned from the 2007-2008 food crisis⁵⁸ showed that countries should cooperate to prevent beggar-thy-neighbour policies (economic policies through which one country attempts to remedy its economic problems by means that tend to worsen the economic problems of other countries).

Agricultural Planning and Zoning

Territorial planning plays a significant role in Food and Nutrition Policy. This points to the multidisciplinary nature of planning and the need for a holistic view when designing long term food policy. The FAO and the OECD⁵⁹ have pointed that too often the territorial dimension of food security have been neglected.

However, as the nature of food insecurity varies significantly across urban and rural regions, as well as across different territories, policies should also reflect regional differences to be effective. Strategic Development Planning practices can provide a substantial basis for the preparation of Agricultural Plans.⁵⁹ As the process of characterising the territory, stakeholders, processes, economics, and infrastructure provide a robust diagnosis of local conditions, key factors for agricultural development are identified. Likewise, future scenarios are designed, and actions are planned to ensure the safety of food production under severe conditions.

These long-term instruments can increase food production and agriculture resilience under different scenarios. Therefore, creating a more sustainable and reliable system to face extreme situations such as the current COVID-19 pandemic.

⁵⁴ Fact Sheet: Land Tenure and Food Security

⁵⁵ COVID-19 and the risk to food supply chains: How to respond? Food and Agriculture Organization of the United Nations

⁵⁶ Agricultural Market Information System

⁵⁷ Food crisis and export taxation: The cost of noncooperative trade policies

⁵⁸ OECD/FAO/UNCDF (2016), *Adopting a Territorial Approach to Food Security and Nutrition Policy*, OECD Publishing, Paris.

⁵⁹ Bousbaine A, Akkari C, Bryant C (2017) What Can Agricultural Land Use Planning Contribute to Food Production and Food Policy? *Int J Avian & Wildlife Biol* 2(1): 00009. DOI: 10.15406/ijawb.2017.02.00009

Healthcare facilities

During a pandemic it is often necessary to increase capacity of healthcare facilities like hospitals, quarantine facilities and recovery care. Converting buildings that are temporary or permanently available could increase the flexibility of the healthcare system to respond to an immediate increase of demand during a pandemic. As the need for conversion during a pandemic is always on short notice several steps can be taken to prepare and plan ahead:

- Determine the buildings available for conversion to healthcare facility
- Assess if buildings follow requirements for healthcare facility
- Maintain a list of buildings that meet requirements
- There are a few tools that can be used for these steps described below.

Demand and Assessment of an Asset for a Crisis Shelter

The severity of the COVID-19 pandemic has put pressure on healthcare infrastructure in regions worldwide, with the immediate need for conversion of buildings to provide additional healthcare facilities for triage and quarantine care. Arcadis has created a Remote Asset Assessment tool which enables the initial assessment of a building's suitability for conversion to a healthcare facility, based on eligibility to meet the basic and priority requirements

The Remote Assessment Tool outlines the following criteria factors for consideration:

- Size, shape, and layout opportunities
- Basic services - including heating, cooling, and water supplies
- IT infrastructure; power and data; fire safety and escape routes
- Certificates and permits (often a no-go if not available)

The analysis creates a high-level summary determining if the site and building are "fit for purpose" for the intended function and daily use, highlighting if prospective buildings meet the basic and most important functions, or not, as applicable.

Arcadis has a support team of technical experts who are specialists in the field of construction and installation technology who can support with design, mobilisation, and implementation of these facilities. Whilst these are



intended to be for temporary use, the Remote Asset Assessment Tool considers all the key criteria required to meet the necessary regulations for adaptation of buildings to meet the required brief for permanent facilities.

Healthcare Facilities Checklist and Resources

The requirements for quarantine facilities to support any pandemic scenario are complex and challenging to generalise for a range of country scenarios and healthcare systems worldwide. During this period, the UK health team have been tasked in providing technical expertise and resource for the procurement of temporary hospitals to support the COVID-19 health crisis.

Following this experience and gaining input from colleagues in other world regions to offer a global perspective, Arcadis has produced an outline checklist intended as helpful starting point for the key baseline requirements for converting buildings into healthcare facilities. This provides high-level considerations for location, access considerations, basic infrastructure and provisional space requirements which may be useful for health resilience of our cities for future pandemic emergency healthcare response scenarios.

The list may be found in Appendix III.

Quarantine Facilities

The provision of quarantine facilities is considered a form of "post-acute care." Post-acute care includes rehabilitation or palliative services that beneficiaries receive following a stay in an acute care hospital. Recommendations for quarantine facilities to avoidance of contact with the disease are:⁶⁰

1. Creating a buffer zone for switching into and out of protective wear.
2. Increasing ventilation with outdoor air
3. Handwashing and disinfection of surfaces
4. Waste Drainage integrity, making sure the drainage is safe and effective
5. Strengthening Cleaning / Disinfection Protocols
6. Proper use of Lavatories

⁶⁰ More detailed recommendations can be found in the Rapid response answer 03 – Corona proofing houses and localities.



Healthcare for Informal Settlements/Displaced Persons

Many houses in informal settlements lack the necessary infrastructure for these requirements. Because many people are living in smaller rooms the isolation necessary for quarantine is near impossible. Creating separate quarantine facilities is a solution.

The prevalence of squalid conditions in informal settlements, around the world, has brought out several distinctive and contextual solutions to tackle the issue of providing quarantine and healthcare facilities to these communities. The disaster-prone state of India, Odisha, has utilised its existing multipurpose cyclone and flood shelters as temporary medical camps and quarantine centres within the state. These shelters are strategically located and include all informal settlements within its catchment. Additionally, as per the national and state educational policies set out, there are government schools within or in very close vicinity of these settlements, some of which have been identified and converted to quarantine centres.

In comparison, the state of Kerala – India’s leading state in the fight against COVID-19 – has effectively utilised its tourism infrastructures such as hotels, homestays and even its houseboats as isolation or quarantine facilities. They have further added on capacity



A cyclone relief centre turned into quarantine facility in Paradip, Odisha (Source: Biswaranjan Rout).

by converting college hostels to house migrant workers, Indian expatriate returnees, and the state population. Following suit, the southern railway departments of India, converted train bogeys into quarantine coaches to ensure adequate provision of healthcare facilities was maintained. Mumbai, home to one of the largest slums in the world, has also responded to the high need and low provision of health facilities by converting its indoor stadium into a special observation quarantine facility.

Several nations have stepped up its capacity by building large temporary field hospitals in exhibition centres or by using tent like structures on large vacant lands. While these facilities discussed above do not directly serve the informal settlements, these solutions come across as reliable options to serve these under privileged communities in the case of any pandemic or disaster.

Social: Communications and community engagement

Equitable access to information about public health and wellbeing is a fundamental human right that should be bolstered during a pandemic. Transparency is the key to ensuring all members of a community are prepared to change their daily lives as outbreaks occur, and eventually, adapt to a new normal when daily life resumes in a post-pandemic society.

In planning, implementing, and sharing public health and risk information, three questions must be answered, which have been adopted and summarised from official WHO risk communications guidance:

1. What information is shared?
2. How do you share it?
3. Who do you share it to?

Sharing public information should be handled by governments, trusted aid agencies, community leaders, and most importantly, medical and health care professionals. The platforms for sharing information should likewise be handled by officials.

However, these strategies are not helpful to a population until they are applied through robust community engagement. While officials handle the details surrounding “what” and “how” information is shared, to “whom” the information is shared should originate from grassroots, ground levels, and focus on community inclusion and equity. As such, “what” and “how” information is shared is explained in the Communications section of this chapter, while local stakeholders’ groups are identified in the Community Engagement section.

Communications

Level 3. Prepare Identifying and communicating public health risks and implementation strategies early is essential to pandemic resilience. Consistent, transparent, and timely information management and dispersal will alleviate public disconnect and panic. An effective model for of this strategy

comes from Kerala, where the Chief Minister issued televised daily updates while including opposition in discussions and spearheading a “Break the Chain” campaign. South Korean President Moon Jae-in also communicated coronavirus information early and consistently to inspire a “wartime sense of purpose” within the public.

Sharing Accurate Information

Information campaigns must be optimised to reach the greatest number of stakeholders using communication methods that are currently available and appropriate for those stakeholders. The messages should be simple to understand, should avoid technical jargon and should be presented in multiple languages and dialects to accommodate and reach the largest and most diverse groups of people possible.

Guidelines for the language of official responses and information about a disease should also be developed in concert with specific messaging techniques. According to the IFRC, how to communicate about a pandemic disease:

- Use a “people-first” language of respect and empowerment while avoiding negative stereotypes and assumptions.
- Use a “facts, not fear” theme that prioritises the collection, consolidation, and dissemination of accurate local and national virus data
- Create a feedback loop can help address fear and misconceptions surrounding a disease, demonstrating to communities that organisations are listening and acting on their questions, suggestions, and concerns.
- Prevent stigmatisation of the disease as it hampers response efforts because collective knowledge and energy is spent combatting other people instead of the virus, which remains the common enemy.

To share such virus-related facts and bulletins, a variety of messaging



platforms should be used. These platforms are conditional for each country, and more so, for each community. As such, sharing information is often determined by existing regional telecommunications infrastructures in combination with the popularity and familiarity of available platforms. According to the UN, important messages to consider during the pandemic in addition to the virus itself include:

- Protect human rights and focus on inclusion
- Communicate safe labour standards
- Support and emphasise consistent education even if you cannot go to school
- Prioritise social cohesion measures – “We’re all in this together, and we’re going to get through this together.” – through free access to educational and cultural resources can be used to overcome social isolation.⁶¹

⁶¹ *Shared Responsibility, Global Solidarity: Responding to the socio-economic impacts of COVID-19*

Transparent Information and Data Management

What information is shared?

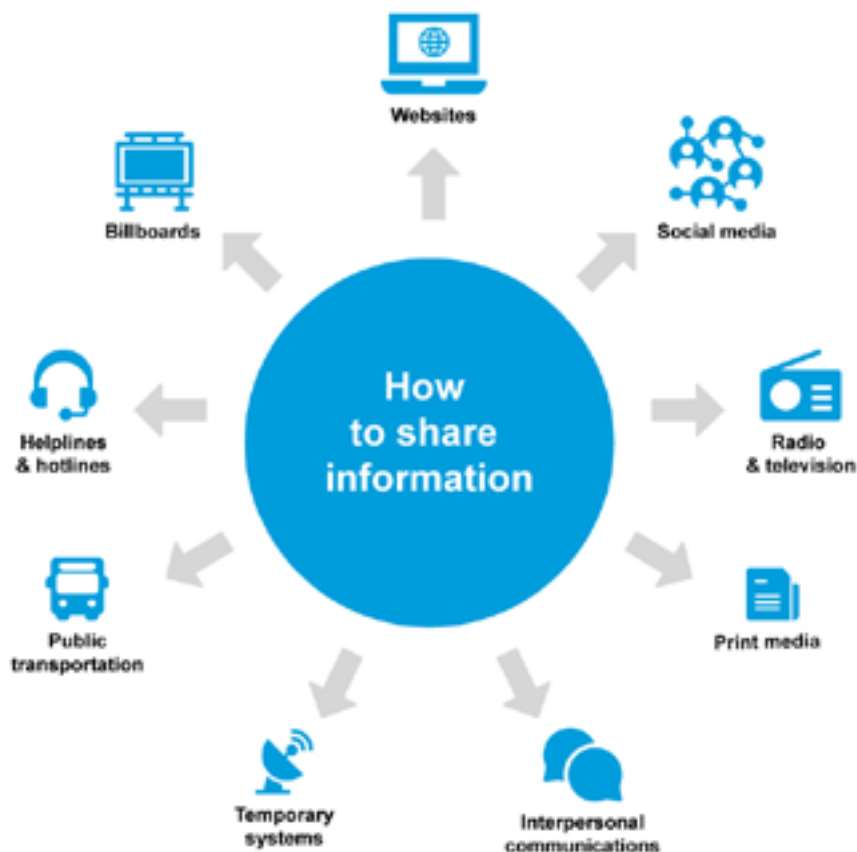
Communities should share available information about quarantines, social distancing guidelines, treatments, workplace and education guidelines, and statistics about cases and deaths. This can be accomplished through interventions by governments and trusted aid agencies, who can rely on existing models from communities previously experiencing outbreaks. Conversely, communities should be cautious not to share too much information, despite the importance of transparency. Any specific information about cases or patients (names, addresses, etc.) should never be shared. In this situation, standard medical privacy procedures should be adhered to.

Accountability

Accountability complements transparency. First, national governments should play the leading role in collating and disseminating official information to their constituents; officials from national health agencies (e.g. the Centres for Disease Control and Prevention in the United States and Africa), should initiate responses, interventions, and information sharing campaigns. Official information should also include guidance and efforts from aid agencies (e.g. the United Nations, WHO, Red Cross, etc.). Second, that information can then be produced and disseminated for public consumption laterally via federal representatives and elected officials. Third, these officials should directly coordinate any public health efforts with community leaders in local municipalities. Establishing a documented, public chain of command for the flow of COVID-19 related information is important when distinguishing accurate data, figures, risks, and treatments to the virus with contradictory (and unofficial) misinformation.

Surveillance Tools and Contact Tracing

When considering national strategies for COVID-19 surveillance, governments should be transparent about the information that is collected through these kinds of technologies. Trusting in the government is essential to engage people to search and share information.⁶² Such strategies include mobile phone applications for contact tracing and GIS



mapping urban areas that have large vulnerable populations. While contact tracing via mobile phones can be an effective way to crowdsource individuals who have contracted COVID-19 through self-assessments, these applications do carry privacy risks and concerns.

Platforms

How do you share it?

Social distancing has led to a spike in at-home media consumption, and growing numbers are turning to news providers for timely and trusted information on the crisis, increasing viewership of mainstream news media by 12%, with people consuming news at 80% of the time to keep abreast,⁶³ hence responsible journalism is the need of the hour. A collaborative approach between media and governance is based on trust in the governance.

Several effective low-cost, high-visibility methods exist for sharing information most relevant to a pandemic, especially for populations living in slums and informal settlements. These include online platforms such as websites, social

media, and third-party messaging and helpline applications; traditional media outlets such as radio and broadcast television and billboards; print media such as newspapers, print PSAs, and informational pamphlets; and direct interpersonal communication deployed by town criers and troubadours.

In addition, from an infrastructure perspective, temporary telecommunications systems, helpdesk phonelines established by the government or trusted aid agencies, and even public transportation systems can be used to further disseminate important pandemic messages.

⁶² *Financial Times*: Yuval Noah Harari: the world after coronavirus, 2020.

⁶³ *World Economic Forum*: COVID-19 proves that media's value is growing – but we need to find better ways to measure it

Community Engagement

Stakeholders Sharing Information

Where and from whom does information originate?

Additional opportunities for public engagement and grassroots ownership exist when sharing public health information. This first requires identifying the relevant stakeholders. Effective risk communication means that messages about risk can be presented to and shared with stakeholders in an open and timely communication process.

The goal of this process is to improve a knowledge-based relationship between information generators and information receivers. As this relationship improves, opportunities are presented to analyse and enhance the public's behaviour to proactively tolerate the risk. As such, a promising strategy for identifying and subsequently sharing appropriate COVID-19 information to relevant stakeholders is the Government-Expert-Public risk communication model.⁶⁴

Government

During a pandemic, government officials should convey, broadcast, and disseminate adequate and accurate information to the public. Information disclosure as a process should be accessible and open, while the actual information shared should consider the public's tolerance for risk, and possible subsequent outcomes that might result from a reaction to risk intolerance. Governments should also empower technical experts, particularly in healthcare, to conduct and publish comprehensive and detailed research on the pandemic and any resulting social uncertainties.⁶⁵ NGOs and Aid Agencies

In most developing countries, non-government organisations (NGOs) and non-profits play a great role in community level service and development. In India alone, it is estimated that there are 3.5 million⁶⁶ registered NGOs, many of which are actively involved through the COVID-19 crisis.

While NGOs are on the frontline during the COVID-19 crisis, most are struggling with using their resources effectively, and need to resort to informal/unstructured communication channels to identify hot spots of requirement. The following recommendations are towards effective crisis response in



the medium and long term with an emphasis on a collaborative approach between Governance and NGOs:

- Establish joint objectives for crisis-response with key participants, especially since business as usual objectives are generally not aligned. This is clearly needed, as in India, NGOs have outperformed government for both food and shelter during COVID-19, illustrating the governance disconnect with its outreach and ability to deal with the issues in isolation.
- Channelise efforts of NGOs with single point platform at the city/district level where they register their services during a crisis, so that they can be assigned clear roles.
- Employ live updates with data mapping so hotspots and their particular need are easily identified along with which NGO is responding to the need.
- Provide for public food distribution locations, where NGOs source the bulk food or centralise the cooking, through community kitchens, to prevent wastage. Across 13 states in India NGOs have provided more than 85 % of food distribution and while some NGOs feel they are not being effective in their outreach, in Kerala a unified collaborative platform for food distribution has ensured minimal wastage.
- Provide adequate guidelines/training to NGOs to limit exposure of their manpower to pandemic virus.

Health and Essential Services Experts

Official information regarding treating, preparing for, and managing COVID-19 (from an individual and community

perspective) should originate from a national level through research and official information provided by:

- Government health departments
- Approved NGOs and external aid agencies with a public health mission focus
- Leading national health officials
- Accredited healthcare volunteers (especially when medical staff are unavailable or scarce)
- Grass root NGOs and youth empowerment

Community Leaders

Strategies and interventions devised by government and aid agencies on a macro level should be implemented in municipalities and communities through the following local parties:

- Local community and neighbourhood leaders
- Teachers
- Local health professionals and clinic workers
- Religious leaders
- Grassroots NGO agencies
- Leaders of youth organisations
- Previously established and respected community volunteer groups and networks, particularly local chapters of larger national organisations

⁶⁴ *Effective Risk Communication for Public Health Emergency: Reflection on the COVID-19(2019-nCoV) Outbreak in Wuhan, China, 2020.*

⁶⁵ *Collecting Open Government Approaches to COVID-19, 2020.*

⁶⁶ *ngoindia.com*



Kudumshree community kitchen -Kerala (<http://www.kudumbashree.org/>)

Each of the trusted partners occupying leadership roles in the Government-Expert-Public matrix can develop and champion innovative ways to share official health-based communications relating to COVID-19. For instance, they can share resources for health information planning services – including the procurement, distribution, and stock monitoring of key commodities (e.g. approved pharmaceuticals and medical treatments, as well as PPE) – via common information technology platforms available to community members (such as SMS texting) and traditional radio and print media platforms where access to mobile networks is limited. The success of such social measures and treatments occur as a result of social mobilisation and information, education and communication campaigns implemented during and after the pandemic crisis and the complementary adoption of these measures by community members, especially those living in slums and informal settlements.

Partners can also play a role in strengthening public health systems by providing emergency health notices that reaffirm the capacities and capabilities of community hospitals and medical centres. Such public health information campaigns should be enhanced to include vulnerable populations living in slums, informal settlements, and rural areas with unreliable existing telecommunications networks. Likewise, any improvement of health communications protocols should be used as an opportunity to apply best practices learned from prior public health crises. For instance, as various African communities have addressed HIV/AIDS outbreaks over the past several decades, public health has been collectively repositioned in the public conscious as vital for improved

livelihoods. This mental shift was due in part to consistent information campaigns. Specifically, Awareness has been increased over the years by regularly broadcasting messages on local radio stations, through school health activities, and by distributing informational pamphlets and materials to communities, all while simultaneously engaging local chiefs and community leaders. This revitalised system enables community leaders and members alike to take ownership of accurate public health information, and as such, apply it to their lives to create a healthier future.

The success of any crisis management, and more so pandemic response, lies with community participation, be it individual understanding their community responsibilities or volunteers, and non-government organisational support. While these broad recommendations are applicable to cities and communities in general, their relevance to informal settlements is even more significant. As discussed in chapter 3, Informal settlements by nature are pockets of their own socio-cultural fabric with influencers being local political leaders, mafia and NGOs who help support these marginalised people, where the government has failed or forgotten them, thus including these stakeholders in a response plan is critical.

Stakeholders Receiving Information

To ensure an effective horizontal approach, engaging at a Community and neighbourhoods' level are imperative, as this not only ensures community-watch dogs but allows for a personalised engagement and inclusion. The effectiveness of this is dependent on a "People First" approach and clear taglines which define the objective, such as Kerala's

COVID-19 Slogan "Social unity -Physical Distancing". The following recommendation broadly outline an inclusive community-based approach:

- Plan for training of volunteers during a crisis and assigning them based on their skill for different areas of need. In the Kerala model, 25,000 volunteers registered within the first 3 days, who were trained to support different needs. This included paramedic/healthcare students to support the shortage in medical staff for testing. In Kolkata-Salt Lake slums NGO have trained volunteers from ages 6-25 years to be health minders and community ambassadors for COVID-19 control.
- Plan for healthcare workers and volunteers' rotation to allow for break between continuous days of work. Odisha experience in disaster management has resulted them in including for 14 days duty and 14 days quarantine for its healthcare workers and volunteers.
- Identify community leaders/religious leaders/volunteers for community level monitoring and awareness. In Dharavi-Mumbai, where there is a general distrust of the governance, community volunteers (Anganwadi workers) are involved in monitoring following up on those who are sick, educating for testing and monitoring unnecessary movement within the area.
- Engage the youth as community support for servicing the vulnerable, door-to-door/social media awareness campaigns. Today's youth are aware that their socio-economic future is impacted and hence have a drive to help the community back on the feet. There are adequate examples of youth role models like Davis Waidhulo in Uganda, who has mobilised a group of 10 youth who are going door-to-door in the community of Jinja to share updated health information about COVID-19 and founded the Mutai Development Initiative, a community-based organisation that partners with 22 hospitals, 33 schools, and more than 160 volunteers to tackle issues like food security and training healthcare workers.⁶⁷

⁶⁷ *Digital opportunity trust: Here's how youth in Africa are creating rapid responses to COVID-19*

- Include for awareness campaigns and include for volunteers to spread awareness, follow up with home quarantined, vulnerable individuals without support system. Whether it is the individual initiatives like those of Davis Waidhulo or Kerala's trained volunteers who educate through door-to-door campaigns and following up on needs of those in quarantine.
- Humanising the experience is essential as during a crisis personal trauma/fears need to be abated. This is illustrated through Kerala's preparedness at all levels where individual experiences of families travelling back to the state/district have had seamless checkpoint assessment, with food provided at each location, and village/district collectors calling to follow up on them.
- An inclusion policy means including for those who have issues with substance abuse, as not only are they more susceptible with compromised immunity, but the inability to source alcohol/drugs results in domestic violence. In Kerala, the special helplines for substance abuse dependents with medication and/ or follow up calls is set up.

An inclusiveness policy should include those who have substance abuse issues. They are more susceptible because of their compromised immunity and inability to source alcohol/drugs results in domestic violence.

Vulnerable Populations

Who do you share it to?

- Chapter 2 describes the vulnerable groups from a socio-economic perspective. Vulnerable population sectors include, but are not limited to, people who:
 - work in the informal economy (waste pickers, etc),
 - work in formal economic industries that rely on interactions with other people in proximity (the service industry, manufacturing, food market workers, etc.)
 - occupy areas prone to natural disasters (flooding, earthquakes, droughts, etc.)
 - have inadequate access to social services or political influence
 - have limited capacities and opportunities to cope and adapt and
 - have limited or no access to technologies.



According to the UNHCR, specific, targeted approaches should be considered when trying to share COVID-19 information with People-Of-Concern (POC's) because the aforementioned vulnerabilities create barriers to access communications platforms and networks.

Interventions that can temporarily alleviate these communication barriers include:

- Understanding existing community and regional connectivity access and needs
- Defining legal barriers to connectivity that hinder remote engagement
- Avoiding the use youth/community centres and educational facilities, which go against social distancing protocols and advisories
- Supporting individual levels of communication access as alternatives to communal connectivity facilities
- Support the immediate, targeted distribution of devices to people with specific vulnerabilities (e.g. disabilities).
- Coordinate with manufacturers/ MNOs to facilitate production and supply chains. Work with NGO partners/third parties to offset costs
 - Consider distributing SIMs registered by humanitarian organisations for vulnerable persons or those with specific community functions.
 - Mobile charging such as solar lamps/wind-up radios with a charging function
 - Public Wi-Fi

- Low-tech solutions
 - Offline sharing
 - Info through USSD PSAs (partnerships with MNOs or third-party companies)
 - Solar radios

- MNO and Regulator partnerships
- Cash-Based Interventions through digital channels.
- Remote assessments and self-administered questionnaires can leverage existing connectivity interventions provided by UNHCR and partners, specifically through captive portals that provide a gateway to access.

Concerted efforts should be made to directly reach these people. As a result, establishing a two-way dialogue between vulnerable populations and community leaders is essential to ensure their basic needs and human rights are not neglected during the pandemic while still provided necessary messaging about COVID-19 itself. For instance, in Kerala, India, officials are conducting awareness workshops in multiple languages to ensure all migrant workers receive recent and accurate information about the virus and its affects.

Governance: guiding pandemic resilience in informal settlements



South Korean president - Early actions and accurate communication both for MERS and COVID-19 (source: <https://www.brinknews.com/south-korea>)

Leadership for building back better

Leadership response during the pandemic has been testing even for the most veteran global leader. Trust in the government is a necessary component during a crisis where the cooperation of the people is crucial. This section identifies a few best practices adopted by global and local leaders during the pandemic crisis.

Identifying and communicating the risks and early implementation is essential for the leader to keep trust with the public and manage effectively. People are less likely to panic during a crisis if the communication by leadership is consistent and honest. Hence the need for governing with transparency—even if it means admitting failures and vulnerabilities is essential. Positive leadership has been seen through several examples such as Kerala chief minister giving daily updates, including opposition in the discussions and spearheading a “Break the Chain” campaign or South Korean President Moon Jae-in communicating coronavirus information early and consistently to inspire a “wartime sense of purpose” within the public.⁶⁸

Quickness to respond (Level 1. Prevent)

The victories in controlling COVID-19 have come through the agility of response and actions taken by leaders in the early days. From Mette closing Denmark’s borders and schools by the second week of March, well before the rest of Europe, to Kerala setting up the COVID-19 control room on 23 January 2020, before the first case appeared and sourcing 13,000 test kits within the first week.

Decentralisation of roles (Level 1. Prevent)

Crisis management and pandemic response is traditionally seen as a top down approach and this comes from a state/district operational model. The need to decentralise is particularly important where there is high population concentration so actions can be taken quickly without bureaucracy. In 1996, the Government of Kerala implemented a significant fiscal decentralisation programme and then built the capacity of its local governments. It launched the People’s Plan Campaign (PPC), which devolved 35 percent of the state’s development budget from

a centralised bureaucracy to local/district governments, with strong accountability, thus allowing a localised focus on better facilities over time, and a focus on service delivery at the primary health centre-level. This allowed smaller healthcare centres to be prepared for COVID-response with adequate testing facilities.⁶⁹

Opportunity during crisis (Level 3. Prepare)

Identifying opportunities that benefit all stakeholders can reinforce positive leadership during a crisis. In Odisha, chief minister Naveen Pattnaik announced an Urban Wage Employment Initiative (UWEI) to help the daily wage workers employed through external agencies on government projects for a period of April to September. The daily wage workers are employed directly and paid on a weekly basis (eliminating the middlemen contractors-reducing cost) and are assigned to small labour-intensive projects around the city, which can be undertaken while the rest of the city is under lockdown. These projects ranged from remodelling playgrounds, afforestation, and community centres in slums. Since public areas are not being used, they are building temporary rainwater harvesting tanks prior to the monsoon to combat the state’s water scarcity issues. The programme has been designed to benefit the urban poor, labourers, and daily wagers, who are currently out of work now because of the lockdown restrictions.⁷⁰

⁶⁸ <https://www.brinknews.com/south-korea>

⁶⁹ Kerala case study, please see the Appendix

⁷⁰ Odisha case study, please see the Appendix

Institutional Policy Planning

Re-evaluate and strengthen provision (Level 1. Prevent)

Defining informal settlements: Often, it is assumed that informal settlements are by nature of the terminology considered illegitimate due to landownership or quality of housing or unplanned areas of the city. However, in many megapolis' often it's the lack of acknowledgement of their role in the city's fabric which results in its degradation. This is starkly visible in Mumbai where locations which are identified as informal have a history dating back to few centuries as fishing villages, with some still actively engaged in fishing. The lack of identifying them within the fabric due to political history or apathy towards them has resulted in encroachment and unauthorised structures. Over the last decade, NGO planners and urban anthropologists have worked towards getting the governance to recognise their contribution and legitimacy in the city's history. Further, they are influencing policy makers to identify them as "gaothans" villages sites including earmarking indigenous structures having heritage conservation value.



Initiatives like "Mahiji Versova"- (My Versova bring focus of the governance to reclassify informal settlements (source: <https://vebuka.com/sachinmaurya>)



(Top): JAGA Mission landownership and reclaiming public spaces -Ishaneswar Slum (source: Built Empathy)

(Left): Kerala Family Healthcare with upgraded testing and daycare facilities

Planning for the Poor: For the first time in history, more than half of the world's population lives in cities. This figure is expected to rise to 68 percent by 2050, presenting a host of new challenges. Urbanisation poses several sustainability challenges related to housing, environment, climate change, infrastructure, basic services, food security, health, education, decent jobs, safety, and natural resources. Urbanisation can also present great opportunities and is a critical tool for sustainable development if it is done right.

Digital innovation is at the forefront of using effective resources in the future and should be extended to digital mapping of the informal settlement bringing emphasis on planning for the poor. Adequate housing is a human right, and the absence of it negatively affects urban equity. Renewed policy attention and increased investments are needed to ensure affordable and adequate housing. The SRA (Slum Redevelopment Authority) of Mumbai has come under severe criticism as the informal settlements are located in the heart of the city and redevelopment policies were geared towards gentrification. In contrast, the award-winning Odisha Liveable Habitat Mission – JAGA Mission by the government, in collaboration with several philanthropic organisations, NGO's and other local communities, is empowering slum dwellers by providing them with a security of land tenure

and better living conditions. It moves away from the stigma of looking at slum dwellers as encroachers but including them as an important contributor to the economy and the state.⁷¹

Healthcare Accessibility: Provision of public healthcare is generally inadequate in megapolis', especially for the poor and near informal settlements. Improving primary healthcare centres for a more active role in community health is required regardless of the density in all urban areas

Further district/rural healthcare centres need to be developed and strengthened to reduce rural areas dependency on the urban healthcare systems. This is starkly apparent in Mumbai public hospitals, where people from the region throng for healthcare, resulting in the urban poor opting for private healthcare, to limit being away from work.⁷² Conversely, state like Kerala have over the past decade upgraded their primary healthcare centres to family healthcare centres, with private contributions encouraged to upgrade the testing facilities. This has reduced the dependency on the government hospitals, especially during COVID-19 crisis.

⁷¹Odisha case study, please see the Appendix

⁷² Mumbai-Dharavi case study, please see the Appendix

Planning for Migrant Workers

A migrant worker is a person who either migrates within their home country or outside it to pursue work, typically on a temporary basis. While all migrant workers have faced significant uncertainty at the onset of COVID, the internal migrants⁷³ of developing and underdeveloped nations that reside within the informal settlements of the cities have been hit the hardest.

This is largely due to the informal nature of their employment which makes it easy for the employer to terminate their employment, thus cutting them off their income. The transient status within the city makes them the least prioritised beneficiaries of the city welfare system, especially at the time of crisis when resources are already stretched. In addition to this, often the internal migrant workers are not fully captured in the official statistics as they cut across multiple departmental and jurisdictional boundaries, making it even more difficult to comprehensively address their requirements during crisis. The abrupt termination of employment and poor visibility within the governance network has landed the migrant workers in an appalling situation during these last few months. This is the case in many communities within countries and continents such as India, China, Vietnam, Africa, Burma, Nepal, and Latin America.

COVID-19 has also brought to light the government's compromised ability to act in absence of an overall welfare and wellbeing framework focused on migrant workers. Although envisioning a reformed governance framework is a tall order, the need to create a bare minimum framework to facilitate disaster management response is urgent. With that filter in mind, following are the key recommendations (Level 3. Prepare):

1. Within the Country level Disaster Management Plan include the unique category of migrant workers and create governance synergies that will facilitate action at the time of crisis. This could include:
 - To maintain active documentation of migrant workers and their patterns. India is estimated to have 100 million circular migrants^{74 75}. Lack of comprehensive documentation of migrant worker numbers, origins, and location in the host cities have delayed the states in comprehending and acknowledging

their COVID-19 related issues and have made it difficult to provide for their safe journey home.

- Create a structure with vertical and horizontal integration of governance to ensure coordinate response to migrant worker issues and effective delivery. The vertical network will connect the government, i.e. central, state, district, city, village while the horizontal network will connect the government, network of NGOs and volunteers at ground-level. In Kerala, the decentralised administrative structure along with leadership foresight has resulted to timely and effective delivery of early response measures.
2. Assess their immediate needs at the time of a disaster and ensure those needs are accounted within the wider Disaster Management Plan for the city/state the work in. Following are critical areas of lock down preplanning emerging from the COVID-19 context:
 - Food security: The temporary nature of migrant workers' employment means they survive off of daily or weekly wages, rendering them penniless within matters of days (In Ahmedabad, migrant workers were starving for three days whilst NGO network were unaware of their plight).
 - Temporary Housing: Informal arrangements through which they get access to water, power and sanitation breakdown during crisis. While a more systemic provision is imperative, interim measures such as portable toilets, generators or rehousing them at the time of crisis is required.
 - Reliable Information: Access and ability to verify authentic information is limited, resulting to mis-informed, emotional, and counterproductive decision making. In Mumbai, a local leader urged the government to operate trains to facilitate migrant workers journey home, and in doing so created confusion wherein amidst lockdown there were thousands of migrant workers at local railway stations in anticipation of travelling back home.
 - Utilise horizontal networks to systematically communicate critical information, while urging worker families to disregard other information sources.



Circular migrant workers living conditions in India

- Mobile Health Clinics: In absence of central welfare delivery system, at the time of disasters, provide basic mobile health clinics and quarantine pods to cover the migrant worker settlements as they are often disconnected from the city's public health network.
- For the migrant workers who choose to continue staying in the city, ensure screening prior to return to work and workplaces provide adequate protection gear for their staff.

⁷³ Internal migration or domestic migration is human migration within one geopolitical entity (country).

⁷⁴ Scroll.in: In India's post-Covid cities, circular migrants must be given their legitimate rights

⁷⁵ Circular migrant are migrants who typically move from village to the city for a period of 3-11 months while maintaining strong socio-economic roots in the villages.



3. Prepare a general strategy and establish linkages to facilitate migrant worker's journey back home. This task is logistically challenging, requiring dynamic approach to multitude of issues that will be faced on-ground. Hence, it is imperative that a phased and systematic approach for return of the migrant workers is pre-conceived. Following are critical areas emerging from the COVID-19 context (Level 3. Prepare):

- Gather city level quantum per route of return.
- Pre-screening of workers needing to travel.
- Set-up safe and affordable travel modes. In India, out of desperation migrant worker families have walked 1,200-1,600 km with no access to food or sanitation and with the continuous fear of getting on the wrong side of the government officials.
- Set up food, sanitation, and health facilities en route.
- Integrate multiple communication modes to facilitate the above. This could be through infographics, multi-lingual announcements, interpreters.

- Screening and quarantine facilities when they return home.
- Access to welfare system once they have returned home, especially during the quarantine phase.

4. As a long-term measure, for overall wellness of the city and the migrant workers, it is imperative that migrant workers are specifically included within a strong vertical network with clear delivery mechanisms through the horizontal network. This network should (Level 1. Prevent):

- Establish centralised definition of 'migrant workers' as currently this varies between states and departments. This will ease the implementation of delivery mechanisms and make it easier for migrant workers to avail benefits. This should be done after understanding the existing migrant choices and patterns.
- Mandatory registration of both inter-state and intra-state migrants.
- Single-window migration support centre at local level. Advika Bureau Report (India), highlights the advantages of such a centre being collection of migrant worker data collection and employment data as well as deployment of

welfare and insurance instruments for the migrant workers.

- Mandate city municipality to acknowledge and provide basic amenities for migrant workers. This is intrinsically tied to issues of political economy and will require more country specific governance solutions; however, it is imperative that discussions on this matter do not end post COVID. Effective long-term solution of migrant workers living conditions with the city remains critical. In 2019, Kerala has initiated an Apna Ghar programme for building well equipped hostels for its migrant staff, however, this approach is subject to land availability, percentile of migrants and cannot be considered as a blanket recommendation.
- Standardise welfare policies across states and identify policies that are based on the concept of central entitlement but local delivery.
- Considerations for minimum wage and insurance. Kerala in the last few years has started providing insurance scheme for registered workers.



Disaster Management and Pandemics

Many countries/ cities and states that are vulnerable on the disaster index scale have Disaster Management Plan catering to physical calamities only. The COVID-19 outbreak has demonstrated the worldwide unpreparedness to face pandemic disaster. Places with a strong disaster history can use their expertise to their advantage as is observed in Odisha that adopted a two-pronged approach in disaster management has come in handy to tackle the spread of the novel coronavirus disease (COVID-19). This involves 'physical infrastructure' created to assist people during disasters and 'intellectual infrastructure' referring to the government's institutional setups evolved to tackle disasters in a swift and efficient way.⁷⁶ The recommendations outline the need for preparedness in the long term, and agility in adapting while having an inclusive policy to be most effective.

The strategic and planning recommendations are (Level 2. Protect):

- Preparing a Disaster Management Plan which includes Pandemic situations. Disaster management should consider all four phases of the so-called disaster cycle-mitigation, planning, response, and recovery. Countries like Japan are now including infectious diseases within their Disaster Management plan.⁷⁷
- Healthcare Disaster Management Plan with global monitoring and rapid response strategies. In Kerala history with the Nipah virus and

lessons learnt were implemented during the COVID-19 crisis as part of their healthcare resilience and response. Similarly, Odisha knowing the shortage of trained medical staff interviewed shortlisted and trained 1400 pharmacists, lab technicians, medical students, and nurses to help with the COVID-19 response.

- Identify Disaster Management Centres, adopt regulations for public buildings for conversion to disaster relief centres for different eventualities for affected people, be it housing for displaced, quarantine facilities or temporary testing centres. In Odisha, the cyclone shelters were converted to quarantine facilities.
- Adopt a localised approach to governance that encourages and empowers accountability even during disasters. Both in Kerala and Odisha the disaster response cell communicates daily to village and district head making them responsible for monitoring their jurisdiction for new cases, quarantine compliance.
- Develop lockdown strategy prior to announcement to account for relocation of masses, food provision, health equipment and essentials, special permits for essential services. While India's early lockdown was lauded for its quickness to respond, the lack of planning for 100 million circular migrants and daily wage earners who totally comprise 70% of the workforce has had disastrous results of homelessness, and lacking transportation to return their villages.
- Conduct simulation studies to estimate

the worst-case scenario, allowing to plan ahead during the pandemic. While Taiwan has controlled the spread of COVID-19 effectively, early in April, they conducted a simulation exercise of 500 cases, community outbreaks and people, involving 16 government entities

- Prepare for multiple disasters and responding to them while maintaining pandemic guidelines. In Canada, Manitoba Province and Ottawa City fought against flooding caused by snow melting while protecting response workers from COVID-19⁷⁸ and in Odisha 1.1 million persons were evacuated last week due to cyclone Amphan. The upcoming monsoon and the epidemics associated to it would further strain the response system if left unplanned.⁷⁹
- Plan for influx to returning immigrants/ migrant workers. Kerala have planned for an estimated 400,000 Non-residents to return due to economic crisis resulting from pandemic. Similarly, Odisha is expecting 500,000 migrant workers returning from different parts of the country after the national lockdown and are preparing 7,000 medical camps for testing and quarantine, which may still be inadequate.
- Plan for quickness of processes and efficiency in the systems, from pre-booking appointments for testing to limit cross infection, to planning for thermal scans for passengers flying in. Most countries have battled with these issues inducing fear and resistance to testing and consequently circumventing mandatory restrictions.
- Create a Sector teams' structure that distributes the responsibility of pandemic/crisis response (In Odisha sectors (specially constituted committees) are identified such as healthcare, food supply, marginalised groups-slums/migrant worker for their individual response during a crisis.

⁷⁶ <https://india.mongabay.com/2020/04/using-lessons-from-disaster-management-odisha-takes-on-covid-19/>

⁷⁷ <https://www.japantimes.co.jp/news/2020/05/03/national/experts-urge-rethink-disaster-response-measures-japan-battles-coronavirus/>

⁷⁸ <https://globalnews.ca/news/>

⁷⁹ Odisha case study, please see the Appendix

While pandemic resilience can be planned or prepared for, the regulatory response would be dependent on the pandemic characteristics. To support the pandemic regulations of social distancing, home quarantine, wash and sanitise, avoid gatherings, the recommendations stemming from the lessons learnt during COVID-19 are [Level 3. Prepare]:

- Plan for segregating pandemic and non-pandemic patients, as little is known about its mode of transmission in the early days. In Italy, the treating COVID-19 and non-COVID-19 patients in the same health facilities and rooms exponentially increased the risk of transmission and fatalities in the early days.
- Tying up with mobile service providers for emergency announcement. UAE has daily alert few hours before curfew, while in Odisha, there was a tie-up with service providers for mobile tracking of movement COVID-19- patient for contact tracing and ensuring home quarantine is adhered to.
- Tie-in GIS portal to identify hot-spot areas such as routes of migration, and use predictive analytics to efficiently supply food drops, transit shelters and sanitation facilities.
- Identify helplines for multiple services such as health, emergency, mental support, physical needs and include for qualified work-from-home volunteers to support these facilities.
- Provide incentives to destigmatise and encourage people to declare if they have symptoms. This especially required where awareness is not adequate and vulnerable feel even more marginalised. In Odisha, they are giving cash incentive of Rupees15,000 for declaring travel history, which made self-declaration a huge success.⁸⁰
- Fining/Penalising blatant violators who disregard curfews for recreation/entertainment or intentionally exposing others to the virus.
- Include for public phone charging, handwashing/sanitising stations (allow communication during absence of electricity)

Economic Resilience

The financial and economic impact of a pandemic is one that cannot be overlooked. Planning for resiliency in case of a pandemic also requires financial planning and considerations.

The consequences of insufficient planning and resources in times of a COVID-19 like crisis is painfully visible because the financial system functions as a backbone for all other systems. Different financial perspectives (preventing, protecting, and preparing) should be considered when planning for pandemic resiliency.

The preventing level focuses on preventing a negative impact of a pandemic on the financial system, a stable financial infrastructure that is less vulnerable and prone to crises should be in place that allows the economy, including the informal one, to continue to the best extent possible. The economic and financial infrastructure should not be the bottleneck in times of crises. A sustainable economic model focuses on “[firing] the four engines of consumption, investment, government spending and exports⁸¹ Some positive examples of financial systems and measures are:

Economic Stimulus

The pandemic crisis affects people financially across society, hence people’s reassured confidence in the governance when holistic economic measures support the crisis efforts. Similar to countries throughout Europe, Denmark implemented several tax relief measures and a subsidy system paying companies and startups 75% salary for salaried persons and 90% loss of revenue to self-employed. As an economic stimulus, cash subsidies have been provided for all cancelled events in addition to loan guarantees for all new loans both for SME and large companies.⁸²

Focus on the vulnerable

Early on, there is a need to identify the challenges of the most vulnerable and provide stability for them. In Turkey, caregivers for children under 13 years, or having physically or mentally disadvantaged dependents are paid by the state 60-80% of their income since April. This should be supported by food security measures described in section 4.8.3 and governance provision measures in sections 6.2.

Using Technology in a cash-based economy

A significant amount of people in developing areas have limited access to a bank account and depend solely on cash. A method used in other developing countries around the world is mobile cash, also known as M-Pesa. This refers to a mobile phone-based transfer system allowing people easy access to deposit and withdraw funds.⁸³

Saving for crisis

On a protective level, the availability of a buffer, in the form of individual savings, in case of a significant financial impact is a crucial part of planning for pandemic resiliency. The availability of individual savings is very valuable in general, but in times of crises such a buffer is crucial. Traditionally, developing countries have focused on higher savings interest rates inculcating a savings culture. This is especially essential as these countries generally do not have a social security system which can support during a crisis.

Focus on growth

The COVID-19 pandemic has woken up governments to the lack of essentials in various sectors from WASH, healthcare, education, providing them an opportunity to focus and accelerate infrastructure projects that not only prepare and prevent a similar situation in the future but also provide market and people confidence in reformatory growth through government spending. In UAE, the cabinet’s focus is towards healthcare and food security⁸⁴ while India’s fiscal budget is towards reinforcing Tier 2 and Tier 3 city and town healthcare⁸⁵

⁸¹Read more at:

https://economictimes.indiatimes.com/news/economy/policy/india-inc-seeks-lower-taxes-banking-reforms-continuity-of-fiscal-recovery/articleshow/69528054.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

⁸²<https://home.kpmg/xx/en/home/insights/2020/04/denmark-government-and-institution-measures-in-response-to-covid.html>

⁸³<https://www.vodafone.com/what-we-do/services/m-pesa>

⁸⁴<https://www.arabianbusiness.com/politics-economics/446457-recovery-plan-sheikh-mohammed-issues-challenge-to-restore-uae-economy-post-covid-19>

⁸⁵<https://timesofindia.indiatimes.com/business/india-business/budget-2018-health-gets-a-super-pep-pill-but-wheres-the-money-for-it/articleshow/62748647.cms>



Point of view: The Community at the Core

Since the pandemic began there have been many voices to be heard in the debate about how to make cities more health resilient and what we actually do about it. There are many initiatives and programmes which have been started – all with varying degrees of emphasis. There are many things which we already know, and perhaps one thing which we know but which has come into sharper focus because of the pandemic: Putting the community at the core.

We know that the painstaking work of **engagement** with communities – **on their terms** – is critical for any agency or authority to win trust to help.

We know that the most effective way forward is to ensure that the engagement of the community leads to a governance structure which owned/empowered and managed by the community. The deferral of responsibility to those who need assistance – building, infrastructure, or public health initiatives – has been documented for many years to be of highest value.

We know that this transfer of ownership can be challenging for the authority but it is entirely necessary to ensure that perceived problems are something that, with assistance, can be managed, developed and grown through the efforts of those within the crisis. This is the only durable solution and builds capability from the ground upwards.

We also know that education – at all levels and in all ways – is essential. The more facilities and the more media outlets there are for communities to access information and knowledge the easier the management of the crisis will be. Education is considered by many to be cornerstone of development and this report endorses that view.

We know that good governance requires integrity. Whilst this is sometimes compromised for many, complicated reasons, it should always be looked for. The route of good governance is trust and trust comes only through engagement and inclusion of the community. They are there to be ‘worked with’ as equal members of a team and not to be ‘worked on’. The process must be equal, fair, and open.

The voices in the debate have discussed these straightforward areas many times.

But the one voice which consistently rises from the grass roots is that of scale. Again and again local community leaders and activists say that the knowledge, expertise, aid, assistance, education, engagement and management must be broken down into small scale projects, processes and initiatives with clear, understandable remits. Everything must be easy to understand and to grasp. The creation of resilient cities is to use the most important resource of all – human resilience. And this quality is found in the communities which are undergoing crisis. There is no single global crisis

– no matter how big or small – which does not have a group of people who reveal just how resilient human beings can be. Their knowledge of their immediate context, their environment and their people give them the best platform for positive change to happen.

And so, any agency who wishes to support a vulnerable community must do it from within and not from without. The agency must work on the ground with the structures, responses, and leaders that there are not the ones we think they might need. Find the pieces which work and build with the community. By working directly and humbly with the people affected we can add value and be a genuine support mechanism for their development – on their terms.

We must always remember that it is not about us, it is about them. The pandemic has been a wakeup call for the cities to focus their efforts on truly achieving the Sustainable Development Goals within cities from zero hunger, good health and well-being, quality education to clean energy and water through reduced inequalities to make our cities and communities sustainable.

Conclusion

Resilience of a city depends as much on its citizens, as it does on its infrastructure, institutions, or governance structures. In recent months we have witnessed a need for our communities to become more resilient to future pandemic outbreaks and we have also seen the creativity and adaptability of many communities worldwide. This report aims to understand healthy pandemic resilient cities and provide recommendations for the mid and long term.

Through the recent work with the UN Habitat Helpdesk our teams have generated a range of guidance, drawing on local case studies and input from our Arcadis colleagues across global regions worldwide. Our Rapid Responses provide short term recommendations and guidelines to help immediate interventions. Our case studies provide examples of prevention and management of viral transmission, serving to reduce infection and save lives.

The crucial role of societal resilience in the COVID-19 recovery is a call to action to place community resilience at the core of urban resilience. In urban design and development, it is important to strengthen collaborative relationships with all the stakeholders in the community. Cities are only as resilient as their most vulnerable citizens. Therefore, policies should include all vulnerable groups in the overall development agenda. Increasing registration and documentation of groups like migrant workers and refugees is a fundamental step towards inclusion.

Through urban planning the overall health of citizens can be increased to strengthen health resilience in a city. The effort for basic needs will need to be continued and strengthened and prioritised. For existing informal settlements and disaster support centres the supply of adequate water, sanitation, and hygiene (WASH) materials (toilets, soap and hand sanitiser, showers, clean water, etc) is one of the top priorities.



Further important issues increasing health in informal settlements are solid waste management, food distribution and energy supply. The benefits of accessible green areas, good air quality, a safe transportation system and infrastructure facilitating many modes of transport increase both physical and mental health. Lastly, the ventilation in buildings and neighbourhoods can be increased by design, which a crucial factor in preventing and reduce spreading of disease.

To plan for robust and adaptable interventions for pandemic resilience, a pandemic needs to be included in the Disaster Management Plans, planning for additional healthcare facilities like hospitals, quarantine and recovery shelters for the vulnerable population with the goal of providing access to nutrition and hygiene. DMP's should also focus on the economic support system especially for those who cannot work remotely and those dependant on daily wage earning and provide safe transit for essential services during pandemic lockdowns.

Using smart technology cities can learn and adapt more easily, which increases pandemic resiliency. Digitalization increases the tools available to capture the benefits of data and increase a cities' ability for impactful pandemic resilient planning and effective interventions during a pandemic. Using GIS mapping techniques and big data to identify transmission hot spots, healthcare availability and manage contact tracing. Tracking movements of (vulnerable) groups in the population can predict spreading and to adapt use of infrastructure for save transport. Monitoring sewerage treatment plants supports understanding city's health. It has been made clear that internet is a critical utility supporting the wider community participation and effective communication.

More than anything, the key to true resilience means putting the community at the core of planning, communicating, and governing.

Appendices

Appendix I Pandemic Resilience Case Studies

Appendix II Rapid Response Answers

Appendix III Healthcare facilities Checklist

Appendix IV Solid Waste management graphics



Appendix I: Cases Studies



1. Odisha, India – Governance & communication, community
2. Dharavi, India Governance & communication
3. Kerala, India – Governance & communication
4. Ahamedabad, India – Governance & communication
5. Cape town, South Africa – Communication and governance
6. Rosario, Argentina, and other food case studies – Food
7. Medellin, Colombia - Housing, transportation, community
8. Yangon, Myanmar – Water
9. China after SARS – Urban Density

Case studies can be found in a separate ZIP file.

Appendix II

Rapid Response Answers



Overview of Rapid Response queries:

- Checklist on conversion on hotels to medical facilities
- Converting public buildings into quarantine facilities
- Awareness program: How can you be sure people are informed?
- What are the best ways to communicate measures during COVID-19?
- Strategies for using public spaces, as well as improving the situation of homes?
- How can you guarantee access to basic services: water?
- How effective is spraying sanitizer? What methods are available for spraying (sanitizing)?
- How to arrange the accommodation for industrial workers?
- How to deal with COVID-19 and elevators in high buildings?
- How can you guarantee access to basic services such as food, telecom, energy, and transportation in relation to the COVID-19 crisis?
- Guidance on access to education resources

Answers on these queries can be found in a separate ZIP file.

Appendix III

Healthcare Facilities Checklist and Resources

The requirements for quarantine facilities to support any pandemic scenario are complex, but the list below provides a helpful starting point for the key baseline requirements, which has been endorsed by our Arcadis UK Health teams who have been involved in recent projects for this purpose:

Location:

- Preferably sited in the outskirts of the urban/city area, or away from crowded and populated areas, subject to local options and hygiene considerations (including recommendation to be located at least 30m away from waterways)
- Site area available to be sufficient size to provide expansion opportunities if necessary, i.e. for waiting room and triage as an example
- Site to be well-protected and secured (preferably by security personnel/ army)
- Ease of access to a tertiary hospital facility with critical care and isolation facility

Access Considerations:

- Parking availability, access, and circulation for emergency vehicles
- Ease of access for delivery of food/medical/other supplies and separated from entrance of patients
- Inclusive design for user friendly facilities and clear circulation (uni-directional flow) for all patients, staff, and visitors, with segregated routes and zones as necessary

Basic Infrastructure

- Rooms or cubicles to be separated from one another with appropriate distancing measures
- Building services to provide adequate lighting, ventilation etc. Reliable utilities connections with sufficient network capacity to serve the facilities
- Sufficient potable water to be available
- Functional telephone system for providing communications.
- Support services and facilities for food, snacks, and recreation areas
- Laundry services
- Sanitation services and storage
- Refuse disposal – bio-medical waste, contaminated waste and other as applicable
- Safety measures: among which escape routes, fire compartments

High Level Considerations

- Suitability of internal finishes to minimise spread of infection
- Space capacity for separation and zoning of facilities for staff and patients
- Circulation flow between undetermined, mild, and moderate cases; segregated from non-epidemic services if applicable
- Sufficient existing building information available to ensure structural integrity, prepare floor layouts and safety plans.

Provisional Space Requirements

- Administrative offices / reception
- Plant / main control room
- Logistics areas and Pharmaceutical rooms
- Staff washroom, changing, welfare and recreational facilities
- Clinical examination rooms/ nursing station
- Laundry facilities (on- or off-site)
- Catering and meal preparation (on- or off-site)
- Holding area for contaminated waste
- Washroom facilities for patients, separated from staff or public areas
- Social support and resources including welfare and recreational areas, whilst adhering to social distancing

Appendix IV

Solid Waste Management

WASTE MANAGEMENT PROCESS



SEPARATION



3 - Bin Standard System



General waste: black plastic bag in (pedal) bin



Infectious waste: yellow plastic bag in (pedal) bin labeled specifically for infectious waste



Sharp waste: 5-liter cardboard sharps container

COLLECTION



Always use PPE (Personal Protective Equipment)



Double-bag each waste container



Use a **collection schedule**



Keep container **covered**



Collect hazardous, non-hazardous and Covid-19 waste **separately**



A **specific area** must be designated for storing medical waste

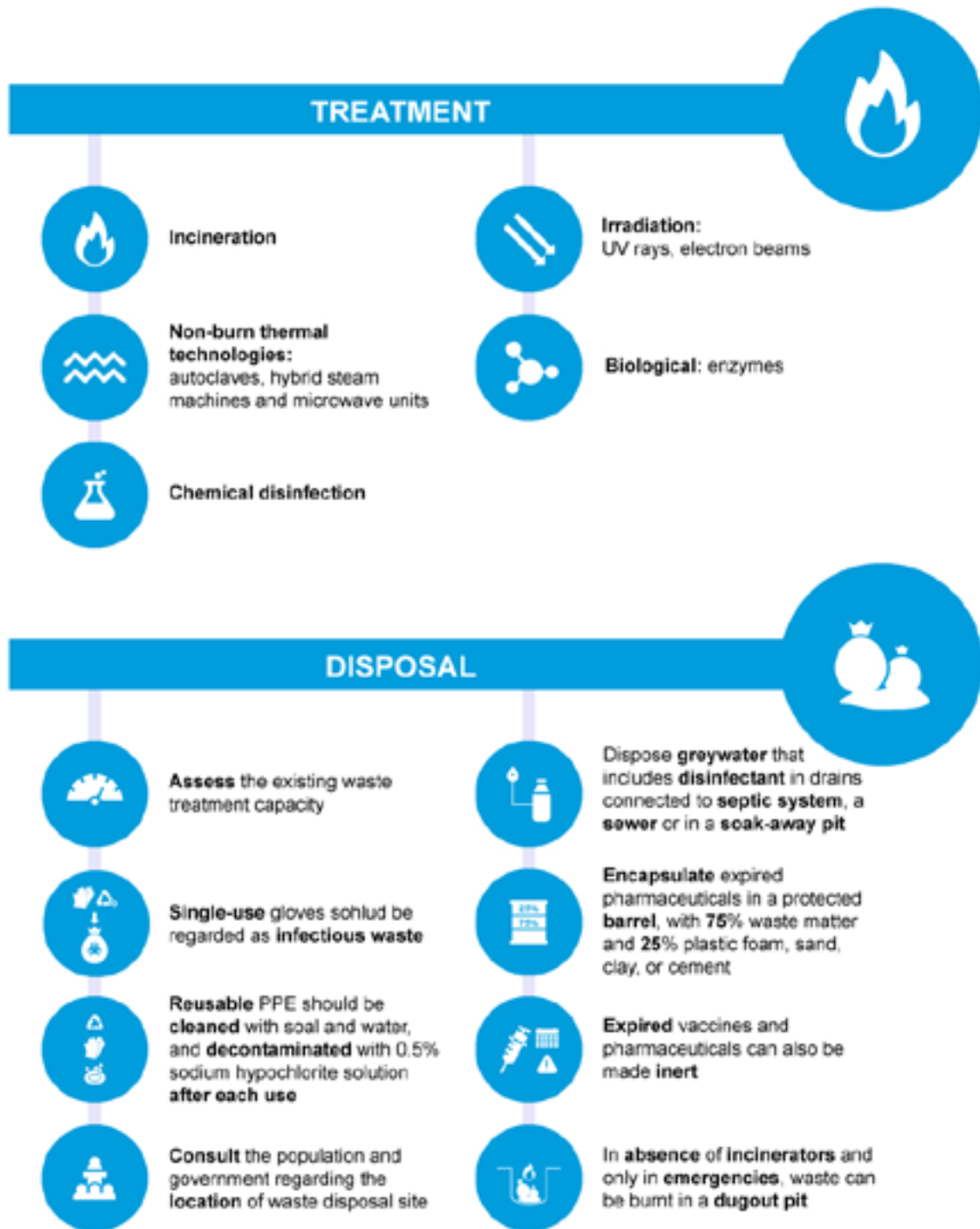
Appendix IV

Solid Waste Management



Appendix IV

Solid Waste Management



Healthy Pandemic Resilient Cities

SHELTER COVID-19 SUPPORT - 2020

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