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Development and operationalization  
of disaster risk management  
framework for COVID-19 pandemic:  
Quezon City inclusive unified  
response, recovery, and  
rehabilitation action plan  
2020–2030

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## 1. Introduction

COVID-19 was discovered in late 2019 in Wuhan. As a result of the WHO's pandemic declaration for COVID-19, the UN Office for Disaster Risk Reduction has urged disaster management agencies to prioritize biological threats. The Ebola and Zika virus outbreaks highlighted the need to break down disaster management silos. It is also important to recognize how such outbreaks can impact multiple sectors of society, including health care, education, global supply chains, travel, trade, and financial services (UNDRR, 2020). The disproportionate impact of COVID-19 has been addressed, but multiple hazards require a comprehensive approach. The present research focuses firstly on the approach response, recovery, and rehabilitation toward COVID-19 Pandemic. Secondly on how to use disaster risk reduction strategies to scale what has been practiced across other countries to address the COVID-19 Pandemic. Thirdly, what should be the Disaster Risk Management Framework (DRMF) for COVID-19 Pandemic? And finally, what should be the Quezon City Inclusive Unified Response, Recovery and Rehabilitation Action Plan (QC-IU3R-AP)? The methodology of this research comprises of two stages. The first stage deals with the assortment and organization of guiding principles to develop the Quezon City Disaster Risk Management Framework for COVID-19 Pandemic (DRMF-COVID-19-P). The second stage includes methods pertinent to the assessment of the COVID-19 spread and health system capacity. During the first stage, this study in coordination with Quezon City DRRMO developed COVID-19 Pandemic DRMF. It is to be noted that the COVID-19 Pandemic DRMF works better with city-level pandemic projections. Further, many researchers believe that the pandemic is a localized disaster because national governments, aid agencies, and neighboring municipalities will be overwhelmed and unable to help using their approaches. One must be self-sufficient in a pandemic (USAID, 2010). This approach involves the public and the media to ensure accurate messages and information. During the second stage this research operationalized the DRMF to develop the QC-IU3R-AP 2020–30. The DRMF-COVID-19-P has six phases, each feeding the next. For this research, the framework was implemented from March 25 to May 26, 2020, in the Quezon City. First, the "U-shaped" community engagement model (Fig. 20.1) was considered in understanding the reproduction of COVID-19. The City Public Health Addendum, the Health Emergency and Disaster Risk Management Framework, and existing City Response, Recovery and Rehabilitation programs are also included. It resulted into the updating of the City objectives and strategies for COVID-19 Pandemic. Therefore, the QC-IU3R-AP consists of 11 programs, projects, and activities (PPAs). In addition to social services, these PPAs focus on agriculture, infrastructure, livelihood, and business development. PPAs for Organizational Development also span the aforementioned sectors.

Basically, PPAs' achievement level and virus reproduction rate determine the end of current COVID-19 Lockdown, ushering in incremental lockdown ease. It also depends on the implementation time frame, i.e., days to weeks and weeks to months. So, Quezon City's timeline depends on PPAs and scientific findings that recommend Smart Lockdown (SL). The SL is a decision matrix consisting of criteria such as Confirmed Case/Outbreak Threshold Ratio, probability of outbreak, etc. After four scientific analyses and daily operational briefings by the Quezon City Incident Management Team, the SL is recommended to be exercised starting May 15, 2020. The SL is basically recommended to workers in the following industries with

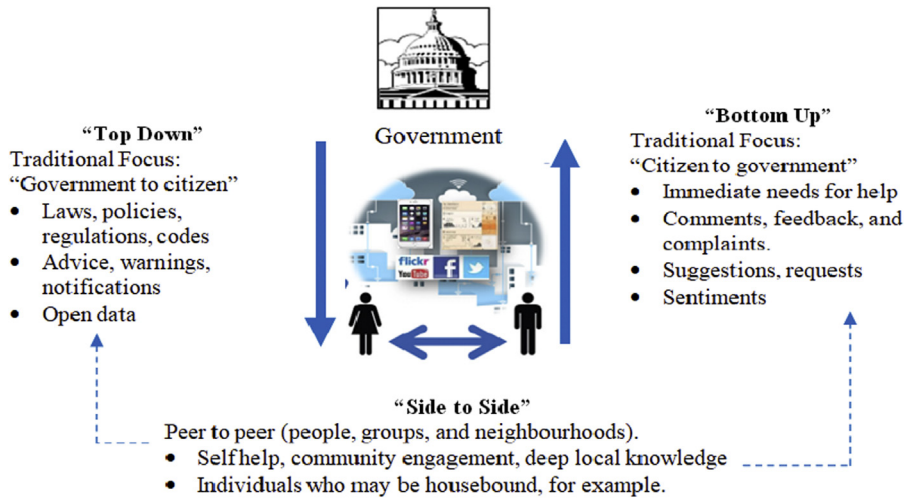


FIGURE 20.1 U-shaped community engagement model (UNDRR, 2020).

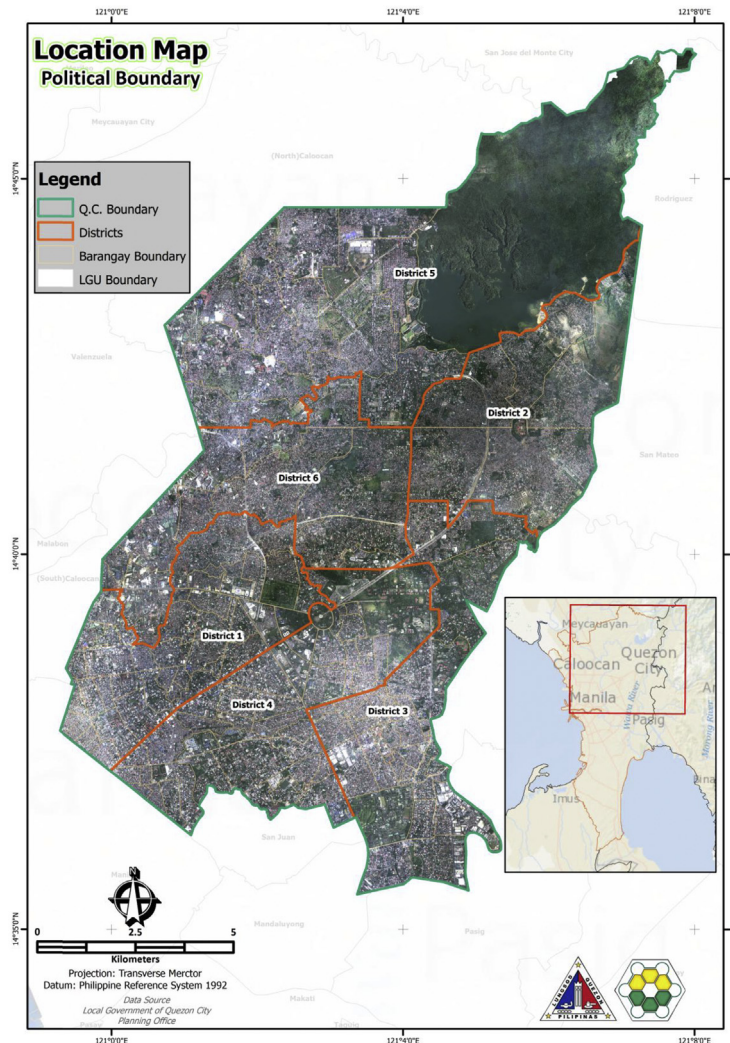
their codes, i.e., C = logistics and transport networks; D = food distribution and retail networks, including public markets and restaurants, among others; E = public works/construction workers. Other types of businesses that use social distancing and alternating days mechanism can also be considered under this SL, i.e., shops should be opened on alternating days per week, e.g., Monday, Wednesday, and Friday (MWF) or Tuesday, Thursday, and Saturday (TThS), giving all shops/stalls/businesses a fair chance to open. Further, these establishments/shops also need to follow a three to four shops apart coding mechanism. The same mechanism can be implemented for other public and private functions. The reproduction of the pandemic virus curve value is also an important ( $R_t$ ) factor in decision-making.

## 2. Objective

The main objective of this study is to develop Disaster Risk Management Framework for COVID-19 Pandemic and implement it to craft the QC-IU3R-AP 2020–30.

## 3. Methodology

Different research methods were used to achieve the objectives of this research, especially in developing DRMF for COVID-19-P. Essentially, the methodology comprises of two stages. The first stage deals with the assortment and organization of guiding principles. The second stage includes methods pertinent to the assessment of the COVID-19 spread and health system capacity. The location of the Quezon City is provided in Map 20.1 (Raza, Karl, et al., 2020). Further, the self-explanatory research paradigm shows interrelated activities to accomplish



MAP 20.1 Location map of Quezon City. *Quezon City Government and UP PLANADES. (2017), Quezon City local climate change action plan 2017–2020. Consulting services for climate change mitigation and adaptation for Quezon City stakeholder project No. 1610–50286.*

the above objectives of the study (Fig. 20.2). Due to the global scope of the issue, the UNDRR and WHO experts' knowledge is also considered at both stages.

### 3.1 Stage I: methodology for assortment and organization of guiding principles

To identify gaps and develop guiding principles for the desired framework, extensive desk research was conducted. These guiding principles are considered in developing DRMF-COVID-19-P. Further, in-house Quezon City Incident Management Team experts' knowledge

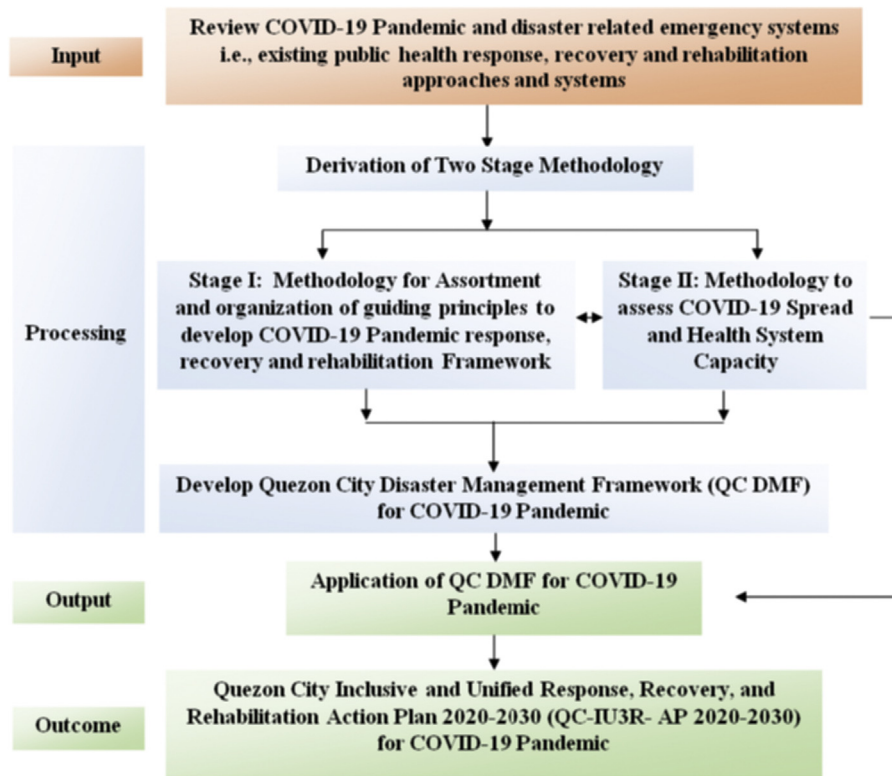


FIGURE 20.2 Self-explanatory research paradigm.

was also acquired in developing the DRMF-COVID-19-P and eventually to implement it to craft the QC-IU3R-AP 2020–30.

### 3.2 Stage II: methodology to assess COVID-19 spread and health system capacity

Most of the tools were selected through a participatory process by matching their applicability to current situation of COVID-19 Pandemic in Quezon City. Further, these tools were calibrated based on the primary data collected by the City Government through Incident Action Plan Forms. Following is a brief description of the tools used to assess the rate of the COVID-19 spread and the capacity of the existing health system in the Quezon City.

#### 3.2.1 Disaster resilience scorecard for cities (preliminary level assessment)

This Scorecard allows local governments to assess their disaster resilience and track their progress in implementing the Sendai Framework for Disaster Risk Reduction: 2015–30. It is based on the UNDRR's Ten Essentials for Resilient Cities first developed in 2005 as part of the Hyogo Framework for Action. Disaster resilience is the ability of a city to understand its



disaster risks, mitigate them, and respond to them in a way that minimizes immediate and long-term loss of life, property, infrastructure, economic activity, and environmental damage. On the other hand, practitioners must take into account chronic stressors that can reduce a city's ability to respond to and adapt to acute shock events.

### **3.2.2 Disaster resilience scorecard for cities: public health system resilience – addendum (detailed assessment)**

The Addendum is structured in sections around the same “**Ten Essentials for Making Cities Resilient**” as the original Scorecard. It inevitably overlaps with the coverage of hospitals and food distribution in Essential 8 and can be regarded as an amplification of these Essentials (UNDRR, 2017).

- Integration of public health and governance (Essential 1).
- Integration of public health and disaster scenarios (Essential 2).
- Integration of public health and finances (Essential 3).
- Integration of public health and land use/building codes (Essential 4).
- Management of ecosystem services that affect public health (Essential 5).
- Integration of public health and institutional capacity (Essential 6).
- Integration of public health and societal capacity (Essential 7).
- Integration of public health and infrastructure resilience (Essential 8).
- Integration of public health and disaster response (Essential 9).
- Integration of public health and recovery/building back better (Essential 10).

In total, there are 24 questions/indicators, each with a score of 0–5.

### **3.2.3 Population-based age-stratified seroepidemiological investigation protocol for COVID-19 virus infection**

This includes the overall prevalence of infection, age-specific cumulative incidence, and the proportion of asymptomatic or subclinical infection. Also, WHO has developed a series of enhanced surveillance protocols that are harmonized to help provide detailed insight into the epidemiological characteristics of COVID-19. Using a standardized protocol, epidemiological exposure data and biological samples can be collected and shared quickly in a format that can be easily aggregated, tabulated, and analyzed globally to inform public health responses and policy decisions. This is critical when dealing with a novel respiratory pathogen like COVID-19 (WHO, 2020).

A cross-sectional study using an age-stratified convenience sample or serial sampling is used in conjunction with other techniques.

### **3.2.4 Assessing the COVID-19 pandemic severity**

The United States' Centers for Disease Control and Prevention (Chinese Center for Disease Control, 2020) has created a Pandemic Severity Index, with increasing severity categories (Category 1 to Category 5). It estimates expected deaths using a ratio. Like hurricane preparedness, this index aids pandemic planning. The study also developed a Pandemic Severity Assessment Framework. Clearly, it is a risk assessment tool with two dimensions (Reed et al., 2013). The indicators for the transmissibility dimension are symptomatic attack rate in various scenarios,  $R_0$  (basic reproductive number), and peak percentage outpatient visits

for influenza-like illnesses. Because the COVID-19 epidemic is new, the Pandemic Health Impact Projection Tool (IPT) (Freitas et al., 2020) is still unsure about several clinical and epidemiological aspects of the disease. These tools are used in part to assess Quezon City severity. As a result, the number of deaths is a more reliable approach. Thus, this assessment uses actual deaths versus assumed confirmed cases, i.e., 30% attack rate of the population under assessment. The CDC's Pandemic Severity Index (Fig. 20.3) (Center for Disease Control and Prevention, n.d) confirmed it. The projections (appearing using a 30% attack rate) are not very realistic considering the current number of deaths due to COVID-19 pandemic or the percentage of sick people in intensive care centers.

Table 20.1 shows the Local Government Unit and Community Strategy by Pandemic Severity for reference. The LGU and community should adjust the following strategy based on their resources and environmental condition. Further, to categorize the pandemic's severity, the case fatality ratio (Table 20.2) is used, which is one of the factors in calculating pandemic projections, as explained in the following sessions.

### 3.2.4.1 Pandemic health impact projections

The Pandemic Health IPT simply calculates expectations, which may change as new information becomes available. The estimates are based on current knowledge of viruses and previous pandemics. This is a health IPT using Microsoft Excel (see Fig. 20.4).

In the case of this study the real-time data are consulted to realize the pandemic severity category in terms of Case Fatality Ratio (CFR) using Table 20.2.

For example, a 2% CFR means that 2% of those who get sick will die. With a 30% attack rate, there will be 30,000 cases in 100,000 people. To calculate the expected case count, multiply the total population by 30. The projected attack rate for category 1 very mild pandemic is 15%. The attack rate for categories 2–5 is 30%. The pandemic attack rate for

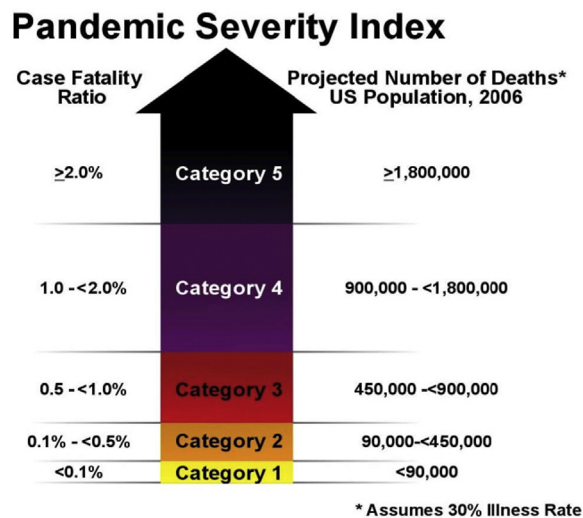


FIGURE 20.3 Pandemic severity index. Courtesy of the Center for Disease Control and Prevention, (n.d), Goals of the Community Measures <https://www.cdc.gov/media/pdf/MitigationSlides.pdf> [Retrieved on April 7, 2020].



TABLE 20.1 Local government and community strategy by pandemic severity.

Interventions by Setting	Pandemic Severity Index		
	1	2 and 3	4 and 5
<b>Workplace/Community</b>			
<b>Adult social distancing</b>			
–decrease number of social contacts (e.g., encourage teleconferences, alternatives to face-to-face meetings)	Generally not recommended	Consider	Recommend
–increase distance between persons (e.g., reduce density in public transit, workplace)	Generally not recommended	Consider	Recommend
–modify, postpone, or cancel selected public gatherings to promote social distance (e.g., stadium events, theater performances)	Generally not recommended	Consider	Recommend
–modify workplace schedules and practices (e.g., telework, staggered shifts)	Generally not recommended	Consider	Recommend

Courtesy of Center for Disease Control and Prevention, (n.d), Goals of the Community Measures <https://www.cdc.gov/media/pdf/MitigationSlides.pdf> [Retrieved on April 7, 2020].

TABLE 20.2 Case fatality ration by pandemic severity category.

Category	CFR
1	0.06%
2	1.23%
3	3.25%
4	7.00%
5	9.10%

Courtesy of Center for Disease Control and Prevention. (2009). Planning tool FluSurge 2.0 [https://www.msh.org/sites/default/files/tool-03\\_healthimpactprojectiontool.xls](https://www.msh.org/sites/default/files/tool-03_healthimpactprojectiontool.xls) [Retrieved April 04, 2021].

Quezon City is shown in [Map 20.2](#) as of May 1, 2020. The attack rate is an important factor in calculating pandemic impact projections through ITP 2.2. The IPT 2.2 is based on the CDC's planning tool Flu Surge 2.0 ([Center for Disease Control and Prevention, 2009](#)). While Flu

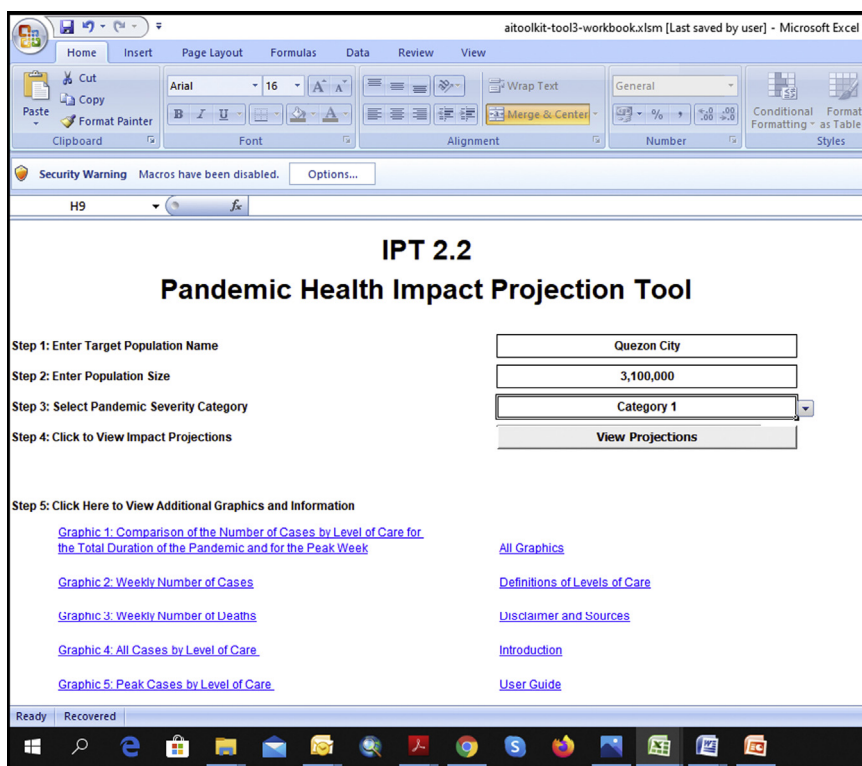


FIGURE 20.4 Screen shot from the pandemic health projection tool developed by US CDC in 2009.

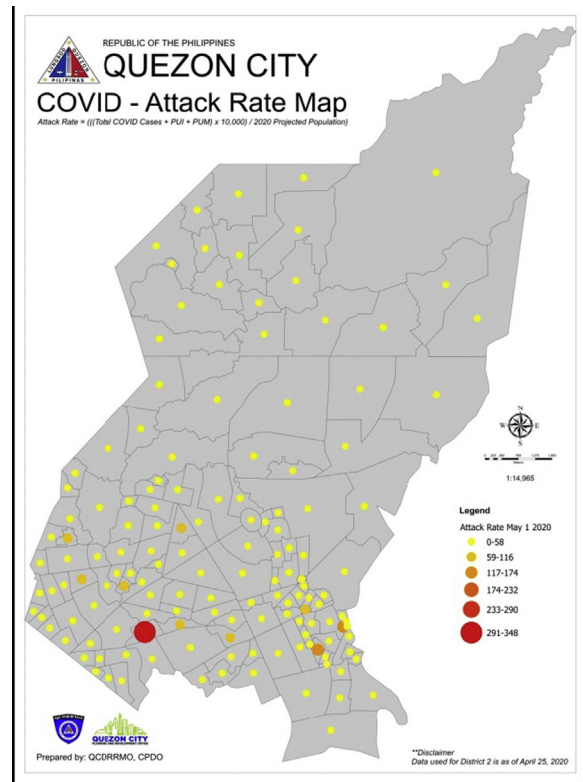
Surge generates important pandemic planning data for developing countries, such as the number of ICU beds and mechanical ventilators needed, this tool was designed to help municipalities/cities make the best use of their resources (Links Media, 2020).

#### 3.2.4.2 Quezon City epidemiology (reproductive rate of virus)

$R_0$ , or “R naught,” is a term used to describe a disease’s contagiousness to a population. It is a number that ranges from low to high and describes the rate or number of people who could be infected by a virus carrier. An  $R_0$  value greater than 1 indicates an active disease outbreak, while an  $R_0$  value less than 1 indicates a pending outbreak. Conditions: (a) no previous exposure to the disease; (b) no vaccination; and (c) no cure or vaccine available for the time being (Ramirez, 2020). Prevailing Computing for the  $R_0$  is not as simple as tracking down all possible contacts with an infected person (Delamater et al., 2019). It is influenced by the disease’s infection period, contact rate, and transmission mode (Ramirez, 2020).

Once interventions like individual testing and quarantine measures are in place, the transmission rate may be lower than  $R_0$ . In this case, the disease’s actual transmission rate,  $R_t$ , is important.  $R_t$  gives policymakers and decision-makers a realistic view of disease spread. The UP COVID-19 Pandemic Response Team uses this value to communicate

MAP 20.2 COVID attack rate from the Quezon City Disaster Risk Management Office.



information that may influence government plans and policies such as quarantines and social isolation.

Using time series modeling, this study predicted new COVID-19 cases in Quezon City for the next 30 days. In parallel studies, [Petropoulos and Makridakis \(2020\)](#) and [Elmousalami and Hassanien \(2020\)](#) used time series modeling to forecast new COVID-19 cases. Exponential smoothing uses a decreasing weight for past observations to forecast time series (linear trend).

The above results can be used in the decision matrix ([Table 20.3](#)) to declare Community Quarantine at the Municipal/City level.

## 4. Interpretation

### 4.1 Interpretation: from assortment and organization of guiding principles

Following are the interpretation of the related guiding principles that are considered in developing DRMF-COVID-19-P:

TABLE 20.3 Decision matrix for declaration of community quarantine at the municipal/city level.

Criteria	No community quarantine (NCQ)	General community quarantine (GCQ)	Enhanced community quarantine (ECQ)	Extreme enhanced community quarantine (EECQ)
Confirmed cases/ outbreak threshold ratio	<0.70	0.70–0.99	1–2	>2
Probability of outbreak	Less than 80%	80% to less than 90%	95% to less than 99%	99% or more
Case fatality ratio (CFR)	<0.1%	>0.1% to <1.0%	>1.0% to <2.0%	>2.0%

Adopted after Chinese Center for Disease Control and Prevention, (2020). The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) — China, 2020. <http://weekly.chinacdc.cn/fileCCDCW/journal/article/ccdcw/2020/8/PDF/COVID-19.pdf> [Retrieved April 05, 2021]; Cayton, P. J. (2020). Modified community quarantine beyond April 30: Analysis and recommendations. *Philippines: University of the Philippines*.

#### 4.1.1 The COVID-19 does not discriminate but its impact does

The elderly, women, day workers, the poor, people with disabilities, migrants and displaced populations, slum dwellers, and the homeless are among the most vulnerable groups that governments must identify and support (UNDRR, 2020).

#### 4.1.2 DRR embraces chronic and acute stresses

On the other hand, acute events can exacerbate chronic stresses. Acute shocks and pandemics are both exacerbated by deforestation (chronic stress) and economic or social deprivation (chronic stress) (Williams, 2020a,b).

#### 4.1.3 Risk perception knowledge dissemination regarding pandemic disaster

Lack of information can cause emotional stress, a risk factor for mental and cardiovascular diseases (Simonov, 1984). To address these issues, the media must provide accurate information about risk and how cities/countries can plan for early recovery. It usually involves working with City risk communication experts to develop and host a series of risk communication online webinars for professional communicators (both internal and external). It includes social media messages, opinion pieces, and guides for practitioners and decision-makers with accurate information. It also includes info-pandemic – rapid spread of correct information and messages among many people in a population. Basically, it is the effective, efficient, and economical dissemination of new information and messages worldwide (Eryomin, 2020).

Real-time access to information, advice, and opinions is critical to preventing, mitigating, and responding to potential emergencies. Diverse at-risk populations, including those with higher levels of vulnerability, require tailored public information activities that are coordinated among stakeholders to avoid conflicting information (WHO, 2019). This principle is embedded in the IU3R-AP 2020–30.

#### **4.1.4 Threat to one of us is threat to all**

A threat to one of us affects us all. We are only as strong as our weakest. Developed countries with more resources to respond to the outbreak must prioritize their own citizens' safety and well-being while also readying international assistance to low- and middle-income countries (UNDRR, 2020).

#### **4.1.5 The nature of risk systemic and crises are cascading**

This pandemic's cascading effects include socioeconomic abnormalities. The COVID-19 has had a major impact on the Philippine tourism industry. It contributed 1.5% to the Philippine GDP (in gross value added terms) in 2018. In 2019, Chinese tourists accounted for 22.0% (1.8 million arrivals) of total foreign arrivals, second only to Koreans (24.0% share; 2.0 million arrivals). Over one-fourth of total tourism receipts in 2018 came from Chinese tourists. Korea spent PHP126.6 billion. Due to COVID-19, the Philippine government imposed a travel ban on China and its administrative regions, as well as a partial ban on South Korea, significantly affecting tourism sector (National Development Authority, 2020). Consumer confidence fell due to health concerns and social distancing measures. This led to a fall in nonessential household consumption (Austria, 2020) by 5%–10%, hence the loss in gross value added and increased unemployment rate (National Development Authority, 2020). An integrated approach to risk management at the local, subnational, and national levels is required to design this action plan strategy.

#### **4.1.6 Cities must embrace "systems of systems"**

A city is a complex collection of interconnected systems, each with its own set of owners and stakeholders. Collaboration is required to achieve resilience within and across these systems (UNDRR, 2017). It addresses the wider issues and implications posed by the Coronavirus and other pandemics in the future. Both causal and related resources and data are interconnected. For this reason, resilience is a "team sport" – a multiorganizational endeavor. This principle guides the IU3R Action Plan 2020–2030 PPAs development. Fig. 20.5 shows a visual representation of "system of systems" (Williams, 2020a). Global systems like trade, travel, and finance are increasingly interconnected. If we are to defeat COVID-19, we must consider all levels of government, society, and the global community (UNDRR, 2020).

#### **4.1.7 Disaster risk reduction is a process with multiple timescale**

Disaster risk reduction is a multistage process. The scale of the disaster necessitates new ways of working and innovative partnerships to ensure interventions reach the community level where they will have the greatest impact. Unlike most disasters (like hurricanes or earthquakes), a pandemic may occur in waves, each lasting 6–12 weeks (Fig. 20.6). The first wave's worst week occurs around the fourth or fifth week after the pandemic begins in your area (USAID, 2010). The IU3R-AP 2020–30 took this guiding principle into account when determining the urgency of PPA implementation.

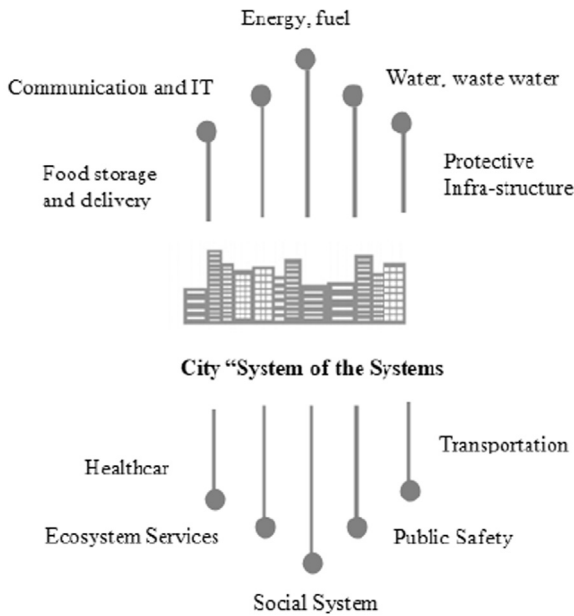


FIGURE 20.5 City system of the systems. Courtesy of UNDRR Office for Northeast Asia & Global Education and Training Institute (UNDRR ONEA & GETI). (2020). Prevention saves lives! COVID-19 key messages and communication campaign. UNDRR: COVID-19 Communication strategy (1 April 2020).

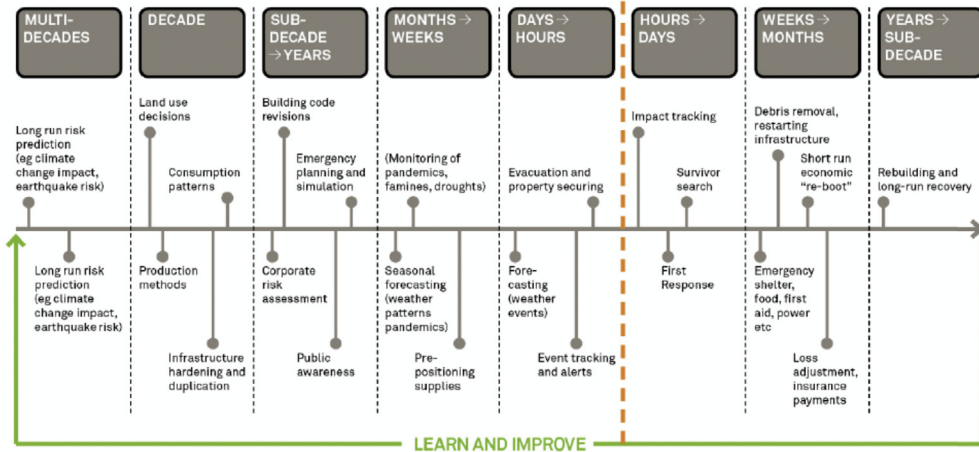


FIGURE 20.6 Timescale in dealing with various kinds of events, e.g., from multidecades to years to subdecades. From the UNDRR Office for Northeast Asia & Global Education and Training Institute (UNDRR ONEA & GETI). (2020). Prevention saves lives! COVID-19 key messages and communication campaign. UNDRR: COVID-19 Communication strategy (1 April 2020).



#### **4.1.8 We must learn what is working**

COVID-19 has created a huge opportunity. It makes us rethink our work, parenting, and even cultural practices. The time has come to reorient toward social, economic, and environmental sustainability.

In many ways, preparing for, responding to, and recovering from a pandemic is similar to preparing for, responding to, and recovering from an earthquake or hurricane (USAID, 2010).

#### **4.1.9 Social restrictions implemented during epidemics must strike a balance between cost and benefit**

Moving around is difficult for the most vulnerable communities, especially daily wage earners. Reduced tax revenues and budget repurposing may lead to reduced funding for vulnerable programs (ILO, 2017). COVID-19 health interventions must not detract from other critical health services, such as disability care or antenatal care.

Mobility issues may limit access to routine health care, further jeopardizing vulnerable groups' health. Aside from the obvious educational impact, school closures increase child safety risks and restrict access to school meals (UNICEF, 2020). Government and society can manage risk in ways that balance costs and benefits. Social stratifications are used to tailor health measures. While anyone can get cancer, only those over certain age or with certain conditions are advised to undergo screening or other interventions. Similar principles would allow for relaxation of restrictions while protecting all citizens (Asia-Pacific Center for Security Studies (APCSS), 2020).

#### **4.1.10 Include health emergencies as top priority alongside other natural and manmade disaster**

It is understandable that natural disasters get a lot of attention. These events are visible and affect over 100 million people annually, but the UN Office for Disaster Risk Reduction must also be ready to address public health emergencies like COVID-19. Now is the time to review national and local Sendai Framework for Disaster Risk Reduction strategies to ensure they prioritize biological hazards and resilient health systems (PreventionWeb News, 2020).

#### **4.1.11 Inclusive, people- and community-centered approach**

In the event of an emergency or disaster, the community's health, livelihood, and assets are at risk. They are often the first to respond to an emergency and are well placed to manage their own risks. Health Emergency Disaster Risk Management (EDRM) promotes accessible and nondiscriminatory participation. Women, children, people with disabilities, older people, migrants, refugees and displaced people, people with chronic diseases, and other subpopulations at higher risk are addressed (WHO, 2019).

#### **4.1.12 Humanitarian logistics and supply chain management**

Logistics is a business function that provides goods and services to customers based on their needs. It includes the coordination and integration of processes and activities across functional areas such as marketing, sales, production, R&D, finance, IT, and suppliers and customers on the supply network. Globally, Healthcare Logistics, Humanitarian Logistics, and Emergency Logistics are critical areas. In short, Healthcare Logistics refers to the

movement of people, products, equipment, and materials required by medical personnel. This can include drug distribution, pharmaceutical inventory management, patient transportation, surgical tool and equipment management, food distribution, medical staff scheduling, blood sample collection, and home health-care activities. Emergency and humanitarian logistics include all activities required to aid in humanitarian operations (Ramalhino, 2020). In previous epidemics, such as Ebola and H1N1, indirect health effects outnumbered direct health effects. During a pandemic response, resource diversion, supply chain disruptions, hospital closures, and shortages of health-care workers (due to deaths, illness, absenteeism, care responsibilities, or control measures) can overwhelm health systems. These restrictions may exacerbate existing resource disparities between urban, rural, and informal settlements. Movement restrictions, legal status concerns, and fear of disease transmission may also hinder access to health care (Lau et al., 2020).

#### ***4.1.13 The above issues are addressed in the framework QC-IU3R-AP. Addressing pandemic through urban planning***

The new coronavirus is sweeping across the globe. How might the virus influence our future urban planning? The pandemic has created a new wilderness outside our doors. Except for essential workers, most of us have shrunk our worlds to the size of our homes (Constable, 2020).

If we are indeed living in a pandemic era, how might we design future cities so that the outdoors remains safe and habitable? (Constable, 2020).

The pandemic's lesson emphasizes that new normal cities should incorporate these risks into early land use and development planning.

#### ***4.1.14 DRR and resilience planning should be incorporated in public health system application and planning (last number)***

As a result of excess mortality and morbidity, disasters create significant public health needs (Ying et al., 2017). Thus, DRR and PHS should be linked. For this reason, rather than mainstreaming DRR into PHS as usual, it is prudent to incorporate DRR and CCA measures into PHS. So, when developing the PPAs for the QC-IU3R-AP 2020–30, this guiding principle is well considered.

## **4.2 Interpretation: from tools to assess COVID-19 spread and health system capacity**

In addition to the Stage I interpretation regarding the guiding principles, within the Stage II, tools that can be part to assess COVID-19 Spread and Health System Capacity were interpreted in terms of their relevancy in developing the action plan. It is done by including City Public Health Addendum; Existing City Public Health System; Disaster Resilience Scorecard for Cities; and Existing Response, Recovery, and Rehabilitation related PPAs, as an integral part of the DRMF-COVID-19-P.

## 5. Output: Quezon City disaster management framework for COVID-19 pandemic

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The above guiding principles are very well considered in developing this framework consists of six phases (Fig. 20.7), each with interrelated activities that must be completed by the personnel conducting the Local Resilience Assessment. The first three phases are constrained to a 1-month time frame. It comprises solid lines whereas the dotted lines activities are start from phase 4 onward and are under the jurisdiction of the Quezon City Government (QCG). It is to be noted that the DRMF-COVID-19-P requires knowledge of localized risk, vulnerability, and response to previous disasters. The following is a brief description of how to achieve a pandemic resilient city.

### 5.1 Phase 1

To fully implement the framework, a thorough understanding of the COVID-19 pandemic in relation to Health Emergencies and Disaster Risk Management Framework; City Existing Response, Recovery and Rehabilitation PPAs; City Public Addendum and Existing City Health System; and Disaster Resilience Scorecard for Cities is required in this phase.

#### 5.1.1 COVID-19 pandemic

Coronavirus disease (COVID-19) is an emerging coronavirus infection. The COVID-19 is spread by saliva or nasal discharge when an infected person coughs or sneezes. COVID-19 was first identified in late 2019 in Wuhan, China. After 4 months, the virus had infected 1.4 million people, killing over 75,000 people. While the pandemic affects everyone, certain groups are hit harder than others (WHO, 2020).

#### 5.1.2 City public health addendum and existing city public health system

The methodology for generating information for this Framework activity is discussed in Section 3.2.2. The results of this activity are shown in Section 4.1.2.

#### 5.1.3 Disaster resilient scorecard for cities

This activity's methodology and results are described in Sections 3.2.1 and 4.1.1.

#### 5.1.4 Health emergency and disaster risk management framework

The Quezon City Disaster Risk Reduction Management Plan (QC-DRRMP) 2014–20 is examined for public health system integration (QC-DRRMP). During the participatory process, it was discovered that the QC-DRRM Framework lacks a COVID-19 Pandemic related elements that could have been translated into objectives, strategies, programs, projects, and activities. These data are used to identify PPAs to fill the gap.

#### 5.1.5 City existing response, recovery, and rehabilitation programs, projects, and activities

We looked at the QC-DRRMP 2014–20, the guiding principles that led to creation of the DRRM Act 10121, and the NDRRMF, with its thematic areas (prevention and mitigation,

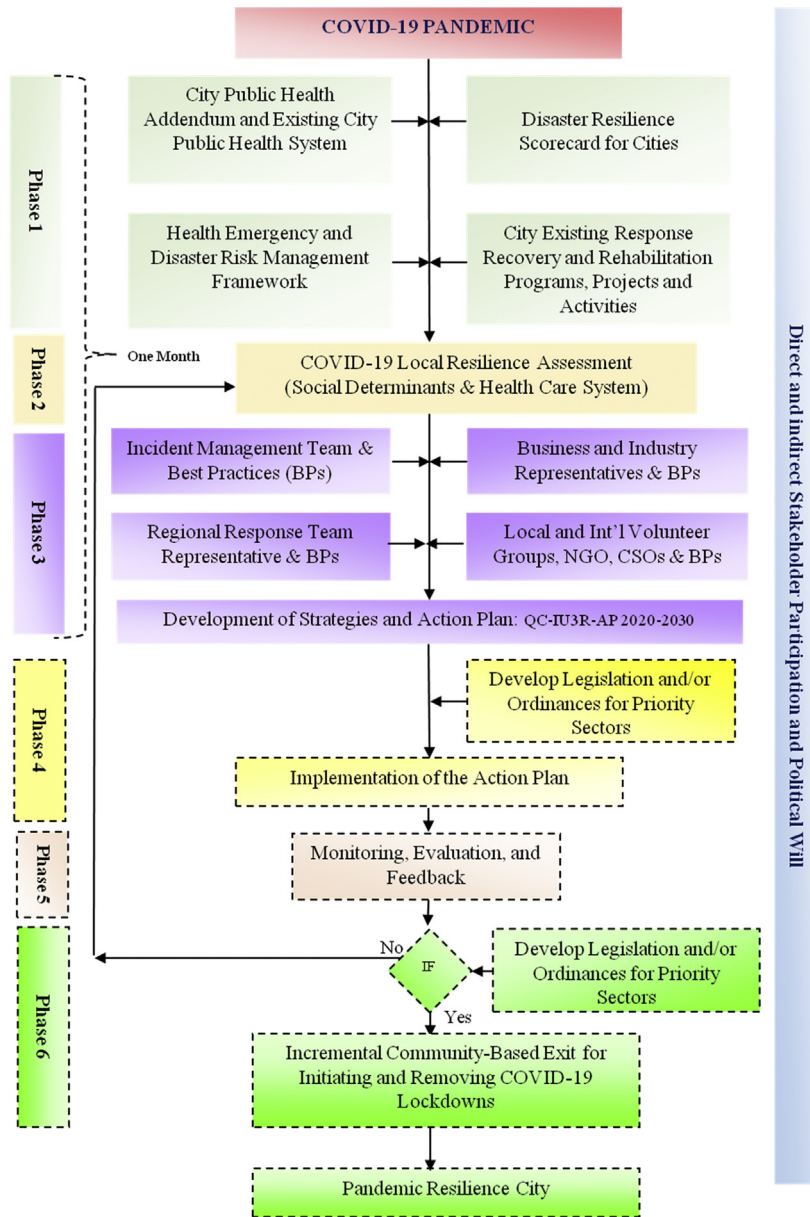


FIGURE 20.7 Quezon City disaster management framework for COVID-19 pandemic.

preparedness, response, and rehabilitation and recovery). The COVID-19 pandemic response recovery and rehabilitation action plan is identified. The available PPAs do not cover pandemic related solutions. Thus, such measures are considered in the QC-IU3R-AP 2020–2030 PPAs.

## 5.2 Phase 2

Phase 2 assesses the local COVID-19 Pandemic through items (Sections 5.1.1–5.1.5) of Phase 1. Thus, compiled assessment becomes Phase 2 input.

## 5.3 Phase 3

This phase includes direct and indirect stakeholder consultation, ordinances, meetings, and workshops. The mission and vision of this action plan are based on best practices and inputs from the Quezon City Incident Management Team, business industry, regional team, and local and international volunteers. This translates into COVID-19 Pandemic Response, Recovery, and Rehabilitation PPAs. This led to the QC-IU3R-AP 2020–2030.

## 5.4 Phase 4

This phase refers to the QC-IU3R-AP 2020–30. It outlines the framework for strengthening and promoting interoffice links, as well as existing institutional structures and mechanisms of the QC-DRRMO, the City, and other line agencies. Priority PPAs are also implemented with immediate-, short-, medium-, and long-term strategies.

Resources, institutional structures, and procedures are required to implement the QC-IU3R-AP. Other than the recommended Response, Recovery, and Rehabilitation PPAs, several other measures and instruments are required to implement the said Action Plan. Implementing the QC-IU3R-AP requires detailed work systems and institutional mechanisms. It is impossible without direct and indirect stakeholder partnerships and the political will of the City Government (Quezon City Government, 2017).

## 5.5 Phase 5

The QC-DRRMO oversees the monitoring, evaluation, reporting, and transmission of feedback. They are in charge of coordinating COVID-19 Pandemic Response, Recovery, and Rehabilitation PPAs.

M&E is an important part of the QC-IU3R-AP 2020–30 because it focuses on efficiency, effectiveness, and impact. Aside from the QC-DRRMO, strategies and plans are still being developed (Quezon City Government, 2017).

## 5.6 Phase 6

To implement the SL in promoting economic restoration and continuity of public and private functions in the new normal, this phase defines the mechanism of developing legislation for priority sectors. It also includes declaring Incremental Community–Based Exit and

initiating the transition from ECQ to GCQ and finally to NCQ. For this, the City Mayor must have his political will backed by proper SOPs, Ordinances, and Laws. Indeed, proper implementation of PPAs and SOPs toward NCQ transition will ensure Pandemic resilient Quezon City.

Following results are generated by operationalizing DRMF-COVID-19-P on Quezon City as pilot in crafting QC-IU3R-AP 2020–30.

## **6. Application of QC DRMF-COVID-19-P**

### **6.1 COVID-19 local resilience assessment (social determinants and health-care system)**

Data were systematically gathered, tabulated, and analyzed using Microsoft Excel, Public Disaster Resilience Scorecard for Cities (Detailed Assessment) calculator/MCR Scorecard Average Excel tool, Health System Resilience – Addendum, Calculator B: Rare/Novel Influenza Event Detection tool, and finally interpreted to achieve the objectives of this research.

#### **6.1.1 Disaster resilience scorecard for Quezon City**

This assessment was conducted by the Quezon City Team in 2018 and the overall score for the assessment was 114 out of 141, each scored 0–3 (preliminary version). That is the total of the score gained for 10 essentials, i.e., Essential 1: Organize for Resilience, Essential 2: Identify, Understand and Use Current and Future Risk Scenario, Essential 3: Strengthen Financial Capacity for Resilience, Essential 4: Pursue Resilient Urban Development, Essential 5: Safeguard Natural Buffers to Enhance the Protective Functions Offered by Natural Ecosystem, Essential 6: Strengthen Institutional Capacity for Resilience, Essential 7: Understanding and Strengthening Societal Capacity for Resilience, Essential 8: Increase Infrastructure Resilience, Essential 9: Ensure Effective Disaster, Response 10: Expedite Recovery and Build Back Better. [Fig. 20.8](#) shows deficiencies in identifying, understanding, and using current and future risk scenarios; pursuing resilient urban development; and recovering and building back better.

#### **6.1.2 Disaster resilience scorecard for cities: public health system resilience - addendum**

The assessment of Public Health Resilience was conducted twice: one by the expert experience and the other through a participatory process during the Incident Management Team meetings on April 24, 2020.

[Fig. 20.9](#) shows the resilience of each health essential by indicative measurable scale from 0 to 5. Where 0 means no consideration of pandemic at all and 5 means the public health emergencies and clusters are fully included by the city either as risk scenario, or as a component of a composite scenario. Annex A ([Table 20.12](#)) shows selective parts of the Disaster Resilience Scorecard for Public Health related to lockdown assessment.

Further, the Public Health System Resilience - Addendum was first used in April 2020 to analyze the prevailing status of the Quezon City Government to determine the areas that need improvements. [Fig. 20.10](#) shows overall score of the assessment. The difference



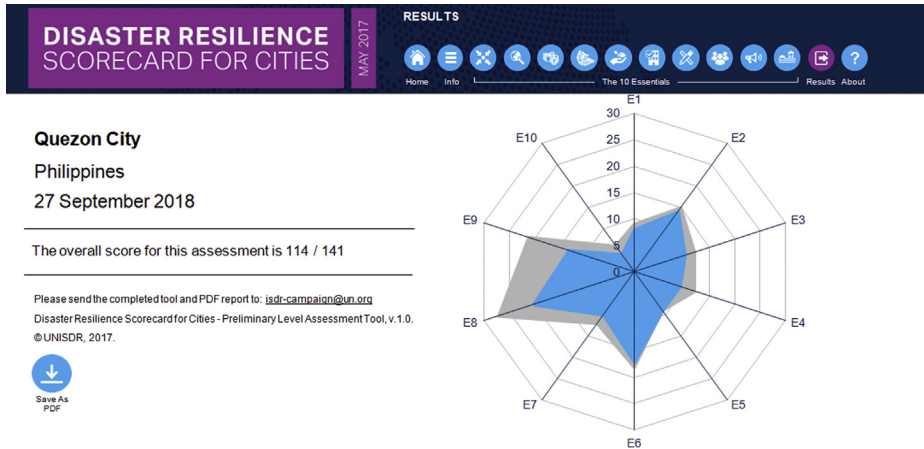


FIGURE 20.8 Disaster resilience preliminary assessment for cities.

**Public Health System Resilience - Addendum Assessment**

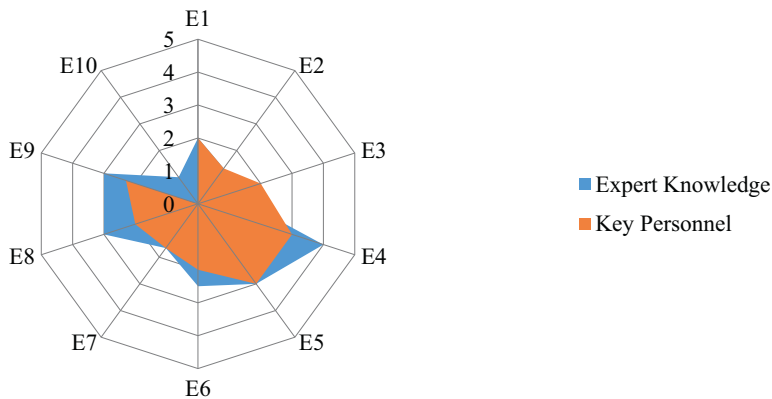


FIGURE 20.9 Detailed assessment of public health resilience of city.

between the purple and gray shade shows the area that need to be improved to create the resilient city. It means to strengthen and integrate coverage of the many aspects of public health issues and its consequences. It is in line with the United Nations’ Disaster Resilience Scorecard for Cities.

Second time the Public Health System Resilience - Addendum was used for QCG assessment on September 16, 2021. Fig. 20.11 shows the total score has improved by 10 points only.

Indeed, it does not show much change in the disaster resilience scorecard for cities. It is most probably due to the reason that viruses are constantly changing through mutation giving rise to new variants of viruses. There are times when new variants emerge and disappear having minimal impact on lives and global economy. However, there are other times when these new variants persist, affecting normal life and economy.

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The overall score for this assessment is 60 / 115

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Please send the completed tool and PDF report to: [mcr2030-global@un.org](mailto:mcr2030-global@un.org)  
 Disaster Resilience Scorecard for Cities: Public Health System Resilience Addendum  
 Tool, Consultative Version 2.0  
 © UNDRR, 2020.

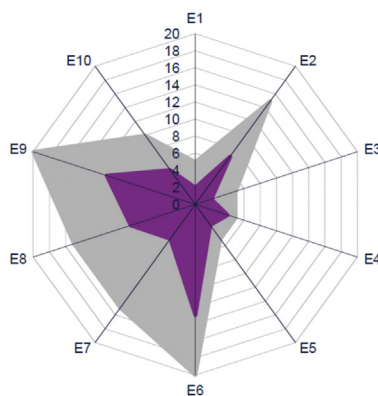


FIGURE 20.10 Overall assessment is shown by 10 essentials.

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The overall score for this assessment is 70 / 115

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Please send the completed tool and PDF report to: [mcr2030-global@un.org](mailto:mcr2030-global@un.org)  
 Disaster Resilience Scorecard for Cities: Public Health System Resilience Addendum  
 Tool, Consultative Version 2.0  
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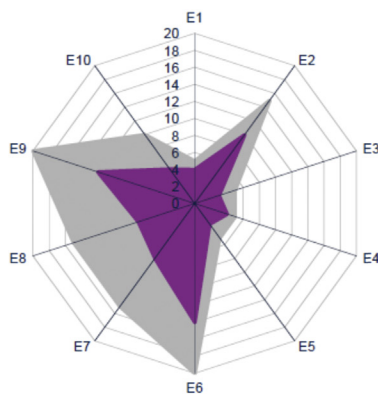


FIGURE 20.11 The overall assessment of QCG done on September 16, 2021.

### 6.1.3 Population-based age-stratified seroepidemiological investigation protocol for COVID-19 virus infection

Calculator B, the Rare/Novel Influenza Event Detection tool, is shown in Fig. 20.12. This tool calculates the COVID-19 rapid sample size per batch for 142 barangays (PHL).

The public health laboratory must test 2071 people to be 95% confident of detecting 1 or more COVID-19 cases where the prevalence rate in the Barangay is less than 0.1429% (1/700). The lab should detect a COVID-19 case when the prevalence rises to 1 in every 700 cases. On April 16, 2020, 1 in 6000 will have it. Tandang Sora, Quezon City (16 confirmed cases) (90,290). Even if the sample size was increased to 2,945, the probability of finding COVID-19 would be 95%, Detection Threshold = 0.1% (1/1000).

When determining how many people in an age cluster should be tested, stratified sampling is best used. According to WHO data, people aged 50 and older are the most susceptible to infection. This age group makes up around 15% of Quezon City's population. That means 331 people from this age group should be tested. Table 20.4 shows the sample size for Barangay Tandang Sora by age.

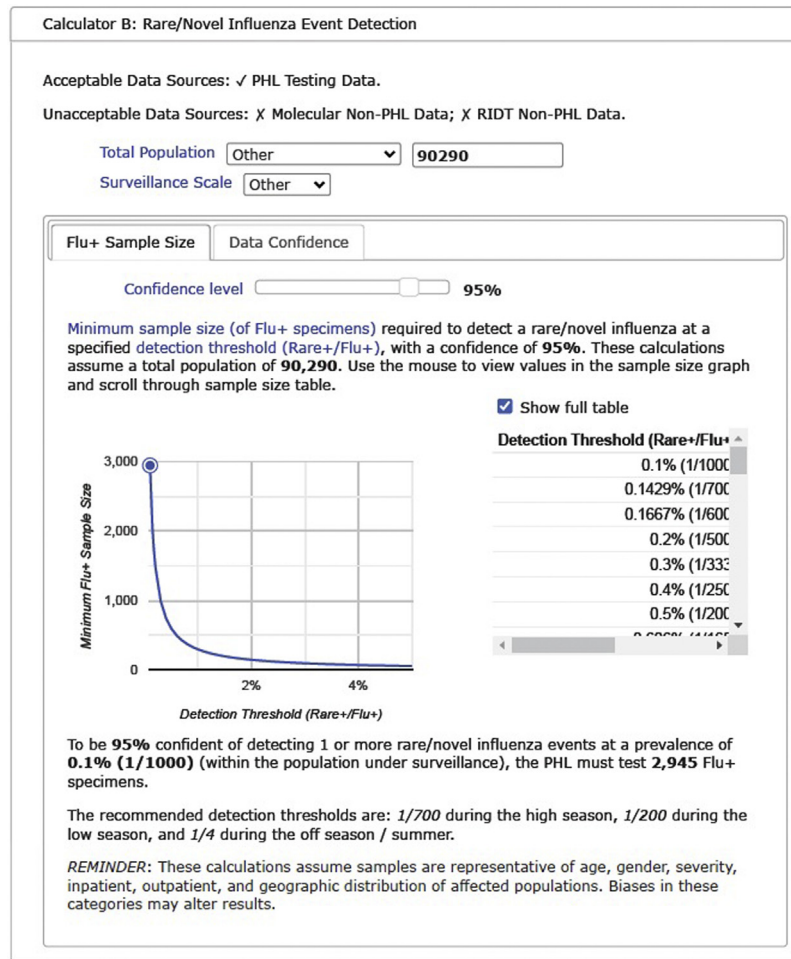


FIGURE 20.12 Calculator B: rare/novel influenza event detection tool.

There is a need to repeat cross-sectional research in the same area (but not necessarily the same individuals each time). The best solution is mass testing. That is, until all 90,290 people in the Barangay have been tested and the COVID-19 positive cases are isolated. For COVID-19 testing, the determined sample size (2071) can be repeated (Fig. 20.12). After 13 repetitions, the output can be easily analyzed to see if the cases are decreasing in number. The number of sample batch testing reiterations is also based on the Barangay population compared to the City population. The priority given to Barangay (Raza, Liwag, et al., 2020) for COVID-19 testing is based on their population density and mobility.

In all QC Barangays, the number of COVID-19 tests per day should be based on the COVID-19 attack rate.

TABLE 20.4 Distribution of samples for COVID-19 testing by age bracket.

Age range	%	Sample size
0–9 years	18	373
10–19 years	19	393
20–29 years	20	414
30–39 years	15	311
40–49 years	12	249
50–59 years	9	186
60–69 years	4	83
70–79 years	2	41
80+ years	1	21
Total sample size	100	2071

Response, rehabilitation, and economic sustainability (RRES) cluster of Quezon city response clusters under the Quezon city disaster risk reduction and management council (QCDRRMC). (2020).

#### 6.1.4 Quezon City epidemiology (reproductive rate of virus)

Because the event is assumed to be linear, a time series model is used to forecast a straight-line trend. This is only useful for forecasting. The data suggest that for a short period like 30 days, the average number of cases will not change.

Because of this, the predicted new cases for Quezon City in the next 30 days, from April 26 to May 26, 2020, would be no more than 20 per day, as shown in Fig. 20.13. Notably, the lines may point upward, downward, or in a plateau-like direction. The line's plateau-like shape indicates that the average forecasted cases have been controlled.

The analysis used nonlinear regression to find the doubling of cases suggested by the DOH data. Although the model does not fit well ( $R^2 = 0.015 = 15\%$ ), other data for this test may be useful. With a growth parameter of 1.0007 Rt, the model predicts that new cases double every 990.5 days. If reproduction slows, one new case may appear in 495 days (no more doubling).

If we look at the overall graph (Fig. 20.13), Quezon City appears to have contained the virus's spread for the next 30 days. The fact that the number of new cases will not exceed 20 per day does not contradict the findings of the University of the Philippines COVID-19 Pandemic Response Team that the National Capital Region (NCR) is flattening the pandemic curve. The Rt for Quezon City falls somewhere between 0.5 and 1, as shown by the Epidemiology at City Level Dashboard (University of the Philippines, 2020) in Fig. 20.14. Using Rt helps governments decide what to do in pandemic situations. Essentially, researchers used various Models to calculate Rt. Thus, it is currently uncertain which model is best suited for the Philippines. If the actual virus case reproduction rate increases, an outbreak is imminent, otherwise the Pandemic is nearing its end. It's about to become an endemic like the flu and colds.

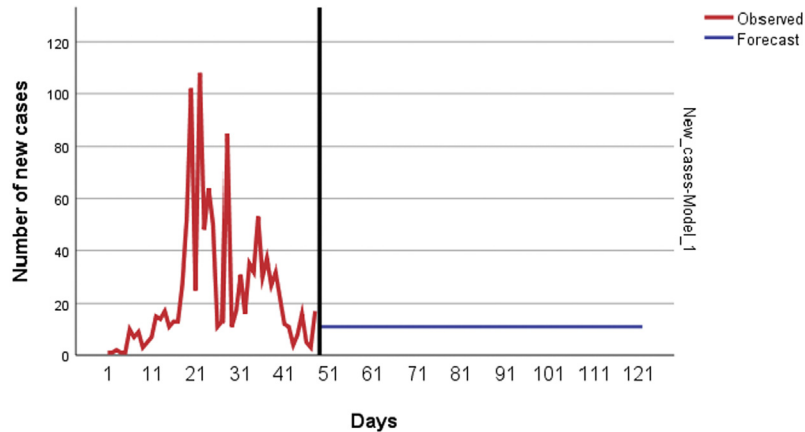


FIGURE 20.13 Exponential smoothing chart for predicting new cases in the next 30 days since data were last gathered, April 26, 2020.

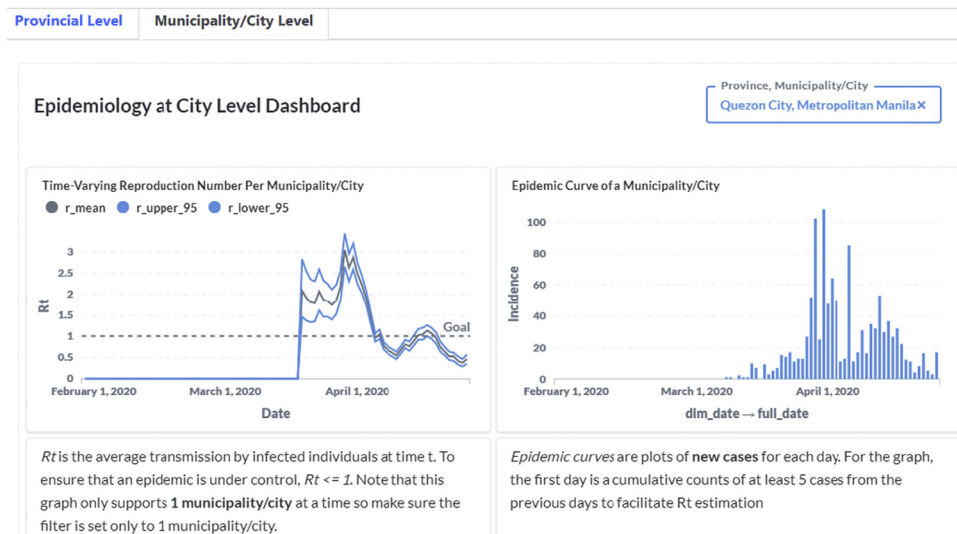


FIGURE 20.14 Epidemiology at the city level dashboard screen shot showing Quezon City epidemic curve. From the University of the Philippines, Diliman (UP-D). (2020). COVID-19 Pandemic Response Team's Policy Note No. 2; methodology developed by Dr. Peter Julian Cayton to estimate probability of outbreak in a given area. [https://endcov.ph/epidemic\\_curves](https://endcov.ph/epidemic_curves) [Retrieved April 27, 2020].

However, misinterpretation may cause more issues than solutions. It is important to note that a  $R_t$  value of 0.5 or less does not necessarily mean the epidemic has died down. A COVID infection wave far deadlier than the first would result, if no vaccine has been delivered, lower  $R_t$  values or not, the pandemic still poses a deadly threat to the general population.

Primarily, these findings must be interpreted with caution. It is risky to declare the pandemic over. These models do not provide certainty. Until a treatment and vaccine for COVID-19 are available, the government should continue to implement the previously mentioned interventions. The IU3R-AP takes into account the virus reproduction rate in Quezon City.

The IATF decision matrix (Fig. 20.15) should also be used to support LGU decisions to declare the transition from ECQ to GCQ and then to NCQ.

### 6.1.5 Interpretation and conclusion

Several countries have taken preventive and control measures against COVID-19. However, responses are heavily influenced by each country's economic and social capital. The Quezon City DRRMO team developed a DRMF-COVID-19-P consisting of six phases: the City Public Health Addendum; the Health Emergency and Disaster Risk Management Framework; and existing city response recovery and rehabilitation programs were used to generate Phase I information for QC-COVID-19-P Scenario. These data were used to update City objectives and strategies for the COVID-19 Pandemic. These outputs are used to develop the mission and vision, objectives, and strategies for COVID-19 Pandemic Response, Recovery, and Rehabilitation. The QC-IU3R-AP provides additional recommendations:

Preserve natural buffers to enhance the protective functions offered by natural capital. Expedite recovery and rebuild better. Second, the City Disaster Resilience Scorecard: The QC-DRRMP 2014–20 did not adequately consider all 10 essentials related to public health emergencies, e.g., COVID-19 Pandemic, either as risk scenarios or as components of a composite scenario during hazard assessment in developing the City Plans. For COVID-

**IATF Decision on ECQ and GCQ based on risk of outbreak**

**LGU ECQ recommendation**

- 1 **Acceleration - ECQ** extended by 2 weeks.
- 2 **Deceleration and initiation** - GCQ following age, health, and sector restrictions.
- 3 **Recognition and preparation - GCQ** following age, health, and sector restrictions, and if no deterioration in 2 weeks, relax GCQ.

LGU EPIDEMIC RESPONSE FRAMEWORK		Critical care utilization rate		
		<30%	30-70%	>70%
Case doubling time	>30 days	Recognition	Initiation	Acceleration
		Preparation		
	7 to 30 days	Initiation	Deceleration	Acceleration
	<7 days	Acceleration	Acceleration	Acceleration

FIGURE 20.15 IATF matrix for making decision on ECQ and GCQ based on risk of outbreak. From the Inter-Agency Task Force (IATF). (2020). How the gov't decided which areas fall under ECQ, GCQ [https://www.youtube.com/watch?v=vBn\\_Zd-F\\_jU](https://www.youtube.com/watch?v=vBn_Zd-F_jU) [Retrieved, April 30, 2020].



19, the Public Health Laboratory (PHL) uses the Population-based Age-stratified Seroepidemiological Investigation Protocol for COVID-19 Virus Infection. To determine the trend of the COVID-19 Pandemic spread, rapid sampling batch size by barangays with number of iterations is possible. For the case fatality ratio, the Pandemic Impact Projections Tool is used. A study by David, Rye, and Agbulos found that the above tool/model is only a rough approximation of projections. Models should always agree with data. This means we need to keep an eye on the pandemic to ensure the model's predictions are met. Without testing, there may be asymptomatic and mildly symptomatic cases. Studies in China and South Korea suggest that up to 30% of patients are asymptomatic. Thus, mass testing and tracking are required. It will aid in locating asymptomatic cases for quarantine. The lag in reporting and identifying cases also impacts the tool/model. We can't know how many people will get sick or die in your city/municipality from the Pandemic Health IPT. No one can accurately predict the impact because understanding a new virus takes time, and viruses can change during a pandemic. The tool simply calculates expectations, which may change as new information becomes available. A time series model that forecasts a straight-line trend is used to calculate the Quezon City Epidemiology (Virus Reproductive Rate). This is only useful for forecasting. The data suggest that for a short period like 30 days, the average number of cases will not change. Because of this, the predicted new cases for Quezon City in the next 30 days, from April 26 to May 26, 2020, will be no more than 20 per day, as shown in Fig. 20.13. Notably, the lines may point upward, downward, or in a plateau-like direction. The line's plateau-like shape indicates that the average forecasted cases have been controlled. If we look at the overall graph (Fig. 20.13), Quezon City appears to have contained the virus's spread for the next 30 days. The fact that the number of new cases will not exceed 20 per day does not contradict the findings of the University of the Philippines COVID-19 Pandemic Response Team that the NCR is flattening the pandemic curve. The  $R_t$  for Quezon City falls somewhere between 0.5 and 1, as shown by the Epidemiology at City Level Dashboard (University of the Philippines, 2020) in Fig. 20.10. Using  $R_t$  helps governments decide what to do in pandemic situations. Essentially, researchers used various Models to calculate  $R_t$ . Thus, it is currently uncertain which model is best suited for the Philippines. But if the  $R_t$  increases, it means an outbreak is underway. If the  $R_t$  drops, the Pandemic is dying. Like the flu and colds, plateau-like lines or constants indicate an endemic. The IATF decision matrix (Fig. 20.15) should also be used to support LGU decisions to declare the transition from ECQ to GCQ and finally to NCQ.

## 7. Outcome: inclusive unified response, recovery, and rehabilitation action plan 2020–30

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In the presence of Incident Management Team, Business and Industry Representatives, Regional Response Team Representatives, and local and international volunteer groups in terms of a strategic meeting session in the QC-DRRMO strategic room, the following activities were performed in developing the QC-IU3R-AP 2020–30.

## 7.1 Inclusive unified response, recovery and rehabilitation action plan (IU3R-AP) 2020–30 vision mission and objectives

To efficiently and effectively achieve full social, economic, and cultural recovery even in times of a new normal, it is significant that apart from the ongoing efforts to contain this pandemic, it is warranting to primarily deep dive into response, recovery, and rehabilitation action plan – recognizing and responding to COVID-19 pandemic impacts, such as fear, recession, job losses, and increased poverty and poor living conditions, in a timely and efficient manner especially in postpandemic situation. Thus, after considering the full spectrum of COVID-19 Local Resilience Assessment including 14 Guiding principles, social determinants, and PHS, the QC Incident Management Team came up with the vision and mission of IU3R-AP as follows.

### 7.1.1 Vision and mission

The vision and mission of the IU3R-AP is anchored on QC Disaster Risk Reduction Management Plan 2014–2020, legal provisions of the RA 10121, and National Disaster Risk Reduction Management Plan (NDRRMP) 2011–28.

#### 7.1.1.1 Vision

To maximize the Quezon City’s ability of reducing risk including health emergencies alongside other natural and manmade disasters by adopting inclusive measures for all, especially marginalized groups with an empowered and responsive citizenry who live in a sustainable, well planned, and structurally sound environment with a vibrant economy under progressive leadership.

#### 7.1.1.2 Mission

Manage the four stages of National Disaster Risk Reduction and Management Plan (NDRRMP) at local level. It has to be done by adopting various techniques in disaster risk reduction for health emergencies alongside other natural and manmade disasters at all levels of City planning; enhance institutional capacities, and human and material resources for minimizing losses to human life, properties, livelihood, infrastructure, and environment for safer, adaptive, and disaster resilient Filipino communities toward sustainable development.

To accomplish the above vision and mission of IU3R-AP 2020–30, the mission has been dissected into possible achievable objectives ([Table 20.5](#)). It was done through a participatory process where the direct and indirect stakeholders were consulted to formulate the said objectives. The following objectives represent COVID-19 Pandemic Local Resilience Assessment output using secondary data and real-time pandemic impact situation and institutional and personal coping capacities based on Disaster Resilience Scorecard for Cities including public health items assessment output.

The objectives in [Table 20.5](#) were crafted by the QC Incident Management Team (QC-IMT) during Strategic Planning Session. It was done in accomplishing the vision and mission of the IU3R-AP 2020–30.

TABLE 20.5 Pandemic threat management priorities and objectives.

Hazards threat	Management priorities	Objectives
COVID-19 Pandemic	Response, recovery, and rehabilitation	<ol style="list-style-type: none"> <li>1. To ensure the safety of responders and general public and prevent panic by systematically integrating expert knowledge and lessons learned from past disasters into response, recovery, and rehabilitation planning.</li> <li>2. To limit spread of COVID-19 and enhance the extent of gathering information about lives lost, person under monitoring (PUM), person under investigation (PUI), confirmed cases, and lockdown of businesses and its impact on city economy.</li> <li>3. To assess the resources and restore livelihood and economic productivity of the city, e.g., Service, industry, MSMEs, agriculture sectors, etc.</li> <li>4. Integrate disaster risk reduction and climate change adaptation (CCA) in public health system.</li> <li>5. To ensure proper medical waste management and management of dead bodies.</li> <li>6. To maintain the continuity of operations of public and private sectors activities and robust the public–private partnership for COVID-19 interventions.</li> </ol>

## 7.2 Development of inclusive unified response, recovery and rehabilitation action plan (IU3R-AP) 2020–30

The output of the strategic planning meetings, daily operation briefings regarding incident Action Plan, and lessons learnt from local and international practices revealed the way forward through the development of IU3R-AP 2020–2030. Further, the relevant data were collected by examining Disaster Resilience Scorecard for Cities, Business and Industry good practices, Existing Public Health System Contingency plan, City Public Health Addendum, and best practices from other countries. The data were then processed to generate information for formulating the vision and mission. Indeed, the Mission is dissected in terms of specific objectives that are provided with corresponding strategies to define and implement Programs Projects and Activities (PPAs) in achieving the said objectives. The IU3R-AP 2020–30 is comprised of a total of 11 comprehensive PPAs.

### 7.2.1 Functional organizational structure for COVID-19 pandemic management

Fig. 20.16 shows the interrelated flow of each department and offices for COVID-19 Pandemic Response Recovery and Rehabilitation.

### 7.2.2 Criteria for prioritizing programs, projects, and activities

Table 20.6 forms the implementation criteria in prioritizing the PPAs for IU3R-AP 2020–30.

## 7.3 Recommendation in terms of IU3R-AP 2020–30

To highlight the COVID-19 pandemic impact and to provide the interventions for IU3R-AP 2020–30, the action plan is constituted of six comprehensive objectives toward Response, Recovery and Rehabilitation during health emergencies. In this way, it also covers the totality of mainstreaming of DRM and CCA in the Public health system as articulated in National

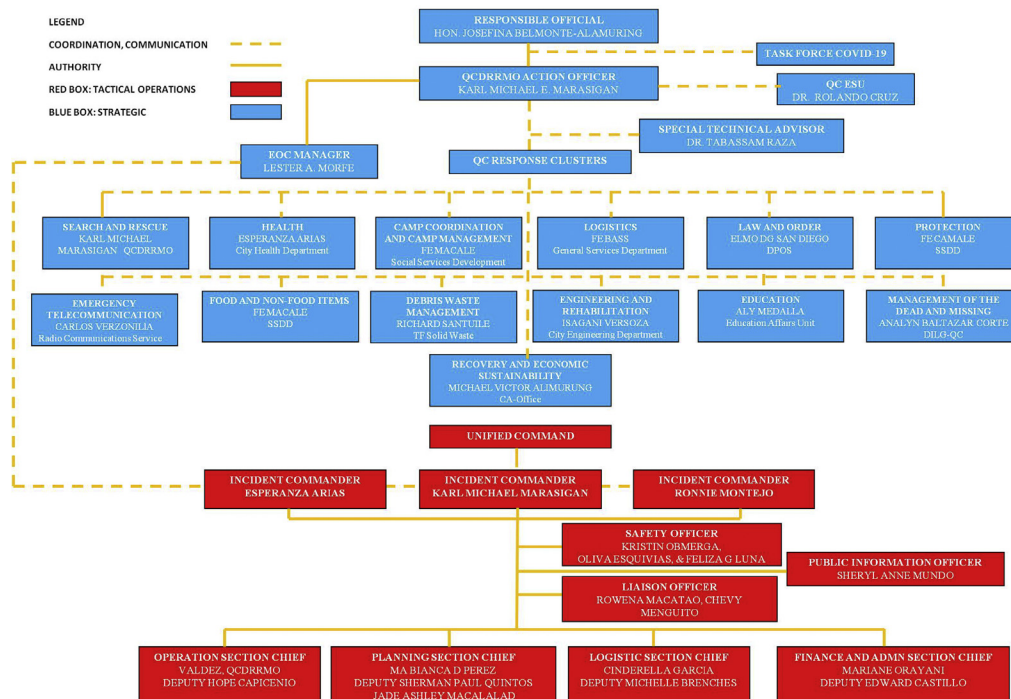


FIGURE 20.16 Response, recovery and rehabilitation organizational structure.

TABLE 20.6 Criteria for prioritizing the programs, projects, and activities (PPAs).

Criteria for prioritizing projects	Time frame	Description
Immediate term	Daily basis to less than 1 year	These are classified as critical projects that must be implemented immediately. Mainstreaming of DRM and CCA in public health system advancement is impossible without implementing these PPAs.
Short term	1–2 years	These are classified as important projects that must be done and implemented within 1–2 years to create the foundation and infrastructure for DRR and CCA, which shall address the significant vulnerability.
Medium term	2–3 years	These are classified as relevant projects that should be done and implemented in the next 2–3 years to improve DRM and CCA in the medium term even with the limitation of resources.
Long term	4 years above	These are classified as relevant projects that should be done and implemented in more than 4 years onward to improve DRM and CCA in the long term.

DRM Act 10121. The PPAs are aligned with development sectors initially covering Social Services, Infrastructure, Livelihood and Business Development, Agriculture and Organization Development in accomplishing mission and vision of this plan as shown from Tables 20.7–20.11.

II. Capacity and response of local government

TABLE 20.7 Response, recovery, and rehabilitation objectives with corresponding strategies, PPAs, indicative budget, and priority criteria for implementation.

Response, recovery and rehabilitation action plan 2020–30 (objectives 1 with corresponding PPAs toward social services, infrastructure, environment, and organization development)							
Hazard threat for (1)	Elements at risk to hazard threat that impact development planning (2)	Goal/objective (3)	Strategy (4)	Programs, projects, and activities (PPAs) options (5)	Office/ department responsible (6)	Indicative budget in PHP (7)	Priority criteria/ time frame (8)
• Pandemic	<ul style="list-style-type: none"> <li>• Human life/capital               <ul style="list-style-type: none"> <li>• Health workers</li> <li>• DRM front liners</li> <li>• Other labors, technicians and professionals</li> </ul> </li> <li>• Economic sectors A, B, C, and D (source of livelihood)               <ul style="list-style-type: none"> <li>• Transportation service/ manufacturing/ industry and SME sectors, etc.)</li> <li>• Agriculture</li> </ul> </li> <li>• Critical facilities operations (hospital and related facilities, schools, churches, mosques and other religious buildings, and government institutions)</li> </ul>	1. To ensure the safety of responders and general public and prevent panic by systematically integrating expert knowledge and lesson learned from past disasters into response, recovery and rehabilitation planning	<ol style="list-style-type: none"> <li>1. Enhance COVID-19 polymerase chain reaction (PCR)-based testing, tracking, tracing and quarantine (enhanced community quarantine ECQ) initially for most vulnerable barangays and prevent panic</li> <li>2. Building back safer and stronger environment</li> </ol>	<ol style="list-style-type: none"> <li>1. Enhance the capacity of COVID-19 PCR-based rapid testing per day with batch size determined for each barangay. Set a target for barangays primarily for barangays that are most vulnerable               <ol style="list-style-type: none"> <li>1.1. Do need assessment and install extra fixed testing booths and drive-through testing to meet the set target</li> <li>1.2. Rapid training of health workers to be assigned at these booths (for swabbing samples)</li> </ol> </li> <li>2. Develop a 360-degree communication campaign: “Prevention saves lives”; it can be done by understanding non-pharmaceutical interventions (NPIs), e.g., social distancing,</li> </ol>	CPDO, CHD, department of building official, engineering department, general services department, QC DRRMO, 142 barangays, and TF-SWM	Discretion of the mayor and finance committee	Immediate and short term (i.e., April 18 to May 18, 2020)
					PAISD, 142 barangays, RCS, CHD, QC-DRRMO, CPDO	Discretion of the mayor and finance committee	Immediate and short term (i.e., April 18 to July 2021)

- Basic services facilities maintenance (water, electricity, gas supply, communication, sanitation, sewerage, etc.)

closures of schools, etc., to prevent the spread of COVID-19 including second wave

- 2.1. Produce content (movies) on how city government is preparing to face the pandemic, and what support they need
- 2.2. Training and host a series on how to talk about risk to build City media capacity to talk accurately about risk and how to prevent it

3. Engage experts to develop QC hotline digital communication expert system (SES)
  - 3.1. Develop mobile application for early warning system including hotline for emergency call services

ITDD, RCS, QC-DRRMO-EOC

Discretion of the mayor and finance committee

Immediate and short term (i.e., April 18 to July 2021)



TABLE 20.8 Response, recovery and rehabilitation objectives with corresponding strategies, PPAs, indicative budget, and priority criteria for implementation.

Response, recovery and rehabilitation action plan 2020–30 (objectives 2 with corresponding PPAs toward social services, infrastructure, and organization development)							
Hazard threat (1)	Elements at risk to hazard threat that impact development planning (2)	Goal/objective (3)	Strategy (4)	Programs, projects, and activities (PPAs) options (5)	Office/department responsible (6)	Indicative budget in PHP (7)	Priority criteria/time frame (8)
• Pandemic	<ul style="list-style-type: none"> <li>• Human life/capital               <ul style="list-style-type: none"> <li>• Health workers</li> <li>• DRM front liners</li> <li>• Other labors, technicians, and professionals</li> </ul> </li> <li>• Economic sectors A, B, C, and D (source of livelihood)               <ul style="list-style-type: none"> <li>• Transportation service/ manufacturing/ industry and SME sectors, etc.</li> <li>• Agriculture</li> </ul> </li> <li>• Critical facilities operations (hospital and related facilities, schools, churches, mosques and other religious buildings, and government institutions)</li> </ul>	2. To limit spread of COVID-19 and enhance the extent of gathering information about lives lost, PUM, PUI, confirmed cases, and lockdown of businesses and its impact on city economy	1. Augment the understanding of pandemic periodic status on timescale basis. It is to protect especially poor families and recovery of economic growth that has been aggravated by the pandemic	1. Real-time monitoring of all the barangays regarding their status on ration/food and medicine; survivor food/medicine bag distribution; and financial and health-care resources <ol style="list-style-type: none"> <li>1.1. Determine pandemic health impact projections by barangays</li> <li>1.2. Assess household most at risk of food and medicine security</li> <li>1.3. Ration/food and medicine acquisition and distribution plan on weekly basis</li> <li>1.4. Develop city pandemic triage plan</li> <li>1.5. Documentation of cluster reports and evaluation of shelter functions</li> </ol> 2. Come-up or update amelioration program for transport, construction personnel, and marginalized	Mayor's office, QC-DRRMO – EOC, QCGH, RMBGH, NDH, city health cluster, food and non-food cluster, logistics cluster, BPLD, Procurement office, GSD, CPDO	Discretion of the mayor and finance committee	Immediate term to short term (i.e., April 16 up to July 2020). It must be reevaluated in the last week of July 2020
					Office of the city administrator, CPDO, SSDD,	Discretion of the mayor and	Immediate term (i.e., April 15 to

<ul style="list-style-type: none"> <li>• Basic services facilities maintenance (water, electricity, gas supply, communication, sanitation, sewerage, etc.</li> </ul>	<p>families that are deprived of 4Ps membership and have not yet received any amelioration program by DTI. It can be done through the economic sustainability approach</p>	<p>city budget department, accounting department, BPLD, treasury department, law and order cluster</p>	<p>finance committee</p>	<p>May 15, 2020)</p>
	<p>2.1. Develop mechanism and SOPs on easing of GCQ, ECQ, EECQ, and no CQ for the elements at risk explained in column 2 of this table</p>			
	<p>3. Develop an SOP for appropriate</p>	<p>CPDO, city health, TF-SWM, QC-DRRMO, city engineering department, DBO</p>	<p>Discretion of the mayor and finance committee</p>	<p>Immediate term (i.e., April 15 to May 15, 2020)</p>
	<p>Construction of sanitization/ decontamination/ disinfection structures for public facilities and private sectors including settlement areas under the jurisdiction of QCG</p>			

TABLE 20.9 Response, recovery, and rehabilitation objectives with corresponding strategies, PPAs, indicative budget and priority criteria for implementation.

Response, recovery and rehabilitation action plan 2020–30 (objectives 3 with corresponding PPAs toward social services, infrastructure, livelihood and business development, agriculture, environment, and organization development)							
Hazard threat for (1)	Elements at risk to hazard threat that impact development planning (2)	Goal/objective (3)	Strategy (4)	Programs, projects, and activities (PPAs) options (5)	Office/department responsible (6)	Indicative budget in PHP (7)	Priority criteria/ time frame (8)
<ul style="list-style-type: none"> <li>• Pandemic</li> </ul>	<ul style="list-style-type: none"> <li>• Human life/capital               <ul style="list-style-type: none"> <li>• Health workers</li> <li>• DRM front liners</li> <li>• Other labors, technicians, and professionals</li> </ul> </li> <li>• Economic sectors A, B, C, and D (source of livelihood)               <ul style="list-style-type: none"> <li>• Transportation service/manufacturing/industry and SME sectors, etc.</li> <li>• Agriculture</li> </ul> </li> <li>• Critical facilities operations (hospital and related facilities, schools, churches, mosques and other religious buildings, and government institutions)</li> </ul>	<p>3. To assess resources and restore livelihood and economic productivity of the city e.g., public private services, industry, MSMEs and agriculture sectors.</p>	<p>1. Implement incremental community-based exit initiation and removal of COVID-19 lockdowns based on scientific findings.</p>	<p>1. Develop guideline, framework, and legislation for restoration of livelihoods and economic productivity.</p> <p>1.1. Assess household most at risk of food security</p> <p>1.2. Resource availability assessment and provide guidelines for its acquisition</p> <p>1.3. Construction of emergency structures, and warehouses for storing emergency medicines and related material including transportation route.</p> <p>1.4. Develop mechanism toward smart lockdown for MSMEs and other industries i.e., Number coding or stall/parcel coding e.g., Open malls, wet-markets, and other various business shops (A, B and D sectors) using the social distancing alternate days</p>	<p>SBPDO, BPLD, PESO, SSDD, BCRD, CED, DBO, CHD, GSD, CPDO, 142 barangays, QCGH, NDH, RMBGH, GSD, law and order cluster.</p>	<p>Discretion of the mayor and finance committee</p>	<p>Immediate (April 30 to May 15, and long term i.e., from April 2020 to April 2030)</p>

- Basic services facilities maintenance (water, electricity, gas supply, communication, sanitation, sewerage, etc.)

standards. It means that not all the shops need to be opened at the same time. A specific % of the total shops/stalls/businesses can be opened on alternate day's basis i.e., MWF or TThS. The shop to be opened must be at a distance of 3–4 establishments apart).

- 1.5. Periodic public awareness program on livelihood, transportation, public safety, and economic and physical recovery and rehabilitation
  - 1.6. Periodic training on health-care triage and the roles of municipal authorities and health-care providers in triage
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TABLE 20.10 Response, recovery and rehabilitation objectives with corresponding strategies, PPAs, indicative budget and priority criteria for implementation.

Response, recovery and rehabilitation action plan 2020–30 (objectives 4 with corresponding PPAs toward social services, environment and organization development)							
Hazard threat for (1)	Elements at risk to hazard threat that impact development planning (2)	Goal/objective (3)	Strategy (4)	Programs, projects, and activities (PPAs) options (5)	Office/ department responsible (6)	Indicative budget in PHP (7)	Priority criteria/ time frame (8)
• Pandemic	<ul style="list-style-type: none"> <li>• Human life/capital               <ul style="list-style-type: none"> <li>• Health workers</li> <li>• DRM front liners</li> <li>• Other labors, technicians and professionals</li> </ul> </li> <li>• Economic sectors A, B, C, and D (source of livelihood)               <ul style="list-style-type: none"> <li>• Transportation service/ manufacturing/ industry and SME sectors, etc.)</li> <li>• Agriculture</li> </ul> </li> <li>• Critical facilities operations (hospital and related facilities, schools, churches, mosques other religious buildings, and government institutions)</li> <li>• Basic services facilities maintenance (water, electricity, gas supply, communication, sanitation, sewerage, etc.)</li> </ul>	4. Integrate disaster risk reduction and climate change adaptation (CCA) in public health system for pandemic	1. Fill in the gap developed between resources available and resources needed during a pandemic	1. Mainstreaming DRR and CCA options into public health system. <ol style="list-style-type: none"> <li>1.1. Develop resolution on developing TWG for disaster management in a pandemic</li> <li>1.2. Development or updating of existing risk sensitive PHS and health contingency plans</li> <li>1.3. SOP for implementation of the plan</li> <li>1.4. Develop guideline on monitoring and evaluation</li> </ol> 2. Update DRRM plan with inclusion of pandemic prevention and mitigation, preparedness, response, and rehabilitation and recovery	TWG-QC DRRMC, office of the city administrator, legislative council, CPDO, EPWMD	Discretion of the mayor and finance committee	Immediate to mid-term (i.e., from April 2020 to April 2022)

TABLE 20.11 Response, recovery, and rehabilitation objectives with corresponding strategies, PPAs, indicative budget, and priority criteria for implementation.

Response, recovery and rehabilitation action plan 2020–30 (objectives 5 and 6 with corresponding PPAs toward social services, critical infrastructure, livelihood and business development, agriculture, environment, and organization development)							
Hazard threat for (1)	Elements at risk to hazard threat that impact development planning (2)	Goal/objective (3)	Strategy (4)	Programs, projects, and activities (PPAs) options (5)	Office/ department responsible (6)	Indicative budget in PHP (7)	Priority criteria/ time frame (8)
• Pandemic	<ul style="list-style-type: none"> <li>• Human life/ capital                             <ul style="list-style-type: none"> <li>• Health workers</li> <li>• DRM front liners</li> <li>• Other labors, technicians, and professionals</li> </ul> </li> <li>• Economic sectors A, B, C, and D (source of livelihood)                             <ul style="list-style-type: none"> <li>• Transportation service/ manufacturing/ industry and SME sectors, etc.</li> <li>• Agriculture</li> </ul> </li> <li>• Critical facilities operations (hospital and related facilities, schools, churches, mosques and other religious</li> </ul>	5. To ensure proper medical waste management and management of dead bodies	5. The dead and the bereaved should always be respected during COVID-19 pandemic	<ol style="list-style-type: none"> <li>1. Develop a manual on management of dead bodies after disasters                             <ol style="list-style-type: none"> <li>1.1. Establishment of standards for tagging bodies</li> <li>1.2. Develop public and private coordination protocol</li> <li>1.3. Management of the Bereaved families protocols</li> </ol> </li> </ol>	Management of the dead cluster and DRRMC	Discretion of the mayor and finance committee	Immediate term short term (i.e., up to July 2020)
		6. To maintain the continuity of operations of public and private sectors activities and strengthen the public–private partnership for COVID-19 interventions	6. Continuity of operations for businesses and organizations providing their essential services during times of crisis	<ol style="list-style-type: none"> <li>1. Develop legislation, SOPs, and guidelines for restoring the function of the offices during COVID-19 pandemic                             <ol style="list-style-type: none"> <li>1.1. Public service Continuity plan with provision of soft loans                                     <ol style="list-style-type: none"> <li>1.1.1. Economic sector A, B, C, and D</li> </ol> </li> <li>1.2. Business continuity for private sectors</li> </ol> </li> </ol>	Quezon City government, e.g., CPDO, CBD, EPWMD, QC-DRRMO, treasury, and procurement are among others	Discretion of the mayor and finance committee	Immediate term short term (i.e., up to July 2020)

(Continued)



TABLE 20.11 Response, recovery, and rehabilitation objectives with corresponding strategies, PPAs, indicative budget, and priority criteria for implementation.—cont'd

Response, recovery and rehabilitation action plan 2020–30 (objectives 5 and 6 with corresponding PPAs toward social services, critical infrastructure, livelihood and business development, agriculture, environment, and organization development)							
Hazard threat for (1)	Elements at risk to hazard threat that impact development planning (2)	Goal/objective (3)	Strategy (4)	Programs, projects, and activities (PPAs) options (5)	Office/department responsible (6)	Indicative budget in PHP (7)	Priority criteria/time frame (8)
	buildings, and government institutions) <ul style="list-style-type: none"> <li>• Basic services facilities maintenance (water, electricity, gas supply, communication, sanitation, sewerage, etc.)</li> </ul>			with provision of soft loans <b>1.2.1.</b> Economic sector A, B, C, and D <b>1.3.</b> Public–private Partnership programs toward COVID-19 interventions			

## Annex A

**TABLE 20.12** Selective parts of the disaster resilience scorecard for public health related to lockdown assessment.

Essential #	Subject/issue	Expert knowledge	Key personnel
A1.1/9.2	Governance mechanisms for disaster risk and emergency management include public health professionals	2	2
A2.1	Disaster risk planning includes public health emergencies	2	0
A2.2	Consideration of public health impacts arising from other disasters	2	2
A2.3	Inclusion in disaster planning of preexisting chronic health issues	0	2
A3.1	Funding earmarked for addressing public health implications of disasters	1	2
A4.1	Conformance of key health facilities with resilient land zoning and building codes	4	3
A5.1	Preservation and management of ecosystem services that provide public health benefits	3	3
A6.1	Sufficient, skilled health professionals to maintain public health around disasters	2	2
A6.2	Public health data shared with all stakeholders that need it	3	2
A7.1	Communities are prepared to maintain public health levels after a disaster	2	2
A7.1.2	Community can access and trust public health information	2	2
A7.2	Community's ability to "return to normality" – mental health	1	1
A8.1	Existence of health infrastructure besides hospitals (e.g., isolation, clinics, labs, supplies)	3	3
A8.2	Health facilities can manage a surge of patients	2	1
A8.3	Continuity of care for those already sick	4	2
A9.1	Early warning systems exist for impending health-care emergencies	3	3
A9.2/9.3/9.4	Integration of public health with emergency management	3	3
A9.5	Existing stockpile of public health items, PPE, medications, and equipment	3	1
A10.1/10.2	Mitigating long-term impact on public health	1	0

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