7 Evaluating Tools and Resources for Strategic Resilience and Sustainability Planning

"Furthermore, towns and cities with their monuments, vast constructions, and large buildings, are set up for the masses and not for the few. Therefore, united effort and much co-operation are needed for them."

Ibn Khaldun (1406, 1969). The Muqaddimah: An introduction to history; In three volumes.

Overview

The seventh chapter delivers an illustrative review of available resources, tools, and assistance for strategic resilience and sustainability planning to accomplish maximum organizational resilience and sustain communities. Chapter seven reviews the resources available for the strategic resilience and sustainability plans. Beyond consulting services, resources and tools are available at no or at an economically feasible cost that requires internal coordination, staffing, and management. Many organizations opt for more feasible in-house completion of plans, including greenhouse gas emission reports. The chapter provides a brief overview of accessible national, state level, and regional resources and organizations supporting the climate preparedness and resilience efforts, including available tools for carbon footprint inventory and greenhouse gas emissions reporting. An illustrative template of strategic resilience and sustainability plan is provided. A template for integrating climate readiness into emergency preparedness and disaster mitigation plan is recommended, and responses to a pandemic are analyzed.

Keywords

Tools · Climate tools · Carbon footprint
Sustainability planning · Resilience planning
Carbon inventory · Climate preparedness
Climate resilience · Emergency preparedness
Carbon footprint · Climate readiness · Climate change · Pandemic

Key Questions

The goal of the seventh chapter of the book is to answer the following underlying assumptions and questions.

- What resilience, sustainability, and climate preparedness resources do local government organizations need to plan for resilient and sustainable communities and to achieve maximum organizational resilience?
- What tools and data do communities necessitate for climate preparedness and resilience?
- What tools and resources are available for resilience planning?
- What carbon inventory and forecasting resources are recommended for the organizations?

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- What templates or outlines are appropriate for cities' resilience and sustainability planning?
- How can communities integrate climate readiness into emergency preparedness?
- How can organizations integrate pandemic action plans into disaster readiness and responses?
- How can private sector firms contribute to climate resilience and preparedness in communities?

Introduction

The seventh chapter of the book provides a perfunctory and illustrative review of available resources, tools, support for resilience and sustainability planning for counties, cities, and other organizations to attain maximum resilience and sustain communities. Beyond private and often expensive consulting services, resources, and tools are available at no cost to organizations, and require internal coordination, staffing, and management.

The review is intended as a possible first step for organizations interested in starting resilience and sustainability strategic planning. It is not an inclusive review as there are abundant resources, agencies, and tools available to local governments, nonprofit, and private sector organizations regionally, in states, or nationally and internationally. An illustrative overview and a template of organizational resilience and sustainability plan using the Quadruple Bottom Line elements are provided. A template for integrating climate readiness for heatwaves and wildfires into emergency management and disaster preparedness and mitigation plans is presented.

Resilience and Sustainability Planning Organizations and Resources

A brief overview of several national, regional, and statewide resources and organizations available to assist in strategic resilience and sustainability planning is provided. Federal and state agencies, national and international organizations offer resources and tools for resilience, climate preparedness, disaster planning, and sustainability planning.

For instance, the US Environmental Protection Agency Pollution Prevention (US EPA P2) (2021a) program website offers information for practices to reduce, eliminate, or prevent pollution before recycling, treatment, or disposal.

Federal Agencies Resilience Resources

The United States Environmental Protection Agency P2 Greenhouse Gas Emissions Calculator

The commitment to reducing the harmful impacts of greenhouse gas emissions is essential in resilience and sustainability planning. The resources and tools provided by the United States Environmental Protection Agency are particularly effective for organizations that may lack resources to retain consultants and rely on internal staff to measure negative impacts of operations. The website includes case studies and measuring pollution prevention (US EPA 2020). The P2 GHG emissions calculator quantifies and inventories annual greenhouse gas (GHG) emissions and translates projects into pollution reduction to enhance resilience. The excel sheet tool is divided into tabs and calculates and aggregates CO_2 emissions, costs savings from emissions reduction, power management, green energy use, green chemistry, mobility, transportation, and water management (US EPA 2020). The P2 cost calculator's unique features convert the greenhouse gas emissions reductions to related cost savings, drawing on data in the P2 Cost Savings Calculator (US EPA 2020).

The climate change resources were removed from the EPA website in 2017 during the previous administration, and the cities of Houston and Milwaukee preserved and housed decades of research on their websites (City of Houston 2017; City of Milwaukee 2017). The US EPA (2021b)

acknowledged that the previous administration forcefully removed climate change information, stating that "EPA's climate change website is back, with more content to come," adding that "understanding and addressing climate change is critical to EPA's mission of protecting human health and the environment" (para. 1 and 2). The US EPA (2021b) "tracks and reports greenhouse gas emissions," leveraging rigorous science, "to reduce emissions to combat climate change" (para. 2).

The White House

Climate readiness for various levels of government was furthered by President Obama's State, Local and Tribal Leaders Task Force on Climate Preparedness and Resilience (The White House 2014). In a sharp reversal of policies from his predecessor, President Biden made it a top priority to combat the threats of climate crises. The White House (2021b) under President Biden rejoined the Paris Climate Agreement, ordered all federal agencies to ensure science is reintroduced back into climate change threat analysis and examinations. President Biden directed federal agencies to reengage on climate change to correct the lack of engagement in the past to advance environmental equity and justice, public health improvements, environmental protection, reduce greenhouse gas emissions, to rely on science and bolster resilience to ensure integrity in decision making (The White House 2021a, b, c). Furthemore, President Biden directed "all executive departments and agencies to immediately review and, as appropriate and consistent with applicable law, take action to address the promulgation of Federal regulations and other actions during the last four years that conflict with these important national objectives, and to immediately commence work to confront the climate crisis" (The White House 2021a, c, para 2 and 3). It requires that "the heads of all agencies shall immediately review all existing regulations, orders, guidance documents, policies, and any other similar agency actions (agency actions) promulgated, issued, or adopted between January 20, 2017, and January 20, 2021, that are or maybe inconsistent with, or present obstacles to the policy outlined in section 1" of the order (The White House 2021a, c, para 2 and 3). Among several steps, resilient strategies will include: Reducing Methane Emissions in the Oil and Gas Sector; Establishing Ambitious, Job-Creating Fuel Economy Standards; Job-Creating Appliance- and Building-Efficiency Standards; Protecting Our Air from Harmful Pollution; and Accounting for the Benefits of Reducing Climate Pollution (The White House 2021a, c, para 2 and 3).

The important identifier of the true cost of climate change is the introduction of the methodology to calculate the various costs of greenhouse gas emissions. President Biden's ordered agencies to capture "the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account," to facilitate "sound decision-making, recognize the breadth of climate impacts and support the international leadership of the United States on climate issues" (The White House 2021a). As noted in the order "the social cost of carbon (SCC), the social cost of nitrous oxide (SCN) and social cost of methane (SCM) are estimates of the monetized damages associated with incremental increases in greenhouse gas emissions," and "are intended to include changes in net agricultural productivity, human health, property damage from increased flood risk, and the value of ecosystem services" (The White House 2021a, para 22). The order is accurate in noting that "an accurate social cost is essential for agencies to accurately determine the social benefits of reducing greenhouse gas emissions when conducting cost-benefit analyses of regulatory and other actions" (The White House 2021a, para. 22). An accurate account of greenhouse gas emissions is crucial to combining the precise measurements of variables introduced into the governance, economic, environmental, and social factors occurring in society due to climate change, and the timing and precision are necessary to account for all these threats and costs.

National Aeronautics and Space Administration (NASA)

The National Aeronautics and Space Administration (NASA) is committed to addressing climate change and promoting climate resilience and sustainability (NASA 2021a, b, c). NASA's (2021a, para. 4) sustainability objectives include: increasing energy efficiency and the use of renewable energy; measuring, reporting, and reducing NASA's direct and indirect greenhouse gas emissions; conserving and protecting water resources through efficiency, reuse, and stormwater management; eliminating waste, preventing pollution, and increasing recycling; leveraging agency purchasing power to foster markets for sustainable technologies and environmentally preferable materials, products, and services; designing, constructing, maintaining, and operating high-performance, sustainable buildings; utilizing power management options, and reducing the number of the agency data centers; supporting economic growth and livability of the communities where NASA conducts business; evaluating agency climate change risks and vulnerabilities and develop mitigation and adaptation measures to manage both the short-and long-term effects of climate change on the agency's mission and operations; raising employee awareness and encourage each individual in the NASA community to apply the concepts of sustainability to every aspect of their daily work to achieve these goals; maintaining compliance with all applicable federal, state, local, or territorial law and regulations related to energy security, a healthy environment, and environmentally sound operations; and complying with internal NASA requirements and agreements with other entities (para. 4). According to the National Aeronautics and Space Administration (NASA) (2021b) organization consider itself to be "a world leader in climate studies and Earth science," and "while its role is not to set climate policy or prescribe particular responses or solutions to climate change, its purview does include providing the robust scientific data needed to understand climate change." Moreover, NASA (2021b) "makes this information available to the global community—the public, policy- and decision-makers and scientific and planning agencies around the world" (para. 1). NASA (2021b) defined mitigation as dropping and steadying the levels of heat-trapping greenhouse gases in the atmosphere and adaptation as adapting to the climate change already underway.

National Oceanic and Atmospheric Administration (NOAA)

The National Oceanic and Atmospheric Administration (NOAA) contains a US climate resilience planning tool with case studies comprising of the climate explorer, funding opportunities for resilience, and topics on the built environment, coasts, food, marine, energy, health, transportation, water, and tribal nations (NOAA n.d.). The NOAA's Climate.gov (n.d) website includes data snapshots and maps with 30-year precipitation by month, drought, temperatures, projections, severe weather, oceans, outlooks, climate dashboard, and climate variability.

Also, the NOAA's website features other organizations' resources and tools on climate change. Each tool serves as a guide to assist the organizations and communities with the various aspects of climate preparedness. The tools include Coastal Flood Exposure Mapper, Quick Report Tool for Socioeconomic Data, access to economic and demographic data for multiple coastal jurisdictions, and other valuable resources (NOAA 2017). The NOAA's Great Lakes Environmental Research Laboratory observes, monitors, and forecasts accurate and up-to-date Great Lakes water levels (NOAA 2018; Great Lakes Climate Resilience 2013).

United States Global Change Research Program (USGRCB)

The United States Global Change Research program (USGCRP) incorporates federal research on climate change effects and implications for society. The USGCRP (n.d.) program was created by Presidential initiative in 1989 and man-

dated by Congress in the Global Change Research Act (GCRA) of 1990, to advance a research program to "assess, predict, and respond to human-induced and natural processes of global change" (para. 1). It includes thirteen federal agencies that conduct or use research on climate change and its impacts on society. It functions under the direction of the Subcommittee on Global Change Research of the National Science and Technology Council's Committee on Environment.

The USGRCP (2017, 2018a, 2018b) produces and publishes National Climate Assessments, and the reports are available online (Mellilo et al. 2014). Other reports produced and published by the USGRCP (2016, 2018b) are the Impacts of Climate Change on Human Health in the United States and The Second State of Carbon Cycle Report (SOCCR2). The SOCCR2 is a decade-long appraisal of the carbon cycle in North America, with input from over 200 experts from national laboratories, universities, private sector, and research institutions and governments in Mexico, United States, and Canada (USGCRP 2018b). For the United States Global Change Research Program (USGCRP), Brown et al. (2015) reported on global food systems.

United States Fish & Wildlife Service

The United States Fish & Wildlife Service (2021a) acknowledged the enormous negative impact of climate change on wildlife, noting that "some populations may decline, many will shift their ranges substantially, and still, others will face [an] increased risk of extinction." Furthermore, the U.S. Fish & Wildlife Service (2021a) reported that "some species will survive in the wild only through direct and continuous intervention by wildlife and fisheries managers," and initiatives to counter climate change through series of strategic plan steps, including:

> "Developing expertise in biological carbon sequestration — sequestering greenhouse gases in plant biomass while also creating or restoring priority native plants, fish, and wildlife habitats — and foster efforts to sequester carbon on lands it manages," and "facilitating habitat conservation through carbon sequestration at the international level. By working with international partners and stakeholders to help reduce deforestation rates in key areas, such as tropical forests, the Service will help preserve areas critical to biodiversity conservation and support greenhouse gas mitigation" (para. 1 and 8). Moreover, "the rapid warming of the earth's atmosphere poses historical challenges for the world — and the National Wildlife Refuge System" (United States Fish & Wildlife Service 2021b, para. 1).

Transnational, National, State, and Regional Groups and Organizations Supporting Climate Resilience and Sustainability Initiatives

Intergovernmental Panel on Climate Change (IPCC)

With the issuance of the most recent climate change report, the IPCC (2021a), the working group of the sixth assessment report developed an interactive atlas. According to IPCC (2021b), the atlas is "A novel tool for flexible spatial and temporal analyses of much of the observed and projected climate change information underpinning the Working Group I contribution to the Sixth Assessment Report, including regional synthesis for Climatic Impact-Drivers (CIDs)." It invites participants to participate in user testing survey and to report any errata. Also, the NASA Sea Level Projection Tool permits "users to visualize and download the sea level projection data from the IPCC 6th Assessment Report (AR6)" (IPCC 2021c).

United Nations Framework Convention on Climate Change (UNFCCC) (2021)

The United Nations Framework Convention on Climate Change, with 197 members, is the United Nations (UN) agency assisting the worldwide responses to climate change threats (UNFCCC 2021a, b). It is charged to organize the annual UN Conference of the Parties (COP) climate change

conferences, including the COP26, that was held in Glasgow, Scotland, in 2021 (UNFCCC 2021b). The UNFCCC (2021c) annual report acknowledges the difficulties of the pandemic in 2020 and its effects on combating climate change threats. The scope of the report included intergovernmental processes and the initiatives in 2020, supporting the Convention adopted in 1992, the Kyoto Protocol, and the 2015 Paris Climate Agreement. The report emphasizes the need for financing mitigation and adaptation initiatives.

Resilient Cities Network

The Rockefeller Foundation funded the 100 Resilient Cities program. Cities in the network were provided the financial and logistical support to create a position of a Chief Resilience Officer, with expertise to develop a "robust resilience strategy," and access to resources for the implementation of resilience strategies and information sharing between member cities (The Rockefeller Foundation 2021). With the 100 Resilient Cities grants, 1,000 cities around the globe applied for the support, and 100 communities were selected to become the Resilient Cities and hired Chief Resilience Officers (CROs) to start plans for climate resilience (The Rockefeller Foundation 2021). The 100 Chief Resilience Officers is an initiative aimed at building infrastructure to plan for climate change through climate resilience policies and programs. By assisting communities to employ a full staff person dedicated to climate resilience, more cohesive efforts are being deployed at subnational levels, allowing a community-based initiative to take hold. The 100 Resilient Cities initiative funding concluded in 2019, with 50 resilient strategies already adopted around the globe (The Rockefeller Foundation 2021). As a renewed attempt to support resilient cities, member cities, and Chief Resilience Officers from the 100 Resilient Cities program established the Resilient Cities Network "sharing a common lens for holistic urban resilience and with thousands of projects in implementation" (Resilient Cities Network 2021). The initiatives promoted by the network include water, waste management, recovery, energy, transportation, and urban oceans (Resilient Cities Network 2021).

The United States Conference of Mayors and National League of Cities

The Alliance for a Sustainable Future (2020), a collaborative effort by the United States Conference of Mayors and the Center for Climate and Energy Solutions (C2ES) issued a report on the state of climate change efforts by cities, showing significant climate resilience leadership by the US mayors. The United States Conference of Mayors through Mayors' Climate Protection Center and other resilience and sustainability initiatives encourage member cities and mayors to take a leadership role in addressing the threats of climate change and to meeting carbon reduction goals (USCM 2021). Similarly, the National League of Cities encourages its members to be proactive on climate resilience, environmental issues, sustainability, and climate change, and offers leadership training and assistance on climate issues (NLC 2017, 2021). Resilient communities are on the front lines of the climate change challenges.

Fiscal constraints and the impact of climate change and the recent pandemic on governance and the ability to deliver outcomes causes significant disruptions. Cities and counties engaged in climate preparedness and resilience efforts adapt and transform and accept discontinuities as they continue to offer services without interruptions. In a crisis, community-resilience related efforts are an opportunity and a tool for governments to change priorities, emergency management processes, and outcomes of the budget process. The Compact of Mayors (n.d.) and the Global Covenant of Mayors for Climate and Energy

(2021) support cities with set targets and goals in reducing carbon emissions.

Resilient Organizations and Initiatives Spotlight

The Great Lakes Cities Saint-Lawrence Cities Initiative offers networking opportunities, best practices, advocacy, and an array of tools and documents for its members on an array of issues related to resilience, sustainability, and energy (GLSLCI 2021a, b). Also, the initiatives for its members include resources and training on climate change adaptation and mitigation, with a focus on climate-ready cities toolkit, climate-ready infrastructure and strategic sites protocols, and other climate resilience tools (GLSLCI 2021b, c).

A non-profit organization, **Architecture 2030** (2018a), was established in 2002 to adjust the cities' built environment from being the main contributors of greenhouse gases to those addressing climate crises. It oversees 2030 Districts, the private–public challenge for energy consumption and carbon reduction in cities in the United States and Canada, including Seattle, Cleveland, Los Angeles, Pittsburgh, Denver, San Francisco, Dallas, Toronto, Albuquerque, San Antonio, Austin, and others. The commercial building owners and facility managers of government buildings in those cities are committed to reducing greenhouse gas emissions, water conservation, and energy consumption. 2030 Challenge issued to building owners include goals to establish a greenhouse gas emission baseline and targets, applying passive design strategies to achieve maximum energy efficiency and integrating energy-efficient technology and systems, and incorporating renewable energy to meet the buildings' energy demands (Architecture 2030 2018b).

ICLEI-Local Government for Sustainability (ICLEI) A global network of over 1,750 governments, ICLEI represents one of the most extensive networks of local governments. Since 1991 ICLEI has been providing climate resilience and sustainability support advice to local government leaders and administrators (ICLEI USA 2021a). In addition to offering ClearPath greenhouse gas emissions inventory and greenhouse gas emission protocol as part of the membership, ICLEI has additional tools for its members to prepare for climate change impacts and emissions management (ICLEI USA 2021b).

Urban Sustainability Directors Network (USDN) (2021) is a network of sustainability officers from cities around the United States sharing the best practices and information. It includes opportunities for collaborative projects.

The Nature Conservancy features links to the climate adaptation and planning tools, sustainability and resilience tools with geospatial data information (the Nature Conservancy 2021a, b).

Northern Gulf of Mexico Sentinel Site Cooperative (2021a, b) with its Gulf Tools for Resilience Exploration Engine (Gulf TREE) assists the government planners and administrators with climate preparedness and readiness planning. It is designed as a decision-support tree framework assisting users in the Gulf of Mexico region to identify the appropriate climate resilience tool used to evaluate and analyze the science-based data to prepare for hazards and resilience for the coastal areas. The Gulf TREE climate change and resilience exploration engine is a collaborative endeavor between the Northern Gulf of Mexico Sentinel Site Cooperative (SSC), the Gulf of Mexico Climate and Resilience Community of Practice (CoP), and the Gulf of Mexico Alliance (GOMA) team (Northern Gulf of Mexico Sentinel Site Cooperative 2022).

Resilient Michigan Resilient Michigan is a collaborative effort "developed by the Land Information Access Association (LIAA), non-profit community service and planning organization headquartered in Traverse City,

Michigan" (Resilient Michigan n.d.). According to its website, Planning for Resilient Communities advances "community-wide planning efforts that promote community resilience in the face of rapid economic changes and increasing climate variability" (Resilient Michigan n.d.). It published a practical handbook and resource guide with the following nine themes of resilience: Local Governance and Leadership; Gray and Green Infrastructure; Transportation; Local Food and Food Systems; Housing and Neighborhoods; Natural Resources; Public Health; Coastal Processes; and Energy (Resilient Michigan 2017).

Public Sector Perspective

Private companies utilize the P2 tools and are featured in the P2 case studies, including initiatives in energy efficiency and savings, water conservations, lifecycle assessment, waste reduction, and water reduction in production (Xu et al. 2016; University of Wisconsin-Madison 2016; Hardcastle 2016a). Ford and Pepsi Co. committed to saving water and, in the process, saving millions of dollars in operations (Hardcastle 2016a, b). The US EPA (2021c) provides a comprehensive recycling guide for businesses to help them reduce waste and reuse materials, including a recycling purchasing guide. As noted on the US EPA (2021c) website, "the Comprehensive Procurement Guideline (CPG) program is part of EPA's Sustainable Materials Management initiative that promotes a system approach to reducing materials use and the associated environmental impacts over the materials entire life cycle," and is "authorized by Congress under Section 6002 of the Resource Conservation and Recovery Act (RCRA) (42 United States Code 6962)" (para. 1 and 2). As climate change threats increase, large scale changes in political and policy issues such as climate change and pandemics require business and corporate leadership and partnership. Murray (2019) discussed the businesses involved in addressing climate change threats and those businesses on the opposite spectrum. It will take all sectors to contribute to the efforts to reduce greenhouse gas emissions to eventually alter the negative effects of climate change (Alibašić 2018, 2020; Davis et al. 2018). Large international corporations, including Google, Facebook, IKEA, Sida, Strantec, Iberdrola, Microsoft, BNP Paribas, partner with the United Nations on initiatives to counter climate change risks (UNFCCC 2021d).

Strategic Resilience and Sustainability Plan Outline

Each community and organization has a differing set of priorities and initiatives, and has different governance, economic, environmental, and social circumstances. However, the resilience and sustainability strategic plan consists of the following elements:

- Establishing categorical goals, outcomes, targets, and initiatives, in alignment with the vision, objectives, and mission of an organization or a community.
- Outlining the deadlines for accomplishing resilience and sustainability-related goals.
- Ascertaining the internal and external stakeholders, collaborators, partners, and supporters.
- Categorizing resilient and sustainable projects with the most desirable return on investment community-wide and organizationally, including governance, accountability, reporting, management and material use minimization, reuse, repurposing and recycling of materials, emergency management and disaster readi-

ness operations, building efficiency, energy use, renewable energy production, affordable housing projects, equity, justice, income disparity, and sustainable development.
- Integrating targets in the plan.
- Assigning outcome champions and implementers.
- Formulating greenhouse gas emissions and carbon footprint reduction and climate resilience objectives and targets.
- Defining measurements of the Quadruple Bottom Line outcomes.
- Charting specific governance, economic, environmental, and social outcomes, goals, and corresponding metrics.
- Recommending the resilience implementation strategy, connecting the management of resilience and sustainability strategic plan to the budget process.
- Mapping out public outreach and campaign plan.

Assigning the Resilience and Sustainability Outcome and Target Champions

A sample process of assigning outcome and target champions and delineating direct and indirect functional responsibilities is provided in Table 7.1, entitled Assigning the Strategic Resilience and Sustainability Plan Outcome and Target Champions. The table represents a resilience and sustainability plan sample, using the Quadruple Bottom Line of governance, economic, environment, and social elements, and layered in the following sequence, Quadruple Bottom Line association > objective > outcome > outcome > outcome > target. It pertains to the significance of assigning direct and indirect champions of resilience and sustainability targets. The template is shared between staff for additional input, changes to the proposed targets, and identifying appropriate stakeholders and outcome and target champions among staff. The numbers and percentages used in the template below are for illustrative purposes.

The proposed plan may be set in the following order: **Quadruple Bottom Line (QBL) association ≫ Objectives ≫ Outcomes ≫ Targets**

The Quadruple Bottom Line provides the overarching elements:

Governance **Economic**, **Environmental**, and **Social**

The specific elements of the plan are defined through four categories of the Quadruple Bottom Line, starting with Governance and specific targets are categorized under separate goals and outcomes. The four components are associated with resilience and sustainability as an outline of initiatives under the four areas, regardless of what the communities or organizations decided to call it, climate action plan, resilience plan, sustainability plan, climate adaptation and mitigation plan. The logical representation of the objectives and targets are represented in the comprehensive strategic resilience and sustainability plan.

Under Objectives, there are numerous options, tailored to specific needs of the community and organizations:

Under Objectives, each outcome has a broader explanation correlated to targets. The plan is color-coded for ease in identifying spe-

QBL1: GOOD GOVERNANCE

- OBJECTIVE 1: ACCOUNTABLE GOVERNMENT, ACCESSIBLE AND TRANSPARENT SERVICE DELIVERY
- OBJECTIVE 2: EFFECTIVE STAKEHOLDERS ENGAGEMENT
- OBJECTIVE 3: ENSURE AN OPEN AND INCLUSIVE GOVERNMENT
- OBJECTIVE 4: RESILIENT, EFFECTIVE AND EFFICIENT SERVICE DELIVERY
- OBJECTIVE 5: MAINTAIN RESILIENT ASSET MANAGEMENT

QBL 2: RESILIENT ECONOMIC GROWTH, SUSTAINABLE DEVELOPMENT, AND BUSINESS OPPORTUNITIES

- OBJECTIVE 1: CREATE A RESILIENT ENVIRONMENT FOR BUSINESS AND COMMERCE
- OBJECTIVE 2: FACILITATE DIVERSE JOB CREATION AND JOB GROWTH
- OBJECTIVE 3: FOSTER RESILIENT ECONOMIC GROWTH

QBL 3: RESILIENT ENVIRONMENT

- OBJECTIVE 1: RESILIENT ENERGY MANAGEMENT AND CARBON FOOTPRINT REDUCTION
- OBJECTIVE 2: CLIMATE CHANGE RESILIENCE AND READINESS
- OBJECTIVE 3: WASTE MINIMIZATION AND EXPANSION OF RE-USE AND RECYCLING OPPORTUNITIES
- OBJECTIVE 4: PROTECTION AND ENHANCEMENT OF NATURAL SYSTEMS

QBL 4: RESILIENT AND SAFE NEIGHBORHOODS

- **OBJECTIVE 1: PROMOTE RESILIENT QUALITY OF LIFE**
- **OBJECTIVE 2: RESILIENT NEIGHBORHOOD INFRASTRUCTURE**
- **OBJECTIVE 3: INCREASE NEIGHBORHOOD PARTNERSHIPS AND COLLABORATION**

cific objectives, in the sample provided in this chapter, red represents the Governance Quadruple Bottom Line feature association, blue represents the Economic pillar, green is used for Environmental and orange color is used for the Social element of the Quadruple Bottom Line. An illustrative sample of strategic resilience and sustainability plan with targets, in alignment with the Quadruple Bottom Line elements, is provided on the next page.

QBL1: GOOD GOVERNANCE

OBJECTIVE 5: Maintain Resilient Asset Management

OUTCOME 5.1: Implement an integrated lifecycle investment to maintaining the infrastructure and other assets to maximize benefits, ensure resilience, and manage risk and provide satisfactory levels of service to the public in a sustainable and environmentally responsible manner

TARGETS:

1. Adopt an asset management policy and program implementation plan by June 30, 2022.
2. Implement an asset management governance model by June 30, 2022.
3. Establish levels of service measurements consistent with asset management plans by June 30, 2022.
4. Develop a comprehensive five-year capital improvement plan and integrate resilience models by June 30, 2022.

QBL 2: RESILIENT ECONOMIC GROWTH, SUSTAINABLE DEVELOPMENT AND BUSINESS OPPORTUNITIES

OBJECTIVE 3: Foster Resilient Economic Growth and Economy

OUTCOME 1.1: Advance a resilient, entrepreneur-focused economic development strategy leveraging the local government resources, building the internal and external infrastructure required to support the economy, and maintain the economic vitality of the community and the region.

TARGETS:

1. Incentivize $100 million in private investment by June 30, 2030.

QBL 3: RESILIENT ENVIRONMENT

OBJECTIVE 1: Resilient energy management and carbon footprint reduction

OUTCOME 1: Implement initiatives to counteract the effects of greenhouse gas emissions (GHG) to create a resilient community.

TARGETS:

1. Reduce the City's greenhouse gas (GHG) emissions to 15% percent below 2015 levels by 2030.
2. Achieve 100% of energy use from renewable sources from solar, wind, and geothermal by June 30, 2030.
3. Double water reuse and recovery by June 30, 2024.

QBL 4: RESILIENT AND SAFE NEIGHBORHOODS

OBJECTIVE 3: Increase Neighborhood Partnership and Collaboration

OOUTCOME 1: Implement cost-effective, data-driven programs designed for high-risk groups and environments to promote safety, prepare for emergencies, and install and maintain city equipment and systems that ensure a safe and resilient environment for residents and businesses.

TARGETS:

1. Remove graffiti in the city within 24 HOURS from the initial report from neighborhood associations.

Table 7.1 Assigning the strategic resilience and sustainability plan outcome and target champions

TARGET#	TARGET WORDING	Outcome Champion	Comments/Metrics/SUPPORT/REVISIONS/RESEARCH
QBL 1: GOOD GOVERNANCE			
OBJECTIVE 1: ACCOUNTABLE GOVERNMENT AND ACCESSIBLE AND TRANSPARENT SERVICE DELIVERY			
OUTCOME 1: Resilient financial management, and reduced operational costs.			
TARGET 1.1.1.1	Decrease cost as a result of energy efficiency improvements by an additional percentage over FY 2021 results in City facilities by DATE.	Energy Manager	All departments to coordinate with power utilities
OBJECTIVE 2: EFFECTIVE STAKEHOLDERS ENGAGEMENT			
OUTCOME 1: Communicate decision-making process and outcomes in a clear and understandable manner			
TARGET 1.2.1.1	Translate all documents and programs into Bosnian, Spanish, and Arabic.	Analyst	Work with translation agencies.
OBJECTIVE 3: ENSURE AN OPEN AND INCLUSIVE GOVERNMENT			
OUTCOME 1: Ensure services are easily accessible to a diverse customer base through proven best practices and coordination across all service channels			
TARGET 1.3.1.1	Increase the use of online permitting to 100% by 2025.	Planner	City Planning Department
OBJECTIVE 4: RESILIENT, EFFECTIVE AND EFFICIENT SERVICE DELIVERY			
OUTCOME 1: Implement decisions and processes with the most efficient use of resources to serve the needs of the diverse community			
TARGET 1.4.1.1	Respond to 100% of street lighting outages within 24 hours of being reported.	Director	Street Lights & Public Works
1.4.1.2	Increase the City's overall Fire Code inspection completion rate to % by DATE.	Fire Chief	Fire Department & Inspections
QBL 2: RESILIENT ECONOMIC GROWTH, SUSTAINABLE DEVELOPMENT AND BUSINESS OPPORTUNITIES			
OBJECTIVE 1: CREATE A RESILIENT ENVIRONMENT FOR BUSINESS AND COMMERCE			
OUTCOME 1.1: Adopt innovative, entrepreneur-focused economic development strategies that leverage the resources of the city to maintain the economic resilience of the community.			

Tab. 7.1 (continued)

TARGET 2.1.1.1	Attract and retain 25 new businesses in the city before June 30, 2025.	City Manager/ Director	Economic Development Department with the Chamber of Commerce and regional economic development organizations to support the target.
OBJECTIVE 2: FACILITATE DIVERSE JOB CREATION AND JOB GROWTH			
OUTCOME 2.1: Facilitate resilient business development to support job creation using tax incentives and other available economic development tools.			
TARGET 2.2.1.1	90% of jobs created or retained with incentives will be permanent, full-time employment with benefits.	Director	Economic development and business organizations to collaborate and support the target.
TARGET 2.2.1.2	Increase the number of diverse businesses by 30% over FY2020 results by June 30, 2024.	Director	Economic development, diversity officer and local business organizations to collaborate and support the target.
QBL 3: RESILIENT ENVIRONMENT			
OBJECTIVE 1: RESILIENT ENERGY MANAGEMENT AND CARBON FOOTPRINT REDUCTION			
OUTCOME 1: Implement initiatives to counteract the effects of greenhouse gas emissions (GHG) to create a resilient community.			
TARGET 3.1.1.1	Reduce the City's greenhouse gas (GHG) emissions to 15% below 2015 levels by 2030.	Energy Manager	Inventory from 2015 of the total CO2e was estimated to be # of metric tons. TARGET aims to reduce levels to # metric tons CO2e. An alternative TARGET could be --%.... # metric tons CO2e.
TARGET 3.1.1.2	Achieve 100% of energy use from renewable sources from solar, wind, and geothermal by June 30, 2030.	Chief Resilience Officer	Resilience and Sustainability Office
OBJECTIVE 2: CLIMATE CHANGE RESILIENCE AND READINESS			
OUTCOME 1: Integrate climate resilience preparedness into plans to respond to climate change related threats and disasters.			
TARGET 3.2.1.1	Include climate change projections and incorporate climate adaptation planning into capital, operating and maintenance programs by 2022.	Chief Resilience Officer	Resilience and Sustainability Office
TARGET 3.2.1.2	Include climate resilience and vulnerability assessment into emergency preparedness plans by 2022.	Chief Resilience Officer	Resilience and Sustainability Office & Public Safety and Executive Office

Tab. 7.1 (continued)

OBJECTIVE 3: WASTE MINIMIZATION AND EXPANSION OF RE-USE AND RECYCLING OPPORTUNITIES			
OUTCOME 1: Integrate protection and restoration of natural systems into plans to provide ecological services.			
TARGET 3.3.1.1	Reduce the amount of landfill contributions by 20% within 2 years.	Waste Management Director	Solid Waste Management
TARGET 3.3.1.2	Increase tons of waste sent to waste-to-energy facility by 10% each year over the 2020 baseline year.	Energy Director	Energy Management
OBJECTIVE 4: PROTECTION AND ENHANCEMENT OF NATURAL SYSTEMS			
OUTCOME 1: Expand tree planting opportunities and increase plants' bio-diversity in public and private green spaces.			
TARGET 3.4.1.1	Increase tree canopy coverage by 1% per neighborhood by 2025.	Parks Director	Parks Department
TARGET 3.4.1.2	Increase bio-diversity of plants in parks by 1% each year.	Parks Director	Parks Department
QBL 4: RESILIENT AND SAFE NEIGHBORHOODS			
OBJECTIVE 1: PROMOTE RESILIENT QUALITY OF LIFE			
OUTCOME 1: Promote quality design and construction consistent with neighborhood character to encourages efficient land use, green building design, sustainable mobility, resilience, safety, walkability.			
TARGET 4.1.1.1	Decrease the number of vacant lots or brownfields by 10% per neighborhood increasing by 2030. .	Community Development Director	Metric: % of brownfields per neighborhood & % of projects preserving historic buildings. Alternative metrics: % of land designated by city to preserve open space % of land designated as historic preservation
TARGET 4.1.2.1	Increase the number of completed lots to preserve historic buildings and repurpose vacant lots and brownfields by 10% by 2030.	Planning Director	Planning department
OBJECTIVE 2: RESILIENT NEIGHBORHOOD INFRASTRUCTURE			
OUTCOME 2: Promote resilient neighborhood infrastructure with housing, city streets, and sidewalks, available trees, green space, access to parks and recreation amenities as important elements of any neighborhood.			
TARGET 4.2.2.1	Increase the number of affordable housing units by 100 by June 30, 2024.	Community Development Director	COMMUNITY DEVELOPMENT

Resilient Emergency Management, Disaster and Pandemic Preparedness, and Climate Readiness

Climate change represents an unprecedented set of challenges to emergency management and planning, disaster readiness, and preparedness for municipalities. Borchers et al. (2020), Reid et al. (2016), Richardson et al. (2012), Smith et al. (2014), and Youssouf (2014) documented the health impacts and social costs associated with wildfires and heatwaves, poor air quality, further exacerbated by climate change and global warming.

The recent COVID-19 pandemic has put an additional strain on all resources in communities and organizations in all sectors and put a spotlight on public health risks from the global pandemic. Communities continue to experience the effects of the extended heatwave events, fires, COVID-19 and droughts with long-term consequences.

To appropriately and timely respond to disasters and generate resilient emergency management, cities, counties, and states emergency action guidelines, disaster preparedness, and hazard mitigation plans are amended to include additional considerations and planning procedures incorporating the climate change information and data.

The following checklist aids the public health and communication service sections in the emergency preparedness plans:

- Coordinate with the nonprofit organizations to establish cooling shelters that provide air conditioning and relief from extreme heat events and fires.
- Distribute public statements to inform residents of ways to avoid heat-related illness and injury, encouraging them to check on vulnerable neighbors and family members and providing them with the shelter locations information.
- Issue public statement to encourage lowering emissions during prolonged heat events to improve air quality.
- Organize and coordinate with power utilities to ensure timely response in the case of prolonged power outages.
- Ensure all pandemic responses are coordinated with public health agencies.

Beyond amendments to the governments' emergency preparedness guidelines and plans, the list of recommendations and supporting documents are included in the Public Health Services section of the emergency and disaster plans. The items are incorporated into a comprehensive report on emergency preparedness in response to extreme weather threats and the changing climate.

Resilient Emergency Planning Recommendations:

- Inventory available communication methods and the crucial emergency personnel.
- Catalog available communication methods with the community concerning emergencies and available resources and solutions, including landlines and other means of communication in case of loss of landlines and cellular reception.
- Assess the ability to identify specific portions of the city and population, low income and vulnerable population, including elderly, school children, businesses, and community aid organizations.
- Evaluate the ability to disseminate emergency information to specific segments of the population.
- Create educational material on the likelihood of an increased number of emergency events.
- Provide the educational content on the availability of recourses for a particular emergency event: including evacuation routes, cooling center locations, water pollution threats and potential treatments, avoiding injury or health issues during high heat and poor air quality events.
- Include stakeholders from various sectors to ensure all concerns are addressed comprehensively.
- In the case of a pandemic, it is critical to coordinate efforts with the federal, state, and local public health agencies.

Severe Heatwaves or Fires Events Resilient Planning Recommendations:

- Use satellite imagery, census data, and GIS to identify vulnerable populations.
- Use satellite imagery and GIS to determine locations where the heat island effect will increase the severity of heatwave events or fires.
- Reduce carbon emissions during high heat events to improve the local air quality.
- Create an automated system to alert and check on at-risk citizens.

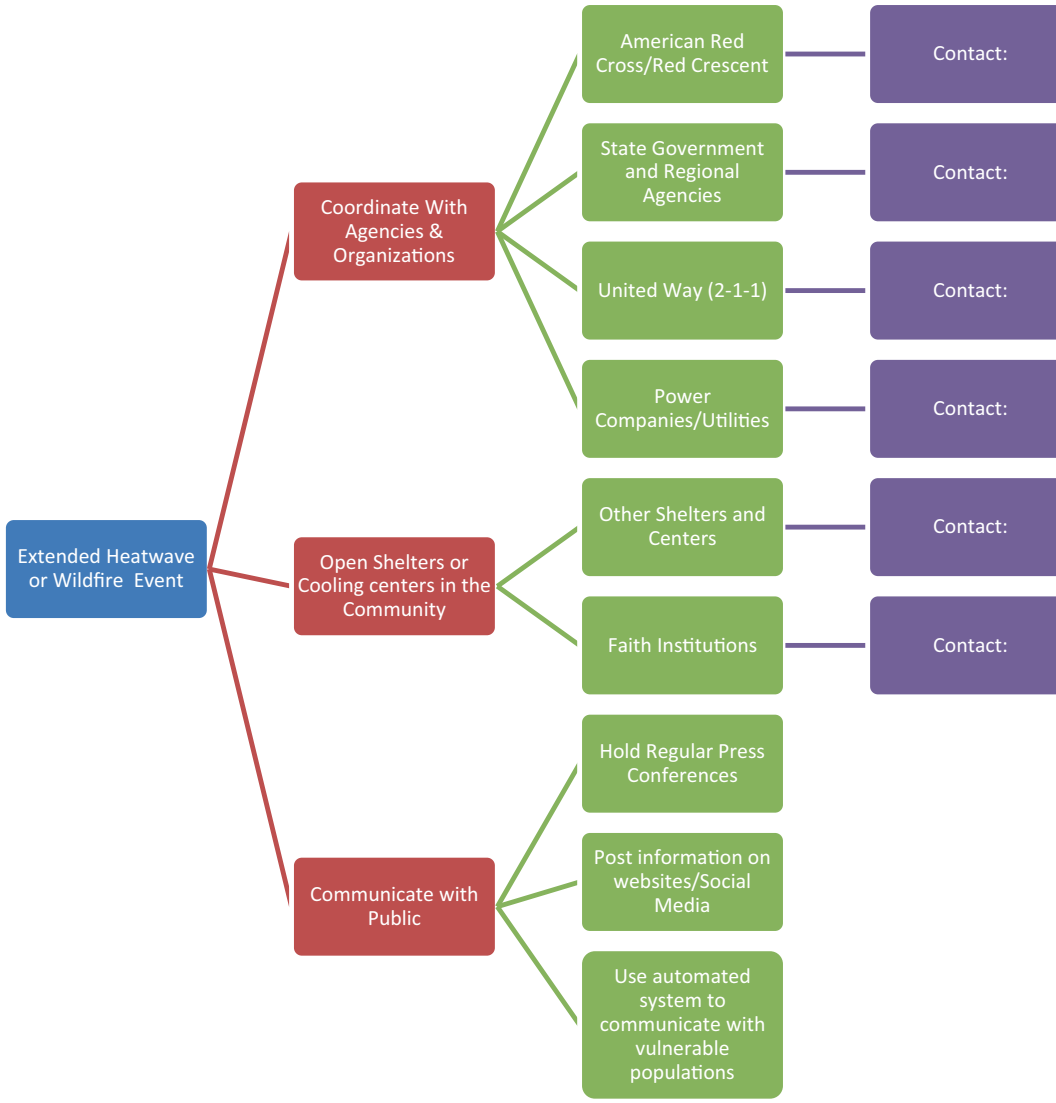

Fig. 7.1 Flowchart—emergency preparedness for extended heatwave or wildfires events

- Open the cooling centers or centers for evacuated populations and collaborate with local nonprofit organizations to make temporary shelters.

In the case of protracted heat events or wildfires, the flowchart represented by Fig. 7.1 features a recommended community-wide response, from coordinating with the relevant community organizations, utilities, and state, regional, and federal agencies, communicating with the public, and opening of the shelters (Fig. 7.1).

Pandemic Resilient Planning Recommendations:

- Provide easy access and infrastructure to testing and vaccination for residents.
- Ensure daily data on new cases and hospitalizations, mortality rates.
- Coordinate shutdowns and shelter in place with the state and regional agencies.
- Strategize mask policies and other mandates and requirements across all levels of governments.

Summary

Countless resources and tools are available at no or at a relatively small cost to the organizations and communities to develop robust strategic resilience and sustainability plan. The availability and ease of access to resources make it a compelling reason for governments to pursue resilience and sustainability initiatives in their plans. Likewise, with the supportive elected and appointed leadership, institutionalized resilience and sustainability strategies, and dedicated staff, the use of available resources and tools results in concrete strategies and outcomes for the organization. Moreover, the available resources and tools are only relevant if the appropriate internal and external stakeholders are identified, environmental analysis is conducted, and measurable targets are created using the steps described in the previous chapters.

Finally, the tools and resources add value with dedicated staff to plan and implement strategic resilience and sustainability initiatives. Institutionalizing strategic resilience and sustainability planning assists organizations and communities to better prepare for the inevitable adverse effects of climate change and be ready for events such as the current COVID-19 pandemic to be more resilient to the unpredictable nature of disasters.

Outcomes, Discussions, and Further Considerations

- Discuss the resources that local government administrators would require for resilience and sustainability strategic planning.
- Assess how the communities and organizations propose to measure carbon footprint and energy productions.
- Scrutinize the available measures utilized by organizations and communities.
- Evaluate the available staffing and the requirements for implementing a strategic resilience and sustainability plan.
- Analyze the objectives and targets, including reducing energy consumption, renewable energy, and greenhouse gas emission targets for communities and organizations.
- Discuss how to implement climate resilience, pandemic responses, disaster readiness, and resilient emergency management.

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