READY FOR RESILIENCE

A GUIDE FOR EMBEDDING CLIMATE ACTION INTO LOCAL GOVERNMENT OPERATIONS

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This is intended to be a living document and will be updated periodically to ensure it is useful and contains the latest information.

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Overview

Climate Change and Local Governments

Climate change is a global problem whose impacts will be felt most intensely at the local level. From sea level rise to worsening severe weather events such as storms, droughts, floods, and heat waves, the impacts of a changing climate will challenge the safety, economy, and way of life for Maryland communities.

Climate change is rippling through communities, exacerbating existing problems, stretching already strained budgets, and shifting how local governments operate, leaving decision-makers to make increasingly more difficult choices with fewer resources. Aging infrastructure is already a major issue throughout the U.S., and climate change puts more stress on these systems. Many communities are experiencing more frequent flood events that are not associated with a federally declared disaster, meaning that the local governments must shoulder more of the financial burden for repairs and recovery. While climate change is a global crisis beyond the control of any one community, there are clear actions that can be taken by local governments to help mitigate and adapt to the effects of climate change. Specifically, integrating climate action and resilience adaptation into government operations can help local governments prepare for uncertainty and launch a transformation into just, equitable, and thriving communities.

CLIMATE MITIGATION

Steps taken to limit the magnitude and stabilize the rate of climate change. This generally involves reducing the flow of heat-trapping greenhouse gases into the atmosphere, either by reducing sources of these gases (e.g., improving energy efficiency and switching away from fossil fuels) or enhancing the “sinks” that accumulate and store these gases (e.g., forests and soil).

CLIMATE ADAPTATION

Steps taken to adjust natural or human systems to the expected impacts of climate change. This generally involves either reducing vulnerability to the harmful effects of climate change (i.e., adopting practices to avoid harm from more intense weather events or sea level rise) or making the most of potential beneficial opportunities associated with climate change (i.e., longer growing seasons).

CLIMATE RESILIENCE

The capacity of a community to anticipate, prepare for, and respond to climate change in order to thrive and prosper. This will require communities to adopt a continuous process of learning, leading, and implementing both mitigation and adaptation strategies to ensure the long-term health, safety, and financial well-being of their residents.

What is Local Government Resilience?

For local governments, “climate change resilience” refers to the ability to anticipate, prepare for, and respond to climate threats so the community can thrive and prosper despite changing conditions. To increase resilience, local governments will need to understand both chronic stressors and acute threats impacting their community, develop and implement measures to reduce their greenhouse gas emissions, and begin anticipating and planning for the climate impacts that will likely affect their environment, economy, and residents.

A successful response to climate threats will depend on a local government’s ability to mobilize both community support and resources around local adaptation and mitigation actions. To do so, local decision makers must proactively take steps to build their capacity to adopt governance strategies that boost resilience and integrate climate considerations into their daily operations.

Whether big or small, urban, or rural, increasing a government’s capacity to adapt to climate change is essential for building community resilience. This is especially important for safeguarding our most vulnerable populations including, Black, Indigenous, People of Color, economically disadvantaged, and people with disabilities or chronic illness, who will be disproportionately impacted by climate change. To address equitable climate adaptation, The Innovation Network for Communities identified seven essential capacities for urban climate adaptation that should be developed to ensure that everyone in the community has access to the same opportunities and resources needed to adapt to climate change and build community resilience.

Essential Capacities for Urban Climate Adaptation

1. **Scientific Foundation.** Capacity to assess and understand climate risks and vulnerabilities of a city’s built, natural, and economic assets and populations, and use these analyses for ongoing adaptation planning
2. **Communications.** Capacity to communicate with and educate civic leaders and community members in ways that build and sustain a sense of urgency to adapt for climate changes
3. **Equitable Adaptation.** Capacity to make social and economic equity a central driver of the city’s adaptation approach
4. **Inclusive Community Engagement.** Capacity to fully engage stakeholders and the public, especially vulnerable and underrepresented populations, in developing, implementing, and monitoring adaptation plans
5. **Intergovernmental Alignment.** Capacity to coordinate planning and action across governments at local, regional, state, tribal, and federal levels
6. **Technical Design.** Capacity to design, test, and implement adaptation actions that require engineering, legal, and other highly specialized details, as well as performance metrics for monitoring
7. **Financial Resources.** Capacity to repurpose, leverage, and obtain public and private funds to invest in infrastructure development and other adaptation actions.

(Innovation Network for Communities, 2017)

About This Guide

The University of Maryland Environmental Finance Center (EFC) developed this guide with support from the Maryland Department of Natural Resources (DNR) to help local governments assess and improve their capacity for increasing climate change resilience. The guide provides an approach for developing a baseline of local government operations as it relates to climate change, integrating climate change into local daily decision making, and enhancing the core functions of local government to better enable the implementation of climate action strategies.

This guide is intended to be particularly useful for small and medium-sized municipalities regardless of whether they are located on the coast or inland. It provides easy-to-use worksheets with corresponding action resources, templates, and case studies.

This guide focuses on strategies that facilitate implementation. It does NOT detail strategies for conducting a vulnerability assessment, climate action and resilience planning, or addressing specific hazards or risks (e.g., flooding, drought) since plenty of tools and guidance already cover these topics and are referenced throughout the document. Most of the implementation strategies and actions identified in this document do not require formal planning and assessment to get started. These strategies for integrating climate change into local government operations largely take a "no-regrets" approach, meaning they are actions that will likely benefit the community regardless of whether they are explicitly tied to climate change impacts or objectives.

DOES COVER

- Best practices for local government operations
- Ways to expand funding and financing options
- No-regrets implementation approaches
- Resources and tools

DOES NOT COVER

- How to conduct a vulnerability assessment
- Steps for climate action and resilience planning
- Specific strategies for addressing hazards or risks
- Emergency/disaster response

“NO-REGRETS” ACTIONS

Actions taken by households, communities, and local/national/international institutions that can be justified from economic, social, and environmental perspectives whether natural hazard events or climate change (or other hazards) take place. "No-regrets" actions increase resilience, which is the ability of a "system" to deal with different types of hazards in a timely, efficient, and equitable manner. Increasing resilience is the basis for sustainable growth in a world of multiple hazards.

(Heltberg, Siegel, Jorgensen, 2009; UNDP, 2010)

Approach to Local Government Resilience

There are generally two ways in which a local government can become more resilient to climate change: 1) adjusting existing procedures, plans, and standards, and 2) implementing new projects and programs. Most communities will need to employ a combination of both approaches, depending on their available capacity and specific needs.

This guide helps to identify opportunities for embedding climate change resilience into existing government operations and offers recommendations for new projects and programs. This table presents six core functions into which climate resilience can be integrated, but it is not an exhaustive list.

CORE FUNCTIONS OF LOCAL GOVERNMENT					
Hazard, Risk, And Vulnerability Assessment	Infrastructure and Asset Management	Planning	Policy and Regulations	Finance and Budgeting	Outreach and Engagement
					

Click on the icon for each core function in the table above to:

- Read the function description
- Complete the worksheet questionnaire
- Delve into the action recommendations
- Explore the resources for improvement

Through this approach, a community can examine its government operations; identify potential areas for improvement; and adopt action strategies to integrate climate change mitigation, adaptation, and community resilience into daily decision making.

Work with a Team

Working with a team of your partners and community stakeholders can help considerably with this process. Including elected officials, town administrators, finance officers, public works, sustainability coordinators, emergency response personnel, planning staff, Green Team members, and community leaders, particularly those representing the underserved, will enable a variety of voices to be heard, broaden the perspectives on priorities and potential needed actions and expand the base of partners who can support implementation.

Holding a kick-off meeting with this team offers the opportunity to discuss goals and responsibilities for completing the assessment and the implementation of resilience measures. While interrelated, the six core functions do not need to be completed at one time or in sequence, but ideally, the core functions should be assessed collectively, as this enables better integration, which can help strengthen the implementation process and boost overall resilience outcomes.

Hazard, Risk, and Vulnerability Assessment

Local governments play a key role in mitigating a community's natural hazard-related risks and providing the continuity of operations and services whether on a day-to-day basis or following a disaster that affects the quality of life for the people in their community. Unfortunately, climate change is delivering an increase in the frequency and intensity of natural hazards and creating uncertainty that local governments will have to address. In Maryland, communities are already experiencing recurring problems related to more intense stormwater flooding, longer heat waves, and coastal sea level rise. It is important to learn where and how these changes will affect the physical, social, and economic landscapes of a community. All this places urgency on local governments to assess and manage potential hazards and risks and take steps to reduce vulnerabilities to build resilient communities.

The first step to managing risks is identifying them. This includes understanding current problems as well as future risks. Once the risks that a particular hazard can pose to residents, natural resources, and physical infrastructure are understood, steps can be taken to proactively plan and implement actions that mitigate risks and reduce vulnerabilities.

Local governments should regularly evaluate potential hazards and risks and implement plans to reduce community exposure to those risks. This will not only help agencies operate effectively and know how to respond quickly in the case of an emergency but can also protect the government against liability. Additionally, proactive risk mitigation saves money--for example, studies show that every dollar spent on natural hazard mitigation saves $4 to $11.

A WORD ABOUT FLOODPLAINS

Most towns have adopted floodplain ordinances to guide decisions in areas that have a 1% annual chance of experiencing a flood, sometimes called the "mapped" or regulatory floodplain. It is important to note that floods can, and often do, occur outside of the regulatory floodplain so any risk assessments should take a wider range of actual flood risks into consideration.

NATURAL HAZARD

A potentially damaging physical event or natural phenomenon that may cause the loss of life or injury, property damage, social and economic disruption, or environmental degradation.

VULNERABILITY

The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. Vulnerability is determined by a combination of the exposure, sensitivity, and adaptive capacity of the city's assets, populations, and neighborhoods.

RISK

The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions in a given area and time period.

RISK MITIGATION

The process of taking steps to reduce potential losses and harms from a risk.

Worksheet Questionnaire

My local government:	Yes	No	Notes
1. Understands how it has been historically impacted by weather and climate-related hazards.			
a. Maintains records on the impacts of weather events.			
b. Tracks damages and costs associated with events. 			
c. Monitors recurring issues.			
d. Has mapped the impacts of historical weather events.			
2. Understands how weather and climate-related hazards are expected to change over time due to climate change.			
3. Has conducted a climate change vulnerability assessment.			
a. Includes all weather and climate-related hazards into a single comprehensive vulnerability assessment.			
b. Addresses the potential impacts on cultural, economic, social, environmental, and built assets in its vulnerability assessment. 			
c. Identifies specific populations that are particularly vulnerable to climate change in its vulnerability assessment. 			
d. Includes a detailed geospatial mapping component in its vulnerability assessment that overlays projected climate-related hazards onto assets and populations to identify high risk and vulnerability hotspots.			
4. Has assessed its own climate-related financial risks. 			

HAZARD, RISK, & VULNERABILITY ASSESSMENT CHECKLISTS

When conducting a hazard, risk, and vulnerability assessment there are many details to consider. These checklists offer examples of the types of hazards, impacts, risks, assets, and sectors that local governments will want to include as part of a comprehensive assessment effort.

WEATHER AND CLIMATE-RELATED HAZARDS:

- ☐ Precipitation
- ☐ Storms
- ☐ Drought
- ☐ Heat
- ☐ Fires
- ☐ Sea level rise

HAZARD IMPACTS:

- ☐ Flooding
- ☐ Storm surge
- ☐ Erosion
- ☐ Low water table
- ☐ Saltwater intrusion
- ☐ Heat-related disease
- ☐ Natural resource loss
- ☐ Loss of biodiversity
- ☐ Agricultural shifts
- ☐ Population change
- ☐ Business interruption
- ☐ Property damage
- ☐ Road closures

GOVERNMENT FINANCIAL RISKS:

- ☐ Property tax revenue
- ☐ Sales tax revenue
- ☐ Tourism revenue
- ☐ Bond ratings
- ☐ Increasing or new costs
- ☐ Funds

VULNERABLE POPULATIONS:

- ☐ Black people
- ☐ Indigenous people
- ☐ People of Color
- ☐ Immigrant communities
- ☐ Disabled people
- ☐ Elderly and children
- ☐ Low-income
- ☐ Non-English speakers

INFRASTRUCTURE & COMMUNITY ASSETS:

- ☐ Critical facilities (hospitals, fire stations, shelters)
- ☐ Buildings (number and type of structures)
- ☐ Affordable housing stocks
- ☐ Infrastructure (roads, utilities)
- ☐ Equipment (generators, HVAC systems, vehicles, tools, electronics)
- ☐ Natural Capital (open space, wildlife habitat, water resources, critical areas)
- ☐ Cultural resources (libraries, museums, archeological sites)
- ☐ Economic Drivers (business districts, tourism, industry)

See also: Infrastructure & Asset Management Checklist

Action Recommendations

Beginner

- [ ] Learn about climate change impacts in your region.
- [ ] Identify the climate-related hazards that are projected to impact your community and may exacerbate existing hazards or present new problems.
- [ ] Begin keeping records on impacts of climate-related hazards in the community and track the frequency and nature of incidents, including intensity (e.g., 6.5 inches of rain in 1 hour); location; damage to physical, community, and natural assets; health and safety impacts; and costs.

> ***In Maryland, you will want to pay special attention to locations that frequently experience flooding or drainage issues!***

- [ ] Identify community members that are most vulnerable to the impacts of climate change (e.g., Black, Indigenous, and People of Color, low income, elderly, etc.). See Infrastructure & Asset Management Checklists.
- [ ] Compile and review existing maps and community plans that address weather and climate-related hazards (e.g., hazard mitigation plan, floodplain maps, flood mitigation studies, etc.). See Community Plans Checklists.

Intermediate

- [ ] Develop a map of projected climate change impacts overlaid with your community's critical infrastructure and vulnerable populations and identify impacts that cannot be easily mapped. See Infrastructure & Asset Management Checklists.
- [ ] Conduct a vulnerability assessment of critical infrastructure and vulnerable populations.
- [ ] Assess flooding and drainage incidents for whether they occur inside or outside of mapped floodplains, what types of property or assets are impacted, the scale of impact, and whether affected property owners/tenants are enrolled in flood insurance.
- [ ] Assess flood insurance coverage status within the community and identify properties that are vulnerable due to lack of coverage or at risk of increasing insurance rates or loss of coverage.

Advanced

- [ ] Conduct a comprehensive climate vulnerability assessment using spatial analysis of the hazards, impacts, and risks on the physical, natural, and economic assets of the community, as well as on vulnerable populations. See Hazard, Risk, & Vulnerability Assessment Checklists.
- [ ] Identify and quantify the economic impacts of climate change on the community's physical, natural, and economic assets, as well as the government's climate-related financial risks. (e.g., property and infrastructure damage, unemployment, loss of businesses, impacts on vulnerable populations, utility restoration, and lost tax revenue.)

Resources for Improvement

Guides and Reports

- Steps to Resilience. U.S. Climate Resilience Toolkit. https://toolkit.climate.gov/steps-to-resilience/steps-resilience-overview
    - Five-step framework that helps communities understand and plan for climate change impacts. Steps 1 (Explore Hazards) and 2 (Assess Vulnerability & Risk) can inform other planning and decision processes and can be used to prioritize action strategies.

- Cultural Resources Hazard Mitigation Planning Program. Maryland Department of Planning Maryland Historical Trust. 2017. https://mht.maryland.gov/grants_hazardmitigation.shtml
    - The *Architectural Survey Form for Hazard Mitigation Planning* and accompanying how-to document and video can help communities conduct a risk assessment for historic structures that are important to the community and vulnerable to flooding.

- Maryland's CoastSmart Communities Scorecard. Maryland Department of Natural Resources. 2013. https://dnr.maryland.gov/ccs/coastsmart/Documents/scorecard.pdf
    - Comprehensive checklist for assessing coastal risk and vulnerability.

- Nuisance Flood Plan Development Guidance. 2019. https://dnr.maryland.gov/ccs/Documents/NuisanceFloodPlan.pdf
    - Simple guidance that a jurisdiction can follow to meet the State's nuisance flood plan (NFP) requirement or to identify and track other flooding issues.

- Planning Framework for a Climate-Resilient Economy. https://www.epa.gov/smartgrowth/planning-framework-climate-resilient-economy
    - This EPA tool helps communities assess their economic vulnerability to climate change and improve their economic resilience. The framework consists of five basic steps to identify economic vulnerabilities and ways to be more climate resilient

- Resilience Resources from the Federal Highway Administration. https://www.fhwa.dot.gov/environment/sustainability/resilience/
    - Vulnerability Assessment and Adaptation Framework, 3rd Edition https://www.fhwa.dot.gov/environment/sustainability/resilience/adaptation_framework/ A manual to help assess the vulnerability of transportation infrastructure and systems to extreme weather and climate effects and integrate integrate climate adaptation considerations into transportation decision-making.

- Sea level rise projections for Maryland. 2018. https://mde.maryland.gov/programs/Air/ClimateChange/MCCC/Documents/Sea-LevelRiseProjectionsMaryland2018.pdf
    - Report provides updated projections of the amount of sea-level rise relative to Maryland coastal lands that is expected into the next century.

- Maryland and District of Columbia State Climate Summaries. NOAA National Centers for Environmental Information. 2014. https://statesummaries.ncics.org/chapter/md/

- High-level summary of observed and projected changes to Maryland's climate.

Data Sets and Tools

- Maryland Coastal Atlas. https://gisapps.dnr.state.md.us/coastalatlas/WAB2/
  - Mapping tool that allows users to visually analyze and explore coastal and ocean data layers for project and planning purposes.

- Maryland Flood Risk Application. https://mdfloodmaps.net/
  - Mapping tool that can be used to determine whether a property is likely located within a regulatory floodplain according to Flood Insurance Rate Maps (FIRMs). Other flood risk map layers such as sea level rise and storm surge vulnerability can also be viewed.

- Maryland CRAB Tool Application. https://mdfloodmaps.net/crab/
  - A new mapping tool for the Coast Smart - Climate Ready Action Boundary (CS-CRAB), which shows the projected extent of the coastal 100-year or 1% chance floodplain with three additional feet of water. Construction projects using over $500,000 in state funding are required to use the CS-CRAB layer.

- MDDOT SHA Climate Change Vulnerability Viewer. https://www.arcgis.com/home/item.html?id=86b5933d2d3e45ee8b9d8a5f03a7030c
  - ArcGIS Online web application that showcases geospatial data products related to sea level change and the potential impacts of coastal flooding on the State of Maryland's transportation infrastructure.

- Adapting Stormwater Management for Coastal Floods. https://coast.noaa.gov/stormwater-floods/
  - This online tool allows you to understand, assess, analyze, and take action on coastal flooding that impacts stormwater systems.

- Neighborhoods at Risk. https://headwaterseconomics.org/apps/neighborhoods-at-risk/
  - This web-based tool provides community-level climate projections for temperature and precipitation and generates customized, interactive maps and reports that highlight potentially vulnerable neighborhoods by census tract.

- Coastal risk mapping tools: Coastal Resilience Tool, Sea Level Rise Viewer, Surging Seas Risk Finder. https://coastalresilience.org/wp-content/uploads/2016/10/Fact-Sheet_Sea-Level-Rise-Assesment-Mapping-Tools.pdf
  - Quick reference guide that compares three mapping tools to assess sea level rise impacts, with links to the different tools.

- Coastal Risk Screening Tool: Affordable housing at risk of flooding in 2050. https://coastal.climatecentral.org/map/12/-73.968/40.7219/?theme=flood_threats&map_type=affordable_housing

- The Climate Explorer. https://crt-climate-explorer.nemac.org/
  - Explore graphs and maps of historical and projected climate variables, including temperature and precipitation, for any County in the U.S.

Infrastructure and Asset Management

Building infrastructure and maintaining assets are two of the biggest responsibilities of local governments and is usually the biggest expense as well. While traditional asset management focuses on physical assets, more communities are applying asset management to natural capital, especially stormwater and green infrastructure, as they seek new strategies to deliver their core services in more financially and environmentally sustainable ways. In addition, local governments are starting to better identify and assess community assets that can be leveraged to ensure a thriving and vibrant community.

Investing in better asset management can result in savings and additional revenues for the local budget, better-quality assets and services, and more trust between people and government. Apart from taking a proactive approach to maintaining, repairing, and replacing its physical assets, communities should plan to upgrade physical assets so they can withstand climate change impacts. This will reduce the risk of catastrophic failure, preserve public safety, and ensure the continuity of local services.

> "Asset management focuses upon optimizing the conditions of assets with available revenues. Well-maintained assets generally are better able to withstand the stresses of storm events and other disasters better than weakened and poorly maintained ones."
>
> *(Federal Highway Administration, 2013)*

While natural assets have historically not been considered on equal footing or included in asset management plans, natural assets provide services that are comparable to traditional engineered assets. Municipalities are increasingly recognizing that natural assets such as wetlands, forests, and streams can provide equivalent or better services than many engineered assets and often at a fraction of the cost, specifically as it relates to ongoing maintenance, while providing additional community benefits such as space for recreation, shade, beautification, and air quality improvement.

Likewise, more communities are beginning to monitor and track community assets to proactively respond to the needs of their residents and businesses. By adopting an asset management approach to community assets, local governments can effectively tailor services to residential needs and advance efforts to build stronger community cohesion. This can help improve daily quality of life and reduce vulnerability in emergency situations, ensuring maximum community benefit in the most cost-effective manner for present and future generations.

Ultimately, asset management is not intended to be a one-time exercise—over time, the physical infrastructure and natural capital will deteriorate if not tended to, while populations will grow and decline. To account for this, the needs of each municipality as well their assets must be continuously re-evaluated and maintained to reduce vulnerabilities and mitigate risks.

ASSET MANAGEMENT

The process of inventorying a community's existing assets, determining the current state of those assets, and preparing and implementing a plan to maintain or replace those assets—allowing municipalities to make informed decisions regarding a community's assets and finances. (https://mnai.ca/about/)

PHYSICAL ASSETS

Any physical resource owned, controlled, or managed by the local government that can be used to produce positive economic or social value. This typically includes properties, equipment, and built infrastructure; in this guide it also includes natural assets (described below).

COMMUNITY ASSETS

Any resource that can be leveraged to improve the health and well-being of community members. This typically includes skills, talents, and abilities of organizations, associations, and individuals, as well as physical structures or places where communities convene.

NATURAL ASSETS / NATURAL CAPITAL

Refers to the physical and biological resources within a jurisdiction that provide a benefit to the community. These resources can provide ecosystem goods (e.g., food, clean air, and water), ecosystem services (e.g., nutrient cycling, water purification and climate regulation), and non-material benefits (e.g., recreation, aesthetic, and cultural benefits).

NO-REGRETS ACTION

Asset management is the ultimate no-regrets approach. It reduces costs, helps minimize labor, and can prevent service interruptions. Maintaining and repairing existing infrastructure can benefit the community regardless of future climate change impacts.

"Uncertainty about the location and condition of infrastructure assets and lack of comprehensive planning often leads to a reactive approach to maintenance and the occurrence of emergency situations stemming from asset failures."

(U.S. Environmental Protection Agency, 2017)

Worksheet Questionnaire

My local government:	Yes	No	Notes
1. Maintains a detailed inventory of physical and community assets.			
a. Includes critical facilities, built infrastructure, natural resources, cultural resources, economic drivers, and social capital in its inventory of assets.			
b. Engaged the community in the identification of community assets. 			
c. Maintains records on the expected lifespan of assets.			
d. Tracks the operations and maintenance needs of assets.			
e. Records estimated maintenance and replacement costs in its asset inventory. 			
2. Developed procedures for regularly examining structural components of its critical facilities and built infrastructure.			
a. Has a plan for repairing and upgrading its critical infrastructure. 			
b. Is current on all capital improvement infrastructure repairs, maintenance, and/or replacement projects. 			
3. Assessed its physical assets for vulnerabilities to climate change. 			
a. Identified strategies to reduce its assets' vulnerabilities to climate change. 			
b. Adjusted its infrastructure maintenance processes and schedules to account for climate change impacts.			
c. Makes changes and/or updgrades to infrastructure at the end of its useful life or during routine repairs to reduce its vunerability to future climate impacts.			
d. Adopted updated siting and design guidelines for new infrastructure projects and programs. 			
e. Developed a process to determine when it will stop upgrading existing infrastructure that is being impacted by increasing weather hazards and sea-level rise. 			

INFRASTRUCTURE & ASSET MANAGEMENT CHECKLISTS

Maintaining an asset inventory is important to managing a community's vulnerability to climate risks. These checklists identify the types of infrastructure, assets, and resources local governments should consider tracking to better manage their climate risks. In addition to tracking location, condition, and service needs of various assets, consider tracking co-benefits that help contribute to a community's adaptive capacity.

CRITICAL FACILITIES:

- ☐ Hospitals
- ☐ Shelters
- ☐ Cooling centers
- ☐ Community resilience hubs
- ☐ Fire stations
- ☐ Police stations
- ☐ Emergency evacuation routes
- ☐ Wastewater treatment plant
- ☐ Drinking water system
- ☐ Stormwater system
- ☐ Powerlines
- ☐ Electrical transformers
- ☐ Wells and pumps
- ☐ Cell towers

BUILT INFRASTRUCTURE:

- ☐ Buildings
- ☐ Roads
- ☐ Utilities
- ☐ Equipment

NATURAL ASSETS:

- ☐ Green infrastructure
- ☐ Urban tree canopy
- ☐ Forests
- ☐ Open space
- ☐ Easements
- ☐ Wetlands
- ☐ Floodplains
- ☐ Water bodies
- ☐ Coastal land
- ☐ Wildlife habitat
- ☐ Critical Areas

CULTURAL RESOURCES:

- ☐ Libraries
- ☐ Museums
- ☐ Historic districts
- ☐ Art districts
- ☐ Archeological sites

ECONOMIC ASSETS:

- ☐ Property values
- ☐ Business districts
- ☐ Factories and industrial facilities
- ☐ Working waterfronts
- ☐ Anchor institutions
- ☐ Banks / Credit Unions
- ☐ Local businesses
- ☐ Tourism
- ☐ Major employers

CO-BENEFITS DESIRED:

- ☐ Storm buffering
- ☐ Heat reduction
- ☐ Flood water management
- ☐ Erosion control
- ☐ Coastal protection
- ☐ Wildlife habitat
- ☐ Air quality improvements
- ☐ Health impact reductions
- ☐ Community building
- ☐ Property value increases
- ☐ Economic development

Action Recommendations

Beginner

- [ ] Develop and maintain an inventory of all critical infrastructure/facilities, including age, repair status, and life expectancy of individual assets.
- [ ] Establish an operations and maintenance (O&M) schedule for critical infrastructure and dedicate adequate capacity and funding to conducting repairs and upgrades.
- [ ] Prioritize critical infrastructure repair needs and reduce backlog of repairs to minimize vulnerabilities.
- [ ] Identify and catalog all built and natural assets in the community beyond critical infrastructure.

Intermediate

- [ ] Develop a map of projected climate change impacts overlaid with your community's critical infrastructure and identify locations and elevations of the structural components of critical infrastructure.
- [ ] Maintain a more detailed inventory of all built and natural assets in the community, including age, location, size, function and/or service, condition, and life expectancy of individual assets.
- [ ] Develop an O&M schedule for all built and natural assets in the community.

Advanced

- [ ] Conduct a comprehensive climate hazard vulnerability assessment of all built and natural assets. See also: Hazard, Risk, & Vulnerability Assessment Checklists.
- [ ] Ensure that natural assets/capital and green infrastructure are fully incorporated into the community's asset inventory and management process, including O&M schedules and budgets.
- [ ] Identify in the natural asset inventory the community benefits provided (e.g., shoreline protection, cooling shade, improved air quality, etc.) and the general risks to the asset (e.g., development pressure, invasive species, ecosystem migration, etc.).
- [ ] Adjust infrastructure maintenance policies and processes to account for climate change (e.g., conduct upgrades to reduce future flood damage when making repairs, identify particularly vulnerable infrastructure that may require elevation or relocation, etc.).
- [ ] Develop criteria based on best available climate data to assist in the decision-making process for determining function, size, and siting of new assets (e.g., incorporate future flooding data into culvert size and placement).
- [ ] Prioritize investments in natural assets that can offer multiple benefits (e.g., additional protection from flooding and/or coastal hazards, shade/cooling, improved public health, etc.).
- [ ] Consider using an asset management software system.

Resources for Improvement

Guides

- Asset Management for Local Governments. https://www.aglg.ca/app/uploads/sites/26/2017/04/Asset_Management_For_Local_Governments.pdf
    - Provides guidance for local governments on how to get started in the management of capital assets.

- A Diagnostic Tool to Assess Asset Management Needs of Local Governments in the Least Developed Countries. https://www.un.org/development/desa/financing/sites/www.un.org.development.desa.financing/files/2020-03/UNDESA%20and%20UNCDF%20-%20Diagnostic%20Tool%20for%20Municipal%20Asset%20Management.pdf
    - A diagnostic tool to assess asset management needs of local governments. While it is targeting least developed countries, this resource provides an excellent list of physical assets and how to evaluate them.

- Integrating Natural Assets into Asset Management. https://www.assetmanagementbc.ca/wp-content/uploads/Integrating-Natural-Assets-into-Asset-Management.pdf
    - This is a primer for staff of local governments to help capitalize on the real and immediate benefits of managing their natural assets. It introduces an approach for including natural assets throughout the asset management process.

- Municipal Natural Assets Initiative. https://mnai.ca/key-documents/
    - Provides scientific, economic, and municipal expertise to support and guide local governments in identifying, valuing and accounting for natural assets in their financial planning and asset management programs, and in developing sustainable and climate resilient infrastructure.

- Community Partnering for Local Development Assets Based Community Development. http://www.communitypartnering.info/assets64.html
    - Website outlining a method of community development that builds on the assets and strengths of a community. This method can be used effectively in urban and rural communities to empower and build the capacity of community members to take action.

- The Community Mapping Toolkit: A guide to community asset mapping for community groups and local organizations Community assets. Preston City Council. https://conexionesecuador2018.files.wordpress.com/2018/05/community-mapping-toolkit.pdf
    - Guides communities on the different steps to involve residents in conducting a community mapping/asset mapping.

- Asset Management Framework for Forested and Natural Assets. US Endowment for Forestry and Communities. 2020 https://www.waterrf.org/system/files/resource/2020-10/DRPT-4727.pdf

    - Framework, and associated practical guidance, for how utility professionals can apply the principles and tools of asset management to the natural systems in order to meet utilities' objectives.

- ASCE guidance [webinar] https://www.asce.org/education-and-events/explore-education/elearning-webinars/stretching-the-dollar---asset-management-as-a-tool-to-improve-resiliency
    - Webinar for State and local governments to hear from those using data collection and utilization as a tool to improve community resilience and better understand how to incentivize and improve asset management around the country.

- Green Infrastructure Mapping Guide. NOAA Office of Coastal Management Digital Coast. https://coast.noaa.gov/digitalcoast/training/gi-mapping.html
    - Online guide shows spatial analysts how to incorporate nature-based solutions, or green infrastructure, into their GIS work. A GIS work plan is provided, along with examples, process guidance, case studies, and templates.

- AM KAN Work!: An Asset Management and Energy Efficiency Manual. https://swefc.unm.edu/home/amkan/main.php
    - Guidebook that helps water and wastewater utility owners, operators, managers, and board members assess the status of their operations and develop strategic plans for sustainable water and wastewater service.

- Climate-Friendly Stream Crossings Toolkit. https://streamcontinuity.org/naacc/resources/climate-friendly-stream-crossings-toolkit
    - A compilation of resources and tools spanning a range of topics to improve road-stream crossings including asset management tools, assessing vulnerability, implementing codes and standards, and training personnel.

- Identifying Community Assets and Resources. Community Toolbox. https://ctb.ku.edu/en/table-of-contents/assessment/assessing-community-needs-and-resources/identify-community-assets/main
    - Provided guidance on how to identify community assets and resources, and how to engage them in a community change effort.

Data Sets and Tools

- Projected Intensity-Duration-Frequency (IDF) Curve Data Tool for the Chesapeake Bay Watershed and Virginia. https://midatlantic-idf.rcc-acis.org/
    - An interactive online tool with updated IDF curves that can be used across the Chesapeake Bay Watershed and Virginia to plan, design, and build infrastructure assets to be more resilient to climate change.

Planning

Written plans are perhaps the most common way to put forth a vision for a local government's future. These documents set priorities, long-range goals, and objectives for all activities that affect the local government. From broad comprehensive plans that provide guidance on how to make decisions on public and private land use, to issue-specific stormwater management plans and geographically focused downtown economic development plans, planning is used across a range of issues to provide guidance on how to meet the current and future needs of residents and businesses while maintaining environmental conditions that will support those demands.

With climate change shifting weather patterns and creating a "new normal," local governments will need to consider how current plans may be disrupted and how future planning processes should be informed by current climate science data to ensure long-term community sustainability, allocate public services equitably, encourage a strong local economy, and protect the population and natural resources.

To plan for climate change, there are typically three approaches.

Local governments should consider which approach for climate change planning is right for their community and work towards mainstreaming the use of climate projections and data into all community plans, processes, and projects.

INTEGRATE CLIMATE INTO EXISITING PLANS

Local governments are already responsible for several community-wide, long-term, multi-sector plans such as community comprehensive plans, hazard mitigation plans, and stormwater management plans. Climate change could be integrated into those plans as either a stand-alone section or as a criteria lens through which to assess the validity of a policy or project.

DEVELOP A STAND-ALONE CLIMATE ADAPTATION / RESILIENCE PLAN

A dedicated climate adaptation or resiliency plan can provide a road map by which to prepare a community for the impacts of climate change. Stand-alone plans can help establish a formalized process through which to engage a variety of sectors on the topic in a focused manner, ensure a direct political commitment, and set up climate adaptation as a community priority.

INTEGRATE CLIMATE INTO LONG-TERM PROJECTS

A community may decide to address climate change on a project-by-project basis. In this case, the community could require that all departments and agencies use a set of climate projections in their planning process and project design and/or establish climate-related project selection criteria for prioritizing project funding and implementation.

Worksheet Questionnaire

My local government:	Yes	No	Notes
1. Has developed a community-based definition for resilience. 			
2. Explicitly identifies climate change and resilience as community priorities. 			
3. Completed a planning document crosswalk to identify and better integrate climate resilience projects and opportunities across the community's planning efforts.			
4. Identified a set of resilience strategies/actions that are either the basis of a stand-alone resilience plan or being integrated into other community plans and processes. The resilience plan (or integrated strategies):			
a. Addresses the environmental, social, and economic impacts of climate change.			
b. Provides short-, mid-, and long-term resilience goals.			
c. Clearly identifies high-impact implementation strategies and projects needed to mitigate risk and achieve resilience goals.			
d. Prioritizes projects and strategies identified in more than one plan.			
e. Considers future growth and demographic projections.			
f. Explicitly references and incorporates a climate vulnerability assessment. 			
g. Identifies funding and financing sources connected to proposed projects and programs. 			
5. Actively participates in multi-jurisdictional and/or watershed-focused planning processes and aligns community plans and goals with regional efforts.			

COMMUNITY PLANS CHECKLISTS

Local governments often maintain several community plans that may address climate-related hazards. This checklist provides suggestions on the types of plans that should be considered in a planning document crosswalk and identifies some high-level considerations for tracking.

	Maintains this plan or included in regional plan	Included in planning document crosswalk	Incorporates projected climate change impacts	Identifies nature-based solutions
Comprehensive Plan				
Capital Improvement Plan				
Economic or Community Development Plan				
Community Growth Plan				
Hazard Mitigation Plan				
Climate Action and Resilience Plan				
Flood Mitigation or Floodplain Management Plan				
Nuisance Flood Plan				
Stormwater Management Plan				
Green Infrastructure Plan				
Open Space Plan				
Parks and Recreation Plan				
Urban Tree Canopy or Forestry Plan				
Extreme Heat Plan				
Energy Management Plan				
Zero Waste Plan				
Historic and Community Preservation Plan				
Transportation Plan				
Other (e.g., utility, health, or emergency plans)				

Action Recommendations

Beginner

- [ ] Identify existing community plans which may address extreme weather or climate-related hazards and conduct a planning document crosswalk to identify any climate-related goals, areas of project and program alignment, and opportunities for climate resilience enhancements.
- [ ] Create a single inventory of the existing climate-related projects and programs identified in the planning document crosswalk.
- [ ] Actively engage in regional (i.e., multi-jurisdictional) and county Hazard Mitigation Plan (HMP) and Climate Action Plan processes. If the community does not have its own local HMP, advocate for the inclusion of local hazards and adaptation projects in the next multi-jurisdictional or County HMP update.
- [ ] Learn about the benefits of nature-based solutions for advancing climate resilience.

Intermediate

- [ ] Develop a community definition of resilience and codify climate change resilience as a top community priority.
- [ ] Identify priority adaptation and resilience strategies that will help address the community's major vulnerabilities.
- [ ] Establish a timeline for completing more detailed studies and planning processes.
- [ ] Identify and pursue potential sources of funding to support assessments and plan/strategy development (e.g. FEMA for FMP or HMP, or other sources for a climate change-specific plan).
- [ ] Determine which approaches to resilience planning are most appropriate for your community.
    - Develop a stand-alone climate adaptation/resilience plan.
    - Integrate climate change into the community's comprehensive plan through a resilience element.
    - Weave climate resilience strategies and projects into other community plans.
- [ ] Incorporate climate change data into all community plan updates.
- [ ] Consider developing other climate-related plans (e.g., flood mitigation, open space, green infrastructure, and watershed protection plans).

Advanced

- [ ] Obtain information on and include climate-related population change (either immigration or emigration) in community planning processes.

- [ ] Incorporate adaptation/resilience strategies into existing planning documents, and update plan components based on climate hazard, risk, and vulnerability assessment findings.
- [ ] Implement projects that are in accordance with the plans and policies developed to utilize natural and nature-based features to increase resilience.
- [ ] Incorporate green infrastructure and nature-based solutions into community resilience planning. (e.g., land acquisitions or easements in flood prone areas, open space conservation, tree preservation, etc.)
- [ ] Provide direct funding to areas designated as the most ecologically valuable land, such as those identified in the Maryland GreenPrint Map.

Resources for Improvement

Guides and Resports

- Plan Integration for Resilience Scorecard GUIDEBOOK: Spatially evaluating networks of plans to reduce hazard vulnerability. http://mitigationguide.org/wp-content/uploads/2018/03/Guidebook-2020.05-v5.pdf
    - A tool to help communities integrate local plans by spatially evaluating their plan documents and existing vulnerabilities to effectively advance the cause of hazard resilience.

- Guide to Equitable, Community-Driven Climate Preparedness Planning. Urban Sustainability Directors Network. 2017. https://www.usdn.org/uploads/cms/documents/usdn_guide_to_equitable_community-driven_climate_preparedness-_high_res.pdf
    - Strong general guide for climate planning with an emphasis on community engagement and equity considerations.

- Community Resilience Planning Guide for Buildings and Infrastructure Systems. NIST. https://www.nist.gov/community-resilience/planning-guide
    - Six-step guide that helps communities set priorities and allocate resources as they plan for their needs, their particular hazard risks, and recovery of the built environment

- Climate Action Planning Guide. https://cdrpc.org/wp-content/uploads/2015/05/CAP-Guide_MAR-2014_FINAL.pdf
    - Planning guide for reducing greenhouse gases in a community.

- Maryland GreenPrint Map. https://geodata.md.gov/greenprint/
    - Map displays Targeted Ecological Areas (TEAs), lands and watersheds of high ecological value that have been identified as conservation priorities by DNR. The mapping application contains a Parcel Evaluation Tool that provides a Conservation Benefits and Ecosystem Service Assessment Report Card for every land parcel in Maryland.

- Green Works for Climate Resilience: A Guide to Community Planning for Climate Change. National Wildlife Federation. 2014. https://www.nwf.org/~/media/PDFs/Global-Warming/Climate-Smart-Conservation/2014/green-works-final-for-web.pdf
    - Provide an overview of the kinds of nature-based approaches that can be used to respond to and prepare for the impacts of climate change.

- Community Resilience Building. https://www.communityresiliencebuilding.com/
    - Community-driven process for assessing risk and developing local planning capacity.

- Building Community Resilience with Nature-based Solutions: A Guide for Local Communities. FEMA. 2020. https://www.fema.gov/sites/default/files/2020-08/fema_riskmap_nature-based-solutions-guide_2020.pdf
    - This guide helps communities identify and engage the staff and resources that can play a role in building resilience with nature-based solutions.

Policy and Regulations

Local governments establish and enforce a variety of policies and regulations in their communities to protect public safety, conserve the natural environment, and encourage economic growth. Land use policies in particular are used to influence where and how a community grows, making these tools important for shaping a community's footprint and its impacts on the landscape. Adopting Smart Growth policies, including zoning, building codes, and ordinances, can also be used to strengthen a community's resilience to climate change. Communities should evaluate their existing codes and ordinances and determine where it is feasible to make changes or develop new ordinances that will help them become more resilient to climate change.

Regulations can offer a proactive approach--such as by preventing structures from being built in harm's way or requiring new construction to be more resilient to climate-related hazards--and they can also be used to stimulate innovation. One benefit of using regulatory measures to enhance resilience is that they help to spread the costs of adaptation across residents and businesses, rather than relying solely on the local government to take on the burden. In many cases, putting policies in place that support resilience can yield other benefits to the community. For example, adopting stronger floodplain regulations can result in flood insurance premium discounts for community members through the Federal Emergency Management Agency (FEMA) Community Rating System (CRS) program.

Policy strategies to improve climate change readiness can be incorporated into a community's regular processes, such as scheduled updates to zoning and building codes. Communities should not delay in making policy updates, however, as it often takes years for changes in codes and ordinances to affect land-use patterns and the built environment. Some of these tools are better at addressing individual structures' risk while others may be used to impact resiliency on a neighborhood or district scale. Also, a jurisdiction that expects to physically grow is likely to have more policy tools at its disposal than a community whose ability to grow is land constrained. Finally, if flooding and/or sea level rise are a major concern in a community that does not have room to move, it may need more innovative policies and solutions to gradually and strategically relocate people and existing structures out of harm's way.

SMART GROWTH

Smart growth is an "approach to development that encourages a mix of building types and uses, diverse housing and transportation options, development within existing neighborhoods, and robust community engagement."

(Smart Growth America website)

Worksheet Questionnaire

My local government:	Yes	No	Notes
1. **Regularly reviews and updates its policies, codes, and ordinances based on new information, best practices, and industry standards.**			
2. **Will often adopt enhanced policies, stricter regulations, or stretch codes that go above and beyond state requirements.**			
3. **Conducts code and ordinance reviews to identify opportunities for enhancing community resilience.**			
4. **Limits waivers and/or exemption clauses in its codes and regulations.**			
a. **Establishes a plan and/or process for phasing out waivers and exemptions.**			
5. **Informs all permitting staff of new codes, ordinances, and policies and provides a mechanism for enforcement.**			
6. **Includes sustainability staff in the permitting review process.**			
a. **Reviews permits for potential climate impacts and vulnerabilities.** 			
7. **Regularly evaluates fees and fines to ensure they are appropriately priced to incentivize compliance.** 			
8. **Maintains robust and ongoing enforcement of codes, ordinances, and policies.**			

POLICY & REGULATIONS CHECKLISTS

This section suggests the types of policies, codes, and ordinances that can be established or updated to help address climate risks.

REVIEW POLICIES, CODES, & ORDINANCES RELATED TO:

- ☐ Building Codes
- ☐ Setback and Buffers
- ☐ Floodplain Management
- ☐ Critical Areas Requirements
- ☐ Onsite Stormwater Retention Requirements
- ☐ Tree Canopy and Forestry Preservation
- ☐ Streets and Parking Maximums
- ☐ Affordable Housing Policies
- ☐ Community Engagement Policies
- ☐ Health and Equity
- ☐ Accessibility

BEST POLICY PRACTICES THAT ALSO ADVANCE CLIMATE RESILIENCE:

- ☐ Minimize Impervious Surfaces
- ☐ Maximize Open Space
- ☐ Preserve Natural Areas
- ☐ Smart Growth
- ☐ Expand Floodplains
- ☐ Increase Setbacks
- ☐ Increase Public Participation
- ☐ Prioritize Vulnerable Populations in the Implementation of New and Existing Programs

Action Recommendations

Beginner

- [ ] Identify existing policies and ordinances which may address extreme weather or climate-related hazards and conduct a crosswalk to identify any areas of alignment, and opportunities for climate resilience enhancements.
- [ ] Adopt and enforce the minimum level of codes and standards (e.g., the state's Model Floodplain Ordinance).
- [ ] Adopt the latest building codes as per the Maryland Building Performance Standards (MBPS).
- [ ] Evaluate opportunities to improve policies, beyond minimum requirements, that support resiliency, including such topics as building codes, floodplain management, tree canopy/street tree, stormwater management, affordable housing, and open space protection.
- [ ] Read *Smart Growth Fixes for Climate Adaptation and Resilience: Changing Land Use and Building Codes and Policies to Prepare for Climate Change* (EPA 2017).

Intermediate

- [ ] Develop streamlined permitting processes for projects that are proposed in lower-risk areas and/or that incorporate green infrastructure or Smart Growth features.
- [ ] Expand the regulatory floodplain to the 0.2%/500-year floodplain.
- [ ] Adopt a higher freeboard requirement for structures located within regulatory floodplains.
- [ ] Establish ordinances to protect sensitive ecosystems or areas from development or disturbance, such as riparian areas, dunes, bluffs, eroding cliffs, wetlands, or beaches.
- [ ] Adopt protective measures for aquifer recharge areas, including wells, springs, seeps, lakes, and headwaters.
- [ ] Update siting and design guidelines for infrastructure projects and programs.

Advanced

- [ ] Develop and adopt new floodplain maps that reflect projected flood risks.
- [ ] Incorporate more stringent design standards for floodplains.
- [ ] Develop a strategy and establish appropriate supportive policies to enable people and businesses to remain within jurisdictional boundaries if they are seeking to relocate out of a flood-prone location.
- [ ] Establish a policy or approach for addressing repetitive loss properties.

Resources for Improvement

- Smart Growth Fixes for Climate Adaptation and Resilience: Changing Land Use and Building Codes and Policies to Prepare for Climate Change (2017). https://www.epa.gov/smartgrowth/smart-growth-fixes-climate-adaptation-and-resilience
    - Provides strategies to prepare for climate change impacts through land use and building policies.

- The Code & Ordinance Worksheet: A Tool for Evaluating the Development Rules in Your Community (2017). https://owl.cwp.org/mdocs-posts/better-site-design-code-and-ordinance-cow-worksheet-2017-update/
    - Helps communities evaluate their local development regulations and identify revisions to minimize impervious cover, conserve natural areas and use runoff reduction practices to manage stormwater.

- Making Your Community Forest-Friendly: A Worksheet for Review of Municipal Codes and Ordinances (2018). https://owl.cwp.org/mdocs-posts/making-your-community-forest-friendly-a-worksheet-for-review-of-municipal-codes-and-ordinances/
    - Helps communities review and revise their development regulations, so that future projects conserve and protect valuable trees and woodlands and encourage new plantings.

- Higher Standards: Opportunities for Enhancing Flood Resilience. Georgetown Climate Center (2019) https://www.georgetownclimate.org/reports/higher-standards-opportunities-for-enhancing-flood-resilience-in-the-eastern-shore-of-maryland.html
    - This report contains recommendations and model language written by the Georgetown Climate Center pertaining to floodplain, zoning, and regulatory standards. This section is geared towards local government staff and decision makers on the Eastern Shore.

- Managed Retreat Toolkit. Georgetown Climate Center. https://www.georgetownclimate.org/adaptation/toolkits/managed-retreat-toolkit/introduction.html?full
    - A comprehensive online resource on managed retreat that combines legal and policy tools, best and emerging practices, and case studies to support peer-learning and decision-making around managed retreat and climate adaptation.

Finance and Budgeting

To deal with climate change impacts, local governments will need to develop sufficient and sustainable financial support for resilience initiatives. They also need to consider future climate impacts in all investment decisions, especially projects with long lifespans. This will help leverage limited funds to ensure that current and future investments in infrastructure and services are going towards smart, resilient, and long-term community solutions. It is also important to note that a growing number of funding and financing sources are encouraging or even requiring communities to consider future conditions in their plans and projects as a stipulation on funding. The Maryland Coast Smart construction siting and design criteria are one example that is already in effect.

Addressing resiliency in finance will require flexibility, collaboration across local departments/projects and evaluation of multiple funding sources. Some local governments have started to set up dedicated revenue sources in the form of user fees or general taxing authorities to fund resiliency projects directly, or to generate a stable funding stream that is used to finance larger projects or a set of bundled projects. Access to steady revenue streams improves a community's chances of qualifying for loan programs or being able to demonstrate matching funds for grant programs.

Smaller municipalities can find it especially challenging to identify one single funding source for large-scale or for multiple resiliency projects. However, since these projects have many benefits and likely involve several partners, local governments should also consider a "blended finance" approach by combining different funding sources to pay for different components of resiliency projects. This can include identifying multiple departments within the local government that can contribute towards a project or combining private and public sources of funding or financing.

Since funding all needed resiliency projects may not be realistic, local governments should also work to identify which projects or project components are the most urgent. Strategizing which resiliency efforts should be prioritized based on risk reduction and funding/financing possibilities can help create a timeline for implementation of resiliency efforts and allow for the evaluation of different funding and financing sources during different implementation stages.

While there is certainly more that federal and state governments can do to support climate adaptation at the local level, those entities will not be able to address all of a community's concerns. Funding and technical assistance programs are shifting to support more local-scale adaptation but cannot possibly pay for or implement all the measures that need to be undertaken.

Worksheet Questionnaire

My local government:	Yes	No	Notes
1. Identified a portfolio of projects that would be needed to improve local resilience. 			
a. Estimated costs for these projects and programs.			
b. Identified potential revenue or funding sources.			
2. Assesses financial solvency on a long-term time scale.			
a. Accounts for climate change impacts when projecting future financial stability. 			
3. Tracks and monitors investments and procurement of goods and services.			
a. Tracks and assesses expenditures related to climate action.			
4. Has the technical ability and political feasibility to develop new dedicated revenue streams.			
a. Currently maintains dedicated funds that are self-sufficient, solvent, and stable.			
b. Supports projects and programs related to climate change with a dedicated fund.			
c. Explored establishing a dedicated revenue source for resiliency efforts.			
5. Actively pursues grants and other funding opportunities for climate resilience projects.			
6. Is comfortable using debt financing to pay for projects.			
a. Has bonding authority.			
b. Has used bonds or loans to pay for resilience projects.			
7. Has the authority to establish a public private partnership (P3).			
a. Is comfortable with establishing a P3 to fund programs and projects.			
b. Considered using a P3 to implement resilience projects.			

8. Maintains a capital improvement program or an equivalent budgetary process in addition to the general operation budget. 			
a. Includes Natural Capital and Green Infrastructure in the capital improvement program.			
9. Has well-defined decision-making criteria for investments and procurement.			
a. Aligns its investment strategy, budget, and procurement criteria with its community plans.			
b. Explicitly addresses climate change in their decision-making criteria.			
c. Prioritizes projects that will yield multiple co-benefits.			
d. Requires cost-benefit analysis for all projects and programs or that exceeds a certain cost threshold.			
i. Includes the cost of climate impacts, cost of inaction, and lifecycle costs as part of its cost-benefit analysis requirements.			
e. Has a review process to ensure all investments and budget allocations are in line with community plans. 			
f. Has a single staff person responsible for reviewing investment and development decisions to ensure compliance with climate criteria.			
g. Has trained finance officers to evaluate procurement requests based on compliance with climate criteria.			
h. Adopted a “dig once” approach to project implementation. 			

Action Recommendations

Beginner

- [ ] Identify the portfolio of projects through a planning document crosswalk that will make the community more resilient to climate change and estimate the cost of these projects.
- [ ] Prioritize implementation of projects, or project components, to decide where to allocate limited funds.
- [ ] Identify potential funding/financing sources, including public or private grants, state or private financing, or funding by different departments within the local government.

Intermediate

- [ ] Offer climate change education and training opportunities for community members to encourage private sector action and drum up support for local investment in these needs.
- [ ] Engage the community in the development and prioritization of the portfolio of climate-related projects and programs.
- [ ] Explore combining different funding and financing sources to pay for climate projects.
- [ ] Consider how a capital improvement planning or equivalent budgetary process can be a vehicle for addressing resilience needs for both built and natural solutions.
- [ ] Collect information on the performance of nature-based infrastructure, including lifespan, maintenance needs and costs to facilitate easier green/gray comparisons.
- [ ] Perform a cost-benefit analysis to determine how investments have the potential to generate future savings.

Advanced

- [ ] Create new codified and sustainable revenue streams, such as a climate tax or resilience utility fee, that will support resilience programs and infrastructure projects. Revenue can be used to fund projects directly or to take on debt and pay back interest and principal.
- [ ] Explore taking on low-interest debt, such as through the State Revolving Fund, Greenbank, or Resilience Authority, to pay for resiliency projects.
- [ ] Identify ways to incentivize private sector investment in resilience through mechanisms like tax breaks, streamlined permitting processes, or property that can be leveraged.
- [ ] Enable public private partnerships (P3) in the community's procurement processes.
- [ ] Create an evaluation system for determining when P3's would be appropriate and beneficial to the infrastructure financing processes.

Resources for Improvement

- Life After Carbon Website. http://lifeaftercarbon.net/reports/
    - Has great resources on how state government can help communities invest in climate resilience and how cities are paying for climate resilience and more.

- Financing the Resilient City: A demand driven approach to development, disaster risk reduction, and climate adaptation. https://www.environmental-finance.com/assets/files/Report-Financing_Resilient_City-Final.pdf
    - Provided a conceptual framework for better understanding how to integrate climate and other risk reduction measures in urban areas and discusses how to leverage climate finance.

- Financing Climate Resilience, Funding and Financing Models for Building Green and Resilient Infrastructure in Florida. https://ash.harvard.edu/files/ash/files/financing_climate_resilience_final_report.pdf
    - Identifies and evaluates twelve creative funding and financing models that can help accelerate investment in infrastructure projects that incorporate resilient design features.

- Georgetown Climate Center-Green Infrastructure Toolkit – How to Pay for Green Infrastructure: Funding and Financing. https://www.georgetownclimate.org/adaptation/toolkits/green-infrastructure-toolkit/how-to-pay-for-green-infrastructure-funding-and-financing.html
    - Provides information on how local jurisdictions can pay for green infrastructure programs and projects.

- EPA - Getting to Green: Paying for Green Infrastructure Financing Options and Resources for Local Decision-Makers. https://www.epa.gov/sites/production/files/2015-02/documents/gi_financing_options_12-2014_4.pdf
    - Identifies various funding sources that can be used to support stormwater management programs or finance individual projects.

- EPA - Financing Alternatives Comparison Tool. https://www.epa.gov/cwsrf/financing-alternatives-comparison-tool
    - Financial analysis tool that helps municipalities, utilities, and environmental organizations identify the most cost-effective method to fund a wastewater or drinking water management project.

- Funding and Financing Strategies for Integrated Hazard Mitigation and Water Resource Plans webinar and module [webinar]. https://efcnetwork.org/events/webinar-funding-and-financing-strategies-for-integrated-hazard-mitigation-and-water-resource-plans/
  Module https://bit.ly/3sKxRjG
    - Discusses incorporating funding-financing strategies into integrated hazard mitigation and water resources management plans to leverage funding and reduce costs.

- A Guide to Assessing Green Infrastructure Costs and Benefits for Flood Reduction. NOAA Office for Costal Management. https://coast.noaa.gov/data/digitalcoast/pdf/gi-cost-benefit.pdf
    - provides a process that communities can use to assess the costs and benefits of green infrastructure to reduce flooding

Funding and Financing Resources

- U.S. Climate Resilience Toolkit website with links to various funding opportunities. https://toolkit.climate.gov/content/funding-opportunities

- Flood Funding Finder. https://floodcoalition.org/fundingfinder/#home
    - Interactive website—to simplify the complex federal grants system and to help small communities identify and prioritize opportunities to fund flood resilience

- Funding and Technical Assistance Programs: Federal Resources for Nature-Based Solutions to Climate Change. https://www.eesi.org/files/FactSheet_Nature-Based_Solutions_Funding.pdf

- Climate Resilience Funding Guide - Funding sources for climate adaptation Model Forest Policy Program. http://www.mfpp.org/wp-content/uploads/2017/07/Climate-Resilience-Funding-Guide.pdf
    - This resource provides guidance to assist communities in identifying potential funding sources for climate adaptation projects and highlights a collection of funding sources that have evolved to provide funding for climate adaptation activities.

Outreach and Engagement

To ensure that government efforts are aligned with community priorities and that the needs of community members are met, local governments often communicate with residents and conduct outreach to community stakeholders about the status of government services, existing or upcoming challenges, and opportunities to participate in planning and decision-making processes. While local governments need to inform and educate residents of ongoing activities at a minimum, the success of any local government initiative hinges on building deep public buy-in through inclusive engagement processes that can establish meaningful long-lasting relationships with the community.

Climate adaptation and community resilience are long-term goals which will require mobilization of a community-wide coalition. Broad scale outreach and education activities that inform community members about climate change can help residents, businesses, and leaders understand the climate-related impacts they may face and learn how they can become more resilient individually and as a community. In addition, local governments should understand the continuum of community engagement strategies and adopt community-driven inclusive processes whenever possible. An inclusive process will foster community ownership of resilience initiatives, improving the prospects of success, and will help ensure that the selected resilience-building strategies yield more equitable outcomes in which everyone has access to the benefits of programs and investments.

INFORM	CONSULT	INVOLVED	SHARED LEADERSHIP	COMMUNITY-DRIVEN
Local government initiatives an effort, coordinates with departments, and uses a variety of channels to inform the community to take action	Local government gathers information from the community to inform local government-led interventions	Local government engages community members to shape government priorities and plans	Community and local government share in decision-making to co-create solutions together	Community initiatives and directs strategy and action with participation and technical assistance from local government
CHARACTERISTICS OF ENGAGEMENT				
• Primarily one-way channel of communication • One interaction • Term-limited to project • Addresses immediate need of local government	• Primarily one-way channel of communication • One to multiple interactions • Short to medium-term • Shapes and informs local government programs	• Two-way channel of communication • Multiple interactions • Medium to long-term • Advancement of solutions to complex problems	• Two-way channel of communication • Multiple interactions • Medium to long-term • Advancement of solutions to complex problems	• Two-way channel of communication • Multiple interactions • Medium to long-term • Advancement of solutions to complex problems
STRATEGIES				
Media releases, brochures, pamphlets, outreach to population groups, translated information, new and social media	Focus groups, interviews, community surveys, public hearings, public comment periods	Forums, advisory boards, stakeholder involvement, coalitions, policy development and advocacy, including legislative briefings, and testimony, workshops, community-wide events	Co-led community meetings, advisory boards, coalitions, and partnerships, policy development and advocacy, including legislative briefings and testimony	Community-led planning efforts, community-hosted forums, collaborative partnerships, coalitions, policy development and advocacy including legislative briefings and testimony

Guide to Equitable, Community-Driven Climate Preparedness Planning. Urban Sustainability Directors Network. May 2017.

Worksheet Questionnaire

My local government:	Yes	No	Notes
1. Has developed a community-based definition for resilience.			
2. Provides information or fact sheets on the risks and impacts of climate change.			
3. Offers climate change education and training opportunities for residents.			
4. Facilitates community discussion sessions on the risks and impacts of climate change.			
5. Provides the public an opportunity to comment on their climate initiatives.			
6. Prioritizes equitable and accessible community engagement that empowers residents to identify their resilience needs and supports them in attaining those goals.			
a. Established an equitable and inclusive community engagement strategy.			
b. Conducted a neighborhood or block-scale assessment of resident demographics, needs, and vulnerabilities.			
c. Developed messaging tailored to different population groups to address various interests and communication needs.			
d. Formed a resident committee dedicated to climate initiatives.			
7. Engages various stakeholder groups in decision-making processes.			
8. Provides robust opportunities for meaningful participation in decision-making processes.			

OUTREACH & ENGAGEMENT CHECKLISTS

Meaningful community engagement requires building trust with residents and stakeholders. This section lists potential social capital that can be leveraged to build trust, opportunities for engaging stakeholders in decision making processes, and methods for improving outreach & engagement efforts.

SOCIAL CAPITAL & COMMUNITY ASSETS:

- ☐ Shared values
- ☐ Shared vision
- ☐ Support networks
- ☐ Trusted voices
- ☐ Volunteers

STAKEHOLDER GROUPS TO ENGAGE IN DECISION MAKING:

- ☐ Homeowners and civic associations
- ☐ Faith-based Institutions
- ☐ Community groups
- ☐ Local businesses
- ☐ Development
- ☐ Nonprofits
- ☐ Higher education institutions
- ☐ K-12 schools
- ☐ Vulnerable populations

See Hazard, Risk, & Vulnerability Assessment Checklist

OPPORTUNITIES FOR ENGAGING COMMUNITY STAKEHOLDERS IN DECISION MAKING:

- ☐ Hazard, risk, and vulnerability assessments
- ☐ Planning
- ☐ Policy and regulations
- ☐ Community budgeting
- ☐ Community outreach and education
- ☐ Climate action implementation

COMMUNITY OUTREACH & ENGAGEMENT METHODS:

- ☐ Flyers, brochures, and handouts
- ☐ Bulletin boards
- ☐ Press releases and newsletters
- ☐ Social media, NextDoor, and website
- ☐ Videos
- ☐ Events and workshops
- ☐ Community competitions
- ☐ Surveys, listening sessions, and focus groups
- ☐ Resident volunteer groups

KEY CONSIDERATIONS FOR COMMUNITY EVENTS:

- ☐ Engage trusted partners
- ☐ Set clear goals and expectations
- ☐ Schedule for a time that is convenient for attendees
- ☐ Provide incentives for participation
- ☐ Ensure ADA Accessibility
- ☐ Select a location that is accessible, convenient, and comfortable for attendees
- ☐ Offer translated materials and language interpretation

PARTICIPATION INCENTIVES:

- ☐ Food
- ☐ Childcare
- ☐ Child-friendly events and activities
- ☐ Stipends and/or gift cards
- ☐ Transit pass or transportation services

Action Recommendations

Beginner

- [ ] Add information on local climate change impacts to existing educational programming.
- [ ] Provide informational material on the risks and impacts of climate change, steps community members can take to improve their climate resiliency, and available resources (e.g., fact sheets, flyers, brochures, community newsletters, social media posts, website pages, etc.).
- [ ] Promote existing climate-related education and training opportunities to the public.
- [ ] Provide the public with opportunities to comment on local climate initiatives.
- [ ] Identify stakeholder groups to involve in climate-related decision-making processes (e.g., vulnerable populations, homeowners, small business owners, non-English speakers, etc.).

Intermediate

- [ ] Offer regular climate change education opportunities for community members.
- [ ] Streamline outgoing communications about local initiatives and programs that assist residents and stakeholders in developing community resiliency (e.g., emergency preparedness, flood mitigation assistance, energy efficiency and weatherization programs, etc.).
- [ ] Develop tailored messaging and outreach strategies to address interests and communication needs of various stakeholder groups with a special focus on reaching the community's vulnerable populations.
- [ ] Facilitate community discussion sessions on the risks and impacts of climate change.
- [ ] Engage residents and community stakeholder groups in the development of climate-related plans, programs, and projects, especially from vulnerable and underserved populations.
- [ ] Establish a voluntary resident climate committee, task force, or working group.

Advanced

- [ ] Conduct a neighborhood or block-scale assessment of resident demographics and community-defined assets, needs, and vulnerabilities.
- [ ] Establish an equitable and inclusive community outreach and engagement strategy in partnership with community leaders and stakeholder groups.
- [ ] Provide funding, technical support, and decision-making authority to resident climate committee to lead, host, and facilitate climate-related initiatives and community outreach events.
- [ ] Establish clear learning or behavior change objectives to be achieved through outreach and education efforts, track messaging and outreach efforts, and assess outcomes of outreach.
- [ ] Monitor and track the community's climate action efforts and publicly report outcomes (e.g., annual report, virtual dashboard, public address, etc.).

Resources for Improvement

Guides

- Guide to Equitable, Community-Driven Climate Preparedness Planning. Urban Sustainability Directors Network. May 2017. https://www.usdn.org/uploads/cms/documents/usdn_guide_to_equitable_community-driven_climate_preparedness-_high_res.pdf
    - Provides guidance to local governments in designing and implementing a more inclusive, equitable planning process.

- Let's Talk Communities and Climate: Communication Guidance for City and Community Leaders. ecoAmerica. 2017. https://ecoamerica.org/wp-content/uploads/2017/03/ea-lets-talk-communities-and-climate-web.pdf
    - Synthesizes academic research and message testing on climate communications from across the social sciences into a practical guide to support communities have meaningful discussions on climate change.

- Community-driven Climate Resilience Planning: A Framework. https://kresge.org/sites/default/files/library/community_drive_resilience_planning_from_movement_strategy_center.pdf
    - Developed for community-based organizations, this guide helps residents of vulnerable and impacted communities define for themselves the complex climate challenges they face, and the climate solutions most relevant to their unique assets and threats.

- Tools for Equitable Climate Resilience . https://www.rivernetwork.org/connect-learn/resources/clrtoolkit/
    - Helps communities address the diverse risks posed by climate change through a two-part toolkit that provides case studies regarding community-led research and leadership development, as well as comprehensive descriptions of the theory and practice of each strategy.

Programs, Trainings, and Technical Assistance

- Sustainable Maryland. http://sustainablemaryland.com/
    - A "one-stop-shopping" program helping communities choose a direction for their sustainability efforts, improve access to resources needed to implement action, measure their progress, and gain recognition for their accomplishments.

- Whole-Community Coastal Climate Resilience Planning. https://www.nj.gov/dep/climatechange/trainings/asat-about.html http://www.prepareyourcommunitynj.org/vulnerable-populations/
    - Online training to improve the practice of coastal resilience planning by incorporating the needs and perspectives of populations that are especially vulnerable to changing climate conditions.

- Cool Block program. https://coolblock.org/welcome
    - How-to-guide for local communities to bring entire neighborhoods together to support each other and build community over shared environmental and climate goals. The

program demonstrates the untapped potential of citizens to engage in this grassroots initiative in an effective and achievable.

- Bright Action. https://www.brightaction.com/
    - Platform makes it easy to help your team or community take simple, everyday actions and make an impact.

Data Sets and Tools

- Maryland EJScreen Mapper. https://p1.cgis.umd.edu/ejscreen/ https://mde.maryland.gov/programs/Crossmedia/EnvironmentalJustice/Documents/mdejscreen-cejsc-2-25-2021v1.pdf
    - A tool for mapping environmental justice in Maryland.

- MD Park Equity Mapper. https://p1.cgis.umd.edu/mdparkequity/
    - Decision-support tool that can be used to determine which areas in the State are in need of new park space and which communities may be currently underserved or underutilized by existing park space.

- Equity in Action Database. Sustainable States Network and Be Bold Services. February 2021. https://docs.google.com/spreadsheets/d/1RaqVZhopufs8BTR9QH5yjofKjZCbAQ9x/edit?usp=sharing&ouid=106421069403030772287&rtpof=true&sd=true
    - Database of equity plans, frameworks, indicators, and more.

- Inclusive Outreach and Public Engagement Guide. Race & Social Justice Initiative. January 2012. https://www.seattle.gov/Documents/Departments/RSJI/GRE/IOPEguide01-11-12.pdf
    - Example from Seattle, Washington. A practical guide and resource for all City staff on Inclusive Public Engagement.

- A Seat at the Table: Integrating the Needs and Challenges of Underrepresented and Socially Vulnerable Populations into Coastal Hazards Planning in New Jersey. Prepared for the New Jersey Department of Environmental Protection. May 31, 2020.http://eac.rutgers.edu/wp-content/uploads/Final_Report_Dated_5-31-20._Completed_6-8-20_-_Reduced.pdf
    - https://www.nj.gov/dep/climatechange/trainings/asat-about.html
        - Related training: Whole-Community Coastal Climate Resilience Planning. The goal of the online training is to improve the practice of coastal resilience planning by incorporating the needs and perspectives of populations that are especially vulnerable to changing climate conditions, many who are historically underrepresented in community-based decision making.
    - http://www.prepareyourcommunitynj.org/vulnerable-populations/
        - Fact sheets and checklists: Integrating Vulnerable Populations into Resilience Planning.