Second Nature

RESILIENCE SERIES

Climate Resilience Background

OVERVIEW

Resilience is the ability of a system or community to survive disruption and to anticipate, adapt, and flourish in the face of change.

Resilience is not just about survival and recovery, but about being able to thrive. It incorporates both short-term disruption and long-term trends, as well as emphasizes the importance of understanding and anticipating the challenges and opportunities of climate change. The key concept in resilience is that in an era of change, it is critical to develop adaptive capacity.

The resilience of any campus or community will be based on its own unique set of characteristics, future goals, existing capacity and strengths, and current and future vulnerabilities. The most successful campus resilience plans will be those that fully embrace the catalytic nature of resilience assessment and planning, and that incorporate diversity and inclusiveness throughout the process.

This document provides background information on the concept of resilience as it relates to college and university planning efforts.

A FEW KEY CHARACTERISTICS OF CLIMATE RESILIENCE FOR CAMPUSES AND COMMUNITIES

Community

All institutions interact with the communities around them. They impact, and are impacted by, the local neighborhood, town, or city. It is not possible to be a resilient campus without being part of a resilient community. A campus is better protected from climate change, and has greater capacity to adapt, when it cooperates with the community on building resilience together.

Flexibility

Colleges and universities will never know the future with absolute certainty. A resilient approach incorporates and enhances flexibility to allow management to accommodate a range of impacts and possibilities. Rigidity often imposes brittleness; if a community operates without flexibility, it may feel harsher impacts when climate-related shocks occur, just as a material breaks when it cannot bend. To this end, adaptive planning should form the heart of a resilience approach.

Inclusivity

Assessing and promoting resilience rests on understanding the adaptive capacity of a system or community. Just as strong natural ecosystems will often have great diversity of flora and fauna that help withstand a wide variety of impacts, human systems also benefit from diversity. Second Nature's resilience planning framework breaks down adaptive capacity into five different categories (Social Equity & Governance, Health & Wellness, Ecosystem Services, Economic, and Infrastructure). Inclusivity is important to resilience not only because it allows the institution and community to articulate multiple viewpoints, but also to brainstorm many potential solutions that a less diverse approach might not identify.

Learning

An adaptive process like resilience requires dynamic learning and actions responsive to changing knowledge or circumstances. While the goal is to be as proactive as possible, it is not possible to be absolutely certain about the future. It is necessary to build learning and knowledge-sharing processes into adaptive systems. This is partly why the Presidents' Climate Leadership Commitments include an annual evaluation of progress. This fosters regular opportunities to reflect on changing knowledge and to adapt. It also encourages sharing knowledge across campuses, so that all institutions can learn through shared experience.

Prevention and Management

Resilience not only entails adapting to a changing climate, but working to prevent negative impacts. Resilience blends mitigation activities (those that reduce the likelihood of major climate disruption) with adaptation – managing the consequences of a changed and changing climate. For example, a resilient community will be one that offers low carbon energy solutions as well as a reliable power supply.

RESILIENCE AND SUSTAINABILITY

Sustainability and resilience often go hand in hand, but there are a few key differences. While sustainability typically focuses on actions that can perpetuate without rendering the future less prosperous overall (economically, socially, or environmentally), **resilience requires operating in the context of change and disruption**, overcoming problems in the short-term while preparing for a continually changing future. In some cases, building resilience capacity, such as creating reliable and redundant backup systems, can make an institution less sustainable.

Energy Systems Example:

When an institution uses energy more efficiently, the demand for fossil fuels lessens. This fulfills a central *sustainability* goal. From a *resilience* perspective, it is also pertinent to ask whether the institution requires reliable, as well as efficient, energy systems. This may require greater energy capacity or redundant energy systems. In hospitals, for example, it is often more important that the power is never absent rather than having the most efficient use of fuel. When using resilience as a framework, the institution must consider dimensions that are irrelevant to sustainability. These dimensions help determine a more complete path forward which serves the short- and long-term needs of multiple stakeholders.

This diagram illustrates that if campus planners ask resilience-related questions, they reduce the likelihood that solutions might inadvertently compromise their ability to weather unexpected or extreme events. A greater understanding of the implications of decisions makes communities more resilient *and* sustainable.

Resilience and sustainability can, but do not necessarily, overlap.

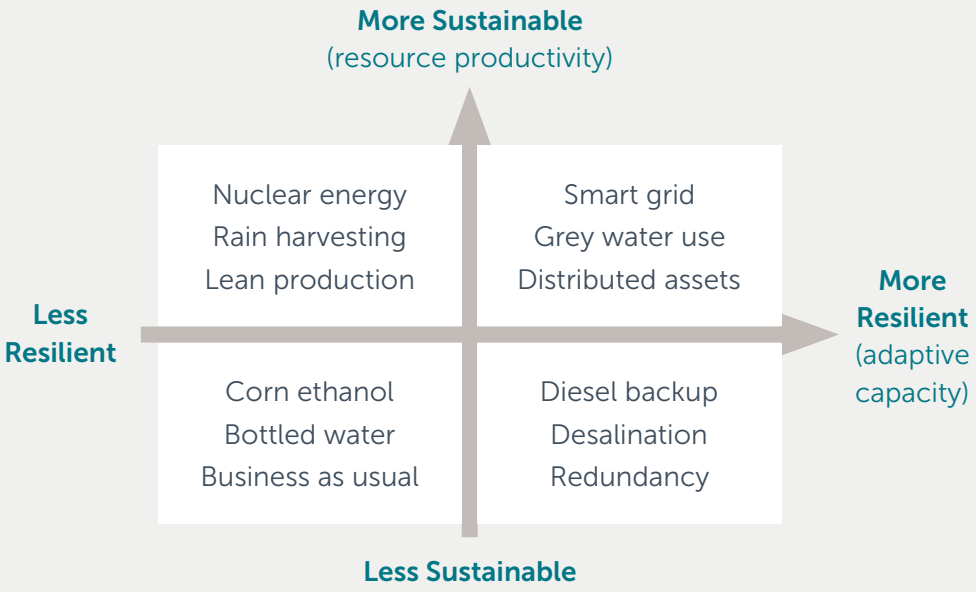

Diagram adapted from: Fiksel, J., I. Goodman, AND A. Hecht. Resilience: Navigating toward a Sustainable Future. Solutions. Solutions, Burlington, VT, 5(5):38-47, (2014).

Rainwater Harvesting Example:

During normal rainfall years, a proportion of residents might use rainwater harvesting to water their yard, sustainably saving water. However, when a drought occurs and there is less rainfall, some residents' rain barrels will run dry. As they have a yard that needs water, they must use city water to irrigate. The city then experiences an unpredictable and unexpected spike in water usage when water availability is already low.

Thus, something that is otherwise sustainable can in some cases make planning for extreme events harder. To be clear, rainwater harvesting is a good solution in many cases. However, *all* implications of sustainable behavior are important to consider in a resilience context.

RESILIENCE AND CLIMATE ADAPTATION

While resilience and adaptation are often used interchangeably, resilience in this context is a broader concept than climate adaptation. Typically, adaptation involves specific actions taken by decision makers in response to a current or anticipated threat that exceeds a threshold of acceptable impact. Resilience includes climate adaptation, but also considers overall adaptive capacity and the ongoing ability of the institution to increase that capacity. A resilient campus or university is not just capable of absorbing impacts and change, but of using those changes to develop more positive and regenerative adaptive capacity. In other words, it can self-renew even as it becomes better at preventing disruption.

Heatwave Example:
If a campus currently experiences a significant heatwave a few times a century on average, it might choose not to invest in major infrastructure or changes in practices because the impact is relatively infrequent. However, if heatwaves are predicted to become longer, more intense, and more frequent, then there are specific adaptations to consider, including accessible cooling centers or increased urban canopies for shade.

A resilience focus might also facilitate considerations of how cooling centers could increase participation of underserved communities in a variety of activities, as well as provide shelter in other emergencies, making them less vulnerable and better connected. Or, the institution and community might promote the weatherization of low income residential neighborhoods to reduce the overall cost for each family while increasing the efficiency of cooling and heating their homes.

Resilience offers a broad, long-term focus on building capacity while reducing specific impacts. Even if the planet were not undergoing a period of human-induced climate change, resilience would be a useful planning framework. It becomes especially useful when it can incorporate specific climate adaptation activities into long-term goals.

RESILIENCE AND DISASTER PREPAREDNESS

Resilience is sometimes equated with rebounding from a disaster. Disaster planning and emergency management are important components of resilience. Knowing how to prepare before an event, manage operations during an event, and recover after an event is certainly part of a resilient approach. Resilience planning differs, however, in that it also encompasses facilitating positive change to enhance the overall well-being, engagement, and prosperity of a community, while also reducing the community's impact on the surrounding environment. While disaster management is critical to resilience as a whole, resilience goals go far beyond managing acute or catastrophic events. Resilience goals also emphasize eliminating chronic stressors and maximizing the dynamic potential of citizens and economic and natural resources.

Civic Planning Example:
Engaging a diverse population in resilience planning not only invests residents in the community overall, but also increases equity by ensuring different segments of the population are considered in terms of resources and amenities. It also allows greater social cohesion and smarter resource distribution in an unexpected event. The residents involved in this process are more likely to help, communicate with others, know what to do, survive financially, and return after a calamitous event. Thus, the campus and community are more financially and socially resilient.

CORE ELEMENTS IN A SUCCESSFUL APPROACH TO RESILIENCE

One unique element of resilience is that it is challenging to be a resilient campus without also being *part of a resilient community*. All campuses, whether rural, urban, or somewhere between, interact with some form of non-academic community and share resources and natural systems with the citizens of the city or county. A specific requirement in the Commitments is the coordination of planning, and to the extent possible, development of indicators of progress across campus-community boundaries. Many communities have already developed resilience-focused efforts independently or as part of a national network. Examples of these networks include **100 Resilient Cities**, **C40 Cities**, and state-level initiatives such as Massachusetts' **Municipal Vulnerability Preparedness** program. If the community does not have an existing resilience effort, this is an opportunity for higher education to demonstrate local leadership and to facilitate interaction. In either case, it is important to consider options for campus-community coordination around planning, goals, and progress so that resilience is built broadly.

Another necessary element of a successful approach is *assessment and evaluation*. It is necessary to start with an understanding of each campus's current baseline. This includes assessing resilience capacity and current vulnerabilities to existing climate threats. It is also necessary to routinely evaluate the institution's progress. To be flexible and adaptive, core criteria for resilience, colleges and universities will need to be conscious of changing knowledge, circumstances, and opportunities. They must be receptive to changing tactics or activities. Dynamic assessment and evaluation create awareness of better ways of doing things, allowing institutions to make rapid and effective progress.

One of the important elements of success in resilience is the inclusive development of *future scenarios*. Many resilience activities begin with a vulnerability assessment. While this is an essential component, it can limit decisions to preventing the negative without also enhancing the positive. By including inclusively-developed and comprehensive future visions for the campus and community, institutions can move more effectively towards a preferred future.