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By

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ABSTRACT

As coastal communities across the U.S. and worldwide undertake efforts to enhance their resilience to coastal hazards, they must do so while ensuring that all voices are heard, addressing and preventing disparate impacts, and, ultimately, increasing resilience in an equitable way. The Resilience Adaptation Feasibility Tool (RAFT) assists coastal communities in incorporating equity into resilience planning and implementation of projects to increase resilience. The RAFT includes social and economic dimensions in assessment of resilience and focuses on how localities can build resilience equitably. The RAFT process has three phases — a scorecard assessment, development of a resilience action checklist that identifies priority actions to build resilience, and implementation of resilience projects over a one-year period — and equity is integrated throughout. This paper provides an overview of the RAFT and how its approach incorporates equity in resilience planning and project implementation. The paper concludes with lessons learned from the RAFT experience that can be helpful for practitioners and communities interested in planning for and taking action to enhance coastal resilience in an equitable way.

We review how social equity is explicitly and implicitly integrated throughout the RAFT's three phases and how the RAFT embodies the key features of equitable resilience planning and project implementation. We offer lessons learned from the RAFT experience for practitioners and communities interested in planning for and taking action to ensure equity in their coastal resilience efforts.

PLANNING AND IMPLEMENTATION FOR EQUITABLE RESILIENCE

Coastal ecosystems are among the most threatened by human development, with climate change and related concerns of sea level rise and extreme precipitation adding to adverse impacts and intensifying risks for many communities in the U.S. and worldwide (Kekeh *et al.* 2020; Martinich *et al.* 2013; Papalexiou and Montanari 2019). Increased exposure and vulnerability, coupled with more severe extreme weather events due to climate change, have increased the impacts on coastal communities, making the resilience of communities to coastal hazards an important issue (Bixler *et al.* 2021).

Resilience has traditionally been defined as the capacity of a system — in this case, a coastal locality — to absorb disturbances, such as from hazards and resulting disasters, and recover through reorganization and changes to retain

As sea levels rise, the need to increase coastal resilience is fraught with conflict and hidden minefields of beliefs, equity, and power. For example, recurring flooding undermines property values, disproportionately impacts low-income populations, and threatens economic stability. Research has shown that residents least able to prepare for, absorb, and recover from the impacts of a hazard, such as those in older and poorer neighborhoods, facing financial instability, and racial minorities, disproportionately bear the brunt of hazards (Bick *et al.* 2021; Collins *et al.* 2018; Jonkman *et al.* 2009; Norris *et al.* 1999; Peacock 2003; Peacock *et al.* 2007). As coastal communities across the U.S. and worldwide undertake efforts to enhance their resilience to coastal hazards, they must do so while ensuring that all voices are heard, addressing disparate impacts and abilities to cope, and, ultimately, increasing resilience in an equitable way. Coastal communities need to incorporate a social equity lens in planning for resilience and implementing solutions to enhance resilience.

This paper addresses two questions. First, what factors need to be considered in facilitating action at the locality level to increase equitable resilience? And second, how can coastal communities build resilience with a social equity lens? We answer these questions using the Resilience Adaptation Feasibility Tool (RAFT) as an example of both a tool and a process for equitable resilience planning and project implementation. We provide a review of the RAFT and how it incorporates equity in resilience planning and project implementation. First, we briefly discuss the literature on planning for coastal resilience, emphasizing equity challenges inherent in resilience planning, and present key features of equitable resilience planning and implementation. We explain how the RAFT facilitates resilience action at the locality level and increases resilience in an equitable way.

function and structure (Walker *et al.* 2004). Disaster resilience more specifically encompasses the capability "to anticipate and reduce risks and vulnerabilities and increase adaptive capacity and the potential for transformative learning in the face of disasters and other major changes" (Cox and Hamlen 2015, p. 221). Resilience, by focusing on enhancing the ability to cope and adapt, recognizes that disruptions are inevitable and can be anticipated. While the capacity to respond and cope with crisis is important, critics of traditional approaches and applications of resilience thinking question the implications of asking already vulnerable and disproportionately impacted communities to "bounce back" and absorb additional shocks in order to remain resilient (Wilson 2018). As Wilson (2018) acknowledges, "it seems outrageous to ask communities of residents with low socioeconomic status, who have been subject to generations of systemic inequities, to rebound after they suffer yet another injustice perpetuated by unfair land-use policies" (p. 5). The RAFT recognizes the need to apply resilience in a way that does not simply ask vulnerable communities to brace themselves for the more frequent and disastrous crises of climate change but rather works with localities to meet the basic needs of all residents as a fundamental step in building resilience. Thus, the RAFT's approach to resilience recognizes that a resilient community is one that is able to anticipate, adapt, endure, and thrive in the face of change, uncertainty, and adversity. Resilience is a multi-dimensional construct, encompassing different elements ranging from environmental and ecological to infrastructural, social, economic, and community-oriented needs.

Equitable resilience

Pelling and Garschagen (2019) make clear the case for equity: "It is a moral duty, and it improves economic productivity, social cohesion, health and peace" (p. 328). Yet, Anguelovski *et al.* (2016) point to evidence of the concept of resilience being used to "entrench speculative, exclusionary, or unsustainable practices, further exacerbating injustices" (p. 335) associated with planning and development approaches that favor the privileged at the expense of resources for and the exclusion of others. By not paying attention to the distributional and power dimensions inherent in these problems,

planning and development outcomes will favor those that are already advantaged (MacKinnon and Derickson 2013). In the case of traditional approaches to community engagement, or at least efforts framed in these terms, Wilson (2018) notes that processes that ignore past inequities and the lived experiences of vulnerable community members often "attract outspoken residents who rarely represent greater neighborhood interests, and they reduce decision-making power to a series of sticky-dot votes instead of privileging the substantive power of collective conversation. Residents in lower-income neighborhoods often do not trust they will be heard… because the meeting experience often includes imbalanced power dynamics, inconvenient locations, unclear marketing, and culturally inappropriate agendas" (p. 1). In terms of resilience, the maladaptive outcomes of such processes may include increased disparities in the capacity of some groups to respond to and recover from a hazard, with greater capacity for some groups to participate while less advantaged groups and their needs are marginalized in formal decision making and planning processes.

The disaster resilience research recognizes that resilience is both an outcome and a process (Cox and Hamlen 2015; Ireni-Saban 2012; Saja *et al.* 2018). As an outcome, resilience "is not uniformly distributed throughout a community" (Cox and Hamlen 2015, p. 223) and as a process resilience must recognize equity challenges and concerns. Resilience outcomes reflect a community's state of resilience from multiple dimensions relevant to disasters, social, ecological, economic, and others, but also the results of a deliberate process rooted in justice and equity that leads to learning, increased adaptive capacity, and other factors contributing to resilience (Ireni-Saban 2012).

Matin *et al.* (2018) define equitable resilience as resulting from practices and processes that consider and account for "issues of social vulnerability and differential access to power, knowledge, and resources" (p. 202). Equity in resilience also involves concerns of health, wellness, and quality of life, requiring consideration of vulnerability, adaptive capacity, and resilience (Cutter 2015; Kim and Marcouiller 2020). Equitable resilience is intertwined with addressing social vulnerability and ensuring adaptive capacity.

Vulnerability refers to the likelihood of exposure to damages, losses, or other impacts (Adger 2006; Turner *et al.* 2003) and is a function of both the physical environment and social characteristics of the individual, community, or place (Cutter 2003). Since social vulnerability determines the capacity of a community to respond to a crisis without becoming further marginalized and more vulnerable, the social and economic conditions of one community may cause it to experience greater losses compared to an adjacent community that is similarly physically vulnerable.

Certain groups — women, children, elderly and people with disabilities, and minorities — are over-represented in vulnerable groups. Studies show that hazards disproportionately impact the most socially vulnerable in a community. Conditions that lead to increased social vulnerability include high unemployment, lower incomes, high levels of poverty, medical fragility, and social isolation. Vulnerable communities generally lack sufficient resources with which to cope with disruptions such as those caused by a hazard event (Bolin and Kurtz 2018; Kim and Marcouiller 2016; Kim *et al.* 2018). Increasing the adaptive capacity of individuals, households, neighborhoods, and communities are important for resilience (Berkes and Ross 2013; Henly-Shepard *et al.* 2015). Using the resilience-as-adaptive-capacity lens (Wilson 2018), the RAFT approaches resilience in a way that focuses on adaptive capacity and inclusivity as critical aspects of resilience planning. Inclusive planning that includes the situated experience of diverse community members is critical for resilience, recognizing that "every community has assets, and building on the existing assets of a place and its people increases social capital and leads to greater community resilience" (Wilson 2018, p. 4). While the RAFT did not explicitly build upon compassionate planning (Lyles *et al.* 2018), the approach to planning for resilience recognizes the importance of compassion in contributing to "collective transformation to a more equitable and livable world" (p. 247) where people and communities have the adaptive capacity to be resilient.

An environmental justice framework for resilience planning

Communities across the U.S. are addressing climate change and its impacts through various planning avenues, such

as comprehensive land use plans, hazard mitigation plans, floodplain management plans, climate adaptation plans, and sustainability plans. While resilience is increasingly being included in existing plans (Berke *et al.* 2014; Keenan *et al.* 2018; Sellberg *et al.* 2018; Taylor *et al.* 2021), some local governments have begun developing resilience plans (Sellberg *et al.* 2018; Taylor *et al.* 2021).

Resilience also emerged as a planning priority against the "backdrop of segregation, spatial inequality, and the uneven application of land use planning and development interventions" (Anguelovski *et al.* 2016, p. 334). As such, equity needs to be a fundamental focus for any collective, community-wide approach to planning for resilience. Participatory and inclusive approaches to resilience planning are needed to reduce government-imposed decisions, generate consensus and increase legitimacy for resilience strategies, and promote decisions and actions that produce long-term resilience outcomes (Chu *et al.* 2016; Yusuf *et al.* 2018). However, Anguelovski *et al.* (2016) found that because planning is "embedded in the very institutions and development processes that reproduce uneven risk exposure and socio-economic vulnerability" they produce "maladaptive outcomes for historically marginalized residents" (p. 333). Similarly, from a research perspective, Meerow *et al.* (2019) did not find any "published systematic, cross-sectional analyses of how equity is addressed in resilience plans" (p. 794).

Equity in resilience is primarily considered in terms of processes and outcomes or framed in terms of procedural and distributive justice (Anguelovski *et al.* 2016; Matin *et al.* 2018). Procedural justice has to do with how and by whom decisions about resilience are made, requiring participation of communities in decisions affecting them (Holland 2017; Paavola and Adger 2006). When applied to resilience planning, procedural justice emphasizes equitable participation in decision making, including in development of the plans themselves, in general participation in governance, and through efforts to encourage continuous public engagement generally and of historically underrepresented or excluded groups (Meerow *et al.* 2019).

Distributive justice relates to the distribution of benefits, costs, and adverse effects of resilience as a process and outcome. It emphasizes allocation of resources to benefit all members of the community, and particularly the most disadvantaged (Schlosberg 2007). In the context of resilience planning, distributive justice emphasizes equitable access to infrastructure, amenities, services, and economic opportunities (Meerow *et al.* 2019).

In addition to procedural and distributive justice, Meerow *et al.* (2019) introduce the concept of recognitional justice, arguing that all three shape a community's resilience. Recognitional justice acknowledges and respects that people have different identities and associated social status that contribute to vulnerability and adaptive capacity (Meerow *et al.* 2019; Schlosberg 2007). Resilience planning rooted in recognitional justice ensures respect for different individuals and groups in a community, prompting more inclusive and collaborative approaches (Meerow *et al.* 2019).

Conceptually, when considering how the concepts of procedural, distributive, and recognitional justice should inform resilience planning, it is vital to view all three as complementary concepts that both elucidate and guide the more fundamental environmental justice framework developed by Bullard (1993). This framework, which "brings to the surface the blunt questions of 'who gets what, why, and how much'" (Bullard 1993), has four core elements that emphasize the importance of procedural, distributive, and recognitional justice in underpinning resilience planning. The first element, the right of all individuals to be protected from environmental degradation, emphasizes the importance to resilience planning of equal protection from increased impacts of hazards that are caused by climate change. This equal protection means that even those who are vulnerable but historically excluded and underserved are included in resilience planning. Second, the framework uses a prevention model as the preferred strategy to prevent the threat before harm occurs. Being able to anticipate and prevent harm before it occurs is an essential element of equitable resilience planning. The third element of the framework calls for shifting the burden to those who do harm, discriminate, or do not give equal protection to racial and ethnic minorities and other protected classes. In the context of coastal resilience, this means that those who are unable to move out of harm's way during a hurricane or catastrophic flooding event are neither blamed nor discriminated against in the planning for these events or in the response and recovery. This core principle also suggests that planning for resilience must identify and protect vulnerable groups that are likely to experience either greater harm and/or lesser capacity to cope. Finally, the framework emphasizes redressing disproportionate impacts through "targeted" action and resources. This core principle suggests that coastal resilience planning must take real, meaningful action that go beyond a paper exercise of identifying vulnerable populations. For resilience planning to be equitable and to be environmentally just, it must be accompanied by the dedication of targeted action and resources to redress the disproportionate impacts experienced by those most vulnerable. Foreman notes that advancing social justice must include ways for decision-makers to engage with their communities in "candid discussions of priorities and tradeoffs" and to discriminate "between the very important and less important, between the deserving and underserving" (2011, p. 134). Lyles *et al.* (2018), in emphasizing the importance of compassion, point to how planning required acknowledgement and consideration of "issues of power, communication, institutional structure, diversity, inequity, decision-making processes, individual personality, and more" (p. 263) that, rather than entrenching existing power imbalances and inequities, can transform communities.

The four core elements of the environmental justice framework taken together suggest that a resilience planning process must address procedural, distributive, and recognition justice; be preventive in nature; identify those most vulnerable to harm and their needs; target actions and resources to addressing those needs. Key features of planning for equitable resilience that are consistent with the environmental justice framework and the three types of justice are discussed next.

Key features of planning for equitable resilience
Resilience planning that assumes equality and a one-size-fits-all approach fails to recognize that certain groups are over-represented in vulnerable groups. For a community to be resilient it must

Figure 1. Key features of equitable resilience planning stemming from the environmental justice framework.
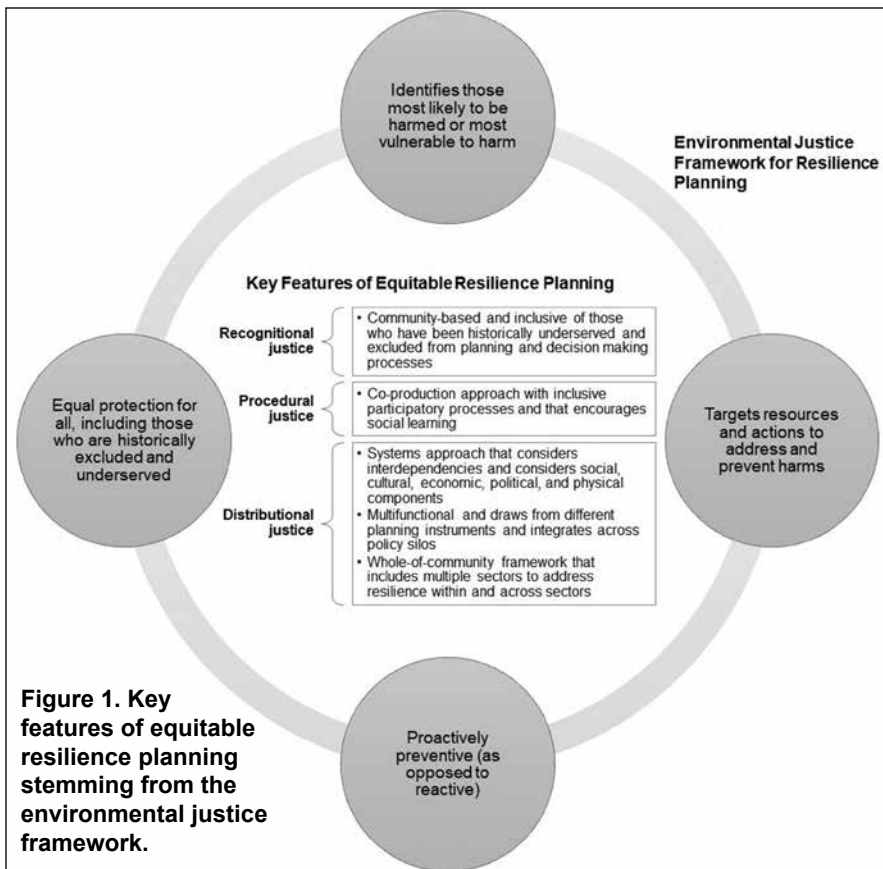
address social vulnerability and disparities in ability to cope and adapt. Resilience plans and policies must speak to social vulnerability and adaptive capacity to be equitable (Meerow *et al.* 2019). Figure 1 offers a theoretical framework for equitable resilience planning that integrates core elements of environmental justice with procedural, distributive, and recognitional justice to offer five key features for ensuring equity in resilience planning.

First, building on the principle of recognitional justice, equitable resilience planning is community-based and inclusive of diverse members of the community, including those who have been historically underserved and excluded from planning and decision-making processes. Equitable resilience must recognize that the nature of community is determined by social and political elements that define power relations, privilege, and other factors that contribute to inclusion and exclusion practices (Buggy and McNamara 2016; Ensor *et al.* 2018).

Anguelovski *et al.* (2016) point to two types of injustices that contribute to inequitable resilience outcomes: (1) acts of commission where decisions and actions disproportionately affect disadvantaged groups, and (2) acts of omission where plans protect the interests of the privileged, private responsibility rather than collective action is the foundation of resilience, and affected communities are excluded from the process. Both acts can be overcome and inequities reduced by ensuring a planning and implementation approach to resilience that recognizes disparities within the community and inclusively engages diverse members of the community, including those who are historically marginalized. Diverse members of the community need to be included in decision-making and action about resilience, as they bring to the table their respective knowledge, risk perceptions, expertise, resources, and other relevant insights (Bahadur *et al.* 2013). This broadened participation via active engagement in the planning process is consistent with one of the seven policy-relevant principles identified by Biggs *et al.* (2012) as being important for resilience of ecosystem services. Consideration of the local community context ensures awareness of equity concerns within and between communities.

Second, equitable resilience planning results from a co-production approach that uses participatory processes and encourages social learning (Matin *et al.* 2018). A co-production approach that helps to create collaborative capacity can integrate scientific knowledge, public perceptions, community concerns, and institutional capabilities to spur actions and solutions (Yusuf *et al.* 2018). Through co-production and inclusive participatory processes, resilience planning addresses procedural and recognitional justice concerns. Participatory processes that recognize individuals or groups as valued members of the community make it possible for these individuals or groups to participate in the planning process and to contribute to resilient outcomes for themselves and the broader community.

Through social learning, multiple stakeholders can analyze their different perspectives and create new understanding through joint learning (Yusuf *et al.* 2018). Co-production approaches that create capacity for social learning such as through collaborative processes of defining problems and solutions, and identifying vulnerabilities and opportunities, can increase adaptive capacity and transform short-term concerns into long-term resilience (Considine *et al.* 2017; Walker and Westley 2011). A planning approach that emphasizes learning supports the fifth principle for enhancing the resilience of ecosystems services (Biggs *et al.* 2012). Broad participation through a community-based and inclusive approach is a key enabler of learning that further supports equity in resilience planning, as an inclusive approach recognizes how power dynamics can "influence how learning takes place, including who is learning, the linkage between learners, what types of learning takes place, [and] whose knowledge is integrated or discarded" (Biggs *et al.* 2012, p. 435).

Third, equity in resilience planning involves a systems approach that acknowledges the interdependencies between shocks (such as coastal hazard events) and chronic stressors (including poverty, aging infrastructure, recurrent flooding, and persistent structural inequalities such as racial injustice, classism, and uneven access to resources across rural and urban areas). A systems perspective forces an expanded appreciation of the social, cultural, economic, political, and physical components that contribute to the distribution of resilience outcomes (Matin *et al.* 2018). Equitable resilience must be embedded in a systems approach that extends beyond consideration of equity in the processes and distribution of

development outcomes to recognize the deeper complexities of social interactions and processes, as well as deeply rooted and institutional processes of social injustice (Holland 2017; Matin *et al.* 2018).

In the case of resilience planning, multiple strategies from different plans and for different facets of capacity (e.g. institutional and infrastructure capacity [Ross 2013]) are being addressed concurrently at any given time. These strategies are interconnected and the equity outcomes they produce are dependent on these jointly executed strategies (Anguelovski *et al.* 2016). Berke and colleagues have emphasized the importance of coordinating for resilience across the multitude strategies and plans (Berke *et al.* 2021; Berke *et al.* 2019) and have implications for equity (Berke *et al.* 2019). As such, a fourth feature of equitable resilience planning is multifunctionality that ensures strategies are implemented in ways that ensure equity. Equitable resilience planning is multifunctional, drawing on different planning instruments (Anguelovski *et al.* 2016; Berke *et al.* 2012) and integrating multiple elements such as disaster risk reduction, infrastructures improvements, historic preservation, building codes, zoning ordinances, comprehensive land use planning, and capital planning. Resilience planning with an equity focus emphasizes an integrative approach to overcome policy silos and avoid the maladaptive outcomes that arise from treating interrelated problems as standalone issues.

However, a systems approach to resilience can promote a focus on the performance of the whole, obscuring individual practices and outcomes that force unequal trade-offs and that inequitably distribute benefits and costs within the community (Matin *et al.* 2018; Meerow *et al.* 2019). Overcoming this concern requires applying to resilience planning a whole-of-community framework that allows spanning of multiple sectors (government, business, nonprofit, academic, faith-based, and civil society) to address resilience within and across these sectors that are affected by and need to be involved in planning efforts. This multi-sectoral and whole-of-community approach is the fifth feature of equitable resilience planning. One example is resilience planning to address sea level rise and flooding in Hampton Roads (Virginia), which involved a whole-of-government

and whole-of-community approach that included federal, state, regional, and local governments, businesses, nonprofit organizations, academic institutions, and community leaders (Considine *et al.* 2017). A whole-of-community framework spanning multiple sectors recognizes the need to promote polycentricity in resilience planning where different sectors and levels of government have independence within their functional and sectoral domains and specific geographic space while linking horizontally and vertically (Biggs *et al.* 2012). This polycentricity "helps capitalize on scale-specific knowledge (e.g. traditional and local knowledge to aid learning through sharing of information, experiences, and knowledge across scales" (Biggs *et al.* 2012, p. 438).

Putting the pieces together, resilience planning that speaks to recognitional and procedural justice concerns recognizes the community context and relies on inclusive co-production approaches that create capacity for social learning. Distributional justice underpins equitable resilience planning by approaching resilience using a multi-functional, system-wide lens, while recognizing the utility of a multi-sectoral, whole-of-community framework. Equity in the resilience planning context is not only about consideration of needs and impacts on the socially vulnerable and reducing disparities in adaptive capacity. It encompasses a wider range of issues including participation in the decision-making process; structures and mechanisms for generating support, facilitating decisions, and taking action; and linkages between coastal hazards, chronic stresses, and other factors that jointly influence resilience.

THE RESILIENCE ADAPTATION FEASIBILITY TOOL (THE RAFT)

The RAFT is a multi-university, interdisciplinary academic partnership initiated in 2015 to create an assessment and response decision framework to assist coastal communities in evaluating risks to coastal flooding, prioritizing action to increase resilience, and identifying sources of technical assistance and funding. The RAFT partners include: (1) the Institute for Engagement and Negotiation (IEN) at the University of Virginia, (2) the Virginia Coastal Policy Center (VCPC) at William & Mary Law School, and (3) the Old Dominion University (ODU) Institute for Coastal Adaptation and Resilience

and the Virginia Climate Adaptation and Resilience Program jointly funded by ODU and Virginia Sea Grant.

The goal of the RAFT is to help Virginia's coastal localities improve resilience to flooding and other coastal storm hazards while remaining economically and socially viable. As such, the RAFT takes a comprehensive approach by including environmental, economic, and social resilience, recognizing that all three are vital for communities to thrive. The RAFT focuses on helping coastal communities build resilience through an on-the-ground approach to equitable resilience planning and project implementation. The focus of the RAFT is on coastal community resilience, defined as the capacity to anticipate threats, reduce the community's vulnerability, and respond to and recover from hazards and chronic stresses. The RAFT provides support at the locality level, addressing the resilience of communities within the locality and increasing their ability or capacity to anticipate, adapt, endure, and thrive in the face of change, uncertainty, and adversity associated with coastal hazards such as hurricanes and extreme weather events and chronic stressors such as flooding.

The RAFT explicitly includes social and economic dimensions in assessment of resilience, focuses on identifying ways to plan and implement projects for equitable resilience, and uses a process that emphasizes justice principles. It is both a tool for resilience planning and project implementation and a process for ensuring equity. The RAFT adopts a multi-level approach, recognizing that resilience begins with individuals, households, and businesses. Greater resilience of these individuals, households, and businesses contributes to resilience of the broader community. The RAFT supports resilience planning and project implementation that often directly impact individuals, households, and businesses, but in terms of official engagement the RAFT works directly with localities. Furthermore, the RAFT does so within a regional context and recognizes that localities in a region benefit from interconnected efforts to build resilience. In Virginia, localities are organized into regional planning districts and these planning districts offer a general governance framework for facilitating regional coordination and cooperation. The RAFT partners with these regional

planning organizations when engaging with localities.

The RAFT supports resilience planning and implementation efforts of localities in three phases. The first phase is a comprehensive assessment of a locality's resilience that is conducted by neutral academics to ensure objectivity. The RAFT Scorecard incorporates not only physical risk to coastal hazards, but also political, economic, and social factors that must be addressed for the locality to adapt over time and be more resilient. This scorecard assesses resilience according to five dimensions: (1) policy, leadership, and collaboration; (2) risk assessment and emergency management; (3) infrastructure resilience; (4) planning for resilience; and (5) community engagement, health, and well-being. Once the comprehensive assessment is conducted via the RAFT Scorecard, the results are presented to local government staff and elected officials.

Following the assessment and presentation of results, the RAFT team convenes a regional community workshop to bring together stakeholders from across multiple levels of government (local, regional, and state) and different sectors (government, nonprofits, faith-based, education, civil society, etc.). During this workshop, which is the second phase of the RAFT, participants develop a Resilience Action Checklist for their community, comprising three to five priority actions that are achievable within a one-year period or for which significant progress can be achieved in one year.

Rooted in the belief that early gains drive future investments and builds momentum for a long-term focus on resilience, the RAFT supports the community through a year of project implementation. In this third phase of the RAFT, an Implementation Team is created to work on projects included in the checklist. This Implementation Team generally includes participants of the community workshop and other stakeholders and community leaders with expertise, resources, and interest in the resilience projects or who are potentially affected by or have a stake in these projects. The RAFT team facilitates this 12-month implementation phase by hosting regular meetings and facilitating discussions with the Implementation Team to provide needed support. The RAFT concludes its work in the region by conducting a regional wrap-up workshop that brings together all localities and Implementation Team members to share their progress, learn from each other's challenges and successes, and to identify possible avenues going forward for collective action.

From a process perspective, in addition to being a collaboration among academic institutions, the RAFT involves a collaborative process where the RAFT team works with regional planning and locality staff, representatives of community organizations, and other community stakeholders. The RAFT's regional approach maintains the community-led focus for development and implementation of each locality's Resilience Action Checklist, while also enabling the localities to discuss shared goals and needs that might be addressed together, to learn from each other, and to avoid duplication of effort.

Development of the RAFT

The idea for the RAFT was formed in 2015 when staff from IEN and VCPC convened a meeting with government and community stakeholders in coastal Virginia localities to explore how they could increase resilience. This meeting grew out of earlier community engagement efforts, such as a Virginia Beach listening session where 92% of participants expressed their belief that local government should prioritize addressing sea level rise (University of Virginia Institute for Environmental Negotiation 2011). The meeting affirmed a community-led desire to advance coastal resilience but noted several barriers, including lack of clear understanding of vulnerabilities and opportunities for resilience, confusion about solutions to increase resilience, and lack of capacity by local governments to manage resilience initiatives. Findings from the meeting suggested the need for a "report card" that could comprehensively assess a locality's resilience while also being easily interpreted and understood by community leaders. The decision to jointly develop a coastal resilience scorecard was the starting point for the RAFT and the coalescing of three academic partners into the RAFT team.

Development of the RAFT Scorecard began with a survey of existing resilience and sustainability scorecards and report cards, and in-depth analysis of selected metrics and scoring approaches. Five scorecards and report cards were identified for further investigation that included interviewing the developers and users to glean lessons learned and recommendations. The RAFT team convened an advisory committee, comprised of over twenty subject matter experts from the government, nonprofit, and academic sectors representing different functional areas and research disciplines that provided advice and feedback on the development of a new scorecard and a larger process to engage localities in using the scorecard. The RAFT team also conducted two focus groups to obtain additional insights on the scorecard. In one focus group, representatives of state and local government agencies involved in coastal issues evaluated the RAFT Scorecard's objectivity and relevance for assessing locality-specific coastal resilience. In another focus group, social equity experts were asked to review the scorecard and evaluate whether it adequately addresses social equity as it relates to coastal community resilience. These social equity experts were drawn from academia, nonprofit organizations, state and local agencies, and the community. More specifically, they included the Virginia Department of Environmental Quality's environmental justice expert; The Nature Conservancy's local climate expert; professors from Norfolk State University, Old Dominion University, and University of Richmond whose research focused on the climate impacts on women and minority populations; a local Shorekeeper who was working on social equity issues; and local grassroots leaders from the Community Services Board, Southeast Care Coalition, Mothers Out Front, and Sustainability Solutions Group. These experts engaged in robust conversation and advised that, rather than creating a separate section in the scorecard for social equity, it should instead be integrated throughout every section of the scorecard. They developed key metrics relating to identifying, mapping, informing, and engaging socially vulnerable populations and as well as identifying and working with their trusted communication messengers and networks.

Following initial development, the RAFT was pilot tested in three selected communities and refined based on the pilot experience. The RAFT was applied in three pilot localities — a city (Portsmouth), a county (Gloucester), and a

town (Cape Charles) — located in different parts of Virginia's coastal zone and with quite different needs and cultures. These pilot communities were selected on the basis of several criteria, including a willingness to participate, demographic diversity, municipality type, density, community size, and physical vulnerability to flooding and coastal hazards. Throughout pilot testing, representatives of the localities and the regional planning organizations provided feedback regarding the RAFT Scorecard and overall process. At the end of the pilot testing experience, an evaluation focus group was also held with representatives from the three pilot localities and representatives of their regional governments. The RAFT team also held a focus group with staff of local and state government agencies, academic researchers, and representatives of community and nonprofit organizations to identify issues and concerns relating to social equity in coastal resilience.

Detailed feedback from the pilot testing and guidance from the evaluation and social equity focus groups led to greater integration of social equity throughout the RAFT Scorecard, as well as an emphasis on identifying vulnerable populations experiencing various kinds of risk, establishing wide ranging networks for communication, and working with trusted messengers. For example, scorecard components were modified to include consideration of vulnerable populations, social equity, and health and wellness. From an overall process perspective, insights from the pilot test and focus groups also resulted in a decision to expand the process by adding a year-long implementation phase that included locality Implementation Teams to work on resilience actions over the one-year period.

Following completion of the pilot and refinement to the scorecard and process, the RAFT was deployed in 2018 to the Eastern Shore of Virginia to support resilience planning and project implementation. At the invitation of the Accomack-Northampton Planning District Commission, the regional planning organization for the region, the RAFT was implemented in seven localities: the counties of Accomack and Northampton, and the towns of Chincoteague, Onancock, Saxis, Tangier, and Wachapreague. In 2019, application of the RAFT was extended to include the Northern Neck

region of coastal Virginia. In partnership with the Northern Neck Planning District Commission, the RAFT was applied in eight localities: the four counties of Lancaster, Northumberland, Richmond, and Westmoreland; and four towns of Colonial Beach, Kilmarnock, White Stone, and Warsaw. Localities in Virginia's Middle Peninsula region engaged with the RAFT beginning in 2021, with on-the-ground resilience planning and project implementation undertaken in five counties (Mathews, Middlesex, Essex, King and Queen, and King William) and one town (West Point).

Incorporating equity into the RAFT tool and process

From a process perspective, a key emphasis of equitable resilience planning and project implementation via the RAFT is the need for broad and durable community involvement. The RAFT process acknowledges the need for representation of broad interests across the community. However, early experiences of the RAFT highlighted how other needs limit the time and resources that regional planning and locality staff can commit to resilience efforts. Early work in the three pilot communities also identified that local governments may constrain community involvement. Furthermore, government agency staff, such as those in social services functions, may reflect the interests and needs of specific vulnerable groups, but are often not representative of the wider range of vulnerable populations, particularly groups that are less visible and do not engage with their local government. Combined, these highlighted the need to broaden participation in the RAFT's resilience planning efforts beyond regional planning and locality staff and those with formal ties to the local government.

As the RAFT was deployed in coastal Virginia regions and localities, process modifications included intentionally broadening the invitation list for participation in the RAFT community workshops to get more community interests represented, and especially to include members of socially vulnerable groups. In that same spirit of broad community involvement, consistent with a whole-of-community framework, the Implementation Teams were enhanced by seeking out community volunteers with interest in specific resilience projects.

Finally, the RAFT recognizes that most communities have broader concerns of social and economic resilience, such as those related to physical and mental health, access to care, and economic issues of jobs and financial resources to cope with disruptive events. Experiences from the RAFT identified that there are many additional needs of vulnerable populations when it comes to resilience to coastal hazards. While various service agencies provide resources and support for issues such as opioid addiction, aging, pregnancy, and lack of transportation, there is less emphasis on helping vulnerable populations prepare for and respond to coastal hazards. Addressing coastal resilience in a way that is equitable, therefore, calls for connecting the dots.

Connecting coastal resilience to economic and social resilience is a significant step. Coastal resilience requires recognition of how the needs of vulnerable populations can be met, and connecting the dots is also necessary to incorporate vulnerable populations into coastal resilience considerations. While service agencies deal with a variety of social and economic issues, they are not always empowered or able to support efforts to help vulnerable populations to prepare for and respond to coastal hazards. Connecting the dots by bringing service agencies into the coastal resilience network is an important step in planning and implementation for equitable resilience. For example, in the largely rural counties of Essex and King and Queen in Virginia's Middle Peninsula region, community members identified food access as an important resilience priority especially for ensuring the health of elderly and low-income residents. During implementation, the RAFT was able to connect community leaders from the Rappahannock Tribe involved with heritage gardening with faith leaders and activists of the African-American community as well as technical experts from Virginia Cooperative Extension. Together, these members have been collaboratively developing the framework for a food security plan for the region that will involve community gardens in partnership with churches, Master Gardeners, and other service organizations.

An additional instance of the RAFT facilitating connections between the locality and other organizations (nonprofits, universities, and service providers) with different expertise is a project
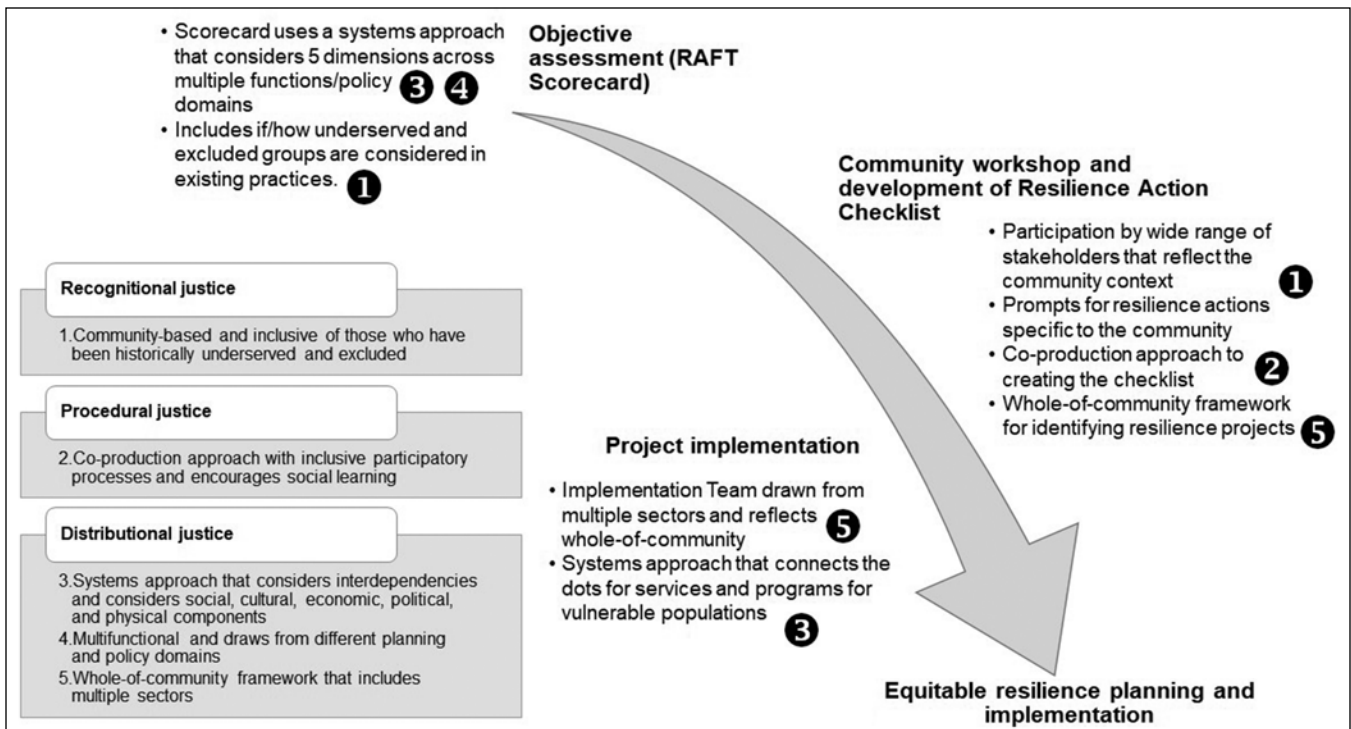
Figure 2. The RAFT phases and features of equitable resilience planning and implementation.

to address shoreline erosion in the Town of Colonial Beach in the Northern Neck region of Virginia. The RAFT helped make connections and build long-term partnerships between the town and researchers at ODU and the University of Virginia, and planning experts with the Green Infrastructure Center. For example, one ODU geography professor supported data analysis and visualization of the town's shoreline erosion issues for areas prioritized by town staff and residents as concern. This research was used to develop a "State of the Beach Report" for the town, and subsequently supported the Town of Colonial Beach's application for grant funding to address the long-term effects of climate change on beach erosion through implementation of the living shorelines plan developed by the Green Infrastructure Center.

How do all the different pieces come together in the RAFT's approach to incorporating equity into resilience planning and implementation? First, the RAFT process incorporates practices that embed equity within discussions and actions about resilience. Second, equitable resilience is integrated within all three phases of the RAFT, beginning with the scorecard assessment, into development of the Resilience Action Checklist and prioritizing projects for coastal resilience, through the 12-month implementation phase to improve resilience on

the ground. As shown in Figure 2, The RAFT embodies the five key features of equitable resilience planning and project implementation .

Equity is incorporated throughout the five dimensions of the RAFT Scorecard by addressing social vulnerability and adaptive capacity. For example, scoring metrics across all five dimensions of the scorecard consider the needs of and disparities faced by socially vulnerable populations. Scoring metrics also assess the extent to which historically underserved and excluded groups are considered in existing practices. Within the risk assessment and emergency management dimension there are scoring metrics related to conducting risk assessments for socially vulnerable populations. Other indicators of equitable resilience related to adaptive capacity include whether hazard mitigation planning is undertaken with public engagement targeted at socially vulnerable communities and whether the locality has provided meaningful information about vulnerability and support to increase emergency preparedness. Using a systems approach to resilience, the scorecard offers an assessment of resilience that considers multiple functions, various policy domains, and draws upon different planning instruments.

From scorecard assessment, the RAFT takes localities through the process of developing their Resilience Action Check-

lists. The community workshop uses a co-production approach to develop the checklist collaboratively among a wide range of stakeholders, including locality staff from functions such as planning, emergency management, and public works; and representatives of state agencies such as the Departments of Health, Forestry, and Social Services, regional planning and service organizations, nonprofit and community organizations, and economic development agency or chamber of commerce; along with faith leaders, community leaders, and residents. The workshop process also emphasizes vulnerable populations as a focus of action for building resilience. During the workshop, participants are prompted to brainstorm ideas for resilience actions that address equity issues unique to their community, such as those related to social vulnerability, health, and wellness. Through this brainstorming activity, equity becomes front and center in consideration of resilience and in development of the Resilience Action Checklist. The brainstorming activity is also informed by the scorecard results and a list of opportunities for enhancing resilience pulled from the region's Hazard Mitigation Plan. Both further reinforce the focus on equity as the RAFT Scorecard has social equity components embedded within it, and the mitigation actions from the Hazard Mitigation Plan may focus on the needs of vulnerable populations.

In the final phase of the RAFT, localities receive ongoing assistance to support implementation of their Resilience Action Checklist items. A key part of this phase is connecting the dots for services and programs that work with vulnerable populations. For example, activities to implement resilience projects may call for the Implementation Team to further identify needs of and impacts on community members who are socially vulnerable. In situating their efforts within broader planning, development, and resource allocation processes, the Implementation Team also creates linkages across functions, organizations, and sectors in a way that helps their resilience efforts be more durable and have long-term impacts. The resilience projects implemented have increased the communities' awareness of the need to identify and prepare their socially vulnerable populations for coastal hazards and have supported efforts to find ways to do this effectively. Some examples include identifying and mapping critical infrastructure that serves vulnerable populations, creating an asset map of services and resources for vulnerable residents, and developing easily accessible emergency information for residents.

CONCLUSION: CHALLENGES, LESSONS LEARNED, AND TRANSFERABILITY

For a coastal community to build its resilience, the environmental justice framework suggests that a community engagement process must offer procedural, distributive, and recognition justice, be preventive in nature, identify those most vulnerable to harm and their needs, target actions and resources to addressing those needs, and do so in a way that enables candid discussion of priorities and tradeoffs. When first conceived, the RAFT process focused on some but not all of these core elements. Over time, however, as the RAFT process proved highly successful in some cases and less successful in others, and as the RAFT team examined what would increase the probability of success, the process now explicitly integrates most if not all of these core elements.

Challenges

Some challenges have come up as we applied the RAFT to support on-the-ground, community-led resilience planning and project implementation. The RAFT has focused exclusively on working in rural localities in coastal Virginia, most of which have limited capacity (such as staff, technical expertise, and financial resources) to address resilience. Recognizing the political tenderness (Foreman 2011) of terms such as climate change and sea level rise, the RAFT has been careful to focus on flooding and storm hazards, and emphasizing the need to meet the needs of and including vulnerable populations in resilience planning. However, there have been instances where the regional planning organizations and localities were primarily focused on the physical aspects of resilience, for example addressing flooded roads, managing coastal erosion, and tackling stormwater challenges, and less focused on the social components of resilience. This laser focus on the physical dimension of resilience sometimes made it challenging to ensure equity.

The RAFT's focus on helping rural localities with limited resources and capacity also posed challenges in terms of engagement by locality staff in developing the Resilience Action Checklists and participating in the Implementation Teams. Our role has been to provide the resilience assessment and facilitate development of the checklist and support implementation. However, meaningful progress on resilience could not be made without input and engagement by locality staff.

Lessons learned

We offer a few lessons we have learned concerning equitable resilience from the development and application of the RAFT in coastal Virginia communities. First, the RAFT, being rooted in an academic partnership that seeks to support resilience planning through facilitation by neutral academic experts, brings academic objectivity to the resilience assessment, prioritization of resilience actions, and the implementation of resilience projects. This objectivity reduces perceived political influence in resilience planning and project implementation while allowing for more authentic consideration of equity in community discussion and action around resilience. This objectivity also supports addressing recognitional justice by critically examining roots of social vulnerability and disparities in adaptive capacity within and between communities.

Second, when addressing issues relating to equity, we learned that terminology and framing are extremely important. For example, we found that while the term "environmental justice" may be useful and catalytic in some communities, others may not find it relevant and prefer to discuss resilience using social equity terminology and framing. What terms to use and how they are used must resonate with the communities. This can only be determined by having conversations with locality staff and other community stakeholders.

More importantly, we have had to recognize that discussion of resilience to coastal hazards may not be seen as possible when economic and social resilience are more urgent and need to be addressed as long-term priorities. We learned that because under-resourced communities may not see coastal hazards as a primary concern, we need to broaden the conversation and frame coastal hazards within the larger context of community resilience. We have learned that in supporting resilience planning at the local level, we play an important role in creating community-wide discussions about resilience, informing residents about increasing flood risks, and helping to connect the dots between resilience, coastal hazards, and economic and social resilience. Doing so requires that we work with localities to approach coastal resilience in a way that also addresses the needs of vulnerable populations and overcomes disparities in adaptive capacity.

Transferability

The RAFT project team is focused on continued improvement of the RAFT and ensuring equity is at the center of the RAFT approach to helping localities plan for resilience and implement resilience projects. For example, to expand the applicability and utility of the RAFT Scorecard, we are modifying the assessment to incorporate specific concerns around extreme heat and riverine and inland flooding that also challenge coastal-adjacent communities. Additional revision to the RAFT engagement process includes recognition of a wider range of stakeholders and a stronger emphasis on education and social learning through offering targeted workshops that bring together Implementation Teams and other stakeholders within a region around specific resilience-related issues such as transportation planning or the impact of sea level rise on septic and well systems.

Coastal communities beyond Virginia are similarly recognizing the need to not only plan for a resilience, but to do so with an eye towards equity. The RAFT as both a tool and a process for resilience planning and project implementation can be transferred to other localities and communities beyond Virginia, but the scorecard would need to be adapted to the different contexts such as by reflecting the laws and policies of the respective states and recognizing the existing regional planning frameworks. The RAFT process is more directly transferable to support equitable resilience planning in other locations.

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