Climate Change, Justice and Adaptation
among African American Communities in the
Chesapeake Bay Region

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Abstract

In this paper we present results from a study of climate change and community adaptation, focusing on two African American communities on the Eastern Shore of the Chesapeake Bay. These two communities are representative of small, resource poor communities that are particularly prone to increased flooding, storms and erosion accompanying climate change. We frame our research within a focus on distributive and procedural justice, including considerations of the role of adaptation capacity and vulnerability. We use methods from cognitive environmental anthropology and psychometrics to ground a participatory and multidisciplinary approach that emphasizes community participation and the sharing of scientific and program information on climate change and adaptation. Our results suggest that community members have a holistic understanding of climate change, recognize a wide range of potential community and individual impacts, face specific vulnerabilities, and are organized through their churches to engage in efforts to reduce the impacts of increased flooding and storms on their communities.
1. Introduction

The impacts of climate change are often discussed at the global, continental or national levels, but ultimately they are experienced at the local level (Paavola and Adger 2006). As a result, issues of justice, equity and inequality present difficulties for policy and decision-makers because local communities experiencing climate change impacts have different vulnerabilities within each country (O’Brien et al. 2004). To further complicate the matter, often the most vulnerable have the least voice and lack equal protection of interests from their national governments. Among the vulnerable, climate change may especially burden those who already struggle with current climate variability and extreme weather events (O’Brien et al. 2004; Adger et al. 2003; Wilson et al. 2010).

The impacts of climate variability and extreme weather events are often felt more intensely in coastal areas because the coastal zone defines the confluence of both marine and terrestrial processes. For instance, coastal communities are more vulnerable to increased flooding due to both sea level rise and projected increases in precipitation and river flows as a result of climate change (Kirshen et al. 2008; USGCRP 2008). It is estimated that over 50 percent of the population in the United States now live in coastal zones, and this number is projected to increase (Wilbanks et al. 2008). This exposure to flooding is projected to increase in the coming decades as a result of sea level rise due to climate change, continued land subsidence, and probable increases in the intensity and frequency of coastal storms (Thomas et al. 2009).

Research, environmental decision-making and governance focused on adaptation to climate change impacts are strengthened by an explicit consideration of social justice
issues (Posner and Weisbach 2010). Differentiated access to information, variability in risks of flooding and storms, restrictions on participation in adaptation programs, and variability in vulnerabilities and adaptation goals will significantly shape the form and ability to adapt to climate change impacts. Communities located in areas more prone to flooding with fewer social, economic and political resources will almost certainly face significant constraints in adapting to climate change impacts, which may be a continuation of historical and cultural legacies of discrimination and inequalities (cf. Wilson et al. 2010).

In this article we present results from a participatory and multidisciplinary study of climate change impacts, vulnerabilities and adaptation for two African-American communities on the eastern shoreline of the Chesapeake Bay. The Eastern Shore of the Chesapeake Bay is particularly prone to the impacts of accelerated sea level rise because of its low topography, hundreds of miles of coastline, and growing population (Cole 2008). Given the low-lying topography and extensive shoreline of the Eastern Shore, most residents are not too far from creeks, marshes, ditches, rivers, sounds or the Bay itself. State and county governments are developing policies and programs to assist communities in adapting to projected increases in flooding, storms, land erosion and salt-water intrusions to the Shore's vast network of marshes (MCCC 2008). However, a challenge facing governmental and local efforts to develop and implement adaptation programs is the variability in community and local environmental conditions that create a wide range of risks, vulnerabilities and adaptation capacity to climate change impacts. This diversity of situations and needs raises questions of social justice regarding what is fair to expect from
local communities, what must be provided to them, who decides on adaptation needs and services, and which vulnerabilities to climate change impacts should be prioritized.

Many African American communities on the Eastern Shore of Maryland today are descendants of slaves, freed after the Civil War, and African Americans who later moved to the Shore. Over the past century, members of these communities worked in agriculture and commercial fisheries (Wennersten 1992). Our interest in African American communities’ vulnerability to climate change arises for a number of reasons. First, these communities represent a socio-economic group that has not been studied sufficiently in terms of climate change impacts (Wilson et al. 2010). Second, because of historical and racial barriers and obstacles, African Americans have had fewer socioeconomic resources at their disposal to respond to environmental and societal threats to their communities. Today, many of these African American communities on the Eastern Shore are disappearing due to declines in local job opportunities and migration of young adults to cities. Third, these communities are often situated on low lying lands exposed to flooding, and with accelerated sea level rise and increased flooding, storms, and erosion many of these communities could literally disappear. Finally, these communities and their churches embody for many African American Eastern Shore residents their history and heritage (Anderson 1998).

We present results from our research on climate change, justice and adaptation for two African American communities on Maryland’s Eastern Shore of the Chesapeake Bay. Located in Dorchester County, Smithville is a dispersed community of residents descended from workers in the agricultural, timber and seafood industries. The center of the

1 The results of a parallel study of urban communities and environmental justice in Boston, Massachusetts is presented in Douglas et al. 2011.
community is the New Revived United Methodist Church. The community of Bellevue is located in Talbot County and is comprised of descendants who worked in the seafood industry (Anderson 1998). The center of Bellevue is St Luke United Methodist Church.

Though the communities share a common history they are also unique in their identities and challenges in adapting to climate change. Both communities face increased threats of flooding, yet the risks that flooding presents to each community is different, and each community’s capacity to adapt is also different, even though they share many broad cultural, socioeconomic and historical characteristics.

We begin with a discussion of climate change impacts for Chesapeake Bay, and in particular for the Eastern Shore, followed by a presentation of some connections among distributive and procedural justice, adaptation and vulnerability that help justify our study focus and specific research approaches. We then follow with a description of our participatory and multidisciplinary approach, and the results from applying cognitive and psychometric methods used to collect information on knowledge, interests, needs and values related to climate change adaptation. We conclude with community specific adaptation challenges and goals, and return to how our research fits within a distributive and procedural justice approach.

2. Climate Change and Adaptation for the Chesapeake Bay

Assessments of climate changes in the Chesapeake Bay are fairly consistent in their focus and direction – and rather dire in their predictions (Najjar et al. 2010). In particular, the phenomena of sea level rise and associated changes -- erosion, flooding, and inundation - - are very important for the Chesapeake Bay region. Accounting for only thermal expansion
and ice melt, sea level rise projections range from 0.8 to 2 meters (Pfeffer et al. 2008; Katsman et al. 2008; Vermeer and Rahmstorf 2009). A recent state-of-the-science review for climate change in the Bay estimates that in the 21st century relative sea level rise will be approximately 0.7 to 1.6 meters – with variability across the Bay (Najjar et al. 2010; Pyke et al. 2008). The consequences of accelerated sea level rise are dire for the low-lying areas along the Chesapeake Bay: permanent land loss due to inundation and accelerated erosion; wetland accretion; migration or drowning; saltwater intrusion; and increased frequency of storm flooding (Gesch et al. 2009). Tidal range and extreme wave height in storms are expected to increase (Najjar et al. 2010).

While the extent and range of impacts may vary, it is generally agreed that the low-lying Eastern Shore, and the counties of Dorchester and Talbot in particular, are in the high-risk category, susceptible to erosion, flooding and inundation (Johnson 2000). Sea level rise, in particular, will have dramatic effects on the region in and around Dorchester County. Sea level rise modeling indicates that in the Blackwater National Wildlife Refuge, a vast marsh and wildlife refuge in the heart of Dorchester County, will be largely underwater by the year 2100, resulting in a loss of about 93 percent of its tidal marshes and swamps and over 32,000 acres of undeveloped dry lands (National Wildlife Federation 2008; also see Johnson 2000:4-5). Given that nearly half of the land area in Dorchester county lies below 1.5 m of sea level and is currently vulnerable to flooding from moderate storms (Cole 2008), the outlook is bleak when considering the impacts of coastal flooding from future SLR and its impacts. No significant research has yet investigated how climate change will impact cultural and socioeconomic processes (and vice versa) across this region (Pyke et al. 2008).
Government and non-government policies and programs are emerging in response to the ecological risks and community vulnerabilities for the Chesapeake Bay. President Obama issued Executive Order 13508 on Chesapeake Bay Protection and Restoration that included the goals to “assess the impacts of a changing climate on the Chesapeake Bay and develop a strategy for adapting natural resource programs and public infrastructure to the impacts of a changing climate on water quality and living resources of the Chesapeake Bay watershed” (Obama 2009: 2). The state of Maryland formed an Adaptation and Response Working Group (ARWG) of the Maryland Commission on Climate Change (MCCC) to investigate short and long-term adaptation measures to address sea level rise and climate change. Specific actions recommended include the promotion of programs and policies to reduce impact to existing areas and future developments; a transition to more sustainable economies and investments; improved preparedness and planning regarding human population safety, health, and welfare; protection of the natural shoreline (MCCC 2008). Additionally, the State of Maryland has developed the CoastSmart Communities Initiative, a program that in partnership with NOAA will provide grants ranging from $10,000 to $75,000 to coastal communities to support the planning and preparation needed to adapt to climate related impacts and provide on-the-ground expertise, planning guidance, training and tools to support local planning efforts (DNR 2012).

Multiple non-profit environmental and stewardship groups are recommending specific policies and programs. For example, the National Wildlife Federation recommends (a) requiring local governments to consider sea-level rise when amending their plans for coastal land use; (b) expanding Maryland and Virginia’s 100-foot buffer zones and increasing the enforcement of existing buffer zone areas; and (c) developing policies such as
rolling easements or mandatory setbacks to discourage new development in vulnerable coastal areas (NWF 2008:10; see also Chesapeake Bay Foundation 2007). However, prior to our study there had been no specific focus on coastal African American communities in the region.

3. Adaptation, Vulnerability and Justice

Adaptation and vulnerability to climate change inherently raise issues of justice (Posnor and Weisbach 2010). Broadly speaking, key justice dilemmas of adaptation include responsibility for climate change impacts, the sharing of assistance to vulnerable countries and communities for adaptation, and fair participation in planning and making decisions on adaptation (Paavola and Adger 2006). These broad justice considerations are empirically based on the fact that adaptation to climate change consists of individual and group choices made in the context of present and predicted climate change impacts, societal concerns and priorities, and existing institutional decision-making structures and processes that bias particular distributions of resources, wealth and power (Paavola and Adger 2006). These choices and decisions are often characterized by conflicts of values and interests, and they cannot be reduced to technological solutions, market driven processes and cost–benefit calculus (Bromley and Paavola 2002). Ultimately, these choices are moral in the sense that they are informed by values that guide the comparison of alternatives choices and decisions. Thus, the collective adaptive decisions need to strike a legitimate and just balance between the different interests and values (Paavola 2005).

The concept of vulnerability is also central for climate justice because it further ties the above concerns of adaptation to those of moral philosophy (Paavola and Adger 2006).
Research on adaptation to climate change defines vulnerability as a function of exposure, sensitivity and adaptive capacity (Paavola and Adger 2006). Research on natural disasters defines vulnerability as the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard (Wisner et al. 2004). This definition draws attention to factors such as assets, sources of livelihood, class, race, ethnicity, gender and poverty that demarcate vulnerable groups (Paavola and Adger 2006). For example, vulnerability is affected by the extent of people’s dependence on risky activities such as agriculture or fishing, and the ability of communities to access health, education, and economic resources.

A focus on vulnerability is further justified given principles of distributive justice (Kolm 1996; Rawls 1971). Distributive justice is comprised of normative principles designed to guide the allocation of benefits and burdens in a society. A fundamental goal of distributive justice is to develop principles that guide the fair and equal distributions of goods and services among individuals and groups. A core principle of distributive justice is strict equality. This egalitarian principle says that every person should have the same level of material goods and services. The principle is most commonly justified on the grounds that people are owed equal respect and that equality in material goods and services is the best way to give effect to this ideal.

Equality is a reasonable theoretical and moral starting point for a focus on vulnerability to climate change impacts. Equality can be considered just if there are no compelling reasons to prefer an inegalitarian distribution. However, need and lack of capacity are often considered to be such compelling reasons that would justify a deviation from the norm of equality (Rawls 1971). Vulnerability can be considered comparable to
need and lack of capacity in providing a justification for favoring the most vulnerable in distributive matters (Paavola and Adger 2006).

In addition to distributive justice, it is also important to focus on procedural justice. Procedural justice is concerned with roles and positions of individuals or groups in the planning and decision-making processes, and includes considerations of factors such as recognition, participation and distribution of power (Tyler et al. 1997; Young 2000). Importantly, procedural justice fosters legitimacy in that it helps assure those whose interests are not supported by a specific decision that their interests have been considered and that they there will be opportunities to be considered in future decisions (Paavola and Adger 2006). Procedural justice allows all stakeholders to express dissent or consent in a context that legitimizes differences and conflicts in interests and values; some decisions will be adopted, some not, but all will have equal and dignified consideration (Schlosberg, 1999). Procedural justice is not independent of distributive justice. If stakeholders are not recognized and thus cannot participate in planning and decision-making, for example regarding adaptation, their interests and values will not inform plans and decisions, which can aggravate inequality rather than reduce it (Paavola and Adger 2006).

4. Study Communities

The study communities of Smithville and Bellevue are both located on the Maryland portion of the Eastern Shore of the Chesapeake Bay (Figure 1). Fishing, farming and forestry are the keystones of the Eastern Shore economy and way of life. As Maryland’s most concentrated agricultural region, counties in the Middle Eastern Shore area (Queen Anne’s, Talbot, Caroline and Dorchester) account for almost one-third of Maryland’s
agricultural land and produce over 50% of the state’s major crops such as corn, soybean, wheat and barley (ESLC 2002). The Eastern Shore possesses a distinct cultural identity within the Chesapeake Bay region and the state of Maryland: those “born on the Shore” are known to be independent, hard working, religious and politically conservative (Wennersten 1992).

The African-American community of Smithville is located in Dorchester County, which refers to itself as the "heart of the Eastern Shore" because of its location in the middle of the Shore and the county's boundaries form a heart-like figure (Figure 2). According to the three-year estimates for the U.S. Census Bureau, Dorchester County in 2006 had a population of 31,734, of which almost 28 percent was African American, compared to 12 percent, nationally. Dorchester is one of the poorer counties in Maryland, though in recent years newcomers and tourists have discovered Dorchester County's open natural spaces and lower cost of living. In 2007, per capita personal income ($25,047) in Dorchester County was 79 percent of statewide per capita income; and is expected to decline to 71 percent by 2030 (Maryland Department of Planning, Planning Services 2007). Unemployment in Dorchester County is 10.1 percent, compared to Maryland’s 7.3 percent average and the U.S. national average of 9.4 percent (Bureau of Labor Statistics 2010).

The community of Smithville is located between Taylors Island and Blackwater National Wildlife Refuge in southern Dorchester County. Based on interviews with community residents, Smithville was formed in the early 20th century when a farmer (named...
Smith) sold land to African Americans living and working on a nearby farm owned by white farmers. The land sold was low lying and marshy, and not suitable for agriculture. By the 1910 to 1920 period there were already a number of African American families living in Smithville, and by the 1940s the population had increased to perhaps 20 families located along what today is Smithville Road. Informants do not know precisely how many people lived in Smithville during the first half of the 20th century, but they remember that "you couldn't get through here [Smithville] because of all the children and dogs." The community, probably along with African Americans living on nearby Taylors Island, even had a baseball team named The Lone Rangers. One informant remembered that when he returned to Smithville after World War II there were maybe about 100 people living here.

Residents of Smithville worked in seafood processing on Taylors Island and at white-owned farms and businesses harvesting and processing vegetables and fruits. Many men also work in local sawmills. Today, there are only a handful of families residing in Smithville. Young people have moved away because there were no jobs outside a few in seafood and agriculture. Those who have moved have not, however, sold their property, and still see themselves socially connected to Smithville. Many who have left relocated to the nearby city of Cambridge but still attend church in Smithville.

In the past as today, church is the most important social institution in Smithville. The New Revived United Methodist Church was built in 1925. Although the policy of the United Methodist Church is to integrate whites and African Americans in its churches, churches on the Eastern Shore in practice remain separated into white and black churches, for historical, social and cultural reasons. Today, New Revived has about 30 active
members, as well as other members who support the church with donations and visit the
curch during its annual homecoming.

4b. Bellevue

The community of Bellevue is located in Talbot County (Figure 2), north of
Smithville, along the Tred Avon River. Talbot County, with its almost 600 miles of
shoreline, is almost entirely surrounded by the waters of Chesapeake Bay and its
tributaries (Nuckols et al. 2010). Parts of Talbot County, because of its proximity to
Chesapeake Bay, are already subject to severe erosion caused by wind and wave action.
The population of Talbot County is approximately 36,000. In addition to long-term
residents, the county has become a retirement location. Almost 23 percent of Talbot County
residents are over the age of 65, contrasting with the national average of 12.6 percent.
Approximately 13 percent of the population is African American. In the nearby town of St.
Michaels the population is 1,193 and African Americans comprise 29.3 percent of the
population. In 2009, the per capita income in Talbot County was $39,294 and the median
household income was $59,633 (U.S. Census Bureau 2011). In 2009 the percentage of
people living below the poverty level in Talbot County was 8.8 (U.S. Census Bureau 2011).
The unemployment rate in Talbot County is 7.4 percent (Bureau of Labor Statistics 2010).

The village of Bellevue was founded in the early 20th century by African Americans
working in the seafood industry as shuckers of oysters, pickers of crabs or as watermen
"working the water.” A seafood-processing factory that employed and housed African
Americans sold part of the adjoining land to African Americans. By the 1930s, the Bellevue
Seafood Company was African American owned and operated, and up until the 1970s there
were many African American watermen who worked the same areas as white watermen,
often on the same boats, and sold their catch to the same processors, with apparently little racial discrimination present (Anderson 1998). Working the water was more profitable than working on farms or in food processing. It is not clear what the population of Bellevue was through the first half of the 20th century, though interviews and observations of the current layout of the village suggest that there could have been 100 to 200 residents. Similar to Smithville, Bellevue also had a baseball team. Today, the population of Bellevue is probably close to 100 residents, mainly African American.

The center of Bellevue, in the past and today, is St. Luke United Methodist Church. The church was built on its current location in the center of Bellevue in 1903. Today, the church has between 30 and 40 active members, and a larger number of supporters who no longer live in the community but return for the church's annual homecoming. The church is also well known for its chicken barbecue, which is an important source of church funds. During summer months, church members sell barbecued chicken from a nearby roadside stand.

5. Participatory Research Approach

Our research approach reflects interests in both distributive and procedural justice. In terms of distributive justice, we needed an approach that would identify community residents' interests, values and needs affected by climate change, community capacity, and vulnerabilities in meeting needs and sustaining values. In terms of procedural justice, we needed an approach that was both participatory and inclusive, while capable of providing information on interests, values and needs in a manner that created legitimacy and ownership of the process and results by community members (Aylett 2010).
More specifically, we used theories and methods from cognitive-environmental anthropology and psychometrics to engage community members in the collection and analysis of their knowledge, interests, values and needs related to climate change impacts. We also provided scientific information on climate change and predicted impacts to both educate and generate community responses on adaptation goals, constraints and opportunities. We also provided information on state-level programs that seek to work with Maryland coastal communities to improve adaptation to predicted increases in storms and flooding due to climate change induced sea level rise. Throughout our data collection and analysis, we involved community members in order to better represent their understandings of climate change, vulnerabilities to climate change impacts, and their values and preferences in terms of adapting to climate change. We brought to this participatory research process expertise from anthropology, hydrology, engineering, geography and program management. Most of our community level information was collected during a series of three workshops held in each community from 2009 to 2010, though we also collected information from informal interviews and participant observation. The specific methods and data collection activities used are described below under cultural analysis, sharing the science, and sharing adaptation options.

Cultural Analysis of Community Understanding of Climate Change (Workshop 1)

Two key goals of the project were to 1) elicit community members' knowledge of climate change as well as their experiences and observations of climate change impacts on their communities and 2) identify opportunities and constraints to different adaptation strategies that could reduce community vulnerability to climate change impacts, most
notably increased flooding due to sea level rise, increased storms, and changing precipitation patterns.

Because climate science is complex, contains considerable uncertainty in terms of local impacts, and the public and political discourse over climate change can be contentious, we anticipated a wide range of views and opinions on climate change among community members. We thus theorized that community residents would draw upon a wide range of information to interpret and make judgments about the source, veracity and utility of information on climate change. As a result, we did not want to assume much about what and how community members understand and think about climate change.

We did hypothesize that workshop participants would conceptualize climate change within existing cultural frames of reference acquired through past, shared experiences. These frames of knowledge could, for example, include religious beliefs and values that might lead to the conclusion that climate change was in fact not occurring, or ideologies that contextualized climate science within political agendas.

Our first research priority was to try to elicit these existing frames of cultural knowledge for understanding climate change, including information on adaptation and vulnerability. We used approaches familiar to cognitive and environmental anthropologists for eliciting shared core knowledge of environmental phenomena (cf. Atran et al. 2005; Kempton et al. 2005; Paolisso 2002, 2007; Shaffer and Naiene 2011). More specifically, to elicit cultural knowledge about climate change we used cognitive and psychometric approaches, specifically free listing, pile sorting and multidimensional scaling (MDS) (Bernard 2006; Kruskal and Wishing 1978; Weller and Romney 1988). We first asked participants to freely list the words that come to mind when they think about "climate
change." We then asked participants, individually, to identify the listed words that they felt were "most important." Next, we identified words that were seen as "most important" by two or more community members. This list represented words that the group shared to some degree. We then had workshop participants organize these shared words (printed on small slips of paper) into piles of terms (pile sort). The only instruction we provided was to organize the words so that words more similar to each other were in the same pile, and words more dissimilar were in different piles. Pile sorting is an easy and useful way for collecting information on similarities and differences in knowledge and values (Weller and Romney 1988). The first workshop concluded with some general discussion of what they found interesting, difficult or confusing about the exercises, and what other thoughts emerged about climate change as a result of the exercises. We analyzed the pile sorts using multidimensional scaling (MDS).

MDS is a set of techniques that help researchers uncover the "hidden structure" of data by analyzing proximities within the data itself (Kruskal and Wish 1978). A proximity is a number or measure of how similar or dissimilar two objects are or perceived to be. The most important output of MDS is a spatial representation of each data point in configurations that suggest how similar or dissimilar the data are to each other (Kruskal and Wish 1978). Visually, the more similar two points are perceived to be to each other, the closer they will be represented in the spatial representation, and the opposite is also true: in the case of our climate change words, the farther apart two words are in the spatial plotting, the more dissimilar workshop participants thought the words were. MDS programs are capable of plotting proximity data in "n" dimensions, though most researchers analyze data using either two or three dimensions. In interpreting the MDS spatial representation, the
researcher, with assistance from community participants in our case, can focus on two specific analyses: 1) identification and evaluation of the meaning associated with close clusters of data (e.g., words about climate change) and 2) exploration of possible explanations for the overall distribution of data in order to identify the hidden dimensions underlying and organizing the data.

Sharing the Science of Climate Change (Workshop 2)

Following a discussion of the cultural knowledge of climate change, we shared scientific information on the causes of climate change and the resulting effects on sea level rise and coastal flooding. We explained how scientists know what past climates looked like from ice core data and how we assess what future climates could look like from modeling various CO₂ emissions scenarios. We presented digital maps showing different flooding projections for Dorchester and Talbot counties depending on different sea level rise and storm scenarios (Figures 2 and 3). Community residents were genuinely interested, asked many questions, located their specific houses and local landmarks on the flood maps, and were clearly valued learning what science offers and what it might mean for their community.

Sharing Information on Adaptation Options (Workshops 2 and 3)

At the end of the second workshop, we presented four categories of adaptation: protection, accommodation, evacuation and retreat. We then discussed with participants the desirability and feasibility of these options for their communities. At the third and final
workshop in each community, we continued the discussion of adaptation options by focusing on community incentives and obstacles to the specific adaptation options. A representative from Maryland’s Department of Natural Resources joined us at the third workshop and led a focused discussion of the adaptation options the State is developing to address climate change impacts. These options include avoidance or prevention of additional risks (e.g., zoning to restrict building in flood prone areas), accommodation (e.g., elevate homes, emergency management), protections (e.g., berms and sea walls), and finally retreat. Participants formed small groups to discuss which options were feasible, or not, and what were the opportunities and constraints to implementing any of the options.

6. Results and Discussion

Our research with Smithville and Bellevue provided a number of valuable insights on community members’ understanding of climate change, their needs, values and vulnerabilities, and their adaptation goals. Both communities were enthusiastic about our project and motivated to learn more about climate change and the implications for their communities. We did not find any resistance to believing that climate change is occurring, or support for any political or religious arguments against climate change. We present our findings in two sections: 1) cultural knowledge of climate change, impacts and responses and 2) justice and adaptation issues. We follow with some overall conclusions linking our study to broader climate justice themes.

6a. Cultural Knowledge of Climate Change

We found that community members had robust and varied understandings of climate change, based on both local experiences and information obtained from media sources.
These understandings or cognitive frameworks were first identified, and most clearly captured, by the freelist, pile sorting and multidimensional scaling activities. The freelist exercise in Smithville elicited a total of 100 words in response to the concept of "climate change." Fifty-six of those terms were mentioned by at least four or more participants. These fifty-six terms were pile sorted by the 24 workshop participants, and the multidimensional scaling results are presented in Figure 4. The freelist exercise in Bellevue elicited a total of 60 terms of which two or more individuals mentioned 35 terms. These 35 terms were pile sorted by eight workshop participants, and the multidimensional scaling results are presented in Figure 5.

A number of patterns and results in the multidimensional scale plot in Figures 4 and 5 warrant discussion. There are differences between the two communities in the number of terms, which is partially accounted for by the larger number of Smithville participants, and the terms themselves, which as explained below reflects each community’s different environmental situations and past historical experiences with flooding and storms. What is most noteworthy in the MDS plots is the general clustering of terms into three large groups. A first large cluster, on the left side of each MDS plot, is a large number of words for environmental impacts of climate change. For Smithville, examples of these environmental impacts of climate change are sea life, forest fires, drought, melting ice, rising tides, flood, hurricane, storms, earthquake and disaster. The 24 terms for environmental impacts listed by Smithville residents cover a wide range of natural impacts.
and vary in terms of specificity (e.g. crabs versus disasters) (Figure 4). In discussing these terms with Smithville community members in workshop two, they clearly saw these words as capturing the "catastrophic natural events" the "main 'frontal' issues one thinks of in terms of climate change, the "immediate impacts" that need to be "dealt with first."

A very similar pattern can be found in the Bellevue MDS plot. For example, workshop participants mentioned 17 words for environmental impacts of climate change, such as volcanic ash, temperature, atmosphere, tsunami, loss of habitat, storms, flooding land erosion, fish kills and declining animal population (Figure 5). These words are similar in terms of breadth and variability to the terms elicited from Smithville community members. In discussion with Bellevue workshop participants, they had little problem relating how each of the environmental impact terms might be related to climate change, though they readily admitted that they were not always "100 percent sure" but that they had "read or heard things." For Bellevue, as well as Smithville, the breadth of the words mentioned for the environmental impacts of climate change is quite impressive, and they include environmental impacts that are of immediate concern to them, such as flooding, storms, land erosion, as well as broader global impacts. They did not claim to fully understand how climate change was linked to all these impacts, and they were open to "being corrected."

A second cluster of terms that appears in both MDS plots represents what workshop participants believed were some of the **individual and community impacts of climate change**. In the Smithville MDS, examples of these 21 human-impact words include fuel prices, jobs, starvation, poverty, hunger, high depression, stress, isolation, and diseases (Figure 4). Workshop participants quickly identified this cluster of terms and referred to
them as "vulnerabilities," commenting, for example, that "if the climate changes and it is too hot or cold, crops may not grow and result in starvation, hunger and poverty," and that "climate change will make it more difficult to make a living off the water" (watermen), and most importantly that the "aged are more susceptible than younger people." They also thought that changing weather, particularly if cloudy or stormy for long periods of time, would cause some people to be fearful, depressed, isolated, and stressed, and cited examples of people they knew who get depressed when the weather is cloudy for a long time. They also thought changes in weather caused more people to get allergies, again with personal testimonies (Figure 4).

In Bellevue there was a more limited number of terms for individual and community impacts. These terms are infrastructure, diseases, genocide, fear, famine, death and food (Figure 5). Bellevue workshop participants echoed much of the commentaries made by Smithville community members about how climate change could cause individuals to be fearful, result in increased diseases and create food shortages leading to famine. Of special note for Bellevue participants was their concern about climate change impacts on infrastructure. Here participants expressed both concerns about the impacts of erosion on the land surrounding the community, and the consequences of flooding on highways and roads that would be used to evacuate residents in the case of storms and floods.

The third and final large cluster of terms evident in both MDS plots represent responses to the environmental and human impacts of climate change. Differences in each of the two communities' current vulnerabilities to flooding and storms account for differences in the words elicited. For Smithville, a total of 13 terms trending toward the right side of the MDS plot represent response or adaptation to the environmental and human
impacts (Figure 4). Moreover, there are important sub-clusters within these terms that suggest different strategies. For example, for Smithville a cluster of terms suggest individual household or community responses, such as relocating, shelters, family members, self-preservation, and even knowledge and understanding (need to know more). Other responses mentioned involve emergency response and dealing with the impacts after they have done damage (rescue vehicle, emergency response, doctors and hospitals). These words represent responses or adaptations familiar to community members, or generalized responses that cover a wide range of individual or community impacts. Contrastingly, the words federal government, politics and national security form a tight cluster of terms (meaning participants saw them as similar) that is relatively distant from other terms, suggesting that community members did not consistently agree with how "government" is associated with other responses as well as the other listed climate change impacts (Figure 4).

For Bellevue, the MDS plot produced a cluster of terms for responses, along the right side of the plot (Figure 5). Similar to Smithville, these responses are relevant, applicable to the situation in Bellevue. Workshop discussion revealed that Bellevue residents are motivated by preserving the community and church (self preservation) and want to be prepared. Since the community and church are on relatively high grounds, they are less concerned about flooding of the community, which in their collective memory has not occurred, but that flooding elsewhere and storms in general will result in an evacuation of the entire area. This concern explains why they listed words such as transportation, communication, emergency warning, and family separation, and possibly looting (in the community while they were evacuated) (Figure 5). They expressed numerous times their
concerns about evacuation bottlenecks, and their fears that lower-lying communities would be evacuated first, and the roads would be blocked, necessitating police enforcement.

A couple of final observations and interpretations of the MDS plots in Figures 4 and 5. First, we were interested in the role of religion in terms of understanding and adapting to climate change impacts. Only Smithville community members mentioned any term with a direct religious reference. Five of the workshop participants marked the term God as important. In the Smithville MDS, the term God appears close to clusters of words representing human impacts and responses. Graphically, the term appears in the center of the plot (Figure 4). From a MDS perspective, this center location of the term is not analytically significant. However, for workshop participants, upon seeing the term God in the center, interpretations were offered such as "he's in the middle of the mix" or the "wheel in the middle of the wheel."

Second, what is absent from the MDS plots are terms that suggest a scientific understanding of climate change and the physical and ecological processes that increase environmental impacts, most notably sea level rise. Based upon our presentation on climate change and sea level rise in the second workshop, it became clear that almost all the participants did not understand the linkages between CO2 and atmospheric warming that lead to many of the environmental impacts they mentioned (e.g. melting ice, storms). However, they were very interested in our presentations on climate change and sea level rise, and asked many good questions. Also of note is they did not mention the term "sea level rise," though they did mention rising tides, flooding, storms, and erosion, which were very salient in their collective thinking, as evidenced by workshop discussion and the rating of these terms as important during the free listing exercise. From our observations and
discussions, it became clear that workshop participants had not connected climate change to accelerated sea level rise and increases in rising tides, flooding, storms and erosion. Finally, they did not mention any county or state government agency that is engaged in developing climate change adaptation policies and programs, suggesting that community members do not readily think of external agencies or institutions as resources to assist them in adapting to climate change.

6b. Justice and Adaptation Issues

A number of salient themes emerged from the discussion of adaptation options that are applicable to both communities. First, both communities expressed a strong desire to acquire more information on climate change and its impacts for their areas. Workshop participants expressed an even stronger desire to learn about the state and county programs that support communities in their adaptation to climate change. We heard participants say "we need to get educated and connected" to the organizations that "can help us." Overall, participants thought that the worst thing they could do is to "live with it [climate change]" and that "the worst we can do is to do nothing."

Second, participants offered carefully worded references to the influence of power and money in terms of supporting communities to prepare for climate change. Questions were asked about "how was it that some communities know this, are already involved in these efforts, and we are only just now learning." Another comment referred directly to the power of money to get support, and without it you are "kinda behind the 'eight ball,' helpless." Very interestingly, one participant asked whether "the environmentalists have any constraints on what some do that harms others?" She believed that some groups or
organizations were acting in ways that were causing her community to be at environmental and social risk. Participants also recognized that their relative poverty, small size and isolation were disadvantages, and that they very easily could get overlooked, or not included. We did not hear any explicit reference to racial discrimination as a factor that had resulted in them not knowing earlier the information we presented. Many of the participants were seniors, who had surely experienced racial discrimination in their lifetime, and all knew the segregated history of their parents and grandparents. Still, at least explicitly, racial discrimination did not surface during the workshops or interviews as a reason for why they had not been included in previous efforts to learn about adaptation to climate change.

Third, of the adaptation plans discussed in the third workshop, the communities differ in their preferences. Bellevue wants to accommodate. Since they are on higher land, they are not prone to flooding. What they are vulnerable to is flooding in nearby low-lying areas that would result in the community being isolated or trapped during a storm, unable to evacuate (as was discussed above in the MDS). As one workshop participant said, "we are on a peninsula here, you can’t go a few miles without running into water." Their needs are to integrate with county and state emergency planning efforts. Bellevue residents also concerned about erosion from storms, because that would lead, over many years, to them being directly vulnerable to flooding in Bellevue proper and the church in particular.

For Smithville, their adaptation priority is different: protect the church and cemetery, and make sure that the few seniors living in the community can be reached when there is a storm. To preserve Smithville, it is about protecting the church and cemetery, and protecting property (not houses, most of which are not occupied). In Smithville, they would
want to protect for as long as possible and only as a last resort retreat and relocate the
church. Bellevue is also against retreat and relocations. In Smithville, the biggest problem
is finances to protect the church and cemetery.²

7. Conclusions

Our participatory research with the communities of Smithville and Bellevue
provides valuable insights on their interests, values, vulnerabilities and adaptation goals, all
of which confront new challenges due to accelerated sea level rise and increased flooding
and storms associated with climate change. Community members were unfamiliar with
science-based information on climate change and the projected impacts for their
communities, and information on state and county programs that could assist them in
adapting to these changes. However, we also found community-based opportunities that
with support and assistance could significantly improve adaptation to climate change.
Members of both communities are highly motivated and interested in learning more about
climate change and its potential impacts for their communities. The MDS results suggest
that study participants are already conceptualizing climate change in holistic frames that
include causes, impacts, vulnerabilities, and possible adaptation responses. Science-based
information on climate change and more information on government adaptation plans would
expand their current knowledge while continuing the community’s participation in the
decision that affect the survival of their communities.

² At the time of the writing of this article, the Maryland Department of Natural Resources
was in discussions with Smithville community members about the possibility of building a
berm around or elevating the church.
Perhaps the most important resource available to each community is their church, and utilization of church-based networks will be key to adaptation plans for the future. Throughout the Eastern Shore local churches anchor communities and provide a social institution that motivates, organizes and mobilizes individuals to work toward common goals. These churches have the ability to involve distant members in, for example, climate change discussions and adaptation planning, which extends community capacity beyond local residents. Very importantly, churches reinforce communities' collective motivation to respond and work together to address challenges to the community sustainability, which now on the Eastern Shore include increased risks of flooding, storms and erosion. As members of both Bellevue and Smithville told us, “we are people of faith;” they truly believe sustaining their communities and adapting to climate change are possible. Finally, the New Revived and St. Luke churches are representative of many other small churches, African American and White, spread across the Eastern Shore landscape that can organize communities confronting new environmental and social challenges brought on by climate change.

The results of our study remind us that the impacts of climate change are more than just flood maps under different sea level rise scenarios, modeled predictions of changing rainfall and storms, and estimates of shoreline erosion. Adaptations to these impacts will require more than just policy and planning documents at the county or state levels. The scientific understanding of climate change and its impacts, and comprehensive planning for adaptation are vitally necessary and need further refinement and development at both regional and community scales. As the science and policymaking on climate change and adaptation proceed, it is also essential to better understand how climate change and policy
become situated in communities that face different risks and social vulnerabilities.

Adaptation will be site specific; it will ultimately be a human endeavor of social relationships with exchanges of information and resources. The results of this study have shown for two, generally-similar African American communities on the Eastern Shore there can be quite different adaptation goals: one is to save the church for an extended community for as long as possible, and then relocate if necessary; the other is to ensure evacuation from storms and prevent long-term shoreline erosion. Both of these adaptation goals should be achievable, using a mix of community and governmental support.

We hope our research contributes to the large and growing literature focused on environmental justice that seeks to understand the complex relationships between culture, society, economy, race, ethnicity, and environmental change and hazards (cf. Bryant 1995; Checker 2005; Johnston 2011). Among this literature, are a growing number of studies focusing on racial and economic injustices in response to natural disasters, including those related to climate and weather (cf. Allen 2007; Elliot and Pais 2006; Oliver-Smith 2009; Pezzolli et al. 2007; Wilson et al. 2010).

More broadly, our participatory research with the Smithville and Bellevue communities is an attempt to put into practice some of the fundamental principles of distributive and procedural justice. We used cognitive-environmental approaches to elicit community interests and values in a highly participatory manner. The elicited information on community impacts and responses and our discussions of the science of climate change and program options for adaptation provided very useful insights into specific adaptation interests and values (e.g., save the church, avoid isolation during evacuation) and community vulnerabilities (e.g., lack of information, resources, connection to emerging
adaptation programs). Our use of workshops prioritized community participation, and involved Maryland officials who are developing climate adaptation policies and programs. Supported by the cognitive analysis of interests and values (e.g., MDS), these workshops helped us move toward the goals of procedural justice. Ultimately, the legitimacy of the adaptation decisions affecting Smithville and Bellevue will rest both on their distributive outcomes and their procedural justice implications.

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Figure 1: Location of Smithville and Bellevue

Figure 2: Smithville: 10 Year Flood at Mid Century Under Different Sea Level Rise Scenarios

Figure 3: Bellevue: 10 Year Flood at Mid Century Under Different Sea Level Rise Scenarios

Figure 4: Smithville MDS Plot of 56 Terms for Climate Change (plot stress 0.18)

Figure 5: Bellevue MDS Plot of 35 Terms for Climate Change (plot stress 0.11)
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