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# CLIMATE CHANGE: CONSIDERATIONS FOR GEOGRAPHIC COMBATANT COMMANDS

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Colonel Jason A. Kirk



# **Climate Change: Considerations for Geographic Combatant Commands**

**by**

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## FOREWORD

Global changes to the environment are having a dire impact on the stability and security of nations and regions within Geographic Combatant Commands. GCCs must focus more attention on emerging threats which impinge on U.S. interests and develop innovative approaches to assist partner nations in planning preventing, and mitigating potential catastrophes.

Recent published documents such as the President's 2015 National Security Strategy and DoD's 2014 Climate Change Adaptation Roadmap provide GCCs with initial broad climate change risk information and mission effects assessment. Recent senior leader policy speeches such as former Defense Secretary Hagel's October 2014 address to the Conference of Defense Ministers of the Americas and President Obama's May 2015 commencement address at the U.S. Coast Guard Academy further amplify the national security implications of climate change.

The imperative to address climate change risks across a GCC's area of operations provides an opportunity to embrace the interagency approach long seen as crucial to stability operations. With the U.S. Agency for International Development (USAID) already moving out on its Global Climate Change Initiative, GCCs can support and expand these programmatic efforts to use climate change adaptation as a point of dialogue and cooperation with partner or prospective partner nations. Climate change will only increase as part of the U.S. Government's mutually supporting "3Ds" portfolio of defense, diplomacy and development.

As GCC's anticipate receiving more directive DoD guidance that builds upon the 2014 Adaptation Roadmap, this monograph provides a useful case-study

for approaching initial analysis of climate change risks. Through analysis of current-state conditions in SOUTHCOM, Colonel Kirk recommends that GCC's employ a combination of leader engagement, technical water resources advising along with recommendations to partner nations on the multiple sources of climate change adaptation funding. In all cases, these efforts must proceed with interagency unity of effort foremost in mind.

This monograph is a timely and thorough work that will serve as a ready reference for senior leaders and joint staff officers charged with assessing climate change implications to theater campaign plans. Efforts to reduce the destabilizing impacts of projected climate change will support long-term humanitarian assistance/disaster response (HA/DR) readiness as well as aid the GCC's efforts to be the Partner of Choice with nations in their area of operations.

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## ABOUT THE AUTHOR

COLONEL JASON A. KIRK is an Army Corps of Engineers officer who has served with combat mechanized engineer units in Georgia (3rd Infantry Division), Texas (4th Infantry Division) and Germany/Iraq (1st Armored Division). Col Kirk served tours in Iraq as a major/lieutenant colonel working at battalion and brigade combat team-level—one tour prior to “the Surge” 2005-2006, and one tour “post-Surge” 2008-2009, serving in and around Baghdad both times. Col Kirk also served with two of the US Army’s Corps of Engineers districts—in New Orleans working on Louisiana Coastal Area Restoration (pre-Katrina) and in South Carolina as the District Commander executing a broad portfolio that included civil works (including dredging and hydropower), environmental protection (wetlands regulation), disaster response and military and Dept. of Energy facilities construction. Col Kirk earned a B.S. from West Point in Environmental Engineering, an M.S. from Missouri Univ of S&T in Engineering Management, a M.Engr. from Univ of Florida in Environmental Engineering and a Masters in Strategic Studies from the U.S. Army War College. Col Kirk has completed the Army’s Sapper and Airborne schools and he is a registered Professional Engineer (in the state of Missouri). Currently, Col Kirk is serving as the Commander of the Corps of Engineers Jacksonville District with programmatic responsibilities for Florida, Puerto Rico and the U.S. Virgin Islands.



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My thanks also goes to my War College Strategic Research Paper advisor Ms. Carol Horning who provided much assistance in our working towards a research topic that would help me gain knowledge [and aspirationally add to the established knowledge] on the Joint, Interagency community at work within the Development arena in the South Atlantic region where I’ll soon be posted with our Army Corps of Engineers.

For fulfilling specific “second reader” duties and being a trusted formal and informal faculty advisor throughout the War College year, thanks to Colonel Dale Watson.

As noted in the extensive end-notes—a large number of professionals within the Department of Defense and US Agency for International Development were generous of their time and expertise in phone and electronic correspondence that contributed to this manuscript. We can all have confidence that a talented group is engaged in near and long-term programmatic responses to the risks posed by climate change. All errors and omissions are clearly of my doing.



I am eager to correspond with and work with others engaged in addressing this and other national security concerns long into the future.

## CLIMATE CHANGE: CONSIDERATIONS FOR GEOGRAPHIC COMBATANT COMMANDS

We [the Joint Force] must better identify opportunities that generate the greatest advantages and results using the right tools, in the right places, and with the right partners.

—Gen. Martin E. Dempsey  
18<sup>th</sup> Chairman Joint Chiefs of Staff<sup>1</sup>

Climate change is a national security issue that all geographic combatant commanders (GCCs) must consider as a challenge, and in some cases, an *opportunity* as they continuously assess risks and update their theater campaign plans to gain *advantage* in achieving their desired *end-states*. Not only must GCCs assess climate change impacts to U.S. operations from specific risks to force-employment supporting infrastructure; but, they should also assess the opportunities that exist to further international partnerships by supporting and coordinating with the U.S. Agency for International Development (USAID) as it carries out specific development mandates within its Global Climate Change Initiative. By doing so, GCCs will follow CJCS Dempsey's guidance by turning climate change *risk* into an "opportunity" to leverage the "right tools" to enhance relationships with "the right partners." This paper will focus on the risks and opportunities for action specific to U.S. Southern Command (SOUTHCOM) as a "case-study" useful for any GCC addressing Department of Defense's recent climate change adaptation guidance and for advancing the dialogue that took place during DoD's September 2014 *Combatant Command Climate Security Information Exchange*.<sup>2</sup>

## Higher Level Guidance

Recent climate change adaptation guidance relevant to all GCCs includes several presidential statements and policy directives as well as Department of Defense (DoD) guidance. In his 2015 *State of the Union* address, President Obama stated that “no challenge poses a greater threat to future generations than climate change....I am determined to make sure American leadership drives international action.”<sup>3</sup> The President reinforced these remarks with inclusion of climate change as one of the top national security threats in his 2015 *National Security Strategy*. Important for DoD and the GCCs is his statement that “the United States has a unique capability to mobilize and lead the international community to meet [these threats].”<sup>4</sup> DoD’s recent guidance relevant for review by GCCs is found in the 2014 *Quadrennial Defense Review* and the 2014 *Climate Change Adaptation Roadmap*. The former document offers a summary of increased risks as “climate change may increase the frequency, scale and complexity of future missions,” while the latter includes the requirement for GCCs to review and prioritize climate change resiliency measures.<sup>5</sup> Within the next year, DoD plans to publish a *DoD Directive* that will have prescriptive requirements for GCCs, expanding on the somewhat descriptive *Roadmap*.<sup>6</sup> Taken together, these published documents provide ample initial guidance to drive formal consideration of climate impacts within a GCC’s area of responsibility (AOR) and updates to theater strategic estimates, theater campaign plans, theater security cooperation plans, etc.

Following the introductory discussion highlighting higher-level climate change guidance, this paper

will detail “*who*” comprises the partners necessary in addressing climate change, “*where*” to address climate change, “*what*” the scientific community defines as the risks of climate change—the GCC’s “problem statement”—followed by recommendations for “*how*” a GCC and its partners can address climate change, concluding with discussion of “*why*” these efforts matter in the context of a GCC’s primary security mandate.

### **GCC’s Partners in Addressing Climate Change**

GCCs will do well to consider the CJCS’s citation above to work with “the right partners” as they consider the risks associated with climate change. DoD’s partners will include both the nations facing climate change risks to their security and stability and the interagency (IA) community. It is important for GCCs to consider the President’s charge for collaboration between DoD, Department of State (DoS) and USAID in approaching defense, diplomacy and development—the 3 D’s—as mutually reinforcing elements of the U.S. Government’s (USG’s) comprehensive approach to national security.<sup>7</sup> GCCs need to work closely with DoS and USAID to explore the range of whole-of-government mechanisms that can add value to their overall theater security campaign plan. To successfully achieve unity of effort between the USG’s 3 D’s, GCC’s must understand the importance of climate change within USAID’s programs. “Climate Change” is USAID’s #2 Agency Priority Goal and the Global Climate Change Initiative (GCCCI) is one of three signature initiatives of the Agency.<sup>8</sup> Collaboration with USAID in approaching the complex problem of assessing climate change impacts will also ensure that a GCC supports several of the pillars of the President’s *Global Development Policy*.<sup>9</sup>

- A new operational model that positions the United States to be a more effective partner and to leverage our leadership; and
- A modern architecture that elevates development and harnesses development capabilities spread across government in support of common objectives.

This paper will further explain USAID’s capabilities to help GCCs follow the President’s guidance to “invest in game-changing innovations” and to “balance our civilian and military power” in response to climate change. The “right partners” for a DoD GCC to engage in addressing climate change include USAID, DoS and the nations within a GCC’s AOR.

### **Further Defining “Who” Will Work with GCCs to Address Climate Change Risks**

GCCs must work closely with the interagency (IA) and partner nations to determine specific vulnerabilities in military and economic sector infrastructure, as well as which populations are vulnerable to the adverse effects of climate change. SOUTHCOM has established formal interagency memoranda of understanding (MOUs) with the Departments of State, Commerce, Treasury, Energy, Transportation, Health and Human Services, Homeland Security (DHS), Justice as well as USAID and its Office of Foreign Disaster Assistance (OFDA), the Drug Enforcement Agency and the Federal Bureau of Investigation (both within DoJ) and with the office of the Director of National Intelligence.<sup>10</sup> Usually coordinated by the GCC staff’s “J9,” this IA team is critical to developing comprehensive near and long-term risk assessments and a “whole of

government” unity of effort approach that maximizes the contribution of each agency working under their specific programmatic mandates. SOUTHCOM’s IA construct follows the President’s specific guidance to “seek an enhanced level of interagency cooperation in complex security environments by ... common analysis, planning, and programs that draw upon the distinct perspectives and expertise of different U.S. agencies.”<sup>11</sup> SOUTHCOM’s coordination with USAID’s Bureau for Latin America and the Caribbean (LAC) should be informed by knowledge of the central role of climate change within the LAC Bureau’s mission statement.<sup>12</sup> USAID will also bring inputs from its partnerships with private voluntary organizations, indigenous organizations, universities, and American businesses.<sup>13</sup> In assessing and later responding to climate change risks, SOUTHCOM can build upon the IA partnerships developed during on-going efforts to counter transnational organized crime and past humanitarian assistance and disaster relief (HA/DR) responses to ensure a “whole of government” approach to climate change adaptation.<sup>14</sup>

### **“Where” to Focus Climate Change Adaptation Efforts**

In the opening epigraph above, the CJCS instructs the Joint Force to operate in “the right places.” In his 2013 *Presidential Policy Directive 21: Critical Infrastructure Security and Resilience (PPD-21)*, the President tells DoD and other USG agencies that the scope of the climate change adaptation endeavor includes “engaging with international partners to strengthen the security and resilience of...critical infrastructure located outside of the United States on which the Nation

depends.”<sup>15</sup> The *USA PATRIOT ACT of 2001* provides the definition of “critical infrastructure” as “the systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters.”<sup>16</sup> Secretary of Defense Hagel advised his subordinate GCCs: “We must also work with other nations to share tools for assessing and managing climate change impacts, and help build their capacity to respond.”<sup>17</sup> Across a given AOR, DoD will have critical infrastructure vital to its own interests while also assisting partner nations to assess their intrastate vulnerabilities to climate change impacts and their particular nation’s most important critical infrastructure.

This paper uses SOUTHCOM’s Caribbean Basin as a “case-study” location from which any GCC can extrapolate in considering the implications of climate change risks within their AOR. Among the many geographic options for study, this paper addresses the Caribbean Basin for the following reasons:

- SOUTHCOM’s recent experience sharing water resources management expertise with the nation of Brazil can be expanded to more broadly address climate change risks with other partner nations;
- on-going risk analysis by DoD and DHS focused on the Southeastern U.S. coastline’s susceptibility to sea-level rise and storm damage can be extrapolated to the nearby Caribbean islands
- this “soft power” effort to support Caribbean nation’s preparations for climate change impacts reinforces U.S. security interests in the southern Western Hemisphere.<sup>18</sup>

Owing to USAID having the lead role in U.S. government climate change policy, all GCCs need to be familiar with USAID's criteria for prioritizing its climate change funds: 1) clean energy criteria tied to partners most able and ready to demonstrate leadership in clean energy development, 2) sustainable landscapes criteria, and 3) adaptation criteria.<sup>19</sup> After a GCC and their interagency partners review the climate change risk throughout their AOR, they can refine the critical areas that merit responses as part of their theater campaign plan and related DoS/USAID development plans. GCC's should identify synergistic outcomes in this unity of effort approach; e.g. a USAID development program to support crop diversification in a climate-change impacted area may support the GCC's security end-states by increasing the prosperity of a population otherwise subject to cooption by transnational organized crime or other violent extremist organizations.<sup>20</sup>

## **Defining "What" the Problem is: Risks of Climate Change**

This paper looks at "risk" in terms of the destabilizing human security *effects* tied to the *causes* which are the various physical manifestations of climate change. The destabilizing *effects* on humans are potential hunger, economic decline including coastal/low-lying infrastructure destruction/degradation and conflict over diminished food and water resources with sporadic population migrations.<sup>21</sup> The *causes* are the combination of "rising global temperatures, changing precipitation patterns, climbing sea levels, and more extreme weather events."<sup>22</sup> The 2014 U.S. Global Change Research Program (USGCRP) publi-



cation titled "Climate Change Impacts in the United States," specifically addresses physical causes and human security effects relevant to much of the Caribbean.<sup>23</sup> The physical manifestations of climate change most important for consideration in the Caribbean are sea level rise, increased storm intensity, and temperature increases (which drive the aforementioned storms). The USGCRP reports that precipitation trends are "unclear" with predictions that some regions will receive smaller annual amounts and some larger amounts of precipitation.<sup>24</sup> Existing National Oceanic and Atmospheric Administration's (NOAA's) gauges around Puerto Rico are useful data points for SOUTHCOM's initial consideration of sea level rise. At Magueyes Island, Puerto Rico, U.S. Army Corps of Engineer's (USACE's) "intermediate" / mid-range sea level rise projection by the year 2100 is 0.46m (1.52 ft).<sup>25</sup> For informing risk assessments, both USACE and the Intergovernmental Panel on Climate Change (IPCC) highlight the importance of evaluating the widest possible range of impacts.<sup>26</sup> In a recent forum addressing Defense Ministers of the Americas, Secretary of Defense Chuck Hagel summarized an initial assessment of a 50-year horizon of sea level rise risks in the Caribbean as having the potential to "claim 1,200 square miles of coastal land" and causing some islands "to be completely evacuated."<sup>27</sup>

In addition to sea level rise and the expected global temperature change of 2-5°F in the Caribbean, SOUTHCOM planners will need to consider the predictions by USGCRP and other scientific bodies that warming temperatures will cause tropical storms to be fewer in number, but stronger in force, with more Category 4 and 5 storms.<sup>28</sup> SOUTHCOM planners will need to leverage the technical resources detailed later

in this paper to further develop country-by-country risks within the Caribbean Basin, refining the IPCC's "high confidence" conclusion that key risks to "Small Islands" are "major contributions" to changes in marine and terrestrial ecosystems and "minor contributions" to livelihoods, health and/or economics.<sup>29</sup> All GCC planners must take care not to assign overly specific predictions to localized areas through extrapolation of data collected elsewhere. In a latter section this paper will expand on "*what*" a GCC can do to support development of more robust predictive datasets and regional-scaled modeling to inform more specific, i.e. more useful, risk estimates.

### **Addressing Risks within the Theater Campaign Plan**

"One of the most critical steps in developing strategy is to conduct a thorough theater estimate, which is "the process by which a theater commander assesses the broad strategic factors that influence the theater strategic environment, thus further determining the missions, objectives, and courses of action throughout their theaters."<sup>30</sup> The predicted increases in the intensity of Category 4/5 storms will in turn increase the scale of the disaster relief efforts that SOUTHCOM will find itself supporting. Beyond ensuring that the GCC remains ready to execute the standing responsibilities of HA/DR, the GCC planners need to identify specific elements of national security-related critical infrastructure within their AOR. Examples of critical infrastructure with projected impacts from sea level rise within the Caribbean are port facilities at the Naval Station Guantanamo from a *military* perspective and 28% of the Caribbean airports, 80% of commercial

seaports from a regional *economic* perspective.<sup>31</sup> Taylor et. al., provides one of the most comprehensive assessments of expected impacts in the Caribbean along with suggestions for adaptation responses – one illustrative adaptation example is “increase water storage capacity to mitigate the effects of drought.”<sup>32</sup> In addition to Taylor’s Caribbean-specific review, the recent 2014 IPCC report, and the 2014 USGCRP report, several recent scholarly works address the relationship between climate change and security [Nordas and Gleditsch 2007; Raleigh and Urdal 2007; Campbell et al. 2007; Hsiang et al. 2013; Kelley 2014].<sup>33</sup> One example is Kelley’s discussion of the relationship of Syria’s persistent drought as a contributory factor to the popular uprising and Civil War that began in 2011.<sup>34</sup> DoD’s CCAR organizes into four areas “high-level potential effects of climate change: Plans & Operations, Training & Testing, Built & Natural Infrastructure, and Acquisition & Supply Chain.”<sup>35</sup> Together, these impact assessments provide useful context for future SOUTHCOM theater estimates and they inform possible inclusion of climate change security implications in the GCC’s theater campaign plan risk assessment, science and technology (S&T) priorities, and the Integrated Priority List (IPL). This IPL communicated from the Commander, SOUTHCOM to the Chairmen of the Joint Chiefs of Staff could be used to create a “demand signal” for joint engineer forces or contract capacity to address high-risk infrastructure in need of adaptation to account for sea level rise impacts.<sup>36</sup> The DoD CCAR provides a useful framework for a GCC to categorize mission-relevant risks within their theater estimates.

## USSOUTHCOM Response to Climate Change Risks

Secretary of Defense Hagel invokes Clausewitz's assertion that though some uncertainty remains with the state of current climate change predictions, planners must move forward "in a mere twilight."<sup>37</sup> The IPCC's latest *Summary for Policymakers (SPM)* report sheds additional *light* on evaluating the "climatic drivers" as *causes* for the resultant risk *effects* of interest to a GCC evaluating the overall AOR risk. As discussed above, the *SPM* and Taylor's Caribbean-specific study detail "adaptation issues and prospects" that offer options for increasing the resiliency of potentially affected areas.<sup>38</sup> The work of a GCC to evaluate a range of options as to "how" to support partner nations in their efforts to increase climate change resiliency needs to be informed by the White House's *Presidential Policy on Development (PPD6)* that "raise[s] the importance of development in national security policy decision-making."<sup>39</sup> While USAID is the USG lead for development, climate change adaptation initiatives are one area where DoD has the opportunity to support this whole of government effort. Incorporation of this guidance will widen the aperture beyond *reactive* disaster relief and foster greater GCC involvement in the *pro-active* elements of development while adhering to the *PPD6* guidance that the U.S. government "elevate[s] development as a central pillar of our national security policy, equal to diplomacy and defense."<sup>40</sup> GCCs should work with DoS/USAID experts to focus on resiliency measures most useful to particular nations in terms of their population and economic security. The National Intelligence Community's (IC's) assessment on "Water Threats" concluded that "states with water

problems will require integrated water, land use, and economic data to achieve sound policymaking and management.<sup>41</sup> Provision of data is just one example of the assistance that the USG may provide to a partner nation after the GCC has worked with these nations and the IA to build an AOR-wide threat assessment to guide both near and long-term efforts aimed at the highest payoff targets linked to military and/or economic security. While DoD will not be directly involved in addressing “economic security” issues, GCC planners will incorporate relevant operating environment threats into their overall theater estimates. The section below will further detail the options available to GCCs and their IA partners as they support partner nations’ climate change resiliency measures.

This section will primarily address the capabilities resident within or available to DoD if applied as part of DoD-led Title 10 theater strategic cooperation initiatives and/or as DoS Title 22 Security Assistance authorities that assist partner nations in becoming more resilient in the face of climate change-induced sea level rise and increased intensity storm/precipitation events.<sup>42</sup> Just as the specific risks are variable between geographic locales, human population concentrations, etc., the measures that add to a nation’s resiliency will vary.<sup>43</sup> This paper will highlight measures such as leader engagement, technical support and funding sources that are within existing or emerging capabilities and that in varying degrees address near-term storm damage risk reduction and longer-term sea-level rise risk reduction. Except in cases where the resiliency target is U.S.-owned infrastructure, the support to a regional partner’s climate change resiliency should be undertaken with an eye to building sustainable partner capacity.<sup>44</sup> The section below will recommend the ways

and means—the “*how*”—to support increasing a partner nation’s climate change resiliency.

## **Leader Engagement**

Through engagement with selected partner nation military and public and private sector leaders, GCC, DoS and USAID development personnel have the opportunity to reinforce the importance of immediate-term disaster response planning and preparation, shorter-term Hurricane Storm Damage Reduction (HSDR) projects and longer-term water resources and land use planning. Leaders can discuss the feasibility of these various means as proactive measures that reduce risk and protect lives and property from the effects of climate change. Secretary of Defense Hagel led the way in this dialogue as he used the venue of the *Conference of the Defense Ministers of the Americas* hosted in Peru in October 2014, to not only emphasize the shared interests between defense leaders in addressing climate change; but, to announce the release of DoD’s CCAR the very day of the Conference.<sup>45</sup> Leaders accomplish these dialogues during recurring *staff talks*, during disaster response *exercises*, and during periodic strategic-leader visits by the SOUTHCOM Commander, the U.S. Army Corps of Engineers Commanding General, etc. Leaders from SOUTHCOM’s Miami-based headquarters as well as the service component commands (Army, Navy, Marines, and Air Force) and especially from the regionally-aligned combatant command-supporting engineers from Army Corps of Engineers South Atlantic Division (USACE-SAD) and Naval Facilities Engineers-Southeast (NAVFAC-SE) also have a role in supporting USAID’s development expert’s efforts to convey the value and opportunity

that proactive responses to climate change will have for population security and stability. Both USACE-SAD and NAVFAC-SE have project planning and management personnel forward stationed in the Caribbean, and in Central and South America.<sup>46</sup> It is critical that all DoD engagements nest with USG policy-level officials that also conduct strategic engagements as part of the United Nations Framework Convention on Climate Change and IPCC sessions.

### **Technical Support**

Once the combined efforts of DoS, USAID and the SOUTHCOM staff determine that the USG will support a particular country's climate change adaptation efforts, together they will work with the partner nation to tailor support actions based on if the resiliency target is a specific localized infrastructure or broader basin-wide water resources system. Examples of localized infrastructure would be Trinidad and Tobago's ocean-side Point Fortin natural gas liquefaction and transfer facilities or Jamaica's Goat Island port. An example of a basin-wide target would be Haiti's low-lying Cul de Sac flood basin. DoD and USAID can leverage a fast growing body of knowledge in support of partner nations. Among the open-source technical resources are several DoD/USACE technical publications that address climate change considerations and provide both qualitative and quantitative methods for evaluating current projects and systems and for planning future projects and systems to increase their resiliency.<sup>47</sup> In addition to these references, DoD's *Strategic Environmental Research and Development Program* (SERDP) is charged with ensuring DoD has the necessary science and tools to support climate change-related vulner-

ability assessments.<sup>48</sup> Though USAID's Development Laboratory (DevLab) has a scope broader than climate change considerations, GCCs can also work with and leverage innovations from DevLab's work in support of U.S. development goals.<sup>49</sup> The body of knowledge and tools being developed by SERDP, DevLab and the various technical publications detailed above are available to GCCs in support of their adaptation efforts with the GCC's IA and multinational partners.<sup>50</sup>

The IC "Water Threats" assessment concluded that "neglecting infrastructure investments (e.g., dams, canals, and water management sensors) can also increase vulnerability to extreme weather events."<sup>51</sup> The IC addressed studies that have shown that water investments reduce damage from extreme weather events from 25-30 percent of GDP to around 5 percent making these investments a crucial element in achieving social stability.<sup>52</sup> USACE and SOUTHCOM's on-going advisory role to Brazil's CODEVASF water planning authority and SOUTHCOM's recently completed *Joint Assessment* of climate change risks conducted with Trinidad and Tobago are two examples of partner nation assistance that GCC's can apply to other nations specifically to address climate change-induced negative effects.<sup>53</sup>

Above, this paper addressed a brief review of projected climate change effects expected within the Caribbean Basin. As part of development assistance initiatives, a GCC could leverage their Joint Plans and Exercises Staff (J3/5/7) expertise in scenario planning and development to "war game" the wide range of effects of climate change related to security within a particular partner nation. Read's dissertation expands upon existing *scenario planning* research to offer methodologies specific to evaluating long-term security-



relevant “socio-environmental” consequences of climate change.<sup>54</sup> The coordination and collaboration with the various unified action partners – especially interagency players at which SOUTHCOM has excelled—would be particularly useful if leveraged in a scenario planning exercise to better determine risk-based priorities for climate change resiliency investments.<sup>55</sup>

In addition to technical support that aids a partner nation’s building long-term resilience to climate change impacts, a GCC can benefit from USAID’s Office of Foreign Disaster Assistance (OFDA) to share methods and tools useful in HA/DR.<sup>56</sup> Assigned OFDA representatives proved extremely helpful to the SOUTHCOM Commander during the January 2010 Haiti earthquake crisis by providing daily updates on USAID activities and facilitating coordination and decision-making to achieve unity of effort between USAID and SOUTHCOM during this disaster relief effort.<sup>57</sup> Technical exchanges tied to the funding sources discussed below can enable partner nations to employ well-developed U.S. technologies for early warning communication systems integrated with standard operating procedures to execute evacuation plans from population centers to reduce the scope of human casualties [the risk of which increases as climate change induces more intense storms]. USAID’s “Thomazeau’s Disaster Contingency and Mitigation Plan” – part of a larger USAID strategy to support the Cul-de-Sac floodplain communities – is an example of a proactive development initiative developed in collaboration with Haitian Civil Protection Committee members, the private sector, state institutions, local assemblies, and community-based associations.<sup>58</sup> The extent to which a GCC and USAID can assist a partner

nation in becoming more prepared and resilient *before* a storm event reduces the scope of possible HA/DR required *after* a storm.

## **Funding Sources**

In today's highly competitive resource-constrained environment, a GCC's J9 and the USAID LNO can be a conduit for a partner nation to connect with a variety of governmental and non-governmental funding sources. While DoD receives recurring annual HA/DR funding for preparedness and upon request, response activities, USAID is the principal USG agency that manages development assistance funds—at an approximate annual level between \$20-\$30 billion across all its program activities.<sup>59</sup> While the U.S. leads the international donor community in contributions, more than 56 nations and 260 multilateral aid organizations contribute development resources—World Bank administered trust funds totaled almost \$9 billion in 2008 and private donors such as foundations and NGOs contributed more than \$52 billion in 2008.<sup>60</sup> New donor nations are emerging with China, India, Brazil, Taiwan, and Russia collectively contributing over \$8 billion annually.<sup>61</sup> The Inter-American Development Bank, the Pan American Health Organization, the Organization for American States Inter-American Fund for Assistance in Emergency Situations (FONDEM), UN-administered Green Climate Fund and the DoD's Defense Environmental International Cooperation Program (DEIC) are all sources of funding for HA/DR and/or proactive climate change resiliency measures.<sup>62</sup> Within the USAID-administered Global Climate Change Initiative, the U.S. Treasury Department leads the multilateral finance component.<sup>63</sup> It

is important for a GCC to be knowledgeable of these funding sources and their various motivations – from religious, to political, to commercial – and where possible support alignment in both short-term HA/DR operations and long-term strategic climate change resiliency efforts.

The GCC also has a role in collaborating with USAID in prioritizing risk and focusing the USAID’s Global Climate Change Initiative’s strategic investments.<sup>64</sup> Specific to Haiti and the Cul-de-Sac Basin (and the Matheux Basin) addressed in the section above, USAID administers the Watershed Investment Fund (WIF) to provide grants, subcontracts, direct procurement, training and short-term technical assistance to selected beneficiaries.<sup>65</sup> To fully realize the intent of the President’s call for “an enhanced level of interagency cooperation in complex security environments” GCCs and USAID’s Senior Development Advisor should work together with the partner nation to determine if the development goals can best be achieved by DoD-Title 10 authority, a DoS-Title 22 authority (e.g. foreign military sales (FMS) case), a USAID-only funding mechanism, a foreign non-governmental development bank, or a wholly private enterprise.<sup>66</sup> Considerations for determining the appropriate funding source include the local nation’s ability to contribute, the risk-based prioritization from both the security/access and the humanitarian risk perspective, and finally availability of other non-governmental or private funds.

The President’s *Global Development Policy* and the *USAID Forward* transformation initiative seek to strengthen “monitoring and evaluation” of all development efforts.<sup>67</sup> This guidance regarding monitoring and evaluation may present specific opportunities for a GCC to plan for and incorporate the use of joint force

engineers including professional construction quality assurance personnel from the U.S. Army Corps of Engineers or the Naval Facilities Engineering Command to provide the transparency and accountability increasingly demanded by the development interests prior to their contribution of funds.<sup>68</sup> In concert with or in lieu of USAID quality assurance professionals, these DoD personnel could work on a specific “pilot model” project to demonstrate to-standard monitoring and evaluation practices—transitioning from serving as the lead quality assurance representatives to an advisory role for a host nation’s military or public works professionals. This approach would leverage DoD’s unique water resources technical expertise and particularly their training capabilities in the near term with a long-term objective of building the partner nation’s internal capacity to provide the “rigorous and high-quality impact evaluations” directed by the President’s Development Policy and included as a critical component of USAID’s and prospective donor’s climate change project selection criteria.<sup>69</sup> For DoD to execute these efforts funded by a development bank such as the World Bank or the Inter-American Development Bank, the two parties would need to develop a unique legal framework enabling that funding mechanism.<sup>70</sup> USAID could fund DoD directly through the “*Economy Act*” (31 U.S. Code §1535) that facilitates transfer of appropriated dollars between federal agencies when the interagency action “is in the best interest of the USG.”<sup>71</sup> USAID would make the “best interest of the USG” determination guided by very specific criteria including authorized and appropriated funding being on-hand for the express project purpose, and USAID determining that the technical services “cannot be provided by contract as conve-

niently or cheaply by a commercial enterprise.”<sup>72</sup> It is this combination of technical knowledge, training ability, transparency and existing military-to-military contacts that may make use of the DoD personnel in a “pilot model” for this evaluation and monitoring work advantageous over the standard practice of contracting commercial providers.

Besides the back end project oversight and accountability, the front end project purpose is critical to making a particular development project attractive to funding sponsors. The Intelligence Community’s Assessment on Water makes the judgment that developing countries forego considerable donor funding because they focus on single-purpose water infrastructure projects that do not provide for sufficient environmental considerations and preservation of ecosystem services which are becoming more valued by the NGO funding sources.<sup>73</sup> As a result, the developing countries work bilaterally with private interests or nation-states such as China that historically do not attach environmental consideration “strings” to their project support.<sup>74</sup> As part of an ongoing dialogue with developing countries regarding the natural system climate change effects, the U.S. senior civilian or military official; e.g. U.S. Army Chief of Engineers, may be able to reinforce to these nations the importance of considering the natural ecosystem values in all water resources-related projects. By seeking this higher order approach, the developing nation would be better able to access funds from donors that demand consideration of overall ecosystem resources.<sup>75</sup> Though not yet supported by empirical evidence, this effort may provide the GCC a positional advantage as the “partner of choice” vis-à-vis competing nations such as China or Russia in helping the developing nation address their long-term water resources concerns.

## Additional “How to Assist” Recommendations:

The IPCC’s *Summary for Policymakers* speaks to the Caribbean and other island nations in their summary comments on “adaptation issues and prospects,” stating “additional external resources and technologies will enhance response.”<sup>76</sup> Beyond those technologies and funding sources already addressed, this paper recommends:

- USSOUTHCOM request/coordinate for USACE to host an AOR-wide or Caribbean-specific “water and security conference” to further refine identification of high-risk areas and high-payoff investments for security-related climate change resilience. Expanding upon hosting a conference, the GCC would benefit from the results of a scenario planning exercise that develops the complex evolving socio-environmental security implications of climate change.<sup>77</sup>
- All DoD elements operating within a CCMD’s AOR must work to achieve strategic communications integration and thus prevent messaging “fratricide.” A specific measure of performance is disciplined input of all Theater Security Cooperation, Security Assistance, Support to Others activities into the Global Theater Security Cooperation Management Information System (GTSCMIS) in accordance with the Joint Staff’s annual suspense.<sup>78</sup>
- CCMD J4 Director integrates the Army and Joint Engineer force enabling capabilities in support of the HA/DR and “Partner Nation of Choice” LOEs with the caveat that funding will be through a variety of sources; e.g. *Title 10, Ti-*

tle 22 FMS, Donor Development Bank, USAID through *Economy Act, etc.*<sup>79</sup>

- Expeditionary “Troop Labor” on select projects
  - Disaster Preparedness and Response Exercises
  - Military-to-Military Counterpart Engagements as discussed in “Leader Engagement” section above
  - Integrated Water Resource Management and hydrological modeling tools from USACE’s Institute for Water Resources (IWR)
  - Science and Technology Applications especially from USACE’s Engineering Research and Development Center (ERDC); e.g. technical assistance in locating additional sea stage gauges to increase site-specific change estimations.
- GCC may find value in convening a “Task Force Climate” committee that ensures broad consideration of climate change-induced risks across the joint warfighting functions and provides holistic inputs to DoD’s *Climate Change Adaptation Working Group*. The J3 or a member of the operations and planning staff should co-chair this committee alongside the GCC’s USAID Senior Development Advisor to ensure unity of interagency effort and consideration of both near and far-horizon planning considerations. The “Task Force Climate” should include the CCMD’s engineer director, the Science & Technology advisor and other subject matter experts.

Thus far, this paper has sought to present “*what*” the problem is, i.e. higher-level Administration and DoD-level guidance and initial estimate of climate change risks; “*who*” ought to be engaged in addressing the problem of security-related climate change effects; “*where*” within a given region with this paper’s focus on the near-shore Caribbean Basin part of USSOUTHCOM’s AOR; and finally “*how*” a GCC can assist a partner nation with developing responses to climate change that increase that nation’s resiliency and security. With the *ways* and *means* attended to through the discussion above, this paper will now summarize the “*why*” or *ends* that a GCC achieves through consideration of climate change.

### **“Why” Support to Climate Change Adaptation Matters to a GCC**

GCCs should incorporate projected adverse climate change effects into their threat estimates and their risk assessments that inform their annual integrated priority list (IPL) submission to the Chairman of the Joint Chiefs of Staff. In the case of SOUTHCOM, while *climate change adaptation* may not out-rank *countering transnational organized crime* as a stand-alone priority, the risks from climate change will effect accomplishment of the CCMD’s priority missions. Examples of increased risk from climate change effects include the scale of required prepositioned humanitarian/disaster relief supplies, impeded access to specific port facilities, increased littoral (underwater) areas, and mass evacuation/migration requirements from affected populations, etc. While some aspects of climate change risk will fall outside the scope of a five-year Theater Campaign Plan, and other specific risks



may be addressed by the Armed Services under their Title 10 responsibilities, the GCC will focus on those identified issues relevant for inclusion as updates to the Campaign Plan and contingency plans while documenting longer-term risks within the GCC's operational environment assessment. They will account for the adjusted resource requirements and capability gap assessments that merit inclusion in the overall IPL; e.g. additional littoral combat ship or riverine patrol boat missions in the AOR. Climate change as a *risk driver* is the first reason *why* GCCs must attend to this environmental variable and its effects across the breadth of their assigned missions.

Beyond the Theater Campaign Plan *line of effort* (LOE) "Humanitarian Assistance/Disaster Relief" which is made more complex by climate changes in temperature, precipitation, sea level and storm intensity, the LOE "Critical Access and Relations" is another reason *why* GCCs should consider climate change adaptation within their theater campaign plans. Helping build a partner nation's capacity to prepare for and respond to a disaster and supporting that nation in the aftermath of a disaster provides a neutral forum that can be used to build governance capacity and strengthen *relations*. The connection between these LOEs also manifests if the combination of an intense storm with wave surge upon a higher sea level prevents safe dockside *access* into port facilities for delivering humanitarian supplies or evacuating displaced persons escaping inland floods. USSOUTHCOM's two LOEs detailed above support accomplishment of two of their military *end-states*:

- "Partner Nations capable of conducting HA/DR operations to mitigate effects of disasters," and

- “USSOUTHCOM is partner of choice in the AOR.”

While the HA/DR end-state is directly correlated to USSOUTHCOM’s LOE “Humanitarian Assistance/ Disaster Relief,” the correlation to the latter end-state and USSOUTHCOM’s LOE “Critical Access and Relations” is more nuanced. The “choice” word suggests competition that exists as potential partner nations establish bilateral relations between the United States and/or/in combination with other nations such as China or Venezuela. Leader engagement with partner *and potential partner* nations, provision of technical expertise, and enabling or in some cases providing funds are the main three *ways* that GCCs with the IA community can aid nations in increasing their climate change resiliency. These are all long-term investments with the purpose of strengthening bilateral country-to-country relationships. SOUTHCOM’s commander General Kelly states that “trust must be built, nurtured, and sustained through regular contact.”<sup>80</sup> Senior leader and technical-level climate change discussions create another venue for this “regular contact” and trust-building effort in support of USSOUTHCOM’s LOE for “critical access and relations” to achieve their end-state of “USSOUTHCOM as partner of choice in the AOR.”

There is a confluence of events that create an increased opportunity for discussions between USG and partner or potential partner nations regarding the mutually beneficial long-term effort of climate change resiliency. For SOUTHCOM in its Latin America Caribbean AOR the strategic environment includes cross-cutting diplomatic, informational, military and economic issues.

One example of the cross-cutting factors relates to the competing Caribbean-nation partner Venezuela which is in decline due to their economy's almost singular reliance on reduced export income from petroleum.<sup>81</sup> Their "PetroCaribe" arrangement of providing bargain oil supplies to ten members of the Caribbean Community along with the Dominican Republic and Cuba is faltering. This energy instability leads to an opening for these nations to seek alternative sources of oil or alternative sources of energy altogether—in line with U.S. promotion of non-carbon [non-climate change-causing] fuel sources as a part of the overall Caribbean Energy Security Initiative (CESI).<sup>82</sup> The CESI seeks to provide a market for energy, especially U.S. liquid natural gas, as an alternative to the Venezuelan's "Petrocaribe" construct which continues to be propped up by Chinese financing.<sup>83</sup> Dominican Republic and Puerto Rico have already "made the switch" from Venezuelan diesel and fuel oil for their electricity generation requirements.<sup>84</sup> These intertwined economic-security-energy issues certainly merit continued monitoring as a part of SOUTH-COM's overall theater estimate and consideration of significant "at-risk" oil infrastructure tied to sea level rise projections.

A second example is Cuba. The recent U.S. rapprochement with Cuba creates the opportunity to use the shared interest of climate change resiliency as a vehicle for cooperative efforts. The methods the U.S. uses for infrastructure hardening or other climate change adaptation measures within the Caribbean could in time be shared with the Cuban government just as with other [potential] partner nations. As the largest by population of the Caribbean nations, any forward steps toward climate change resiliency tak-

en by Cuba will be an influencer to other Caribbean nations.

## **Conclusion**

Within recent guidance documents including the 2014 *Climate Change Adaptation Roadmap*, DoD addresses the Department's measures to review Geographic Combatant Command Theater Campaign Plans to address the security implications of climate change within their area of operations. Beyond attention to the more objective expected risks to U.S. owned or utilized infrastructure and the assessed increased risks to the scale of potential humanitarian assistance / disaster relief mission, GCCs can utilize this emerging issue as a point of dialogue and cooperation with partner or prospective partner nations as part of the U.S. Government's mutually supporting 3D portfolios. These efforts to reduce destabilizing impacts of projected climate change will support long-term HA/DR readiness as well as aid the U.S.'s efforts to be the Partner of Choice on the global stage. While each GCC's strategic environment and the nations within their AOR have different risks and current approaches with respect to climate change, review of SOUTHCOM as a "case-study" shows the cross-cutting nature of the stability and security *threats* and *opportunities* emerging from the phenomenon of climate change.

## **Endnotes**

1. Gen. Martin E. Dempsey, USA, "From the Chairman: The Posture Paradigm," *Joint Force Quarterly* 76 (December 30, 2014), <http://ndupress.ndu.edu/Media/News/NewsArticleView/tabid/7849/Article/12354/jfq-76-from-the-chairman-the-posture-paradigm.aspx> (accessed February 9, 2015).

2. Ms. Patton coordinated and served as a moderator during the September 23-24, 2014, *Combatant Command Climate Security Information Exchange*. E. Rebecca Patton, Office of the Assistant Secretary of Defense for Energy, Installations and Environment, telephone interview by author, March 2, 2015.

3. Barack H. Obama, *State of the Union Address January 20, 2015*, (Washington, D.C.: The White House Office of the Press Secretary January 20, 2015), available at <http://www.whitehouse.gov/the-press-office/2015/01/20/remarks-president-state-union-address-january-20-2015> (accessed February 9, 2015).

4. Barack H. Obama, *National Security Strategy* (Washington, DC: The White House, February 2015), i.

5. Chuck Hagel, *Quadrennial Defense Review*, (Washington, D.C.: U.S. Department of Defense, March 4, 2014), IV; Chuck Hagel, *Department of Defense 2014 Climate Change Adaptation Roadmap* (Washington, DC: U.S. Department of Defense, June 2014), i.

6. DoD's *Climate Change Adaptation Roadmap* serves as DoD's strategic department-level Adaptation Plan developed in response to two Presidential Executive Orders (EOs), 2009's EO 13514 *Federal Leadership in Environmental, Energy, and Economic Performance* and 2013's EO 13653 *Preparing the United States for the Impacts of Climate Change*. The in-development *DoD Directive* will further operationalize the *Adaptation Roadmap* strategy. Important to note that the *Roadmap* focuses on one of the two ways DoD is addressing climate change, specifically "*adaptation*," versus "*mitigation*." *Adaptation* includes efforts to plan for the changes that are occurring or expected to occur; while *mitigation* includes those efforts that reduce greenhouse gas emissions. DoD's overall *Strategic Sustainability Performance Plan (SSPP)* addresses the *mitigation* activities related to emissions reductions. Patton, OASD (EIE), telephone interview by author, March 2, 2015.

7. Barack H. Obama, *Presidential Policy Directive 6 (PPD6): US Global Development Policy Fact Sheet*, (Washington, DC: White House Press Office, September 22, 2010), <https://www.hsdl.org/?view&did=7154> (accessed January 24, 2015).

8. U.S. Agency for International Development, *USAID Policy Framework 2011-2015*, (Washington, DC: USAID, September 2011), 20; U.S. Government webpage Performance.gov, "Department of State and USAID Agency Page" <http://www.performance.gov/agency/department-state-and-usaid?view=public#apg> (accessed February 12, 2015).

9. Obama, PPD6 Development Policy Fact Sheet, 1.

10. Vic Ramdass, SOUTHCOM J9 Director, "Annex V (Inter-agency Collaboration) to Update 1 USSOUTHCOM FY15-19 Theater Campaign Plan, September 22, 2014, V-2.

11. Obama, PPD6 Development Policy Fact Sheet, 4.

12. USAID Bureau for Latin America and the Caribbean Home Page, <http://www.usaid.gov/who-we-are/organization/bureaus/bureau-latin-america-and-caribbean> (accessed February 13, 2015).

13. Ramdass, Annex V, V-4.

14. John F. Kelly, *Posture Statement of the Commander, US Southern Command*, presented to the 113<sup>th</sup> Cong., House Armed Services Committee, (Washington, DC: U.S. Southern Command, 26 February 2014), [www.southcom.mil/newsroom/Documents/2014\\_SOUTHCOM\\_Posture\\_Statement\\_HASC\\_FINAL\\_PDF.pdf](http://www.southcom.mil/newsroom/Documents/2014_SOUTHCOM_Posture_Statement_HASC_FINAL_PDF.pdf) (accessed January 3, 2015), 17.

15. Barack H. Obama, *Pres Policy Directive 21: Critical Infrastructure Security and Resilience (PPD-21)*, (Washington, D.C.: The White House, Feb 12, 2013), available at <http://www.whitehouse.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-and-resil>

16. *USA PATRIOT ACT of 2001*, 42 U.S.C. 5195c(e), Sn. 1016(e).

17. Hagel, *DoD 2014 Climate Change Adaptation Roadmap*, i.

18. Marcelo Salles, USACE, SAD, LNO to USSOUTHCOM, telephone interview by author, February 6, 2015; R. Evan Ellis, "The Strategic Dimension of Chinese Engagement with Latin America," Perry Paper Series, No. 1, 2013 (Washington, DC: William J. Perry Center for Hemispheric Defense Studies), 1.

19. The second two sets of criteria are most applicable to DoD in the security-to-development connection and the third criteria which addresses “small island developing states” is most applicable to SOUTHCOM and the Caribbean. From USAID: Criteria 2, “Sustainable Landscapes Criteria: USAID prioritizes partner countries with globally important forest landscapes (e.g. the Amazon basin and the Congo basin which have high current and future carbon storage potential); high demonstration potential (e.g. early movers able to demonstrate credible resultsbased payments for carbon storage under Reducing Emissions from Deforestation and Degradation (REDD+) programs); commitments to developing monitoring, reporting, and verification systems, and enabling policy structures such as land and resource tenure;” Criteria 3, “Adaptation Criteria: USAID prioritizes work with countries, both in terms of exposure to physical impacts of climate change and socioeconomic sensitivity to those impacts. These include the likelihood of significant physical changes, dependence of population on climatesensitive sectors, percentage of population in highrisk areas (e.g. lowlying coastal areas), and the ability of a country’s economy to respond to climate changes. Thus, USAID is prioritizing working with least developed countries (especially in subSaharan Africa), small island developing states (SIDS), and glacier dependent countries. U.S. Agency for International Development (USAID), *Climate Change and Development Strategy 2012-2016*, (Washington, DC: USAID, January 2012), 1.

20. Sarah Wines, U.S. Agency for International Development LNO to U.S. Southern Command, telephone interview by author, March 6, 2015.

21. Ole Magnus Theisen, Nils Petter Gleditsch, and Halvard Buhaug. “Is Climate Change a Driver of Armed Conflict?” *Climatic Change* 117, no. 3 (04, 2013): 613-25, <http://search.proquest.com/docview/1315961094?accountid=4444> (accessed November 30, 2014), 615.

22. Hagel, *DoD 2014 Climate Change Adaptation Roadmap*, i.

23. Jerry M. Melillo, Terese (T.C.) Richmond, and Gary W. Yohe, eds., 2014: *Climate Change Impacts in the United States: The Third National Climate Assessment* (Washington, DC: U.S. Global

Change Research Program, October 2014), [http://s3.amazonaws.com/nca2014/high/NCA3\\_Climate\\_Change\\_Impacts\\_in\\_the\\_United%20States\\_HighRes.pdf](http://s3.amazonaws.com/nca2014/high/NCA3_Climate_Change_Impacts_in_the_United%20States_HighRes.pdf) (accessed February 12, 2015), 396.

24. *Ibid.*, 398.

25. USACE has developed an open-source on-line “sea level calculator” to aid in obtaining low, intermediate and high-end scenarios for sea level change based upon the National Research Councils’ “Curves I, II and III; for this paper projections at both Amalie, US Virgin Islands and Mayaguez, PR were checked. Another Caribbean-specific data point is USGCRP’s notation of current sea level rise causing the coastline of Puerto Rico around Rincon being eroded at a rate of 3.3 feet per year. Though P.R. is in U.S. NORTHERN COMMAND’s AOR, this data point is useful for SOUTHCOM planners considering risks in the Dominican Republic, Cuba, Jamaica, etc., until NOAA or national weather agencies emplace additional gauges and develop additional datasets. *U.S. Army Corps of Engineers Responses to Climate Change Home page*, “Sea level calculator,” <http://www.corpsclimate.us/ccaceslcurves.cfm> (accessed January 31, 2015).

26. The U.S. Army Corps of Engineers reported in 2014 that the range of expected global mean sea level rise between now and 2100 is estimated from a low-end .2m (8 in) to a high end 2.0m (6.6 ft). U.S. Army Corps of Engineers (USACE), *Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation*, Engineer Technical Letter (ETL) 1100-2-1 (Washington, DC: USACE HQs, June 30, 2014) [http://www.publications.usace.army.mil/Portals/76/Publications/EngineerTechnicalLetters/ETL\\_1100-2-1.pdf](http://www.publications.usace.army.mil/Portals/76/Publications/EngineerTechnicalLetters/ETL_1100-2-1.pdf) (accessed January 31, 2015), 2-1; Rajendra K. Pachauri and Leo Meyer, eds., “Summary for Policymakers,” in *Climate Change 2014 Synthesis Report* (Geneva, Switzerland: Intergovernmental Panel on Climate Change, 2014) [https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR\\_AR5\\_SPMcorr1.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_SPMcorr1.pdf) (accessed February 13, 2015), 17.

27. Chuck Hagel, “Prepared Remarks for Delivery to the Conference of Defense Ministers of the Americas,” Arequipa, Peru, October 13, 2014, <http://www.defense.gov/Speeches/Speech.aspx?SpeechID=1893> (accessed March 7, 2015).

28. Melillo, et al., 2014: *Climate Change Impacts*, 399.



29. Pachauri and Meyer, "Summary for Policymakers," 7.
30. Derek S. Reveron and James L. Cook, "From National to Theater Developing Strategy," *Joint Force Quarterly* 70, (3Q, 2013), 117.
31. Michael A. Taylor, Tannecia S. Stephenson, A. Anthony Chen, and Kimberly A. Stephenson, "Climate Change and the Caribbean: Review and Response," *Caribbean Studies*, 40, no. 2 (July-December 2012): 185.
32. *Ibid.*, 187.
33. Mark Read, *Embracing Uncertainty: Scenario Planning for Climate Change-Security Challenges and Opportunities*, Dissertation for PhD (State College, PA: The Pennsylvania State University Graduate School Dept. of Geography, August, 2014), 5.
34. Colin P. Kelley, "Recent and Future Drying of the Mediterranean Region: Anthropogenic Forcing, Natural Variability and Social Impacts," Order No. 3612184 (New York, NY: Columbia University, 2014) <http://search.proquest.com/docview/1506156388?accountid=4444> (accessed March 7, 2015), iii.
35. Hagel, DoD 2014 *Climate Change Adaptation Roadmap*, "Annex 2," 16.
36. Reveron and Cook, "From National to Theater Developing Strategy," 115.
37. Hagel, DoD 2014 *Climate Change Adaptation Roadmap*, i.
38. Pachauri and Meyer, "Summary for Policymakers," 30; Taylor, et.al. "Climate Change and the Caribbean," 185-187.
39. Obama, PPD6 Development Policy Fact Sheet, 1.
40. *Ibid.*
41. Office of the Director of National Intelligence (ODNI), *Global Water Security Intelligence Community Assessment, ICA*

2012-8, (Washington, DC: Office of the Director of National Intelligence, February 2, 2012), [http://www.dni.gov/files/documents/Newsroom/Press%20Releases/ICA\\_Global%20Water%20Security.pdf](http://www.dni.gov/files/documents/Newsroom/Press%20Releases/ICA_Global%20Water%20Security.pdf) (accessed February 4, 2015), 6.

42. Defense Security Cooperation Agency Home Page, "Foreign Military Sales," <http://www.dsca.mil/programs/foreign-military-sales-fms>; and Marcelo Salles, "LATAM Program Management Plan," briefing slides from email correspondence to author, October 10, 2014.

43. Ed King, "What does it mean to be climate resilient?" *Responding to Climate Change* website, <http://www.rtcc.org/2014/11/10/what-does-it-mean-to-be-climate-resilient/> (accessed January 31, 2015).

44. U.S. Department of State, *The First Quadrennial Diplomacy and Development Review (QDDR): Leading Through Civilian Power* (Washington, DC: U.S. Dept. of State, 2010), <http://www.state.gov/documents/organization/153108.pdf> (accessed June 20, 2014), 76; U.S. Agency for International Development, "CDCS Guidance, Version 3," (Washington, DC: USAID, August 8, 2012) [http://www.usaid.gov/sites/default/files/documents/1870/CDCS\\_Guidance\\_V3.pdf](http://www.usaid.gov/sites/default/files/documents/1870/CDCS_Guidance_V3.pdf) (accessed June 20, 2014), 8.

45. Hagel, "Prepared Remarks for Delivery to the Conference of Defense Ministers of the Americas (CDMA)," Arequipa, Peru, October 13, 2014.

46. USACE South Atlantic Division, *SOUTHCOM Program Management Plan (PgMP)*, December 1, 2014, 12.

47. U.S. Army Corps of Engineers (USACE), *Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation*, Engineer Technical Letter (ETL) 1100-2-1 (Washington, DC: USACE HQs, June 30, 2014) [http://www.publications.usace.army.mil/Portals/76/Publications/EngineerTechnicalLetters/ETL\\_1100-2-1.pdf](http://www.publications.usace.army.mil/Portals/76/Publications/EngineerTechnicalLetters/ETL_1100-2-1.pdf) (accessed January 31, 2015); USACE, *Guidance for Climate Change Adaptation Engineering Inputs to Inland Hydrology for Civil Works Studies, Designs, and Projects*, Engineering Construction Bulletin (ECB) 2014-10 (Washington, DC: USACE HQs, May 2, 2014), [http://www.wbdg.org/ccb/ARMYCOE/COEECB/ecb\\_2014\\_10.pdf](http://www.wbdg.org/ccb/ARMYCOE/COEECB/ecb_2014_10.pdf) (accessed

January 31, 2015); USACE, *Incorporating Sea Level Change in Civil Works Programs*, Engineering Regulation (ER) 1100-2-8162 (Washington, DC: USACE Civil Works Directorate, December 31, 2013), [http://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER\\_1100-2-8162.pdf](http://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER_1100-2-8162.pdf) (accessed February 8, 2015); DoD, *Unified Facilities Criteria for High Performance and Sustainable Building Requirements (UFC 1-200-02)*, (Washington, DC: Dept. of Defense, November 7, 2014) [http://www.wbdg.org/ccb/DOD/UFC/ufc\\_1\\_200\\_02.pdf](http://www.wbdg.org/ccb/DOD/UFC/ufc_1_200_02.pdf) (accessed March 1, 2015); DoD, *Manual Number 4715.03: Integrated Natural Resources Management Plan Implementation Manual*, (Washington, DC: Dept. of Defense, November 25, 2013) <http://www.dtic.mil/whs/directives/corres/pdf/471503m.pdf> (accessed March 8, 2015).

48. U.S. Department of Defense Strategic Environmental Research and Development Program and Environmental Security Technology Certification Program Home Page, "Climate Change and Impacts of Sea Level Rise," <https://www.serdp-estcp.org/Featured-Initiatives/Climate-Change-and-Impacts-of-Sea-Level-Rise> (accessed March 7, 2015).

49. U.S. Department of State, *QDDR*, 100.

50. Patton, OASD (EIE), telephone interview.

51. ODNI, *Global Water Security Intelligence Community Assessment*, 8.

52. *Ibid.*

53. While the technical expertise sharing USG has done with Brazil's water authority CODEVASF [in Portuguese: *Companhia de Desenvolvimento dos Vales do Sao Francisco e do Parnaiba*] could be parlayed to other nations, the funding structure would likely be different. Brazil is able to fund/reimburse the USG efforts, whereas the funding scheme to provide technical support in less developed economies in the Caribbean would require USG or other development bank contributions. Marcelo Salles, U.S. Army Corps of Engineers, South Atlantic Division, Liaison Officer to USSOUTHCOM, telephone interview by author, February 6, 2015; Hagel, *Remarks for CDMA*.

54. Read, *Embracing Uncertainty*, 4.

55. Joanna Gutierrez Winters, *Establishing a Conceptual Framework for Interagency Coordination at U.S. Southern Command*, PRISM 5, no. 1, 144.

56. "SOUTHCOM has three representatives from OFDA detailed to its J7 staff directorate." Wines, USAID LNO to SOUTHCOM, phone interview, March 6, 2015.

57. Winters, *Establishing a Conceptual Framework*, 144.

58. U.S. Agency for International Development Haiti homepage, "Official Presentation of the Thomazeau Contingency Plan and Flood Warning Sirens," <http://www.winnerhaiti.com/index.php/en/videos/news-flash/93-official-presentation-of-the-thomazeau-contingency-plan-and-flood-warning-sirens> (accessed February 8, 2015).

59. Curt Tarnoff, Marian Leonardo Lawson, *Foreign Aid: U.S. Programs and Policy* (Washington, DC: US Library of Congress, Congressional Research Service Report, February 10, 2011) <http://www.fas.org/sgp/crs/row/R40213.pdf> (accessed March 4, 2015), 19.

60. U.S. Department of State, *QDDR*, 96.

61. *Ibid.*

62. Susan L. Clark-Sestak, *Analysis to Support Execution of the Defense Environmental International Cooperation (DEIC) Program*, (Alexandria, VA: Institute for Defense Analyses, May 2012) <http://www.dtic.mil/dtic/tr/fulltext/u2/a564901.pdf> (accessed March 7, 2015), 1; Hagel, *Remarks for CDMA; Obama, NSS*, 12.

63. U.S. Department of State, *QDDR*, 85.

64. The GCCI provides "fast start" climate financial support that totaled nearly \$30billion during 2010-2012 intended to build lasting resilience to unavoidable climate impacts. Obama, PPD6 Development Policy Fact Sheet, 4.

65. U.S. Agency for International Development Homepage, "Watershed Investment Fund," <http://www.winnerhaiti.com/index.php/en/investment-funds> (accessed February 8, 2015).

66. Obama, PPD6 Development Policy Fact Sheet, 4.

67. Obama, PPD6 Development Policy Fact Sheet, 3; U.S. Agency for International Development, *USAID Policy Framework 2011-2015*, (Washington, DC: USAID, September 2011), iv.

68. As of this writing, Department of the Army Staff Judge Advocate is reviewing a draft memorandum of understanding that would allow the World Bank or the Inter-American Development Bank (IADB) to directly fund USG/military planners and quality assurance professionals to provide services in support of World Bank or IADB-funded water resources projects. Marcelo Salles, USACE, SAD, LNO to USSOUTHCOM, telephone interview by author, February 6, 2015.

69. Obama, PPD6 Development Policy Fact Sheet, 3; U.S. Agency for International Development (USAID), *Climate Change and Development Strategy 2012-2016*, (Washington, DC: USAID, January 2012), 1.

70. Marcelo Salles, telephone interview by author, February 6, 2015.

71. Cornell University Law School Legal Reference Web Site, "31 U.S. Code § 1535, para (a)" <https://www.law.cornell.edu/us-code/text/31/1535> (accessed March 31, 2015).

72. *Ibid.*

73. ODNI, *Global Water Security Intelligence Community Assessment*, 8.

74. Richard L. Bernal, *Dragon in the Caribbean: China's global Re-Dimensioning, Challenges and Opportunities for the Caribbean*, (Kingston, Jamaica: Ian Randle Publishers, 2014), 50.

75. Mark R. Tercek, Jonathan S. Adams, *Nature's Fortune: How Business and Society Thrive by Investing in Nature*, (New York: Basic Books, 2013) 144.

76. IPCC *SPM*, 2014, p.24

77. Read, *Embracing Uncertainty*, 4.
78. Ramdass, Annex V, V-17.
79. USACE South Atlantic Division, *SOUTHCOM PgMP*, 17.
80. Kelly, John F. Kelly, *Posture Statement of the Commander, US Southern Command*, 20.
81. Author Not Provided, "Venezuela: Empty Shelves and Rhetoric," *The Economist*, January 24, 2015, 30.
82. Author Not Provided, "PetroCaribe and the Caribbean: Single Point of Failure," *The Economist*, October 4, 2014, <http://www.economist.com/news/americas/21621845-venezuelas-financing-programme-leaves-many-caribbean-countries-vulnerable-single-point> (accessed February 9, 2015); Alexis Arthur, "Beyond Petrocaribe: An Alternative Energy Future for Central America and the Caribbean," paper and comments delivered as part of the Florida International University's Latin American and Caribbean Center/Applied Research Center/U.S. Southern Command Policy Roundtable Series, Miami, Florida, June 16, 2014, 6.
83. *Ibid.*
84. Arthur, "Beyond Petrocaribe..." 6.

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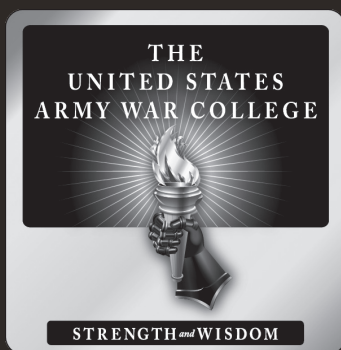
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