Environmental stress and human migration in a low-lying developing nation: A comparison of co-evolving natural and human landscapes in the physically and culturally diverse context of Bangladesh

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Vanderbilt University and Columbia University

Team of Participants

We are an interdisciplinary team of colleagues who bring expertise and experience to bear on this intellectually rich and societally relevant topic.

Social Science Group – Brooke Ackerly (Department of Political Science, Vanderbilt) brings expertise in interdisciplinary team research (in progress), research ethics (Ackerly and Attanasi 2009), research design (Ackerly and True 2010), and research at the intersection of climate change and equity (Ackerly and Vandenbergh 2008). Additionally, she has done ethnographic survey research and elite interviews in Bangladesh as a Fulbright Fellow. Dr. Bina D'Costa (Research Fellow, Center for International Governance and Justice, Australian National University and Visiting Fellow, Refugee Studies Center, Oxford Department of International Development). Her research explores nation-building and conflicts (D'Costa 2010), gender in the Asia-Pacific (D'Costa and Lee Koo 2009), NGOs and social movements in Bangladesh (D'Costa 2008), and human displacement in Sri Lanka and Bangladesh (D'Costa 2010). D'Costa and Ackerly are previous collaborators.

Katharine Donato (Department of Sociology, Vanderbilt) is a demographer and international migration expert who has worked largely on migration between Latin America and the United States. She is interested in a variety of research questions related to migration, including the impacts of U.S. immigration policy (Donato *et al.*1992a; Donato 1994; Donato and Carter 1999; Donato and Sisk 2012), effects of migration on employment and working conditions (Donato *et al.* 1992b; Donato and Massey 1993; Donato *et al.* 2005, 2008a; Donato and Sisk 2012), whether and how gender differentiates migration outcomes (Donato 1993; Donato *et al.* 2006, 2008b), and the consequences of outmigration for the health of families in Mexican communities (Kanaiaupuni and Donato 1999; Donato *et al.* 2003, Donato and Duncan 2011). She is on the Advisory Board for the Mexican Migration Project and has extensive experience implementing and using data from its ethnosurvey (Donato *et al.* 2010).

The demographic methodology is complemented by a social and behavioral psychology methodology developed by the multidisciplinary team at Vanderbilt's Climate Change Research Network (CCRN) and the Vanderbilt Institute for Energy and Environment (VIEE). Amanda Carrico is a research assistant professor whose research explores human dimensions of environmental change with a particular focus on behavioral issues in developing climate change mitigation policy in the US (Carrico *et al.* 2009; Carrico *et al*., 2011; Vandenbergh *et al*., 2011) as well as adaptation to climate change within agricultural communities. She brings expertise in survey research methodology (Carrico and Riemer 2010; Carrico *et al.* 2012). Currently Dr. Carrico is collaborating with other VIEE researchers (including Drs. Hornberger, Gilligan and Thabrew) on a project to examine adaptation to drought conditions among paddy farmers in the Mahaweli River Watershed in Sri Lanka. This work examines opportunities for improving water efficiency through irrigation practices and decision making regarding cultivation among farmers.

Dr. Shahnaz Karim (Governance Specialist at the Asian Development Bank and Senior Parliamentary Advisor at the World Bank) brings expertise on socio-political research, project management, policy advocacy, monitoring and evaluation, and CSO consultation and participation. She has a specialist understanding of South Asia's development, economic and political situation. Her areas of research interests include governance and anticorruption. She is our collaborator based in Bangladesh and will serve as the project's Field Supervisor, helping to design and implement field methods.

Physical Science Group and Remote Sensing – Steve Goodbred (Department of Earth and Environmental Sciences, Vanderbilt) has worked in Bangladesh for 16 years and brings expertise in earth-surface systems on continental margins, emphasizing interactions among process-scale patterns (Goodbred and Kuehl 1998, Rogers and Goodbred 2010), landscape response and evolution (Goodbred 2003), and humans (Nicholls and Goodbred 2005). David Furbish (Department of Earth and Environmental Sciences, Vanderbilt) is an expert in fluid mechanics and transport applied to problems in hydrology and geomorphology (Furbish 1997), and will bring key knowledge on tidal transport and coastal evolution (Fagherazzi and Furbish 2001). George Hornberger (Departments of Earth and Environmental Sciences and Engineering, Vanderbilt) is a U.S. National Academy of Engineering member, and his research is aimed at understanding complex water-energy-climate interrelationships and how hydrological processes affect mass transport through catchments and aquifers (Hornberger et al. 1998, 2006, 2008).

The expertise at Vanderbilt is complemented by that of the Columbia University and Dhaka University research teams, who also have extensive experience working in Bangladesh. Mike Steckler (Lamont-Doherty Earth Observatory) has important expertise on the isostasy, tectonics, and modeling of sedimentary basins, such as that occupied by Bangladesh (Steckler *et al.* 2007b, 2008). Steckler also brings broad experience with diverse geophysical techniques (Steckler *et al.* 2007a, 2010). Leonardo Seeber (Lamont-Doherty Earth Observatory) is an expert in tectonophysics and earthquakes (Seeber and Armbruster 2000; Seeber et al., 2010) and a member of Columbia's Center for Hazards and Risk Research. On the Dhaka University team, Dr. Syed Humayun Akhter (Dhaka University, Earth Observatory) is specialized in Structural Geology & Tectonics, Thermoluminescence Age Dating, Field Geology, Photogeology & Remote Sensing as well as in Engineering Geology and Petrography. Dr. Akhter is an active member of the Geohazard Research Association for Bangladesh (GRAB) at Dhaka University, and presently working on crustal dynamics & seismicity in Bangladesh with Columbia University.

Chris Small (Lamont-Doherty Earth Observatory) brings to the project his expertise in remote sensing (Small 2004, Small *et al.* 2009), spatial analysis (Small 2003), and their application to the spatial and temporal dynamics of land surface properties (Small and Liu 2006) and human population distributions (Small 2010b; Small and Nicholls 2003).

Integrative Analysis Group – Jonathan Gilligan (Department of Earth and Environmental Sciences, Vanderbilt) brings expertise in transdisciplinary research on the environmental impacts of voluntary behavioral change (Dietz *et al.* 2009, Carrico *et al.* 2009) and risk policy (Vandenbergh and Gilligan 2011, Gilligan 2006). He also coordinated a program on transdisciplinary approaches to environmental problems, with participation by students and faculty in the physical and social sciences from the U.S. and Bangladesh. John Ayers (Department of Earth and Environmental Sciences, Vanderbilt) brings expertise in GIS (Ayers *et al.* 2006), aqueous geochemistry and geochemical modeling (*ibid*.), and he also worked for the New York Environmental Protection Bureau on environmental problems affecting stakeholders (Rubin *et al.* 1992). Mark Abkowitz (Department of Civil and Environmental Engineering, Vanderbilt) specializes in enterprise risk management, assessing the impacts of climate change on critical

infrastructure, and the strategic and operational deployment of intelligent transportation systems (Abkowitz 2008). Janey Camp (Department of Civil and Environmental Engineering, Vanderbilt) is a research assistant professor who brings expertise in the use of GIS to guide decision-making (Camp *et al.* 2010a,b) and watershed modeling (Daniel *et al.* 2010). She is currently developing new methodology to perform holistic risk management and applying this tool to decision-support for climate change impacts on critical transportation infrastructure. Lanka Thabrew is a post-doctoral fellow and life-cycle and policy analyst with broad experience in international environmental projects (Thabrew and Ries 2009a). She brings expertise in multi-stakeholder decision making (Thabrew *et al.* 2008), integrated development planning (Thabrew and Reis 2009b), and sustainable development (Thabrew *et al.* submitted).

Graduate Students – The following Ph.D. graduate students are also members of the project: Laura Benneyworth (Vanderbilt Center for Environmental Management Studies), Matthew DiLorenzo (Political Science), Gregory George ((Earth and Environmental Sciences), Lindsay Langsdon (Earth and Environmental Sciences), Jennifer Pickering (Earth and Environmental Sciences), Bhumika Piya (Sociology), Chris Tasich (Earth and Environmental Sciences), and Leslie Wallace-Auerbach (Earth and Environmental Sciences).

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