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# A typology of adaptation actions: A global look at climate adaptation actions financed through the Global Environment Facility<sup>☆</sup>

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### ABSTRACT

Climate change impacts threaten existing development efforts and achieving future sustainability goals. To build resilience and societal preparedness towards climate change, integration of adaptation into development is being increasingly emphasized. To date, much of the adaptation literature has been theoretical, reflecting the absence of empirical data from activities on the ground. However, the Funds established under the United Nations Framework Convention on Climate Change and managed by the Global Environment Facility, the Least Developed Countries Fund, the Special Climate Change Fund and the Strategic Priority for Adaptation, have approved financing for 133 adaptation projects in 70 countries with sufficient documented experience to allow for initial categorization and evaluation. This article provides the first substantial compendium of adaptation actions identified through the allocation and disbursement of these Funds and organizes these actions into a generalized typology of adaptation activities. The information obtained sheds new insight into what adaptation is, in practice, and suggests some next steps to strengthen the empirical database. Ten types of overarching adaptation activities were identified through an analysis of 92 projects financed through these Funds. This paper analyzes these adaptation activities and compares them with theoretical constructs of adaptation typologies. We find that many of the early ideas and concepts advanced by theoreticians are consistent with results from the field. The adaptation categories that recur the most in Global Environment Facility projects are enabling and relatively inexpensive measures, such as those related to capacity building, policy reform, and planning and management. However, a rich panoply of technical actions ranging from information and communications technology, to early warning systems, to new or improved infrastructure, are also identified as common project goals. Future refinements of the costs of various adaptation actions, the mixture of technical and management options, and evaluating the efficacy of actions implemented, will be key to informing the future global adaptation agenda.

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## 1. Introduction

Social, economic, and ecological adaptations to change are not new. Human beings have been adapting to climate variability and change throughout the centuries. Today, however, significant amounts of manmade greenhouse gas emissions have altered Earth's climate, raising temperatures 0.8 °C above pre-industrial levels, increasing the frequency and intensity of droughts and floods, and raising sea levels (IPCC, 2012; SREX, 2010). Additionally, the rapid growth in human population and economies globally, significantly concentrated in areas exposed to climatic harm, means that the risks of losses from climate change will continue to increase.

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The confluence of these factors are necessitating action to proactively adapt natural, built, social, and economic systems. Unfortunately, given the pace and magnitude of changes underway, the measures developed in the past to cope with climate variability may, in many cases, no longer be sufficient to adapt to the unprecedented impacts of climate change (Bierbaum et al., 2013; Kates et al., 2012).

Climate change is already affecting various areas around the world: many recent extreme weather events such as floods in Australia and Colombia, droughts in the United States and East Africa, and wildfires in Russia are the types of events expected due to climate change (Babatunde et al., 2013; Peterson et al., 2012). Evidence has shown that the impacts of a changing climate are of greatest concern in the most vulnerable and poorest countries and communities within the developing world (Tschakert, 2007). These countries and communities are vulnerable to climate change, including extreme weather events, because of their disproportionate exposure to climate impacts as well as a lack of adaptive capacity – the resources, institutions, and technical capacity needed to recover when such events occur (Djouidi and Houria, 2013; Reid et al., 2010). For example, the Intergovernmental Panel on Climate Change Working Group II (IPCC, 2007), the World Development Report 2010 (World Bank, 2010), and a recent African Academy statement (African Academy, 2012), among others confirm that Africa is one of the most vulnerable continents to climate variability and change because it faces multiple stresses, now increasingly confounded by more droughts and more floods, and has low capacity to adapt to these changes (The World Bank, 2012; World Bank, 2013a,b).

At the most general level, climate adaptation or coping, is what people do to avoid and recover from unusual or extreme climate events. In recent years, as interest in proactively funding and implementing adaptation programs and projects has increased, the need for a more precise definition of climate adaptation has become apparent. A 2006 Organization for Economic Cooperation and Development report reviewed the range of definitions for “adaptation” noting important differences in definitions prepared by the Intergovernmental Panel on Climate Change, United Nations Framework Convention on Climate Change, United Nations Development Program, and United Kingdom Climate Impact Program, with potentially significant operational and funding implications (OECD, 2006) (see Table 1):

“All four definitions differ from one another in several ways. First, they all use different words to describe what adaptation is. The first key words in the definition that express adaptation as ‘adjustment’, ‘practical steps’, ‘process’ and ‘outcome’ can be interpreted differently by various stakeholders. . . Expectations from adaptation as an outcome might be much higher than expectations from it as a process. Funding aspirations and evaluation of achieved results would also vary accordingly.” (OECD, 2006)

As the impacts of climate change become increasingly recognized in various social, economic, and policy spheres, efforts to understand

and define adaptation will likely intensify, thus giving urgency to efforts of translating the existing evidence on adaptation into a practical ontological system. Without efforts to marry adaptation theory with real-world adaptation practice, the adaptation field will continue to be siloed between theory and practice. It is important to begin to develop ‘lessons learned’ and ‘best practices’ from the practitioner world. This article shares ten years of operational experience built through the implementation of adaptation projects around the world, in an effort to unite empirical data with the ongoing academic discussion on climate adaptation activities. This is done by comparing adaptation efforts financed through the Global Environment Facility with existing typologies of adaptation activities present in the peer-reviewed literature, and identifying similarities, discrepancies, and areas for further study with an ultimate aim of advancing both theory and practice.

## 2. Existing adaptation typologies in the literature

Various typologies of adaptation activities have been created over the last two decades, with finer specification and detail emerging recently. A literature review by Smit et al. (2000), supported by subsequent work found that existing typologies of adaptation activities generally focus on one of five main areas: timing relative to stimulus (anticipatory, concurrent, reactive), intent (autonomous, planned), spatial scope (local, regional, national), form (e.g., technological, behavioral, financial, institutional), and degree of necessary change (incremental, transformational) (Carter et al., 1994; Fidelman et al., 2013; Huq et al., 2003; Smit and Skinner, 2002; Smit and Wandel, 2006; Wilbanks and Kates, 1999). In addition to the categories identified by Smit et al. (2000), other typologies have focused on the driver of action, with the primary drivers being disasters, climate variability, and climate change (Smit et al., 2000; Cutter et al., 2008). Given that projects within the Global Environment Facility portfolio are planned and generally anticipatory, our analysis, and the remainder of this section, focuses on the various forms of adaptation being implemented irrespective of spatial scope and intention.

Work conducted by Eakin et al. (2009) identified three distinct forms of adaptations: (1) social vulnerability approaches aimed at addressing underlying social issues; (2) resilience approaches focusing on enhancing a systems resilience; and (3) targeted adaptation approaches which target actions to specific climate change risks. This high-level “type” of adaptation classification can be refined by adding a more detailed typology of adaptation actions such as that presented by Burton et al. (1993) which includes: prevent loss, tolerate loss, spread loss, change use or activity, change location, or restoration. This is similar to work by Bijlsma et al. (1996), which uses the categories of retreat, accommodate, or protect to classify adaptation actions.

Similarly, Berrang-Ford et al. (2011) developed a methodology to track and categorize adaptation forms and tested it against adaptation actions found in peer-reviewed, English language

**Table 1**  
Common definitions of adaptation.

Intergovernmental Panel on Climate Change	Adaptation is an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory, autonomous, and planned adaptation (IPCC, 2007)
United Nations Framework Convention on Climate Change	Adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change (UNFCCC website)
United Nations Development Program	Adaptation is a process by which strategies to moderate, cope with and take advantage of the consequences of climatic events are enhanced, developed, or implemented (UNDP, 2005)
United Kingdom Climate Impacts Program	Adaptation is the process or outcome of a process that leads to a reduction in harm or risk of harm, or realisation of benefits, associated with climate variability and climate change (UKCIP, 2003)

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