Earth Institute Unit Review

October 25th, 2012
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I. Mission and Goals

1. Mission Statement and Stated Goals

Mission

- CRED’s mission is to comprehend and confront the gap between society’s recognition of environmental problems such as natural hazards and unsustainable consumption and society’s frequent failure to act on the scientific insights, economic analyses, and technological solutions that address these problems. CRED focuses on recent findings in decision science that help explain this gap—the finite nature of human attention, the complex interactions of cognition and emotion in shaping human action, the challenges which uncertainty places on human perception and action, and the profoundly social character of human action.

- CRED seeks to remedy this gap through two major streams of activity. It conducts research in settings such as laboratories and field sites in the US and around the globe, and it carries out a number of forms of outreach, including education, communication guides, advising to local, national and international organizations, and the development of decision support tools which facilitate use of scientific information about the environment and which promote better group decisions. The flow between the research and the outreach goes in both directions: the research informs the outreach and the outreach provides research opportunities to test hypotheses. Taken together, these two streams of activity advance science and advance society’s capacity to address major environmental challenges.

Research Goals

- To extend psychology and behavioral-economics theory of constructive and context-dependent choice from individual decisions to the group and organizational level, in order to identify decision architectures that will improve individual and participatory decision making related to climate and its impacts.

- To improve the communication of scientific information (including seasonal and long-term climate forecasts) to lay audiences by improving our understanding of the mental representation of uncertainty and of decision goals and objectives.

- To apply findings about decision processes to economic analysis; in particular, to suggest architectures for plan evaluation that take into account effects of social context on decision makers’ time horizons and reactions to uncertainty for financial, social and environmental goals.

Stakeholder and Other Outreach Goals

- To involve potential end-users of climate information and other stakeholders in the design of research and in design of applications of research findings.

- To disseminate Center research results to natural scientists, so that they understand the importance and also the limitations of social-science research, and are alert to the kinds of issues raised by social scientists.

- To disseminate Center research results to decision makers at all levels including field project participants, policy makers, the public sector, and educators.

- To collaborate and share research findings with researchers and research groups in other institutions worldwide.

Education Goals

- To demonstrate to high school and undergraduate students the relevance of a social-science research program that intersects with the physical sciences, as a way of attracting students (especially from minority populations) to science.
• To provide a scientific basis for improvements in design and training for group decision making in the public, private, and non-governmental sectors.

• To advance undergraduate, graduate, and post-doctoral education related to the intersection of the social and physical sciences, using the specific context of mitigating or adaptive human behavior in the face of climate uncertainty.

Cross-Cutting Goals

• To integrate theory development and testing across the different levels of analysis typical of different social sciences, to understand more fully the range of determinants of perceptions, attitudes, decisions, and actions impacted by climate variability or climate change.

• To create synergy across Center research activities, so that laboratory, field, and theory projects inform each other.

2. Areas of Research

Three themes connect our research projects: How scientific information is or should be presented and used, the role of social context, and decision architecture.

Use of Scientific Information

To an increasing extent, scientific or technical information is present or can be sought in decision settings. Often it takes the form of a forecast, structured either as the probability of a critical event or as a probability distribution over different events. There are many barriers to the use of forecasts by decision makers, including misperceptions and mistrust. CRED research examines how scientific information, including seasonal-to-interannual forecasts, decadal predictions, long-term climate change projections, natural hazard forecasts, and technical information related to energy consumption, can be communicated and used more effectively. Our research explores, integrates, and tests applicability of two major recent themes in decision making to improve the use of scientific information: Social Context and Decision Architecture.

Social Context

Often omitted from models of decision-making under uncertainty, Social Context means explicit social interchange, or a setting that activates social goals and expectations about others’ goals and strategies. Social context motivates concern for others and enhances conformity to and setting of social norms, which might receive little weight from isolated decision makers. Group meetings, discussion, and participatory processes also alter the ways in which people acquire, learn, engage with, and act on new information. We study individual decisions in group settings, commons dilemmas, as well as group decisions.

Decision Architecture

Decision Architecture refers to a body of insights about how people’s preferences are constructed as a function of contextual specifics of the decision setting (e.g., whether issues are framed as gains or losses, what implicit temporal horizon is suggested, what the choice default is, or in which order information is received). Contextual features help determine the goals that decision makers consider, how information is combined, how the merits of adaptive and mitigating strategies are taken into account. CRED studies the cognitive, emotional, and motivational processes involved.

Social context is a component of decision architecture, but also interacts with other structural features of decision architecture. Understanding these processes and interactions is key to the design of solutions to environmental
problems and sustainable development, from more effective information formats and education programs to better predictions of public acceptance of new technologies and other interventions.

CRED’s Multi-Method Approach
CRED’s program of research includes laboratory and field studies. Most projects contain both, in varying proportions. Field experiments are based on lab results. In turn, we use insights from field observations to modify our laboratory protocols or to suggest new lab experiments that can study select decision mechanisms in isolation. This integrated back and forth between lab and field leads to better understanding of individual and group processes and more efficient field observation. We also conduct many of our surveys and decision experiments online, with access to more broadly representative samples of respondents.

Figure 1 Integration

CRED studies the use of climate and technical information and decision making under uncertainty in a range of domains or sectors:

- Agriculture
- Water resource management
- Food security
- Public health
- Natural hazards
- Energy

Research sites include:

- New York
- Great Plains
- US Cascades
- Alaska
- Florida
- Haiti
II. Governance

1. Completed Self-studies and External Reviews

- CRED has undergone a mid-term review/two-day site visit in 2007, as required by its majority funder NSF. For a copy of the report click [here](#). The mid-term review/site visit for CRED2 is being planned for the spring of 2013. The review is conducted by an external evaluation team (selected by NSF and drawn from experts in CRED-relevant disciplines) and takes place in the presence of NSF Program Managers.

- CRED’s External Advisory Board evaluates CRED’s progress on an annual basis, as required by our cooperative agreement with NSF. The board participates in the center’s annual meeting, convenes for private sessions, and debriefs the center’s directors and submits a letter to NSF which among other things (annual reports) informs NSF’s decision to release the next annual funding installment. Copies of the last two External Advisory letters are available by clicking [here](#) for 2011 letter and [here](#) for 2012 letter.

- CRED has recently undergone a series of informal self-evaluations in form of one-day or half-day retreats of the directors and administrative staff. This is an ongoing process.

- The administrative staff has recently completed a self-study through the hiring of an Organizational Consultant from Columbia’s Learning and Development Department. The purpose of the consultancy was to support CRED Administrative staff in considering ways to improve and further team success. This effort included discussions between the Managing Director and the consultant, followed by one-on-one interviews with all administrative staff. These informed the agenda for an offsite team meeting in the form of an Organizational Retreat with the theme “Creating a Climate for Continued Growth and High Performance.” The team retreat included development and affirmation of the admin vision and strategic goals; review of individual roles, responsibilities, and work flow; identification and sampling of tools for effective communication and team building; and an outline of next steps.
2. Organizational Charts

Overall Organizational Chart:

Executive Committee
- David H. Krantz (Director)
- Elke Weber, Ben Orlove, Kenny Broad
  - Sabine Marx (ex officio, Managing Director)

Steering Committee
- Exec. Comm., plus:
  - Lisa Goddard
  - Michel Handgraaf
  - Robert Meyer
  - Guillermo Podesta
  - Daniel Osgood

Internal Advisory Board
- Jim Hansen
- Klaus Lackner
- Yochanan Kushnir
- Stephanie Pfirman
- Mingfang Ting
- Steve Zeblak
- Heidi Cullen
- Otis Brown

External Advisory Board
- Renate Schubert (chair)
- Michael Oppenheimer
- Thomas Wallsten
- Linda Schuck
- Diana Liverman

Senior Personnel
- (30 Researchers)
  - plus
  - Post-docs, Graduate Students

Assitant Director (Lori Scally)
Program Manager (Rise Fullon)
Program Coordinator (Matt Sisco)

Students, Research Assistants

Field Partners, Research Participants, Stakeholders
Other Outreach Partners

Note:
Steering Committee – includes Executive Committee and additional senior personnel; provides broad input regarding major issues and assumes roles in project integration
Internal Advisory Board – Columbia physical and natural scientists engaged in climate-related studies; assures regular exchange of information and critical discussion of climate-relevant projects.
III. Accomplishments

1. Annual and Donor Reports

- [CRED2 Annual Report 2012](#)
- [CRED2 Annual Report 2011](#)
- [CRED1 Annual Report 2011](#)
- [CRED1 Annual Report 2010](#)
- [CRED1 Annual Report 2009](#)
- [CRED1 Annual Report 2008](#)
- [Temporal Discounting Grant – Annual Report 2011](#)
- [Group Decision Making Grant – Annual Report 2011](#)
- [Climate Guide Grant Final Report - 2009](#)
2. Evidence of Project Scope and Impact

CRED’s accomplishments can be documented in several ways: by counting the number of publications; by summarizing our publications on a variety of topics; by looking at the numbers of students and postdocs trained, and their respective career developments; by considering the reach of our work by looking at our handful of “flagship” articles; or by looking retrospectively at what was understood in 2003 (when we wrote our first proposal) and comparing this with what we now think we know. The more quantitative aspects concerning our achievements are summarized in Sections III.2.b) and III.4. Section III.2.a) provides a more qualitative overview of CRED’s project scope by discussing major research findings.

a.) Major Research Accomplishments

The present short overview attempts to give a broad overview of progress in the past 10 years. It lists the major findings that derive from our lab, field and simulation projects and from our ongoing engagement with the interdisciplinary field of decision science. What links these findings is our two-fold concern to understand the individual and social processes that shape decision-making and to develop usable tools from this understanding.

From Decision Heuristics to Decision Architecture

In 2003 we looked at a fairly developed theory of individual decision making based on the notion that preferences are constructed, not pre-existent. This evolved into a concept of decision architecture – the art and science of designing contexts so that the resulting choices are judged more satisfactory, both by the decision makers themselves and to outside observers.

From Group Context to Social Goals

In 2003 we had no clear idea of how individual decision heuristics would change in a group context: finding out was a principal exploratory goal in our initial work. We quickly became aware of the rich variety of social goals that are sometimes adopted, activated, or strengthened in a group context. We developed a theory of social goals related to affiliation and demonstrated the influence of affiliation strength and of social status on coordination of a set of decision makers.

Decision “Tools”

In 2003 development of “tools” was a mandate from our program directors – one that made us nervous. We have developed many ideas for tools – in the age of “apps”, this becomes easier, but the competition for attention is daunting. Meanwhile, we came to understand that our most useful “tools” involve general principles that can be taught. The Guide (Psychology of Climate Change Communication) is one successful example, serving also as a prototype for future outreach.

Natural Hazards

In 2003, many of us had longstanding interest in natural hazards, but our proposed research focussed on climate uncertainty rather than hazards. Of course, many hazards – flood, hurricane, mudslide, certain infectious diseases – are climate related. Today we have a strengthening partnership with the USGS focussed on several different hazards, as well as research aligned with NOAA concerns, and this looks like a very fruitful research area, especially for extension of decision “tools” (see above) and for decision architecture (institutional change that would lead to better hazard-related decision making).
Uncertainty and Temporal Discounting Revisited: New Architecture for Economic Analysis

In 2003 we wondered whether temporal discounting might vary with different goals (e.g., financial, health, environmental). Today, we have a mass of new information about discounting – the asymmetry between discounting of losses and of gains is one central item – and a new conceptual framework based on the concept of time horizon for decision planning.

We also have a great deal of new information about the roles of uncertainty, as it affects social goals (such as fair sharing), coordination in multi-player settings, and temporal planning.

We see more clearly than ever the failure of standard architecture for economic analysis, which fails to distinguish between delayed consumption and delayed goal attainment in discounting and fails to recognize the importance of subjective uncertainty in discounting the future. The idea that prospective consumption streams should be evaluated (with discounting) as though they were certain, and only then introduce uncertainty (only to wipe it out again via expected utility) is contrary to how people actually think. We are still seeking alternatives, but the questions we are asking have changed completely since 2003.

Participatory Processes Revisited

A motivating theme for the creation of CRED was recognition that the majority of psychological and economic theories that are taught - and that often have direct policy influence - are based on studies of individual decision-making. In the ‘real world’ however, there are spontaneous groups that form to make decisions and increasingly there are situations in which incentives are given to create groups for purposes of deciding on allocation of resources (e.g., community based natural resource management or participatory budgeting are required for receiving a World Bank loan). CRED research is looking at both the ‘self-forming’ and ‘forced’ processes in different sectors and countries and the effect on decision making (with variables ranging from satisfaction with process, compliance, option generation).

Understanding, Using, and Improving Climate Forecasts: Interaction Between Field and Laboratory Research

Drawing on field research associated with different CRED and IRI projects, studies have been designed to test ideas based on field observations in a controlled laboratory setting and visa versa, theories based on lab experiments are being tested by (1) conducting the experiments with actual decision makers in their decision making settings, and (2) comparing ethnographic and video/audio observations with the lab theories. Of particular focus is the strategic use of uncertainty during bargaining in group interactions and how the negotiations that take place outside of the formal participatory setting undermine or support diverse positions. This work is closely tied to participatory processes research.

b) CRED’s Reach and Impact

- CRED is an interdisciplinary center that studies individual and group decision making under climate uncertainty and decision making in the face of environmental risk. CRED’s objectives address the human responses to climate change and climate variability as well as improved communication and increased use of scientific information on climate variability and change. In addition to advancing fundamental theory in psychology, behavioral economics, and other social science disciplines, CRED researchers work on integrated field projects around the world, where decision science is brought to bear on sustainable development challenges in such settings as agricultural decisions and water management. CRED partners with various departments and centers across campus. Over the past few years, CRED has been enjoying increasing recognition within Columbia University and EI units, and its reputation as a go-to center for questions about environmental decision making and climate change communication. We work with many formal and informal collaborators; requests for collaborations and advisory roles within CU as well as inquiries for partnerships with external organizations continue to increase.
- More and more researchers, students, and postdocs are drawn to our work: Between 2005 and 2012, the number of PIs (senior personnel on our NSF grants) has grown from 17 to 30. The number of graduate students and postdocs
who want to work with CRED has risen from 2 to 8 and 0 to 6, respectively. Similarly the number of research assistants (counting only those located at Columbia) has grown from 3 to a peak of 37 last year. Request from visiting scholars from the US and abroad show an equally increasing trend.

- Publications have grown from 2 during the first year to over 25 papers published in 2011, leading to a total of over 120 publications as of Fall 2012. The growth in the number of outreach activities is evidenced by an increase from 13 in our first year to well over 200 each these last two years (3/4 of which are performed by CRED directors and core members at Columbia), see figure 2.

- The role of CRED and of its core faculty has also vastly expanded within Columbia University over CRED’s existence. Co-Directors Krantz, Orlove, and Weber are members of the Earth Institute Faculty, the governing body of the Earth Institute, and serve on various other Earth Institute committees and task forces. Similarly, CRED’s Managing Director and Research Scientist Sabine Marx is filling advisory and committee membership roles at Columbia University, representing and promoting CRED’s mission.

- In addition, we receive a steadily increasing number of requests for collaborations with EI units (outside of NSF-DMUU-funded CRED projects), who are seeking to include a social science perspective in their work. We participate in numerous joint grant proposals, and if funded, engage in more and more research collaborations. To give an example of collaborations outside of Columbia University, we have responded to a request for collaboration with USGS (specifically the Multi-Hazards Program) and are now working on 2 projects, one on perceptions of earthquake hazards information and one on decision making in face of post-wildfire rainfall-related debris flow warnings. We are exploring ways to inform risk communication related to volcanic eruptions. This partnership allows us to apply insights and decision tools that we have developed for one context into other hazards contexts, basically forming extensions of existing projects; additionally the partnership generates new research ideas that weren’t part of our initial set of project suites (proposed to NSF in 2010), yet are promising and worthwhile developments.

- CRED works closely with partner organizations in field projects (e.g., water allocation committees). There are many benefits to field partner engagement for a center whose program of research includes both laboratory and field studies, in varying proportions: we can use insights from field observations and interactions to modify our laboratory protocols, or to suggest new lab experiments that can study select decision mechanisms in isolation. This integrated back and forth between lab and field leads to better understanding of individual and group processes and more efficient field observation. The challenge is the time it can take to develop trust and the effort to maintain relationships. Funding often doesn’t allow us to return to field sites more than once or twice a year and we can’t guarantee that we will be able to continue our research for more than the few years determined by any given award.

- Projects that involve field partners have provided particularly advantageous ground for outreach and education, including co-planning of new research and co-development of decision support tools. For example, in CRED’s South American sites there is a dual focus on co-development of new forecast tools and on co-planning research to investigate how people learn about and use these tools. In Burkina Faso, Climate Forecasting for Agricultural Resources (CFAR) has a strong tradition of co-planning research with local groups and participatory forecast dissemination (collaborating with the National Meteorological Service). Similarly, the CRED/IRI joint index insurance project works to build local research capacity in Ethiopia and other African countries.

- Another group of partners are physical and natural scientists. Outreach to scientists is important because it can broaden both our and their perspectives and lead to better future collaboration or cooperation. We have been most successful with geoscientists, both at Columbia, where the Earth Institute provides important opportunities, and outside. We have also had a strong impact on social science programs oriented toward environmental policy, and have attracted young psychologists, both graduate students and recent Ph.D. recipients. Outreach to economics, sociology, and political science has been less successful thus far.

- The positive impacts of our work present both challenges (lack of personnel to keep up with the growing demands) and opportunities (in some cases new funding sources).
• For more detailed information on our achievements and impact, please see the sections on publications, educational programs, staffing, and joint proposals.

3. Website

• http://cred.columbia.edu/
• Our website has undergone a complete overhaul in 2011/2012, moving to a Wordpress platform. The transition to a more user-friendly platform and additional staff allow for frequent updates of CRED-related events and news.

4. Unit Publications

• Publications have grown from 2 during the first year [2004] to over 120 publications as of fall 2012. Figure 2 illustrates the steady increase of CRED publications since the emergence of the center.
• A list of CRED publications, sorted by date, can be found here.
• A list of CRED reports, sorted by date, can be found here.
• CRED “flagship” papers:


![Figure 2 Overall CRED Publications](image-url)
One especially notable publication is our *The Psychology of Climate Change Communication: A guide for scientists, journalists, educators, political aides, and the interested public*. It is accessible here. We have distributed roughly 10,000 print copies and estimate a total of approximately 16,000 PDF downloads. Figure 3 represents the locations of requests for our guide to climate communication, and illustrates the widespread dissemination which it has achieved. Please note that this map only represents locations of requests for paper copies of the guide. It does not include the locations of digital downloads which are even more dispersed.

*Figure 3* Locations of Requests for CRED Guide to Climate Communication
IV. Finances and Development

1. Revenue Trends over the Last Five Years

CRED revenues from awards held at the Earth Institute and those held at other departments increased from approximately $.9M in FY 2008 to a projected $2M in FY 2013. Projected revenues from FY14-FY15 reflect the end of the CRED main NSF award. Projected revenues for FY16 include an anticipated, but not guaranteed, renewal of funding from NSF for a third five-year award and continuing Administrative support. On average almost 80% of CRED’s total sources over the past five years have come from Government funding from one agency, NSF (Figure 4).

![Figure 4](image.png)

*Figure 4 Total CRED Sources Government vs. Non-Government FY08-FY16

*Data based on department Consolidated Operating budget summary and include revenue estimates from awards held by other departments

2. Breakdown of Types of Sources

In 2004, CRED was awarded a 5 year grant totaling $5.9 M under the NSF Program, Decision Making Under Climate Uncertainty (CRED1) with a $.5M supplementary tranche of funding received in 2008. From FY08-FY10 approximately 50% of the funding for the first NSF five-year award was held by CRED’s affiliated institution ISERP, but was actively managed by CRED Administrative staff. A second NSF 5 year grant totaling $6.5M was awarded in 2010 for Understanding and Improving Environmental Decisions (CRED2). Funding for this main award is now almost entirely held and managed at the Earth Institute. FY12 funding reflects the end of the first 5 year award (after no funds extensions for 3 years) and the beginning of the second 5 year award. Other funding sources from FY2008-FY2013 include several (project specific) NSF grants in the range of $200,000 to $600,000 received by CRED’s co-directors and held at their respective home departments; smaller grants from NASA and USGS, Earth Institute funding to support Administrative functions; a grant from the Norwegian Ministry of Foreign Affairs/United Nations Environment Program; Charles Evans Hughes Foundation (CEHF) and the Humboldt Foundation (Figure 5).
EI funds a large portion of CRED’s Administrative staffing needs with an Administrative support budget. This budget represented approximately 9% of CRED’s total sources in FY08 and FY09 and approximately 20% in outyears (Figure 6). EI increased the budget in FY10 for what was considered bridge funding in anticipation of CRED receiving another five year award from NSF. Beginning in FY11, the agreed upon yearly allotment for the Administrative support budget would be $250k.

The overall increase in funding in the last five years and the transition of that funding to administration by CRED support staff is one of the reasons that in FY12, CRED requested an increase of two Administrative staff positions, an Associate Director and a Program Coordinator. The Administrative budget needs to cover 60% of the Managing Director’s salary, 80% of the Associate Director’s salary, 100% of the Assistant Director and Program Coordinator’s salary and a nominal amount for staff telecommunications. CRED’s administrative costs exceeded the budget in FY12 and are projected to again exceed the budget in FY13. The Administrative budget does not allow costs for any travel, computing, furniture or unallowables. One of the Co-Directors Departmental Incentive account is currently being used for costs associated with furniture, remodeling, and unallowables.

CRED is seeking additional funding to support the Associate Director position through a one year proposal to NSF for $25K. However, additional sources will be needed and could be in part negotiated based on ICR generated from other grants awarded to CRED.
3. Grants Awarded Over the Last Three Years

- Funder: NSF
  - “Understanding and Improving Environmental Decisions”
  - Grant term: Sep 2010 – Aug 2015
  - Amount: $6,500,000
  - PI: David Krantz, Elke Weber, Ben Orlove, Kenny Broad
  - This project explores the gap between society’s recognition of environmental problems and its frequent failure to act on available solutions. Researchers will explore, integrate, and test two major recent themes in decision making – social context and decision architecture – to improve the communication and use of scientific information.

- Funder: NSF
  - “Decisions from Experience and the Role of Feedback in Environmental Decisions”
  - Grant term: Sept 2012-August 2014
  - Amount: $449,986
  - PI: Elke Weber
  - This is for a program of research that extends the field validity of the Description-Experience Gap effect seen in the lab, in order to better understand the ways that people use their personal experience—either in concert with, or to the exclusion of, statistical or descriptive information—when making decisions about an uncertain environment.

- Funder: NSF CCEP II
  - “Polar Learning and Responding : POLAR Climate Partnership”
  - Grant term: September 2012- August 2017
  - Amount: $5M  CRED: support through cost share
  - Senior Researcher: Ben Orlove
  - To implement the educational activities developed under CCEP I, by further developing the theoretical foundation for, and testing novel formal informal educational approaches that will help adult learners to understand the mechanisms climate change on the poles.
Funder: NSF
• “Network for Utilization of Social Science Research on Sustainability and Energy (NUSSRoSE)”
  • Grant term: January 2012-December 2014
  • Amount: $318,000
  • PI: Elke Weber
  • The major goal of this network is to help integrate research on human perception, reaction, and response to environmental risks across social science disciplines and make such insights accessible to practitioners, giving social sciences beyond economics a role in the development of policy options, programs for behavioral change, and in public communication about climate change, energy consumption, and other sustainability challenges.

Funder: NSF Host: Lamont Doherty
• “ULTRA-Ex: Exploring Linkages among Ecosystem Services, Public Health, and the Green Area Factor in New York City”
  • Grant term: Aug 2010 – Jan 2013
  • Amount: $298,000 CRED: $89,999
  • Co-PI: David Krantz Senior Researcher: Ben Orlove
  • The goal of this project is to conduct interdisciplinary research on the dynamic interactions between people, natural ecosystems, and green technologies in the dense urban environment of New York City.

Funder: NSF Host: RAND Corporation
• Sub-award: “Testing the Scenario Hypothesis: The Effect of Alternative Characterizations of Uncertainty on Decision Structuring”
  • Grant term: May 2011 – Apr 2013
  • Amount: $113,000
  • Co-PI: David Krantz
  • This research investigates the use of scenarios in decision making by comparing decisions using decision-support tools that provide forecasts either by presenting best-estimate probabilities or by presenting alternative scenarios.

Funder: NSF
• “Development of Dynamic Risky Decision Making: Behavioral Phenomena and Neural Underpinnings”
  • Grant term: October 2009-September 2013
  • Amount: $250,000
  • PI: Elke Weber
  • The goal of this project is to better understand the specific roles of cognitive control and affective versus deliberative information processing as well as the effects of their relative balance on levels of risk-taking, impulsivity, and quality of decisions in children, adolescents, and adults.

Funder: USGS
• “Project to create a Virtual Simulation System for Research and Education on Debris-Flow Preparation and Evacuation Behaviors”
  • Grant term: September 2012-August 2013
  • Amount: $50,000
  • PI: Ben Orlove
  • The proposed project will develop the content and theoretical structure of a virtual simulation experiment (a “serious game”) that answers both theoretical and practical questions about how people make debris-flow evacuation decisions.
- **Funder: NSF**
  - “Center for the Study of Individual and Group Decision Making Under Climate Uncertainty”
  - Grant term: Sep 2004 – Aug 2012
  - Amount: $6,475,000
  - PI: David Krantz
  - This research aims to investigate decision processes that underlie adaptation to climate variability and change. Main questions include how individuals and groups detect change, frame corrective action alternatives, use scientific information including climate forecasts, and formulate and choose among mitigation and adaptation plans under uncertainty.

- **Funder: NSF**
  - “Temporal Discounting of Social Goals“
  - Grant term: Sep 2008 – Aug 2012
  - Amount: $644,000
  - PI: David Krantz
  - Researchers aim to advance the theory of decision making in social contexts and to develop methods for assessing temporal discounting factors, which will lead to better analysis of public policy costs and benefits.

- **Funder: NSF**
  - “Environmental Decision Making by Individuals and Groups”
  - Amount: $541,000
  - PI: Elke Weber
  - This research aims to examine the relative advantages and disadvantages of having environmental decisions made by a group or an individual, and the nature of participatory processes in environmental decisions.

- **Funder: NSF In collaboration with University of Miami**
  - “Collaborative Research: Understanding Dynamic Responses to Hurricane Warnings – Implications for Communication and Research”
  - Grant term: Jan 2009 – Dec 2012
  - Amount: $428,000 CRED: $28,157
  - Co-PI: Ben Orlove
  - Researchers will investigate how people utilize and interpret a range of forecast products and how this affects their decisions to take protective action. This will be explored using a web-based computer simulation that allows residents to "live through" a hypothetical storm event.

- **Funder: Earth Institute- CU**
  - “Testing the capital constraint: Designing policies to promote small farmer organic fertilizer use in sub-Saharan Africa”
  - Grant term: June 2011-May 2012
  - Amount: $30,000
  - PI: Elke Weber
  - The study has two phases - the first uses adaptive survey tools developed by professors in Columbia Business School but on offline tablet computers to assess the risk and time preferences of Malawian small farmers in the field and combines these measures with existing and new household survey data on fertilizer use and attitudes about climate change.
The second phase is going into the field to test the effects on adoption and participation of the poor of different allocation mechanisms for nitrogen-fixing trees.

- **Funder: NSF**
  - “Individual and Group Decision Making under Climate Uncertainty”
  - Grant term: October 2008-September August 2012
  - Amount: $500,000
  - PI: Elke Weber
  - Supplementary funding to carry out laboratory and field research, test theories and studies that focus on specific sectors related to uncertain climate change, enhance cross-fertilization of ideas and methods through workshops and expand tools and outreach components linked to specific projects.

- **Funder: Earth Clinic**
  - “A web-based decision support system for malaria policy makers”
  - Grant Term: Summer 2011-2012?
  - Amount: $23,550
  - PI/Co-PIs: Derek Willis (PI), Sabine Marx, Madeleine Thomson
  - Project description not available

- **Funder: UNEP/Norwegian Ministry of Foreign Affairs**
  - “Haiti Regeneration Initiative”
  - Grant term: January 2011-June 2012
  - Amount: $ 5,000,000 CRED: $28,000
  - Co PI: Sabine Marx
  - The Haiti Regeneration Initiative (HRI)/Cote Sud Initiative (CSI) is a joint project of the Earth Institute, the UN Environment Programme, and various government agencies, NGOs and other partners in Haiti. This project includes research, analysis and advising work and focuses on the relevant and critical need for enhanced science-based, regional and national scale database and monitoring systems. The Earth Institute harnesses the power of its research and data to inform and create planning, policy and programming decision support tools within the Haitian knowledge networks, university research communities and Government agencies. CRED provides insights on environmental risk perception, awareness and behavior and is contributing to the development of early warning systems, as well as a wider communication strategy for the program.

- **Funder : NSF**
  - “Polar Learning and Responding : POLAR Climate Partnership”
  - Grant term: September 2010- August 2012
  - Amount: $999,281 CRED: support approximately $32,000
  - PI: Krantz
  - To establish a partnership that will make a thorough search of existing polar climate science, learning and decision resources and then develop the theoretical foundation for, and test the initial designs of, novel formal informal educational approaches that will help adult learners to understand the mechanisms and impacts of, as well as possible solutions to, climate change and learn how to respond with sustainable solutions.

- **Funder: NSF Host: University of Miami**
  - Sub-award: “Interactions between Changing Climate and Technological Innovations in Agricultural Decision Making: Implications for Land Use and Sustainability for Production Systems”
  - Grant term: Sep 2007 – Aug 2010
• Amount: $175,000
• Co-PI: Elke Weber
• This project explores interactions among uncertain inter-decadal climate projections, decision making, adaptation, learning, and technological innovations such as genetically improved drought-tolerant crops.

Funder: Charles Evans Hughes Memorial Foundation
• “Center for Research on Environmental Decisions (CRED) Communication Guide development”
• Grant term: June 2008-May 2009
• Amount: $25,000
• PI: Elke Weber
• Development of CRED Communications Guide for outreach

Funder: NSF Subaward: Univ of Miami
• “Understanding and Modeling the Scope for Adaptive Management in Agro ecosystems in the Pampas in Response to Interannual and Decadal Climate Variability and Other Risk Factors”
• Grant term: June 2004- May 2008
• Amount: $1,630,296 CRED: $159,259
• PI: Elke Weber
• The overriding goal of this project is to improve understanding of dynamic linkages between agricultural ecosystems, technical innovation, decision making, and land use/tenure changes over periods of a few decades, a scale relevant to resource management and investment planning. We focus on interactions between uncertain inter-decadal climate projections, awaited technical innovations, decision making, adaptation and learning. CRED’s role is to develop models of agricultural decision making that incorporate recent insights and psychologically plausible mechanisms; create a suite of models (analytical, agent-based) incorporating the effects of climate change and technical innovation, realistic decision making and adaptation processes, and social interactions between farmers, technical advisors and institutions.

4. A Description of the Methods of Fundraising
CRED utilizes a mix of fundraising strategies, yet the majority consists of submissions to open competitions (NSF solicitations). Besides our own initiatives, we join proposal efforts by other EI units or external partners. While partnering in joint proposals can mean a smaller effort in proposal preparation, it often goes hand in hand with relatively modest funding levels. CRED has joined existing and new teams looking for social science expertise. Yet, due to limited human resources CRED will have to become more selective when agreeing to collaborations, and focus on leading major proposals, such as the upcoming renewal of the DMUU program (proposals due 2014). Interaction with sponsors (e.g. Program Managers at NSF) has occasionally led to “unsolicited” informal proposals, generating supplementary funds in the amount of $500,000 in 2008. Another request of $150,000 is currently awaiting NSF decision. Although we have received funding from foundations, thus far CRED has not engaged in fundraising from foundations or private donors in a systematic way. A major goal for the near future is to diversify our funding sources. We hope to strengthen the relationship with EI’s Development Office to identify new fundraising avenues and ultimately secure additional resources.
V. Staffing

1. Unit Staff

For organizational charts see figures 2 and 3.

- Director and staff:
  - Professor David H. Krantz, Director
  - Professor Kenneth Broad, Co-Director
  - Professor Ben Orlove, Co-Director
  - Professor Elke U. Weber, Co-Director
  - Sabine Marx, Managing Director
  - Lori Scally, Assistant Director
  - Courtney St. John, Associate Director for Outreach
  - Maria Risë Fullon, Program Manager
  - Matthew Sisco, Program Coordinator
  - Barbara Platzer, Senior Program Affiliate

- The following is a list of all the principal investigators in addition to the CRED directors who work on CRED research. Each of these scientists, although not primarily based at CRED-Columbia, makes significant contributions to CRED research.
  - Walter Baethgen, Research Scientist, Director of the Program for Latin America and the Caribbean, IRI, Columbia University
  - Roberta Balstad, Special Research Scientist, Earth Institute, Columbia University; Editor-in-Chief, Weather, Climate, and Society, American Meteorological Society
  - Mark Cane, Vetlesen Professor of Earth and Climate Sciences, Professor of Applied Physics and Applied Mathematics, Columbia University
  - Mary-Elena Carr, Earth Institute, Columbia University
  - Steven Cohen, Executive Director, Earth Institute, Columbia University; Director, Master of Public Administration Program in Environmental Science and Policy at School of International and Public Affairs (SIPA), Columbia University; Director, Masters of Science in Sustainability Management, School of Continuing Education, Columbia University
  - William Easterling, Dean, College of Earth and Mineral Sciences; Associate, Earth and Environmental Systems Institute (EESI), Pennsylvania State University
  - Lisa Goddard, Director, IRI; Adjunct Associate Professor, Columbia University
  - Michel Handgraaf, Associate Professor, Economics of Consumers and Households, Wageningen University
  - Geoffrey Heal, Paul Garrett Professor of Public Policy and Corporate Responsibility, Columbia Business School and SIPA
  - Tory Higgins, Stanley Schachter Professor of Psychology, Columbia University; Professor of Management, Columbia Business School
  - Eric Johnson, Norman Eig Professor of Business, Columbia Business School; Director, Center for Electronic Business (CEBlZ); Co-Director of Center for the Decision Sciences (CDS), Columbia University
  - Howard Kunreuther, James G. Dinan Professor, Professor of Decision Sciences and Business and Public Policy; Co-Director, Risk Management and Decision Processes Center, Wharton School, University of Pennsylvania
  - Upmanu Lall, Alan & Carol Silberstein Professor of Engineering, Columbia University; Director, Columbia Water Center; Senior Research Scientist, IRI, Columbia University
Richard Larrick, Faculty Director for the Center for Energy, Development, and the Global Environment (EDGE), The Fuqua School of Business, Duke University

John Levine, Professor of Psychology; Senior Scientist, Learning Research and Development Center, University of Pittsburgh

Robert Meyer, Gayfryd Steinberg Professor, Professor of Marketing; Co-Director, Risk Management and Decision Processes Center, Wharton School, University of Pennsylvania

Daniel Osgood, Research Scientist, Lead Scientist Financial Instruments Sector Team, IRI, Columbia University

Nicole Peterson, Assistant Professor of Anthropology, The University of North Carolina at Charlotte

Alex Pfaff, Associate Professor of Public Policy, Economics and Environment, Sanford School of Public Policy, Duke University

Guillermo Podestá, Research Professor, Rosenstiel School of Marine and Atmospheric Science, University of Miami

Carla Roncoli, Director, Graduate Studies, Masters in Development Practice; Adjunct Faculty, Department of Anthropology, Emory University

Renzo Taddei, Assistant Professor of Anthropology and Communication, Federal University of Rio de Janeiro

María Alejandra Vélez, Assistant Professor, Facultad de Administración, Universidad de los Andes

Affiliated researchers:

Poonam Arora, Assistant Professor of Management, Manhattan College

Shahzeen Attari, Adjunct Research Scientist, Earth Institute, Assistant Professor, School of Public and Environmental Affairs, Indiana University, Bloomington

Miguel Fonseca, Senior Lecturer in Economics, University of Exeter

Min Gong, Behavioral Economist, Altisource™

David Hardisty, Acting Assistant Professor, Stanford Graduate School of Business

Anthony Leiserowitz, Research Scientist, Director of Strategic Initiatives, and Director of the Yale Project on Climate Change, School of Forestry and Environmental Studies, Yale University

Yuelin Li, Assistant Attending Behavioral Scientist, Memorial Sloan-Kettering Cancer Center

Debika Shome, Deputy Director, Harmony Institute

Brian Dowd-Uribe, Assistant Professor, University of Peace, Costa Rica

Visiting scholars:

Diana Reckien, Visiting Research Scholar, CRED

Seth Baum, Visiting Postdoctoral Research Scientist, CRED/Pennsylvania State University

Post-doctoral researchers:

Adrian Camilleri, Postdoctoral Research Scientist, CRED/Duke Fuqua School of Business

Tien Ming Lee, Postdoctoral Research Scientist, Earth Institute Fellow

Nada Petrovic, Postdoctoral Research Scientist, Earth Institute Fellow

Christoph Ungemach, Postdoctoral Research Scientist, CRED

Derek Willis, Postdoctoral Research Scientist, Earth Institute Fellow

Graduate students:

James Cornwell, Department of Psychology, Columbia University

Raymond Crookes, Department of Psychology, Columbia University

Juliana Smith, Department of Psychology, Columbia University

Katherine Thompson, Department of Psychology, Columbia University

Lisa Zaval, Department of Psychology, Columbia University
2. Number of Years Employees Tend to Remain Employed at the Unit

CRED’s administrative staffs have remained in their positions from 1 to 5 years. In the past 8 years, 5 administrative staff members have left. Of the 5 staff who terminated their employment, 1 did so to attend a Ph.D. program, one left due to her spouse’s relocation, and one left to work with one of our partner organizations and still serves as a liaison. Two staff members left due to the position not offering opportunities for growth.

Postdoctoral researchers spend an average time of 2 years at CRED, yet the duration can vary from as little as 1 year to as much as 4 years. Almost all postdocs stay involved with CRED research after they leave Columbia. In many cases we formalize the relationship through adjunct research scientist appointments, in other cases they are more loosely defined collaborations.

CRED employs one research scientist, who has been with the center for 8 years and at Columbia for 10 years.

Three of CRED’s directors have been serving in their roles for 8 years. Roberta Balstad, one of the founding Directors, resigned from her co-director position after 6 years. Ben Orlove joined the directorship in 2010.

3. Plans for Professional Development

Postdocs:

CRED has a formal Postdoctoral mentoring plan. Post-doctoral researchers bring different disciplinary training and background experience, as well as high energy and creativity to CRED research. They are selected for their strong natural and social science background, and interest in interdisciplinary research. Overseeing their further education is a major responsibility.

Our training and mentorship plan strives to provide post-doctoral scholars with a strong skill set in social and decision science research methods; interactions and collaborations with climate and environmental scientists; training in interdisciplinary social science research; and career development. Post-docs work on at least 1 main project, and contribute to 1-2 other projects. Responsibilities include planning of laboratory and field work, coordination between lab and field projects, a major role in data analysis, assisting PIs in oversight of other project personnel, and taking a lead role in preparing research articles and other reports of research results. All post-docs are expected to engage in integration of research results between projects as well as outreach activities.

To enhance the (interdisciplinary) training, post-docs are usually mentored by two CRED PIs. One primary supervisor, whose research foci are similar to that of the post-doc’s Ph.D. discipline, provides guidance in project development and career trajectory. The secondary mentor tends to be from a different disciplinary background. Ideally, if the post-doc’s past training is primarily in field research, the second mentor will be laboratory-focused, and vice versa. Given the cast of researchers and projects in the center, it is very likely that the post-doc will work on interdisciplinary projects which already draw upon multiple methods and disciplines.

Post-docs present their work and participate in weekly CRED seminars. Presenting their research to a broad audience and commenting on studies by other researchers, including graduate students, PIs, and invited speakers, exposes the postdocs to a wide range of natural and social science research topics and methods, allowing them to learn how to operate and collaborate in an interdisciplinary setting.
We encourage and facilitate exchanges of post-docs at Columbia University with CRED’s partner universities as well as with other DMUU collaborative groups. This increases the potential for research collaborations and networks that can be useful in the job search process. During their time at CRED, post-docs have ample opportunity to learn how to supervise research assistants (possibly supervising senior thesis research together with the PI) and to work closely with grad students, building their research managerial skills. We hope to establish monthly postdoc meetings to discuss ongoing research, possible collaborations, and submissions of joint panels at conferences, outreach opportunities, and professionalization issues. Due to medical and sabbatical leaves of two co-directors in 2010/2011 and 2012/13, these meetings haven’t taken place with regularity. Ideally one of the center’s co-directors (Krantz, Weber, Orlove, or Broad) and the managing director Marx join the post-docs for all or part of each meeting to guide the group in selecting activities that fit with center goals and larger career goals.

On an individual basis, post-doctoral scholars undergo a yearly review by their 2 mentors, and other center PIs as appropriate, including an evaluation of research progress and publications; advice on how to improve performance; and guidance on career planning.

**Research positions:**
For positions in the research track, CRED follows the guidelines for promotion from Postdoc to ARS, ARS to RS, and RS to Senior RS, as laid out by the Earth Institute in January 2011.

**Administrative positions:**
Columbia does not have a clear and defined career development track for Administrative staff. As a result of CRED recently contracting an organizational consultant, there is a plan for CRED Administrative staff to meet individually with the Managing Director throughout the year and staff are encouraged to attend training and classes offered by Columbia for professional development. CRED staff receives yearly reviews by their supervisors.

### 4. Diversity
CRED does not have a formal diversity plan, however there are several instances of initiatives which CRED has taken to encourage increased diversity both in the CRED group, as well as in our outreach audiences. For example, from 2006 through 2009, CRED members partnered with Vanguard High School to engage underrepresented students in educational activities related to climate change. The race distribution of these students was 55% Hispanic, 33% Black, 8% White, 2% American Indian, and 2% Asian.

CRED has similarly partnered with the High School for Environmental Studies (HSES). HSES is an ethnically and economically diverse public high school in NY's Hell's Kitchen neighborhood. The school has 80% students of color. CRED programs have included a monthly speaker series in the science research class and participation in the school's annual Career Day Speakers Series.

Additionally, CRED has collaborated with Columbia's Double Discovery Center (DDC), which serves over 1,000 low-income and first generation college-bound New York City youth each year in grades 7 through 12. Their programs help students learn about colleges and careers, improve their academic work, and participate in personal development activities. CRED has presented a special Lecture on global warming impacts and solutions, and has hosted a summer intern. We hope to revive our interactions with DDC now that we have additional capacity to conduct outreach.

Our intention to be inclusive of all races is also evident in the race distribution of our research assistants. In Figure 7, below, you can see the diversity of races in our research assistants.
5. Statistics about the Gender and Race of CRED's Employees

Illustrated in Figures 7 and 8 are the overall distributions of race and gender across the entire CRED group. This includes CRED directors, staff, principal investigators, postdocs, visiting scholars, affiliated researchers, and graduate students.
6. Extent to which Current Staffing is Adequate

- Partially due to retirement, partially due to over-commitment and competing obligations, there is not enough capacity at CRED’s senior leadership level. The threat of lack of senior leadership is serious and real, and could ultimately result in CRED’s demise. This issue is particularly acute because of CRED’s interdisciplinary nature – we require the presence of both psychology and representation of complementary social sciences (anthropology, behavioral economics, etc.)

- The applicability of CRED’s work to broader environmental and societal problems and the interest among its researchers in sustainable development put us into a position to respond to the increasing desire for translational science and practical applications. We are eager to disseminate the many valuable insights from our research to high impact groups. Unfortunately, there is a large and growing misalignment between the number of translational and outreach opportunities the center is asked to provide and the number of staff and other personnel who can execute such requests, so that we need to turn down a large number of opportunities that could otherwise bring CRED’s research to bear on the way organizations, businesses, governments, and the public approach environmental decisions to a much greater extent. Similarly, we have to turn down requests for research collaborations with scientists at other EI units and elsewhere at Columbia University, as well as the larger academic world.

- To illustrate the growing demand for CRED services, the number of outreach events we have managed to fill (from a much larger volume of requests received) has gone from 13 in Year 1 (2004/2005) to over 200 each in the past two years. However, faculty has been constant over this time, creating an unsustainable gap between available resources and demands on them. Administrative staff has only in the past few months increased (by two), only slowly allowing us reduce a huge backlog and relieving the tremendous workload of exiting staff members.
• Without a solid basis for core operational support, in form of an endowment for instance, we cannot maintain, let alone expand the staff that can carry out, facilitate, and support the research collaborations and outreach activities.

• On the teaching front, CRED is regularly asked to staff a growing number of courses related to Environmental Decision Making within Columbia University, with demand for more. The need for teaching personnel far outstrips current faculty availability to staff such courses, with adjuncts for such courses being at best a stopgap measure. In the meantime, we resort to giving guest lectures in existing classes to provide students in the sustainability programs at least some degree of social science perspective and direct them to resources where they can find more information on their own.

• Overall, it is evident that CRED needs additional support in form of full-time faculty, full-time research staff, and if the current trend continues, additional personnel for outreach and research administration.

7. Plans to Increase or Decrease the Number of Staff
• Between 2005 and 2012, the number of PIs (senior personnel on our NSF grant) conducting research that needs to be coordinated and supported by CRED has grown from 17 to 30. The number of graduate students and postdocs (counting only those located at Columbia) who need supervision has risen from 2 to 8 and 0 to 6, both at their peak in mid-2012. Correspondingly, the number of research assistants who need guidance and supervision (counting again only those located at Columbia) have grown from 3 to 26 (with a short-term peak of 37 in 2011).
• Recruitment for the following additional positions/identifying and securing funding for personnel:
  o Two additional hires of full-time faculty (one senior who is expected to take on a major leadership role and one junior) with relevant social science expertise and willingness to participate in CRED governance and research activities.
  o A program coordinator position was added in May 2012. An Associate Director for Outreach position was approved and has been filled as of September 2012. However, funding remains to be secured for the outyears.
  o Most of our current postdocs will remain in their positions for another year; some are seeking funding for a third year. We are starting recruitment of new postdocs for Fall 2013.

8. Extent to which CRED is able to Recruit and Retain the Best Candidates
• Recruitment decisions depend to a large extent on the availability and security of funding. Our current grant support does not allow us to grow. While new collaborations can generate new funding, it goes usually to specific research activities and cannot be used to build a stronger core of full-time researchers or faculty and full-time administrators.
• CRED has lost very capable postdocs who would have preferred to pursue assistant professor or research positions at Columbia, due to the lack of interest in practice oriented and interdisciplinary research on the side of the hiring departments and their traditional academic structures.
• The hiring of junior faculty with interdisciplinary backgrounds often requires that two or more schools agree on a joint appointment, which either turns out to be impossible or prolongs the process to an extent where the candidate will take another offer.
• Recruitment of administrative staff is often hindered by HR regulations for job descriptions, especially in cases where the responsibilities include a mix of research and administrative tasks. The back and forth with HR on the appropriate job designation and grade is time consuming and delays the posting of openings, in some cases by months. University regulations (e.g., admin staff is not allowed to perform research tasks, and researchers are not
supposed to dedicate much time to administrative and managerial duties) are not aligned with the reality of the work required at an Institute like the EI and its centers. Job descriptions can appear quite unappealing to highly qualified candidates.

- Retaining of administrative staff has been impaired by the frustrations arising from ever growing bureaucracy on behalf of the university and government funding agencies. Additional job dissatisfaction results from the dysfunction of the overall administrative system.

- Rather limited career advancement opportunities for professionals without a Ph.D. and the lack of official promotion guidelines for officers of administration can make the job unrewarding, and has lead people to seek employment outside of academia or leave their positions to go back to school.

VI. Educational Programs

1. Courses Offered by Faculty and Graduate Students

- Courses taught by Elke Weber (Co-director):
  - Spring 2012 Psychology W4285 section 001, “MULTIDISC APPROACH-HUM DECIS MKG,” call number 93629

- Courses taught by David Krantz (Director):
  - Spring 2013 Psychology G6006 section 001, “INTRO-STAT MODELING IN PSYCHOLOGY”

- Courses taught by Ben Orlove (Co-director):
  - Summer 2012 Earth and Environmental Sciences W4406 section 001, “SUMMER INTERNSHIP: CLIM & SOCIETY,” call number 51897
  - Summer 2012 Earth and Environmental Sciences W4405 section 001, “SUMMER SEM: CLIMATE & SOCIETY,” call number 51146
  - Fall 2012 Anthropology G9105 section 029, “RESEARCH IN SPECIAL FIELDS,” call number 23863
  - Fall 2012 Earth and Environmental Sciences W4403 section 001, “MANAGING & ADAPTING CLIMATE II,” call number 10979
  - Fall 2012 International Affairs U6259 section 001, “ADAPTATION TO CLIMATE CHANGE,” call number 10279

- Courses taught by Eric Johnson (Principal Investigator):

- Courses taught by Katherine Thompson (CRED Graduate Student):
  - Spring 2012 Psychology S3285 section 001, “Psych of Disaster Preparedness,” call number 61247

2. Course Syllabi and Curricula

Please see appendix 2 (separate document) to this report for syllabi and curricula of abovementioned courses.

3. Enrollment and Degrees Awarded

CRED does not award any degrees. Enrollment in the abovementioned classes is consistently high. We are regularly requested to offer more CRED-related courses by programs such as the major in sustainable development, the newly
created MA in carbon management, the MPA in development practice, and the certificate program offered by CERC. Currently, our ability to meet these requests is not limited in terms of capability or expertise, but is restrained by the time availability of CRED personnel.

4. Education-related Events

CRED has facilitated or participated in nearly one hundred education-related activities from the period of May 2007-May 2012. CRED education can be broken down into the following categories:

**General Education:** 46 events
General Education includes education that reaches two or more of the below categories and/or the general public. Examples of CRED General Education include a presentation at the Women in Science Conference which conducts outreach to NYC high school girls from mostly minority schools and participation in the Lamont Doherty Open House every October.

**Graduate Education:** 21 events
Graduate education includes Master’s and PhD students. Examples of CRED Graduate education include guest lectures to the Climate & Society MA program and Earth Institute Fellows Program. In 2009 CRED director Elke Weber conducted an Applied Economics Seminar to the City University of New York Graduate Center.

**Undergraduate Education:** 11 events
Examples of CRED Undergraduate education include participation in the NYC Minority College Undergraduate Internship program; providing guest lectures across Columbia, Barnard, Yale and other universities; and integration of CRED research topics into a Penn State undergraduate sustainability course.

**High School Education:** 18 events
Examples of CRED High School education include visits to the High School for Environmental Studies to play a CRED game simulating the tragedy of the commons; participation in the ISERP Local High School Summer Intern Program; and a special lecture to the Double Discovery Center that serves over 1,000 low-income and first generation college-bound NYC youth.

One major education and outreach achievement is our so-called communication guide: The Psychology of Climate Change Communication: A Guide for Scientists, Journalists, Educators, Political Aides, and the Interested Public, published in 2009, co-edited by Debika Shome and Sabine Marx, (see www.cred.columbia.edu/guide.) This guide has disseminated CRED research both in print and web-based form to a wide range of audiences. We have distributed roughly 10,000 print copies; we are counting 8,000 PDF downloads (these are only those readers who provide background information on themselves; an equal number of people download the document without sharing who they are, leading to an estimated total of 16,000 downloads)

5. Student and Career Services

CRED doesn’t offer formalized student and career services, however teaching and supervision of undergraduate and graduate research assistants go naturally hand in hand with mentoring and career advice. All members of CRED are open to discussing career plans with students and help expand their networks. CRED’s research assistantships provide an opportunity for students to learn and participate in various stages of the social science research process. We hold
orientation sessions for RAs covering both detailed instructions of how to run a study and the bigger picture and implications of the center’s research.

Another significant component of CRED’s educational outreach can be seen in the widely interdisciplinary group of research assistants which we recruit (Figure 9). While the majority of CRED projects are based in psychology or anthropology, only 40% of our research assistants are psychology or anthropology majors. Hence, the majority of our research assistants gain invaluable experience in social scientific research through their work at CRED. We see this firstly as being significantly beneficial for the professional development of our research assistants. We also view this as an important outreach effort as we hope that we are giving these research assistants important tools and insights to encourage future interdisciplinary research throughout their careers.

![Figure 9 Disciplinary Mix of CRED Research Assistants (n=26)](image-url)
VII. Transdisciplinary and Integrative Efforts

1. Past, Current, and Future Collaborative Project Descriptions

CRED is an interdisciplinary center that responded to a need for social-science/climate science collaboration in solving the problem of climate forecast use for real-world decision making. By definition, CRED transcends the traditional disciplinary divides and the boundaries between research and practice/outreach (see figure 1).

CRED engages in many formal and informal collaborations and advisory roles within EI and CU and beyond. We thereby leverage and extend CRED social science knowledge.

While integrative activities are exciting and rewarding, such developments are associated with increasing demands on coordination, administration, and management. Administrative demands are especially burdensome for collaborative, multi-departmental and multi-site proposals, and requirements for proposal preparation, reporting and documentation are growing on part of both CU and funding agencies.

We would like to highlight one particular integrative effort: the Climate Decision Forum, a joint effort between CRED and CCC, meant to foster a community of interdisciplinary thinking and collaboration. Rotating topics, we touch on many facets of climate change. Thus far, there have been six meetings. We hope to continue advancing the integration between social science research and physical science research, engineering, law, and business, as it relates to climate by reviving regular meetings in the coming months.

The following two sections provide more detail on integrative and transdisciplinary efforts with other units.

2. Joint proposals

Development and Multi-Sectoral Applications of a Demand System
Submitted with CWC, EEE, CCSR (CRED representative: Ben Orlove)
August 2012, not funded

NSF/SRN: Network for Integrative Research on Ecosystem Transitions (NIRET)
Submitted with Center for Environmental Research and Conservation and Tropical Agriculture (CRED representatives: Dave Krantz, Ben Orlove)
April 2012, not funded

Rockefeller Foundation Cultural Innovation Fund: PositiveFeedback: Art and Climate Change
Submitted with Lenfest Center for Sustainable Energy, Office of Environmental Stewardship, NYU, CUNY, (CRED representative: Sabine Marx)
March 2012, not funded

NSF CCEP II: Polar Learning and Responding: (POLAR) Climate Partnership
Submitted with the Climate Center, Lamont Doherty and Earth and Environmental Engineering, (CRED representative: Ben Orlove)
March 2012, funded ($5,000,000)
USAID Higher Education Solutions Network: Climate Information for Public Health Action
Submitted with IRI, CIESIN, Mailman, (CRED representatives: Sabine Marx, Ben Orlove)
March 2012, not funded

NSF Sustainability Research Network
Submitted with Center for Environmental Research and Conservation and Tropical Agriculture (CRED representatives: Dave Krantz, Kenneth Broad)
December 2011, not funded

WHO-TDR, Population health vulnerabilities to vector-borne diseases: Assessing and mitigating the impacts of social, environmental and climate change in Africa
Submitted with IRI, Mailman, CIESIN, (CRED representative: Sabine Marx)
November 2011, funded ($354,943)

NOAA IRAP: Integrating Climate Information and Decision Process
Submitted with IRI, CWC, CIESIN (CRED representative: Ben Orlove)
November 2011, not funded

Research Initiative for Science and Engineering (RISE), Evaluating the Impact of High-Quality Climate Data on Policy Making in the Tanzanian Health and Agriculture Sectors
Submitted with IRI, CIESIN CRED, (CRED representatives: Ben Orlove, Sabine Marx)
September 2011, not funded

Research Initiative for Science and Engineering (RISE), Accelerating Progress Towards Achieving the Millennium Development Goals for Malaria Through the Use of a Systems Science Methodology
Submitted with IRI, CIESIN, (CRED representatives: Ben Orlove, Sabine Marx)
September 2011, not funded

DFID ESRC/Economic and Social Research Council – DFID Poverty Alleviation Call: Factoring in the Climate in the measurement of the MDG’s
Submitted with IRI, (CRED representatives: Sabine Marx, Ben Orlove, Derek Willis)
September 2011, not funded

Earth Clinic: A web-based decision support system for malaria policy makers.
Submitted with IRI, (CRED representatives: Sabine Marx, Derek Willis)
May 2011, funded ($23,550)

Earth Institute Cross-Cutting Initiative: Global Learning Network: Linking Ecosystems, Livelihoods and Governance in Post-Disaster Societies
With CERC, CIESIN, IRI, AC4, CSUD, (CRED representative: Sabine Marx)
May 2011, funded ($46,674)
Earth Institute Cross-Cutting Initiative: PositiveFeedback – Art and Climate Change.
Submitted with Lenfest Center for Sustainable Energy, IRI, CIESIN, Lamont, Office of Environmental Stewardship, (CRED representative: Sabine Marx)
May 2011, not funded

Rockefeller Foundation, Cultural Innovation Fund: PositiveFeedback: Art and Climate Change
Submitted with Lenfest Center for Sustainable Energy, NYU, CUNY, (CRED representative: Sabine Marx)
April 2011, not funded

Ethics of Sustainability - NSF Ethics Education in Science and Engineering
Submitted with the Center for the Study of Science and Religion and Applied Physics and Applied Math Department (CRED representative: Dave Krantz)
March 2011, not funded

NSF CNH-RCN: Meltdown in the Himalayas, Asia’s water tower
Submitted with the CWC (CRED representative: Ben Orlove)
December 2010, not funded

Research Initiatives in Science and Engineering (RISE), Columbia University Office of the Executive Vice President for Research: Flood Index Insurance – An Innovative Approach to Climate Risk Management
Submitted with IRI, (CRED representative: Sabine Marx)
November 2010, not funded

Research Initiatives in Science and Engineering (RISE), Columbia University Office of the Executive Vice President for Research: Malaria interventions – a website for training and research
Submitted with IRI, Mailman, (CRED representative: Sabine Marx)
November 2010, not funded

NSF National Environmental Synthesis Center
Submitted with CERC, CCC, CIESIN, other non-Columbia partners, (CRED representatives: David Krantz, Sabine Marx)
July 2010, not funded

Earth Institute Cross-Cutting Initiative (CCI): Elucidating near-term climate change information to guide water resources decisions and foster sustainability in Chile
Submitted with IRI, Tree Ring Lab, (CRED representative: Sabine Marx)
May 2010, funded ($34,424)

NSF CCEP I: Polar Learning and Responding: (POLAR) Climate Partnership
Submitted with the Climate Center, Lamont Doherty and Earth and Environmental Engineering, (CRED representative: Dave Krantz)
May 2010, funded ($999,281)
Department of Energy Subaward Syracuse University
Submitted with the Engineering and Applied Science Department and EEC (CRED representative: Elke Weber)
April 2010, not funded

UNEP/Norwegian Ministry of Foreign Affairs: Haiti Regeneration Initiative/Cote Sud Initiative
Submitted with CIESIN, MVP, CSUD, UDL, Mailman, UNEP, (CRED representative: Sabine Marx)
Fall 2009, funded ( $5,000,000; $28,000 for CRED)

NSF IGERT: The Statistical Analysis for Policy and Public Opinion (SAPPO)
Submitted with Department of Statistics, Department of Political Science, School of International and Public Affairs and CWC (CRED Representative: Elke Weber)
September 2009, not funded

Deutsche Bank Climate Change Advisors: *Carbon Counter Study*
Submitted with CCC, (CRED representative: Sabine Marx)
Summer 2009, not funded

Understanding and Improving Environmental Decisions
Submitted by CRED with involvement of IRI, Lamont, CCC, CWC
July 2009, funded ($6,500,000)

ULTRA-Ex: Exploring Linkages Between Ecosystem Services, Public Health and the Green Area Factor in New York City
Submitted with Lamont, Urban Design Lab, Office of Environmental Stewardship (CRED representatives: Dave Krantz and Ben Orlove)
July 2009, funded ($298,000)

World Bank Development Market Place: Multi-hazard disaster risk management in Sri Lanka using climate monitoring and seasonal predictions
Submitted with IRI, Columbia Water Center, Partners in Sri Lanka, (CRED representative: Sabine Marx)
May 2009, not funded

Earth Clinic: *Operationalizing malaria risk predictions based on hydro-climatic, terrestrial and epidemiological information in highland Sri Lanka*
Submitted with IRI, Partners in Sri Lanka, (CRED representative: Sabine Marx)
April 2009, not funded

NOAA – Abrupt Climate Change in a Warming World: Outreach and Communication (internal proposal to CICAR)
Submitted with CCC, (CRED representative: Sabine Marx)
January 2009, funded ($100,000)
NSF STC – Science and Technology for Adaptation to Climate Change (STACC)
Submitted with CCC, CERC, Columbia Water Center, CSSR, Mailman, Earth and Environmental Engineering, and non-Columbia Partners, (CRED representatives: Dave Krantz, Sabine Marx)
November 2008, not funded

Supplement to Center for the Study of Individual and Group Decision Making Under Climate Uncertainty
Submitted by CRED with involvement of IRI, Lamont, CIESIN
November 2008, funded ($500,000)

Research Initiatives in Science and Engineering (RISE), Columbia University Office of the Executive Vice President for Research: Communication of Drought Forecasts and Adaptation to Drought
Submitted with Lamont, (CRED representatives: David Krantz, Sabine Marx)
November 2007, not funded

NSF Proposal: Assessing influence of climate, ecological, socio-ecological & vulnerability factors on malaria transmission in Sri Lanka to improve capacity for predictive epidemic warning systems
Submitted with IRI, (CRED representatives: David Krantz, Sabine Marx)
January 2007, not funded

3. Joint Public Outreach Efforts
CRED conducts outreach to four core audiences: 1) Field Research Participants, 2) Formal University Education, 3) Larger Science Community (including natural and social scientists), and 4) General Public (including business, government, and media leaders. CRED has partnered with different organizations to meet outreach goals, including Earth Institute-affiliated centers and the larger Columbia University academic community. CRED derives a tremendous benefit from these EI collaborations, and currently works closely with the International Research Institute for Climate and Society, the Lenfest Center, the Columbia Climate Center, among other EI units. A full list of Joint Public Outreach between CRED and other Earth Institute components for May 2007 – May 2012 appears in Appendix 1.

VIII. Intellectual Opportunities

1. Overall Disciplinary Balance
Three of the four CRED directors are faculty members at Columbia. These are Dave Krantz (Psychology), Elke Weber (Psychology), and Ben Orlove (Anthropology). The fourth director, Kenneth Broad (Anthropology), is a faculty member at the University of Miami. The interdisciplinary composition of CRED research in part reflects the disciplinary mix of these four senior researchers. Hence, CRED research is largely founded in the disciplines of psychology and anthropology and extends to other disciplines including agronomy, climate science, ecology, economics, engineering, environmental science, geography, history, management, meteorology, oceanography, and political science. The research areas of CRED postdocs and graduate students are also an important part of CRED’s disciplinary mix. At present, CRED has five graduate students all based in psychology. CRED’s seven postdoctoral researchers and visiting scholars have backgrounds in biology, geography, physics, public policy, and psychology.
Below are two visual representations of CRED’s disciplinary balance. Figure 10 demonstrates the disciplinary mix of the CRED core group (including directors, postdocs, visiting scholars, and graduate students at Columbia University). Figure 11 represents the disciplinary mix of this core group as well as CRED’s external principal investigators and affiliated researchers.

**Figure 10** Number of Researchers with Expertise in Different Disciplines (in internal CRED group)

**Figure 11** Number of Researchers with Expertise in Different Disciplines (including external CRED researchers)
2. Rationale for Recent and Planned Appointments and Hires
Please see pages 39-40 (“Priority 2”) for descriptions of rationale for recent and planned appointments and hires.

3. Mentorship Programs
Please see pages 23-24 and pages 29-30 for descriptions of CRED mentorship programs.

IX. Space/Infrastructure

1. Designated Office, Lab, and Classroom Spaces

- CRED is located in Columbia University’s Schermerhorn Hall, room 419, office space in the Department of Psychology, provided to Dave Krantz and Elke Weber.

- The continued availability of office space is uncertain. Current operations are becoming unsustainable, with the shortage of space affecting productivity and paralyzing our operational processes. Constant renovations of current space are not cost effective and have resulted in staff making due with cramped quarters with poor lighting. We do not know where to place the additional junior and senior staff we plan to hire, and simply need space.

- Due to uncertainties with regard to the permanence of our space allocation in Schermerhorn Hall, we could be facing a need for a whole new office suite in the mid- to longer term. In an ideal world, all of CRED would be located in one place, with a total of 20 desks to house the following:
  - 4 officers of admin
  - 1 managing director
  - 1-2 co-directors/faculty
  - 6 grad students
  - 6 postdocs
  - 5 work stations to be shared among hourly RAs
  - 2-3 visitor stations
  - conference room
  - lab space to run studies

We are very well aware that there is no such space immediately available, but we would like the idea to be on the radar.

X. The Future

1. Strategic Plan

- A link to CRED’s strategic plan can be found here.
2. Evidence of Long-term Planning and Discussion

- The top three strategic priorities of CRED for the next 1-5 years are the following:

  **Priority 1, Generating and Sharing of Knowledge:**

  We will build on our earlier work by studying decision-making in face of environmental risk, including identifying, selecting and implementing courses of action to address climate change. The first phase of CRED (2004-2010) established that principles of individual decision making extend to decision making by groups or by individuals in a group context. We now understand some of the major effects of group context: inclusion of social goals, changes in the order in which different goals are considered and in the weights given to different goals, shaping of time horizons, and dependence of all this on identification of individuals with particular groups. Our field projects in Uganda, Ethiopia, Burkina Faso and Brazil have also yielded many new insights concerning participatory processes in decision making. Much progress has been made on the effective translation of climate change information into warnings and alerts, taking into consideration people’s reactions to uncertainty and to time delays in costs and benefits. New findings about individual decision making have also emerged, especially the importance of context in determining goals and the importance and malleability of the order in which consequences of decisions are considered. The concept of decision architecture has emerged from our analyses and is a cornerstone of the current (second) phase of CRED. Much remains to be done: we want to elucidate how decision architecture interacts with social context when it comes to environmentally-relevant decisions related to consumption, adaptation and sustainable development. We hope to determine whether and how communication about scientific facts and concepts can be enhanced through participatory processes, and how the temporal and social scales on which decisions are weighed interact both with scientific uncertainty and with uncertain knowledge of others’ choices (interpersonal uncertainty). Translation of what we know about human perception, information processing, goal setting, and motivation into the context of environmental decisions requires field testing of CRED’s and other social science insights in domain-specific field settings in diverse countries and cultures. Besides generating results from both fundamental and applied research, a main objective of the center is to share our findings widely with relevant parties.

- Plans for the 1-year timeframe (2012/2013):

  - We have 5 postdocs (including EI fellows), who are conducting a large portion of the research as laid on in the center’s NSF grant under the DMUU program. Besides securing funding to retain these postdocs for a second or third year, we will be reviewing our postdoc mentorship plan to assure efficiency and intellectual merit. We are in the process of recruiting new Ph.D. students for the fall of 2013. Traditionally we have psychology students, yet we hope to expand the pool of Ph.D. students toward the Ph.D. program in Sustainable Development, E3B, Anthropology, and the Business School.

  - We will continue to leverage and extend CRED social science knowledge by connecting to other EI centers, including joint grant proposals. Another set of activities by CRED Co-Directors takes CRED insights and tools into applied contexts and returns with ideas on where and how basic social science knowledge needs to be expanded. Current examples are the recently funded Research Coordination Network (NUSSRoSE), co-directed by CRED co-director Weber and Woodrow Wilson Center lawyer and legal scholar Ruth Greenspan Bell; the ICARUS (the Initiative for Climate Change Adaptation Research Using Social Science) conference co-organized by CRED co-director Orlove, political scientists Maria Carmen Lemos and Arun Agrawal and geographer Jesse Ribot; CRED co-director and director of University of Miami’s Abess Center for Ecosystem Science and Policy, Kenny Broad’s interactions with the National Hurricane Centers and public outreach efforts of The National Geographic Society.
• We will continue to refine our criteria for selection and level of engagement with new partners.

- Plans for the 3-5 year timeframe:

• We will continue to honor existing commitments and put newly established guidelines in place for selecting collaborations and partnerships. The longer-term strategy could be two-fold, depending on funding: Unless we identify an additional funding source that can provide additional full-time staff (at senior, junior, and postdoc level), we will be forced to be more discerning and protective of our time, human resources, and funds. If we can secure more funding, the focus on key goals will be equally important, yet we can work with a greater variety of partners to achieve these goals – with an eye toward a CRED renewal proposal (due in 2014).

Priority 2, Building Operational Capacity:

Response to CRED and its research insights and their applications within Columbia University, the Earth Institute and beyond has been extremely gratifying. To illustrate the growing demand for CRED services, the number of outreach events we have managed to fill (from a much larger volume of requests received) has gone from 13 in Year 1 (2004/2005) to over 200 each in the past two years. However, faculty and administrative support has been constant over this time, creating an unsustainable gap between available resources and demands on them. On the teaching front, CRED is regularly asked to staff a growing number of courses related to Environmental Decision Making within Columbia University, with demand for more. Current faculty availability to staff such courses far outstrips the need for teaching personnel, with adjuncts for such courses being at best a stopgap measure. CRED needs additional support in form of full-time faculty, full-time research, outreach and research management staff.

- Plans for 1-year timeframe:

• Recruitment for the following additional positions/identifying and securing funding for personnel:

  • Two additional hires of full-time faculty (one senior who is expected to take on a major leadership role and one junior) with relevant social science expertise and willingness to participate in CRED governance and research activities. The recruitment of a senior leader will require exploration of creative options for creating a senior faculty appointment, most likely jointly through a set of departments and school (Psychology, SIPA, DEES). Recent efforts to establish an attractive junior position for a highly desirable candidate ended in plans for a temporary visiting position which the candidate declined. We will revisit the options for establishing joint appointments, aiming to have at least one such position filled by Fall 2013.

  • Train the newly hired associate director for outreach, a newly created position that has been filled as of September 10, 2012. Postdocs (retain current postdocs and start recruitment of new postdocs for Fall 2013 start dates)

  • Continue organizational restructuring efforts (e.g., workflow assessment, re-allocation of responsibilities); possibly consider additional administrative staff positions, depending on the relief that a newly created and filled program coordinator and associate director positions can provide; work with EI to look for ways to increase efficiency (centralization or decentralization of administrative functions).
• Pursue options for additional (interim) space and intensify discussion about options for new space (CRED office suite), adequate for the scale of research and administrative operation.

➢ Plans for 3-5 year timeframe:

• Evaluate and update human resource capacity and operational structure to match the changing needs of the center. In the spring of 2014, NSF will announce a renewal solicitation. This will be an opportunity to request adequate portions of support from NSF. Depending on the nature and level of a next round of NSF funding, we might receive resources to address issues of organizational aspects, and might be able to budget for higher level of core center support.

• Play a major role in expanding the presence of social sciences in the EI, to tackle the well-recognized imbalance between natural/physical sciences and social sciences.

Priority 3, Diversifying our Funding Base:

Expand funding of CRED research and outreach activities from its current base that depends almost exclusively on NSF, in the form of a large cooperative agreement (entering its 3rd year of 5-year funding, with a 5-year renewal option) and a series of project-specific NSF grants. Outreach activities are largely unsupported (only one small foundation grant in the past that partially paid for Climate Change Communications Guide). Other project-specific grants have been obtained through NSF programs DRMS and UltraEx over the course of the past 4-5 years, and are in their No-Cost-Extension stage. A new award has just been received, a NSF DRMS grant to support research on the role of experience and description in the context of natural hazards related decisions. Other grants are pending, including a request to NSF DMMU for supplementary funds to support outreach activities.

➢ Plans for 1-year timeframe:

• Apply for NSF SEES grant to support natural hazard work at CRED, due dates not yet announced.
• Intensify discussions of funding options to support core operations with EI Development Office.

➢ Plans for 3-5 year timeframe:

• Identify research focus for CRED renewal and apply for NSF DMUU renewal grant, Spring 2014.
• Continue to seek non-government funding, possibly an endowment to reduce uncertainties.
• Intensify discussion with EI development office.

Other Priorities:

• Prepare for an upcoming site visit by NSF and an external review team to evaluate CRED’s progress at the mid-term of the 5-year funding period
## Appendix 1: List of CRED Joint Public Outreach

May 2007-May 2012

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
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<tbody>
<tr>
<td>Water Resource Management in Ceara, Brazil</td>
<td>CRED and IRI work jointly on communication of seasonal climate forecasts for water management in Northeastern Brazil. (ongoing)</td>
</tr>
<tr>
<td>PoLAR Climate Change Education Partnership</td>
<td>CRED is working with the Columbia Climate Center and several divisions at Lamont on PoLAR. Dave Krantz (2010/11) Ben Orlove (2011 onward), Sabine Marx (2010 onward), Courtney St. John (2012 onward).</td>
</tr>
<tr>
<td>Haiti Regeneration Initiative (HRI)/Cote Sud Initiative (CSI)</td>
<td>Sabine Marx worked with the EI’s Haiti Regeneration Initiative (HRI)/Cote Sud Initiative (CSI), a joint project of the Earth Institute at Columbia University, the UN Environment Programme, and various organizations in Haiti. She provides insights on environmental risk perception, awareness and behavior and is contributing to the development of early warning systems, as well as a wider communication strategy for the program (Fall 2009-present, ongoing).</td>
</tr>
<tr>
<td>Task Force on Sustainable Development</td>
<td>Sabine Marx, member of the Task Force on Sustainable Development: charged with the development of sustainable development as academic discipline and comprehensive research agenda at the Earth Institute (2010 onward)</td>
</tr>
<tr>
<td>Cooperative Institute for Climate Applications and Research (CICAR)</td>
<td>Sabine Marx serves as Advisory Board Member of Cooperative Institute for Climate Applications and Research (CICAR): charged with promoting scientific collaborations within CICAR and other relevant bodies within Columbia or outside; planning of the CICAR research agenda, in particular identifying and promoting new research opportunities; review the progress and accomplishments of CICAR; identify and promote educational and outreach opportunities (2009 onward)</td>
</tr>
<tr>
<td>Carbon Management MA Program</td>
<td>Sabine Marx serves as on the committee to Develop a Master Program in Carbon Management at Columbia University, (since August 2010).</td>
</tr>
<tr>
<td>Climate and Urban Systems Partnership</td>
<td>Sabine Marx serves as Advisory Board Member, Climate and Urban Systems Partnership (CUSP) project, NSF Climate Change Education Partnership–Phase II (NASA GISS and Franklin Institute).</td>
</tr>
<tr>
<td>ICARUS Panel</td>
<td>CRED/IRI panel on “Climate information and decision architecture for malaria control: new opportunities for improved decisions,” (organized by Derek Willis, with presentations by Derek Willis, Tufa Dinku, Pietro Ceccato; co-chaired by Sabine Marx and Madeleine Thomson), ICARUS New York, May 18-20, 2012</td>
</tr>
<tr>
<td>Historicizing Hazard</td>
<td>Elke Weber, Ben Orlove and Upmanu Lall were invited commentators for “Historicizing Hazard,” an interdisciplinary workshop on environmental learning, ignorance &amp; fear held at Barnard College, April 20, 2012. This workshop was sponsored by the Earth Institute and the Center for International History</td>
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<tr>
<td>Event Type</td>
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<tr>
<td>Climate Decision Forum, April 9, 2012</td>
<td>Climate &amp; Risk · Klaus Jacob: Sea Level Rise: Moving Target, Risks and Public Enigma · Katherine Thompson: Does Experience Breed Complacency? The way we learn probabilities effects our perceptions of risk</td>
</tr>
<tr>
<td>Partnering for the Climate: An Artist/Scientist Mixer</td>
<td>CRED co-sponsored the PositiveFeedback event “Partnering for the Climate: An Artist/Scientist Mixer” on February 12, 2012, at the Isamu Noguchi Museum in conjunction with the current exhibit, Civic Action: A Vision for Long Island City.</td>
</tr>
<tr>
<td>EI Sustainable Development Seminar</td>
<td>Sabine Marx (CRED) joined Marc Levy (CIESIN) and Joe Graciano (Mailman) in presenting as part of the EI’s Sustainable Development Seminar Series: “Balancing Research &amp; Practice at The Earth Institute,” January 26, 2012</td>
</tr>
<tr>
<td>UNFOLD: Climate Change Art &amp; Science Dating Game</td>
<td>CRED collaborated with PositiveFeedback to co-sponsor “UNFOLD: Climate Change Art &amp; Science Dating Game” an event aimed at bringing together climate scientists and artists to further opportunities for discussion and collaboration. December 1, 2011 at the Sheila C. Johnson Design Center at Parsons The New School for Design in conjunction with the exhibit, “U-n-f-o-l-d, A Cultural Response to Climate Change”.</td>
</tr>
<tr>
<td>International Climate and Society Conference, Thimphu, Bhutan</td>
<td>Ben Orlove, participant: International Climate and Society Conference, Thimphu, Bhutan, November 19, 2011. The summit, a collaboration between the Earth Institute and Bhutan’s Ugyen Wangchuck Institute for Conservation and Environment, aimed to foster understanding on how climate change could affect the Himalayas, various impacts on human and natural systems, and strategies for adaptation</td>
</tr>
<tr>
<td>Hudson River Summer</td>
<td>Victoria Rosoff and Sabine Marx (CRED) joined Margie Turrin (Lamont) and the participants of the Hudson River Summer program, and presented “The Psychology of Climate Change Communication,” New York, July 7, 2011.</td>
</tr>
<tr>
<td>Climate Decision Forum: Inaugural Meeting/Initial Planning</td>
<td>Discussion among social and natural/physical based on presentation on decadal climate variability by Lisa Goddard, March 8, 2011, Comer Building, Lamont-Doherty Earth Observatory</td>
</tr>
</tbody>
</table>
| EI and Maison Francaise, Panel Discussion | Sabine Marx (CRED) joined Shama Praveen (Columbia Water Center), Gavin Schmidt (NSAS GISS) and others as panelist for a discussion of the movie “HOME: A Film Screening and Panel
<table>
<thead>
<tr>
<th>Event</th>
<th>Details</th>
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<tbody>
<tr>
<td><strong>CRED Unit Review</strong></td>
<td>Discussion,” co-sponsored by Maison Francaise and Earth Institute, Columbia University. January 31, 2011</td>
</tr>
<tr>
<td><strong>UNEP/Earth Institute Haiti Task Force</strong></td>
<td>Sabine Marx: Member of the UNEP/Earth Institute Haiti Task Force, established to help coordinate activities across the Earth Institute and ensure appropriate linkages with other Columbia University initiatives in Haiti (2010/2011)</td>
</tr>
<tr>
<td><strong>Earth Institute Carbon Management Program</strong></td>
<td>Shahzeen Attari worked with Elke Weber and Galen Treuer to create a master’s class for the new EI carbon management masters program, which will be taught in the next few years. (Sept. 2010-Jan. 2011)</td>
</tr>
<tr>
<td><strong>Earth Institute Fellows Program</strong></td>
<td>Shahzeen Attari- An idea: Using virtual reality to visualize climate change impacts Earth Institute Fellows Symposium, Columbia University, New York, NY (Oct. 2010)</td>
</tr>
<tr>
<td><strong>Climate Symposium: Revitalizing the Debate</strong></td>
<td>Elke Weber-Columbia Climate Center at the Earth Institute, Columbia University and the Consulate General of Denmark in New York, Invited Panel Presentation at Climate Symposium: Revitalizing the Debate, October 11, 2010, organized by Columbia's Climate Center.</td>
</tr>
<tr>
<td><strong>Lamont-Doherty Open House</strong></td>
<td>Through its collaboration with PositiveFeedback, CRED supported the Superhero Clubhouse’s new work, a riff on ‘cultural collapse’ as discovered through dendrochronology (or tree ring dating). October 1, 2011</td>
</tr>
<tr>
<td><strong>How to Use Maps as a Tool to Communicate Climate Risks:</strong></td>
<td>Sabine Marx (with IRI, Francesco Fiondella). “How to Use Maps as a Tool to Communicate Climate Risks: Communicating and Motivating Action – Insights from Cognitive &amp; Social Psychology and the Decision Sciences,” IRI Summer Institute on Climate Information for Public Health, (May 26, 2010)</td>
</tr>
<tr>
<td><strong>Cuny Graduate Center, Martin E. Segal Theater Center</strong></td>
<td>CRED joined Lenfest Center and others to organize a PositiveFeedback an afternoon and evening of performances, presentations, and panel discussions: “Illuminating the Science: Art and Climate Change,” Martin E. Segal Theater Center, Earth Day (April 22, 2010)</td>
</tr>
<tr>
<td><strong>CU Scholarly Communication Program</strong></td>
<td>Sabine Marx (CRED), Gavin Schmitt (NASA GISS) and Ned Gardiner (NOAA), presentations and panel discussion: Research Without Borders: Communicating Climate Change Science, Columbia University Scholarly Communication Program (April 6, 2010)</td>
</tr>
<tr>
<td><strong>Index Insurance Project</strong></td>
<td>CRED and IRI work with farmers in Ethiopia and other field sites to increase the understanding of Index Insurance. Dan Osgood and Nicole Peterson, The work with Relief Society of Tigray (REST) and Oxfam America has been a valuable outreach activity, connecting academic research with policy projects. (2009-2010)</td>
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<tr>
<td><strong>Earth Institute Fellows Program</strong></td>
<td>Shahzeen Attari- Public perceptions of energy consumption and savings- Earth Institute Fellows Symposium, Columbia University, New York, NY (Jan. 2010)</td>
</tr>
<tr>
<td><strong>Earth Institute Board of Directors</strong></td>
<td>David Krantz, on Board of Directors for the Earth Institute (2009-2010)</td>
</tr>
<tr>
<td><strong>Earth Institute Faculty Retreat</strong></td>
<td>Elke Weber, Earth Institute, Columbia University, Faculty Retreat, Invited Presentation on Social System Challenges to Sustainable Development, New York, NY (December 7, 2009)</td>
</tr>
<tr>
<td><strong>Tipping Point</strong></td>
<td>CRED co-organized and co-sponsored first American TippingPoint event, with Columbia Climate Center, Lenfest Center, and non-Columbia institutions TippingPoint is a groundbreaking British organization which explores the boundary between artistic and cultural life and the extraordinary challenge of global climate change and facilitates collaborative conversations between artists and scientists (December 6-7, 2009)</td>
</tr>
<tr>
<td><strong>Earth Institute Seminars in Sustainable Development</strong></td>
<td>David Krantz- Earth Institute Seminars in Sustainable Development; Panel Speaker: Focus on Climate: Behavioral Challenges and Opportunities; (October 22, 2009)</td>
</tr>
<tr>
<td><strong>Earth Institute Practicum</strong></td>
<td>David Krantz- Earth Institute Practicum; Talk on Environmental Research and Decision Making (October 13, 2009)</td>
</tr>
<tr>
<td><strong>MA Program in Climate and Society</strong></td>
<td>Victoria Rosoff, Panelist, Masters in Climate and Society, new student orientation, (August 31, 2009)</td>
</tr>
<tr>
<td><strong>Global Roundtable on Climate Change (GROCC)</strong></td>
<td>CRED members join other EI researchers to inform the Global Roundtable on Climate Change: Elke Weber, Chair, Working Group 4 on Public Attitudes and Ethical Issues; David Krantz, Steering Committee; Tony Leiserowitz, Co-Chair, Working Group 5 – (2004-2009)</td>
</tr>
<tr>
<td><strong>American Museum of Natural History and Norwegian Consulate</strong></td>
<td>Represented CRED at Consul General of Norway Reception regarding the opening of International Polar Weekend at AMNH, Sabine Marx. (February 1, 2008)</td>
</tr>
<tr>
<td><strong>International Polar Year</strong></td>
<td>CRED joined Lamont scientists for displays, activities, and presentations at the American Museum of Natural History’s International Polar Year events in 2007 and 2008.</td>
</tr>
<tr>
<td><strong>ICARUS III Conference</strong></td>
<td>Ben Orlove, one of the founders of the Initiative on Climate Adaptation Research and Understanding through the Social Sciences (ICARUS), co-organized the network’s third meeting jointly with Earth Institute. The meeting provided opportunities for many panels with representation from across EI, and brought together scholars, researchers, students, decision makers, and activists interested in working on adaptation to climate variability and change. ICARUS III was held at Columbia University, May 17-20, 2012.</td>
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</tbody>
</table>