RESPONDING TO CLIMATE CHANGE:
GOVERNING THE CLIMATE EMERGENCY
Fourteenth International Conference on
Climate Change:
Impacts & Responses

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Dear Conference Participants,

A very warm welcome to the 14th Common Ground Research Network’s International Conference on Climate Change: Impacts & Responses.

The science and realities of climate change are ever more clearly underlining the ‘emergency’ this undoubtedly is. As such, the work you are all doing to find real and wise solutions and build your own capacity and abilities to lead them becomes ever more important. We have a few short years to assemble and lock in the positive transformational change we need, and in this context we hope that this year’s conference supports you in your contribution to that.

Once again this conference will be fully online rather than a blended format from Vancouver. We are extremely lucky that Common Ground Research Networks has always been leading in the online research collaboration space to make this experience truly rewarding! While we expect a blended conference to be the norm from next year, it is important that we take the opportunity to further normalize a healthy and climate-aligned way of meeting, sharing our research and working together. The use of online and blended formats also enables us to make the conference more accessible to people from around the world, many of whom would not be able or wish to travel.

We are looking forward to the exciting sessions to come. The range and diversity of accepted submissions to this year’s conference is outstanding – both within this year’s theme and within the static themes. We hope you take time to browse and delver further into, the submissions on the portal which you can find here: https://cgscholar.com/cg_event/events/C22/accepted_proposals#. Topics range from the role of religion, education, the arts, indigenous knowledge, finance and technology in tackling climate change, to considerations of legal matters, systems thinking, food security and the implications of the COVID-19 pandemic for climate responses. We are extremely fortunate to have had submissions from around the world, including scholars and practitioners based in places as far afield as Canada, Ethiopia, Iran, India, the United States, Colombia, Nigeria, Mexico, Spain, Bangladesh, Greece, Japan, Turkey, China – to name just a few!

Our exceptional plenary key notes in the theme of our topic: ‘Responding to the Climate Change: Governing the Climate Emergency’, gives us an opportunity to learn from renowned leaders within the the wonderful city of Vancouver, Canada, as well as from beyond. We will hear from Prof Stephanie Bertels, who is a renowned solutions-focused academic and Director of the Centre for Corporate Governance and Sustainability at Simon Fraser University, Canada; Christine Bergeron, President and CEO of Vancity, Canada’s largest credit union; and the eminent Prof Thomas Clarke, Professor of Corporate Governance at the University of Technology Sydney. Each of these speakers brings their own unique perspective, experience and passion to the challenge of how to govern the Climate and Ecological Emergency.

When thinking about how to respond appropriately to the Climate and Ecological Emergency governance is one of the most important structural considerations. Effective governance of human endeavour is central for achieving our shared goals. Governance is core to setting the direction of a system, keeping that system on track and ensuring accountability. However, governance as a concept, in companies but also in nations and other organizations, especially in the ‘West’, has developed in an era where the idea of ‘success’ and the routes to achieving it were very different – not least now that it has become clear that many traditional versions of success are damaging to the climate and to wider environmental systems. Hence, the way that many have tended to think about governance, and hence the skills we build and energy we devote to it, is in many respects not fit for achieving long-term wellbeing for all people and planet (sustainability). Hence, in this year’s conference, we will together explore how governance might be best understood in an era of multifaceted un-sustainability and what types of governance are needed, at all levels, in order to respond effectively and urgently to the Climate Emergency.
The accepted submissions are naturally and refreshingly diverse. This is because there are many actors and multiple levels that together make up any governance system, along with many ways of making a governance system work. Interdisciplinary and global perspectives on this question are therefore vital inputs into our deliberations, including consideration of: Organizational governance (across all public, private and third sector spheres – including of Universities and Research Institutes), Deliberative democracy and the role of citizen participation; Grassroots innovations and local initiatives; The role of Purpose for the governance we need; Local and national government policy; Reporting and other accountability mechanisms needed; the similarities and differences of the governance needed across different sectors of society to address the Climate Emergency we face.

It is these perspectives we hope are brought to the fore in this year’s conference. We hope, through this conference, that you lead, learn, grow and develop the leadership skills you seek to play your part in Governing the Climate Emergency. Please do take time to explore the various aspects of this year’s conference and remember you can browse more than 20 interdisciplinary Common Ground Research Networks.

With all best wishes,

Victoria Hurth
Senior Associate, Institute for Sustainability Leadership, University of Cambridge, United Kingdom

Stuart Capstick
Research Fellow, Deputy Director, and Theme 3 Leader, Centre for Climate Change and Social Transformations, Cardiff University, Cardiff, UK
Dear Conference Delegates,

From wherever you’ve come, in which way your participating, welcome to the Fourteenth International Conference on Climate Change: Impacts & Responses. I am grateful to all of you for sharing your work at this conference.

For over 30 years, Common Ground has invested in developing technologies that seek to break down barriers of access in scholarly communication. In each phase, we’ve built spaces to support interdisciplinary dialogue, before such approaches were in vogue; connected international voices when disciplines were too often isolated in national silos; and supported an agenda of access and equality, by offering pathways and opportunities for diverse voices. We now propose another kind of intervention -- to build a scholarly communication infrastructure for a blended future. Our blended model seeks to transcend physical boundaries by offering a space to extend in-person conference content online while ensuring online-only delegates are afforded equal participatory and experiential spaces within the platform. At the same time, the model offers participants a legacy resource to which they can return, with access to a social space where fellow participants can keep connected long after the conference ends.

But for us “blended” is more than an approach to technology. We’re using this conceptual filter to consider our mission:

- Blended disciplines as an approach to interdisciplinary research practices
- Blended affinities as a way to approach a shared politics for paradigms of recognition and redistribution
- Blended voices as a way to consider where research happens in and outside of academia
- Blended ideas as the common ground for a new sense of civics

We’re also committed to being industry leaders. In 2021 we became a signatory to the United Nations Sustainable Development Goals Publishers Compact. Launched in collaboration with the International Publishers Association, the compact features 10 action points that publishers, publishing associations, and others can commit to undertaking in order to accelerate progress to achieve the Sustainable Development Goals (SDGs) by 2030. Signatories aspire to develop sustainable practices and act as champions of the SDGs, publishing books and journals that will help inform, develop and inspire action in that direction.

Alongside becoming a signatory to the UN Sustainability Publishers Compact, I had the honor of leading Common Ground Research Networks delegation to COP26 in Glasgow late last year. We are measuring current emissions in all aspects of what we do to identify areas where emissions can be reduced. And we’re committing to long-term science-based Net-Zero targets for our operations. We’ll be sharing a report of our activities and progress annually, so watch this space.

I thank our partners and colleagues who have helped organize and produce this meeting with great dedication and expertise.

Warm Regards,

Dr. Phillip Kalantzis Cope
Chief Social Scientist, Common Ground Research Networks
Climate Change: Impact & Responses Research Network
Founded in 2009, the Climate Change: Impacts & Responses Research Network is brought together by a common concern for the science of, and social responses to, climate change. We seek to build an epistemic community where we can make linkages across disciplinary, geographic, and cultural boundaries. As a Research Network, we are defined by our scope and concerns and motivated to build strategies for action framed by our shared themes and tensions.

The Nature of Evidence

The conscious and unconscious actions of one creature — homo sapiens— have come to profoundly influence the course of Earth’s natural history, not just in local ecosystems but on a planetary scale. This has been the case since humans began a process of populating the whole Earth about one hundred thousand years ago. Ecosystems were revolutionized by the sustained yield harvesting technologies of hunters and gathers, then the farming and animal husbandry technologies of self-sufficient peasants. Nevertheless, the most recent epoch ushered in by the industrial revolution and marked by market-directed agriculture, the widespread clearing and harvesting of forests, and the use of fossil fuels has had undeniably course altering impact on the Earth’s climate. Greenhouse gases are heating the Earth. Ice that was permanent until recently is rapidly melting. Sea levels are rising. Extreme weather events are occurring with higher frequency. The effects feel differently, and regions are affected by these changes in different ways. Evidence is inevitably wrapped up in ecological, social, and economic systems. In the current persistent challenge of universalizing evidence-based approaches, the struggle is often a proxy for a broader conversation about the vested power of those who have benefited from this epoch-defining economic model. If we are to stem the tide of change — indisputably revealed in the evidence — and look to benefit from the opportunities associated with new models for development, we must supplement the evidence with longer views of building resilient societies and economies.

Ecosystemic Impacts

Today we live in the shadow of already occurring and potentially disastrous impacts on ecosystems, species, and genetic diversity. For instance: the special effects of glacial melt on mountain and riverine biodiversity; sea-level rise on coastal and mangrove systems; the effect of sea temperatures on coral reefs; increased rainfall variability in monsoon regions. These are just a few examples. The specific regional impacts on biomes and the vulnerabilities of different ecosystems across the globe need to be assessed in their specificity. There are parallels between some areas, while there are subtle and complex dissimilarities between the changes that are occurring in different parts of the world. These include floods, drought, forest fires, hurricanes, and other sporadic events that could devastate endemic species and threaten microhabitats. Some ecosystems could be highly vulnerable and will not be able to respond even to short-term impacts such as natural disasters. In the presence of climate change, these short-term events could be even more cataclysmic. The challenge in front of us is to consider solutions that can operate at micro and macro levels.

Human Impact

Humans are agents in climate change. Humans are affected by climate change: shifting shorelines, declining agricultural productivity, crisis of food supply, availability of water, the health of populations, and extreme weather events. These impacts will be felt differentially in developed and developing worlds. Marginalized populations of people may not only have their lives and livelihoods affected, but also be affected by declines in species abundance and diversity of ecosystems upon which they are dependent at a landscape level. In heterogeneous landscapes with a mix of wilderness islands within a changing agricultural environment, urbanization, and industrial spread could well increase pressures on protected area networks as the effects of climatic changes increase. Agricultural communities, especially traditional farmers and pastoralists, may be forced to shift into what is now within the protected area networks in developing countries. In considering human impacts we must consider unique contexts, both for effects and responses. How are certain communities bearing the burden of climate change? In what ways are attributing responsibility and to whom for the current reality? How do we measure responses on in the context of local, national, and global human life?
Scope & Concerns

Framing Responses
On the experience of the past one hundred thousand years, humans are clearly capable of adaptive responses. Our species has the capacity or can develop the capacity to nurture nature though a period of transition, for instance by creating corridors to assist species adaptation and inventing new agricultures which alleviate and mitigate the effects of climate change. Humans are also capable of precautionary action, reducing greenhouse gases for instance as part of a broader strategy of sustainable development. We may even be able to master technologies which balance and stabilize climate change. The key, however, will be the extent to which our species can take a proactive role, be that technological or acts of social and political will that produce changed patterns of land and energy use. Like no other creature in natural history, and like no other time in this creature’s history, this is moment when the future of the planet is in our hands. The consciousness which made us a unique species perhaps a hundred thousand years ago, for the first time today puts us in a position of unprecedented responsibility for the course of natural history. Climate change is a key intellectual and practical challenge for today’s science, economics, politics, sociology, and ethics.
The Nature of Evidence
Why the persistent challenge of universalizing evidence-based approaches?

Living Tensions:
- Equilibria and Disequilibria – change processes and countervailing tendencies
- Communicating Measurement – processes, methodologies, and technologies
- The Fundamentals – ice cap reduction, glacial melt, sea-level change.
- Lived Realities – floods, drought, forest fires, hurricanes, and other events
- Data Politics – the use of climate informatics
- Visions of Progress – contesting underlying economic motivations and offering alternatives
- Paleoclimatology – the earth’s climate in short and long views
- Regional Variations, Global Change – negotiating and understanding the difference
- Biomes and Biozones – considering eco-framings of space
- Environmental Policies – institutional response to eco-systemic realities
- Anthropogenic Factors – understanding and attributing human causes
- Debating Scenarios – slow, rapid, abrupt, or episodic
- The Future of Everyday Life – weather events, natural disasters, and ecological surprises
- Considering Capacity Building – individual, institutional, and systemic
- Communities and Nations – established politics of framing responsibility
- Human Systems – transport, energy, communication
- Public and Private Interest – engaging business stakeholders
- Entrenching Inequality – climate change in the developing world
- Adaptation and Resilience – private, public, and individual changemakers
- Alternative and Renewable Energy Sources – technologies, policies, and strategies
- Measures of Responsibility – navigating climate ethics
- Regulatory Solutions – taxes, offsets, standards, and trading
- Climate Finance – valuing nature and action Motivating Solidarity – global movements, local framings

Assessing Impacts in Diverse Ecosystems
What are the impacts of climate change on natural environments in particular and universal views?

Living Tensions:
- Paleoclimatology – the earth’s climate in short and long views
- Regional Variations, Global Change – negotiating and understanding the difference
- Biomes and Biozones – considering eco-framings of space
- Environmental Policies – institutional response to eco-systemic realities
- Anthropogenic Factors – understanding and attributing human causes
- Debating Scenarios – slow, rapid, abrupt, or episodic
Human Impacts and Responsibility
How have we been agents of climate change, what does a politics of responsibility reveal?

Living Tensions:
- The Future of Everyday Life – weather events, natural disasters, and ecological surprises
- Considering Capacity Building – individual, institutional, and systemic
- Communities and Nations – established politics of framing responsibility
- Human Systems – transport, energy, communication
- Public and Private Interest – engaging business stakeholders
- Entrenching Inequality – climate change in the developing world

Technical, Political, and Social Responses
How do scientists, technologies, policymakers, and community members respond to climate change?

Living Tensions:
- Adaptation and Resilience – private, public, and individual changemakers
- Alternative and Renewable Energy Sources – technologies, policies, and strategies
- Measures of Responsibility – navigating climate ethics
- Regulatory Solutions – taxes, offsets, standards, and trading
- Climate Finance – valuing nature and action
- Motivating Solidarity – global movements, local framing
Dr. Stuart Capstick
Cardiff University, United Kingdom

Stuart Capstick holds a Ph.D. in Psychology from Cardiff University. Dr. Capstick is interested in how people understand and act on climate change. What determines our level of interest and concern about this topic? How can we involve people in creating a better, low-carbon society? How can the necessary sense of urgency about climate change be translated into meaningful and far-reaching emissions reduction?

Dr. Stuart Capstick is the Deputy Director and theme lead for the Centre for Climate Change and Social Transformation (CAST Centre), a 5-year investment from the Economic and Social Research Council. Dr. Capstick is also active within the Tyndall Centre for Climate Change Research and an author on the Lancet Countdown on Health and Climate Change. Dr. Capstick co-edit one of the topic domains for the journal WIREs Climate Change.

Dr. Victoria Hurth
University of Cambridge, United Kingdom

Dr. Victoria Hurth is a Senior Associate at the University of Cambridge’s Institute for Sustainability Leadership and Visiting Fellow of Cambridge Judge Business School. She describes herself as a ‘pracademic’, taking a pragmatic interdisciplinary approach to the drivers and solutions of organizational responses to climate change and sustainability. She has a Master’s in Environment and Development from the University of Kwa-Zulu Natal and completed her Ph.D. (Exeter) on the role of marketing as a driver of sustainable/unsustainable consumption. Her research and practice now focuses on purpose-driven organizations and the implications for culture, governance, and strategy. She has been a British Council ‘Climate Change Ambassador’ and a climate change advisor for a UK MP. She is currently a member of the UN Taskforce for developing a methodology for SDG indicator 12.6.1. and the Convenor of ISO37000 – the first global standard on Governance of Organisations.
The Climate Change: Impacts & Responses Research Network is grateful for the foundational contributions, ongoing support, and continued service of our Advisory Board.

- Alison Anderson, University of Plymouth, Plymouth, UK
- Stuard Capstick, Cardiff University, UK
- Gowtarn Raj Chintaram, Earth-Mauritius, Mauritius
- Amar Galla, International Institute for the Inclusive Museum, India
- Candice Howarth, University of Surrey, UK
- David Humphreys, The Open University, UK
- Victoria Hurth, University of Cambridge, UK
- Mordechai Shechter, University of Haifa, Haifa, Israel
- Zhihua Zhang, Beijing Normal University, Beijing, China
The Fourteenth International Conference on Climate Change: Impacts & Responses
For over 30 years, Common Ground has been invested in crafting forums that seek to break down barriers of access in scholarly communication. In each phase, we’ve built spaces for interdisciplinary dialogue, before such approaches were in vogue; connected international voices when disciplines were too often isolated in national silos; and supported an agenda of access and equality, by offering pathways and opportunities for diverse voices.

We now propose another kind of intervention -- a scholarly communication infrastructure for a blended future.

Our blended model seeks to transcend physical boundaries by offering a space to extend in-person conference content online while ensuring online-only delegates are afforded equal participatory and experiential spaces. At the same time, the model offers participants a legacy resource to which they can return, with access to a social space where fellow participants can keep connected long after the conference ends.

In this future we also commit to bilingual pathways.

We support the presentation, publication, and social networking for English and Spanish speaking delegates. In doing so we seek to offer spaces where we can "speak our language" and at the same time interact together.

And blended is more than technology.

And blended is more than an approach to technology. We’re using this conceptual filter to consider some of our original mission positions: blended disciplines as an approach to interdisciplinary research practices; blended affinities as a way to approach a shared politics for recognition and redistribution; blended voices as a way to consider where research happens in outside of academia; blended ideas as the common ground for a new sense of civics.
Responding to Climate Change as Emergency: Governing the Climate Emergency

Effective governance of human endeavors is central in achieving our shared goals. Governance is core to setting direction of a system, keeping that system on track and ensuring accountability. However, especially in the ‘West’, governance as a concept, not only in nations but companies and other organizations, has ‘grown up’ in an era where the idea of ‘success’ and the routes to achieving differ greatly. There are many actors and multi-levels that together make up any governance system, along with many ways of making a governance system work. Together we will explore how governance might be best understood in an era of multifaceted unsustainability and what types of governance are needed, at all levels, in order to respond effectively and urgently to the Climate Emergency. We welcome interdisciplinary and global perspectives on this question, including consideration of: organizational governance (across all public, private and third sector spheres – including of universities and research institutes); deliberative democracy and role of citizen participation; grassroots innovations and local initiatives; the role of purpose for the governance we need; local and national government policy; reporting and other accountability mechanisms; and the similarities and differences of the governance needed across different sectors of society to address the Climate Emergency.

Dr. Victoria Hurth
Senior Associate, Institute for Sustainability Leadership, University of Cambridge, United Kingdom

Dr. Stuart Capstick
Research Fellow, Deputy Director, and Theme 3 Leader, Centre for Climate Change and Social Transformations, Cardiff University, Cardiff, UK

Dr. Phillip Kalantzis-Cope
Chief Social Scientist, Common Ground Research Networks, United States of America
Dr. Christine Bergeron
President, Chief Executive, Vancity, Canada, Chair at Board of the Women’s Enterprise Centre
Board Member of Aviso Wealth, Board of Governors for the Business Council of B.C
United Nations Environment Programme Finance Initiative’s Banking Board

"From Vision to Practice: Vanvity’s People-Centred Path To Net-Zero Financed Emissions"

Christine Bergeron is President and Chief Executive Officer of Vancity, Canada’s largest community credit union, Christine believes that banking plays a vital role in developing a healthy society – building the well-being of people and, at the same time, ensuring the long-term sustainability of the communities in which they live and work. Prior to becoming CEO, Christine held several senior leadership roles within Vancity, serving as Vancity’s Chief Member Services Officer, leading the Member Experience & Community Engagement division. Christine’s achievements in fostering community impact, social justice and environmental sustainability have earned her accolades from Business in Vancouver magazine, which included her in its 2007 “Top 40 Under 40” list. In 2012, the Association of Women in Finance gave her the Rising Star award, and in 2017 Clean50 awards recognized her for her dedication to sustainability. Christine chairs the Board of the Women’s Enterprise Centre, is a board member of Aviso Wealth, and is on the Board of Governors for the Business Council of B.C. Christine also represents North America on the United Nations Environment Programme Finance Initiative’s Banking Board.
Plenary Speakers

**Dr. Thomas Clarke**  
Professor, University of Technology Sydney, Australia  
Editor of the Cambridge University Elements in Corporate Governance Book Series  
Sir Adrian Cadbury Scholar of International Corporate Governance Network

“In Search of Sustainability: Corporate Governance and Climate Change”

Professor Thomas Clarke is a Fellow of the Royal Society of Arts (FRSA) and former editor for sustainability of the Journal of Business Ethics a FTSE 50 journal. He has 200 publications in the field of sustainability and governance. His most recent work is the Oxford Handbook of the Corporation (OUP 2019). He is editor of the Cambridge University Elements in Corporate Governance book series which features works on corporate purpose and sustainability. He contributed to the formulation of the OECD Principles of Corporate Governance (1999) and for the UN delivered a research paper on Sustainable Finance (2016) in the UNEP Finance Initiative. He conducted the 2012 Census of Women in Leadership for the Australian Government, launched by Governor-General Quentin Bryce. He is the Inaugural Sir Adrian Cadbury Scholar of the International Corporate Governance Network (ICGN) that represents $54 trillion institutional investor funds. His current research interests include the pivot towards corporate sustainability including integrating targets and measures, progress towards decarbonisation, and the circular economy.

**Stephanie Bertels**  
Director of the Centre for Corporate Governance and Sustainability at SFU’s Beedie School of Business, Founder the Embedding Project (www.embeddingproject.org)

“Corporate Governance and the Need for Credible Climate Action”

Stephanie Bertels is a professor and the Director of the Centre for Corporate Governance and Sustainability at SFU’s Beedie School of Business. Steph also founded the Embedding Project (www.embeddingproject.org), a research collaborative that partners with leading global companies to develop practical tools that help companies embed social and environmental factors across their operations and decision-making. She regularly advises global companies and their boards on embedding sustainability.
Each year a small number of Emerging Scholar Awards are given to outstanding early-career scholars or graduate students. Here are our 2022 Emerging Scholar Award Winners.

**Fatema Jahan Sharna**  
Judge, Law Commission  
Bangladesh

**Shannon Welch**  
Danial Morgan Graduate  
School of National Security  
USA

**Masako Ichihara**  
Research Institute for Humanity and Nature  
Japan

**Brie O’Sullivan**  
University of Western Ontario, Canada

**Mohammad Reza Khazaei**  
Payame Noor University  
Iran

**Blake Hite**  
Georgetown University  
USA

**Mariya Bezgrebelna**  
York University  
Canada

**Christopher C Graham**  
University of Massachusetts  
USA

**Lauren Smith**  
University of Mumbai  
India
Conference Abstracts
The Impact of Preemptive Investment on Natural Disasters

**Jhorland Ayala García**, Researcher, Banco de la República, Bolívar, Colombia

Extreme rainfall events are expected to become more frequent and more intense in the future. Because their mitigation is a challenge and their cost to human life is large, this paper studies the impact of preemptive investment against natural disasters on the future occurrence of landslides and the losses associated with it. Based on a panel of 746 Colombian municipalities with medium and high risk of landslides and an instrumental variable approach, we find that preemptive public investment can reduce the number of landslides, the number of people who die, are injured, or disappear after a landslide, as well as the number of people affected. However, we do not find any effect on the number of houses destroyed. The results reveal that local governments focus their preventive measures on saving the lives and the physical integrity of their citizens, but they pay less attention to the direct market losses of natural disasters. These results are relevant in the presence of imperfect private insurance markets and increased informal settlements.

Innovation in Climate Responses from the South: Experiences, Challenges and Insights in Building Climate Action Capacity in Chile

**Roxana Bórquez**, Post-doctoral Researcher, Governance and Science-Policy Interface, Center for Climate and Resilience Research (CR)2, Chile

**Ariel Muñoz Pilar Moraga Rodolfo Sapiains**, Professor, Psychology, Universidad de Chile, Magallanes, Chile

**Cristian Henriquez**, Professor, Institute of Geography, Pontificia Universidad Católica de Chile, Región Metropolitana de Santiago, Chile

**Marco Billi**, Researcher, Governance and Science-Policy Interface, Center for Climate and Resilience Research (CR)2, Chile

The Climate emergency requires new approaches, thinking out of the accustomed schemes. Experiences from the South can offer useful insights on how to innovate in Climate action. This study concentrates on the case of Chile: the COP Presidency has allowed interesting development in technical, social and governance conditions of climate action and, while the social unrest in 2019 has prevented the COP to be celebrated in the country, it has also set the stage for a constitutional process which for the first time in history acknowledged the climate and ecological emergency as a frame for the political-constitutional debate. We cover recent developments in building climate action capacity in Chile, offering insights on best practices and challenges for the community at large. It is sponsored by the Center for Climate and Resilience Research (CR)2 with guest participation of the Center for Climate Action and the Center for Global Change. We focus on: 1) existing gaps and opportunities for climate governance, under the lens of the Climate Governance of the Elements framework; 2) a critical assessment of the proposed climate change framework law and the opportunities and challenges it entails for climate action; 3) experiences in participatory co-construction of local adaptation and governance options at the municipal level; 4) experiences and opportunities for regional level climate action and the role of climate refuges, insights from the Patagonia; 5) a possible governance framework for the monitoring and evaluation of climate adaptation, insights from the CBIT Chile project.
Electric Vehicles Transition Evaluation: From the Demand Cross-price Elasticity as a Supplementary Good Evidence and Greenhouse Gas Related Effects

Heiner Camacho, Student, Master Candidate, Seoul National University, College of Engineering, Global R&D Centre, Gyeonggido [Kyonggido], South Korea

Based on historic evidence related to technology developments that arise into the society with the promise of cutting-edge energy-efficient goods and the puisne consequences the present paper evaluates electric vehicles demand as a new technology intended to displaced the ICE and determine if a new raw material market arises with the Co2 footprint of this industry and the links with the fossil fuel derivates (Xing et al., 2019). The methodology (cross-price elasticities of demand) evaluates all the data consistently and considers evidence in order to determine if, besides the main benefits of the massive use and implementation of BEV, the impact of this new industry will cause a non-reversible effect in humanity as once was caused by the gasoline even when at that time they were provided with enough proofs relating its poisonous with several humans deceases. Nowadays the relation is given the current world industry infrastructure and its emissions/contamination can beard a new industry demand that will duplicate (or more) the raw materials demand in case of the BEV end-up as a complementary good. Exist from the governments committed and involved in this new industry clear guidelines to determine the most accurate and responsible extraction of raw materials and production from developed countries.

Japanese Climate Change Litigation in the Cradle

Masako Ichihara, Researcher, Kyoto Climate Change Adaptation Center, Research Institute for Humanity and Nature, Kyoto, Japan

Over the past several decades, climate change litigation (CCL) has rapidly increased worldwide, mainly in Western countries. Accordingly, most scholarship has focused on those areas, and Japan has received scant attention. However, Japan had the first climate change case in 2017 and three other cases in 2018 and 2019, claiming injunction against the operation and construction of coal-fired power plants (CFPP). Considering that Japan still has many CFPPs in operation, there may be some obstacles that hinder the further development of Japanese CCL. This study investigates the obstacles that hinder the development of Japanese CCL. Some implications may be drawn through those abovementioned observations. First, it added another piece of empirical data of climate change cases in East Asia to global society. Especially, this study is the first piece that provided a detailed description and academic exploration of four Japanese climate cases in litigation. Considering that most literature on climate change cases remains in the Western countries so far, this supplement may be significant. Second, it attached a new field of climate change to the Japanese scholarship in policymaking litigation by locating it in the extension of the trajectory of the environmental litigation. Finally, it prospected one possible change of climate policy through further development of Japanese CCL, through the comparison with the trajectory of the past U.S. tobacco litigation.
Climate change is a problem that concerns all countries. When Harvard Humanitarian Initiative (HHI) surveyed 5,184 Filipinos in 2017, the result shows that 59.9 percent are reported having some awareness about climate change on a low to inadequate level and only 11.7 percent are well informed about this global issue (Bollettino et al., 2020). Science literacy is vital for understanding climate change and building climate literacy for citizens to know and understand climate, impacts of climate change, and ways to adapt and mitigate. Making connections between human action and its effect on climate change is an essential step that can be attained in PISA’s learning competencies. Systems thinking is an approach that looks at the relationship of each variable in a system. It is critical to integrate systems thinking to comprehend climate science and manage climate change (Ballew, 2019). This research study utilizes a mixed method research design and the objective is to determine if systems thinking affect global climate literacy of teacher-participants as they translate climate information to their students. Participants are divided into two groups, the systems thinking group and the non-systems thinking group. An e-learning module with similar content is implemented to both groups for 15-hours. Quantitative data is analyzed using paired t-test to identify if there is a significant difference between the results, ANOVA is used to compare and contrast the level of knowledge, depth of learning and reasoning of both groups while qualitative data is analyzed using content analysis.
Building Climate Resilient Communities in Recovery from COVID-19 and Moving to a Green and Resilient Society

Gordon Mc Bean, Professor Emeritus, Geography and Environment, Western University and Institute for Catastrophic Loss Reduction, Ontario, Canada

Responding to the issue of climate change as a security issue, there is need for an integrated energy-climate policy. The UNSG (2021), stated: As we rebuild, we cannot revert to the old normal. Pandemic recovery is our chance to change course. SSHRC Knowledge Synthesis Grant enabled an interdisciplinary team to come together to address how communities across Canada can proactively advance climate-resilience to effectively reduce the risk of adverse climate impacts, loss and damage. For a climate resilient society and communities, there are challenges across multilevel governance levels and sectors of society. There is need for integrated early warning systems and better prevention strategies with collaboration between governments, Indigenous communities, and societies to implement integrated risk reduction actions. The expert community has developed proven tools, based on best practices, to proactively improve climate resilience with a major issue being lack of funding and direction for governments and indigenous communities to address climate resilience. Indigenous communities in Canada and groups of municipalities are at the forefront of climate change adaptation in Canada and bringing them together for effective knowledge translation is necessary for adaptation. The Report (McBean, PI) assesses the academic and government information and provides guidance and the proposed first-ever National Adaptation Strategy needs to move the agenda ahead.

Current Trends in Air Quality and Cancer Prevalence Across the Sub-Saharan African Regions

Omolola Okunromade, Student, DrPH Student, Georgia Southern University, Georgia, United States Atin Adhikari, Associate Professor, Jiann-Ping Hsu College of Public Health, Georgia Southern University, Georgia,

United States Poor air quality and environmental pollution remain one of the main etiological factors leading to cancers and cancer-related deaths worldwide. As a result of human activities and changes in the climate, deleterious airborne chemicals can be dispersed not only in the environment but also released in occupational and industrial areas. Air pollutants and cancer links are now established through various oxidative stress-related mechanisms and related Deoxyribonucleic acid damages. As air pollution dramatically approaches an upward trend in the Sub-Saharan countries, interestingly we found cancer rates and burden also rise here between 1.5 and 4-fold higher than in developed countries. The Sub-Saharan region is predicted to have over 85% rise in cancer burden by 2030, with high rates of especially breast, prostate, and cervical cancer. Approaches to monitoring, minimizing, and creating awareness of the trends in some specific pollutants in sub-Saharan Africa will help ameliorate cancer prevalence and support the reduction of air pollution level safe margin, thereby relieving the burden from all cancer types. This study examines the trends and correlations of carbon dioxide emissions, greenhouse effect in the changing climate, and PM2.5 levels in some highly populated Sub-Saharan countries recently noticed to have higher cancer burden. Utilization of the findings from the study support public health efforts to improve the reduction of all cancer types in the African ancestry especially in the Sub-Saharan region having the poorest outcome and the shortest survival rates from cancer globally.
Design of a Poly Generation System for an Area of the Colombian Caribbean Region

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In this work, the design methodology of the system is shown, counting on sources of energy from wind, solar and, energy from biomass combustion. In addition, a seawater desalination system was integrated by the reverse osmosis method to make it drinkable. This study was based on a theoretical method consulting data and both quantitative and qualitative sources, thus making it a non-experimental type of work, since it is a proposal of a design for possible implementation. It began with the preselection of the most suitable area where climatic, geographical, demographic, social aspects and, the potential of the renewable energies already mentioned were considered. The city of Santa Marta, Magdalena, was selected as it offered the best design features. In each selected source, the possible products that the corresponding equipment could offer (in this case electricity and drinking water) were calculated, where it was concluded that biomass energy is the most economical in terms of cost / kW considering only the cost of equipment when generating 9.89 MW with a cost of 297 USD / kW. Finally, it was obtained that the total electrical energy generated by the system is 16.67 MW and desalinated water is 1,793 m3 / h, which can be translated into providing electricity to 3,023 homes and drinking water to 12,824 homes, respectively. In addition, an estimated cost of the equipment of the system was carried out, where it was obtained that the initial investment would be approximately $21 million without considering the land and other infrastructure.

Global Warming Must and Can Be Brought Under Control – Now: To Bring an End to Global Warming-Make It Rain

William Van Brunt, CEO, JFA, LLC, Minnesota, United States

Over the last 40 years, the catastrophic storm risk has tripled, as the latent heating power of the atmosphere grew, driven by the 15% increase in the average global concentration of the primary greenhouse gas, water vapor. The annual number of catastrophic, weather-related events increased to over 750, by 2019, 525 above the 1980 baseline of 225 annual events causing additional economic losses of 130 billion dollars annually. Since 1980, these global warming weather-related catastrophic events have taken tens of thousands of lives, while wreaking 2.4 trillion dollars in cumulative worldwide weather-related destruction. The annual number of catastrophic weather-related events has increased at an average rate of 11.8 yr.-1 or 45 per tenth of degree increase in temperature. New principles of atmospheric physics are applied to determine changes in the average global concentration of water vapor in response to changes in heating and sea surface temperatures and gauge the effect of these changes on global temperature. These principles demonstrate that by reducing the global concentration of atmospheric water vapor, the rate of increase in the average global temperature can be reduced and with sufficient reduction, the temperature increases can be reversed. An increase in the average, annual, global rate of precipitation of 0.3%, 2.9 mm yr-1 can return the average global temperatures to those of the mid-seventies. While it has taken 40 years to get here, this solution might be effected within a few years. Action has to be taken, now.
Over the next decade, an estimated 100 million people will need to adapt where and how they live to accommodate the changing climate. Although mitigation strategies can slow the pace of climate change, change is inevitable. Government and intergovernmental institutions will need to lead the way in facilitating adaptation processes; but for these to be successful, equitable, and not lead to maladaptive outcomes, institutions need to collaborate with frontline and Indigenous communities, the first and often most impacted by climate change. Currently, the communication infrastructure for collaborative adaptation planning does not exist. Frontline communities lack the mechanisms and institutional support to communicate well with institutions. Likewise, institutions lack the capacity to understand communities’ values or to integrate their lived experiences and visions into concrete decision-making scenarios. At the conference, we will focus on the theme of climate justice that presents a need for a theoretical framework for communication infrastructure for climate action. The Deep Listening Project (TDLP) is a multidisciplinary, and multi-university effort to create a sustainable communication infrastructure for collaborative adaptation. We aim to present our framework that is built on five components of the deep listening project—Knowledge sharing, Holding space, Co-production and sharing of climate imaginaries, Sensemaking with a diversity of perspectives, Evaluation and monitoring support to assure accountability. We will highlight the gaps in current communication infrastructure by inferring from adaptation case studies and explore how the application of tools and procedures for effective communication can contribute towards procedural justice, leading to fewer maladaptive outcomes.
**Elements of Wellbeing Through Loss: Narratives of Displacement due to Climate Crises**

Laura Arpiainen, Professor of Health and Wellbeing Architecture, School of Arts Design and Architecture, Aalto University, Finland

This paper centers on interviews with persons who have experienced either displacement or loss of their home due to climate-related crises, mostly adverse weather events. The research is part of a three-year project called RESCUE (Real Estate and Sustainable Crises Management in Urban Environment) funded by the Academy of Finland. The objective is to identify elements of wellbeing that are tied into the built environment, and comment on how these elements can be taken into account in future planning and policy development in order to promote dynamic resiliency of communities.

**Proof of Carbon: Carbon Capture at Personal Scale**

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Carbon capture and storage technology have long been utilized on an industrial scale. To provide the individual agency in addressing climate change, carbon capture technology is speculated for use on a personal scale. Taking inspiration from the pioneer of the first-invented computer, we named the device “Mark-I” to evoke the possibilities of incorporating carbon-capturing technology into our daily routines within a design space at a personal scale. Mark-I employs mineral carbonation with olivine (\(\text{MgSiO}_4\)) as the carbon-capturing technology to sequester and track carbon dioxide produced in a home environment. The device incorporated a researched-and-designed mechanism that accelerates the mineral carbonation process, actively creating data visualizations and instructions to guide and communicate with users. The design considers the afterlife of olivine filters. It proposes to occupy the existing recycling infrastructures to maximize the use of olivine based on its material capacity. The design of the material afterlife also includes an awarding system based on the blockchain system. It generates carbon coins in exchange for every batch of successfully reused carbon filters of olivine that is full from sequestering carbon dioxide as raw material for new industrial productions.
Climate Change–induced Migration and Exposure Risks for Marginally Housed and Unhoused Populations: Developing a Response Framework

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The effects of climate change disproportionately impact the health and well-being of precariously housed and homeless populations. Addressing this issue requires a systematic approach grounded in the best available evidence and a robust knowledge mobilization strategy. Such an approach is much needed at the climate change–homelessness nexus which represents a major global health concern with stakeholders (e.g., policymakers and service providers) increasingly seeking guidance. This work thus aims to contribute to the field of climate change and health by advancing a response framework. The framework was developed by synthesizing current knowledge on the subject and by drawing on pertinent examples. The syntheses included the results of two systematic reviews and multiple think tanks and feedback sessions held with experts in the field. The result is the first comprehensive global response framework in this area with relevance to future research directions, policy interventions, and service system design. This framework serves to share the existing knowledge, to illustrate the potential application of such knowledge, and is an initial step towards consolidating the best available guidance related to the pressing concern of how climate change is influencing and shaping housing-related vulnerabilities.
Governance of Climate Change Mitigation and De-Carbonization – the New Transatlantic System: Government and Industry Policy and Standards Cooperation for Renewable and Sustainable Strategic Agriculture and Automotive Sectors

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In the 21st century, the UN Paris Climate Agreement requires immediate de-carbonization and greenhouse gas emission reductions in strategic national and global agriculture (food) and automotive (transportation) industry sectors. The achievement of the UN Climate Agreement goals for sustainable low-carbon societies and economies requires national government policy and industry cooperation to accelerate and govern the transition of strategic agriculture and automotive manufacturing sectors. The goal of this global climate policy research paper is to examine the central role of transatlantic government policy and strategic industry cooperation in the de-carbonization, renewable transition and sustainability of national agriculture and automotive manufacturing industry sectors. The conference paper uses a comparative policy case study methodology for the following national government and industry cooperation case studies in the transatlantic region; The United States, United Kingdom and Germany/European Union. The national case studies are examined in following government climate and industrial policy contexts; American Recovery/Climate Plans, the UK Climate/Green Recovery Plan and German-EU Climate /European Green Deal Plan. Contributions; The paper contributes to the following academic and applied policy practice fields; global multi-level governance of climate change, transatlantic government and business cooperation in science based international organizations/UN global scientific/technical standard bodies, Results and Conclusions: The comparative transatlantic policy case studies reveal the need for strong normative agreement, moral leadership and interdisciplinary climate science cooperation. Transatlantic government and industry climate policy cooperation must specifically target strategic agriculture and automotive manufacturing industry sectors to achieve core goals of the UN Paris agreement.

Killing Mother Nature: The Bioethical Roots of Ecocide

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Ecocide has been proposed as a fifth crime under the International Criminal Court. This paper explores the most recently proposed definition with a principled bioethical lens and argues for the legal professions immediate and unanimous support. First, I explain why the legal community has a duty to address ecologically destructive acts in the international forum. I frame this duty within the context of bioethics and contrast the relative silence of the legal profession with unanimity of medical and religious professionals. Second, I use a case-based approach to respond to certain critiques of ecocide. In doing so, the term maleficient difference will be introduced as a framework to measure the damage caused by actors and assess the reasonableness of guilt. While academic literature has been generated on the need for bioethical insights on climate change, to date I have not been able to locate any literature on bioethics within the context of ecocide specifically.
Eastern Coastal Salt Culture from the Perspective of an Ethnographic Investigation Administered in Kutubdia Island, Bangladesh

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Salt culture has evolved in the coastal regions of Bangladesh since early times through traditional approaches. Because of the high salinity in the water of the Bay of Bengal, millions of people have become associated with salt farming as a means of livelihood. Without any institutional knowledge, Peasants, however, their practical expertise have made a profound penetration into the field. The research is conducted in Kutubdia Island, which is surrounded by the Bay of Bengal, from where the country’s handful demand for salt is met. However, the potential sector is yet to expand as the middlemen are prevailing in the communities. Middlemen provide the land with a specific amount for a season and lend funds providing that they will keep control of crops. In fact, middlemen twist and exercise power over the body of the marginal population in developing countries like Bangladesh in the name of community development. Whereas, importing salt from abroad by the state is another form of negligence of farmers. In addition, the existing scientific research reveals the communities are severely vulnerable due to climate change-induced cyclones, floods, erosion, salinity, etc. As a result, salt farmers, and those who are associated with the sector are shifting inherited professions. The current research follows qualitative approaches including observation, interview, and focus group discussion to examines the salt production-oriented way of livelihood and socio-economic perspective salt farming community of Katubdia Island.

Attitudes and Behaviors Towards Climate Change in Europe: A Cross-Regional Analysis

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Many quantitative studies on climate change remain attitude/concern oriented, disregarding the impact of concrete actions. Given there are often gaps between attitudes and behaviours in such a critical issue as climate change, closing the gap between the two requires more consistent and realistic actions against it. Exploring the level of gap helps both to call for public attention and provide guiding results for the government policies. In this article, comparing four different European countries, Germany, Italy, Sweden, and Poland, I examine both attitude and behavior of climate change, based on the data provided by the European Social Survey, Round 8 (2016). The main questions of this study are: 1) How is the correlation between attitudes and behaviors of climate change? 2) Do the demographic, class, cultural and political indicators relate to these? 3) How do these indicators affect attitudes and behaviors? 4) What factors can explain the possible differences between countries/regions?
Rapid Coastal Community Climate Adaptation: How the Great Lakes Climate Corps Accelerates Community Resiliency

Carl Lindquist, Executive Director, Superior Watershed Partnership, Michigan, United States

The Great Lakes Climate Corps has demonstrated how even underserved coastal communities can quickly adapt to a changing climate. From weatherizing low-income housing to installing solar panels, from planting trees to restoring shorelines, from K-12 climate literacy to hands-on community adaptation projects. Learn how any community can move from theory to practice and from vulnerable to resilient! The Superior Watershed Partnership serves coastal communities and Native American tribes on Lake Superior, Lake Michigan, and Lake Huron.

Voluntary Energy Efficiency Program: The Work from Home Trend Presenting a Win-Win Opportunity for the Triple Bottom Line

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The global pandemic COVID-19 has led to an advanced exploration of the remote world, with many employees and employers wanting to continue with the work-from-home (WFH) scenario even after offices reopened. Consequently, it becomes essential to understand the impact of energy load shifts from commercial to residential buildings and the resultant opportunity for the energy-efficient design community with this new trend. Simultaneously, businesses and companies are increasingly declaring net-zero goals, adopting various green market approaches, to tread a socially and environmentally responsible path. We are proposing the creation of a new program for such companies bringing them closer to their climate action goals while also benefitting their employees. It encompasses an opportunity for employers to incentivize energy efficiency upgrades of their employees’ homes, in a manner that proves to be financially feasible for both the primary stakeholders, i.e., companies and employees. We began the research by analyzing utility load shifts due to employees shifting to a WFH setup. Then, we collected information for residential green building retrofit techniques, identifying the most cost-effective and impactful ways to create healthier WFH environments while reducing GHG emissions. Further, we evaluated the viability of the new proposed program relative to the widely used existing decarbonization strategies. Next, we theoretically tested the implementation of the program through a case study. The report culminates with different suggestions to standardize the roadmap of such a voluntary energy-efficiency program and a discussion about its practical implementation to enable a win-win response of COVID-19 to climate change.
Towards Equitable Green Justice: The Cases of Bangladesh, Kenya, and Bhutan

Fatema Jahan Sharna, Senior Assistant Secretary (Joint District Judge), Law Commission, Dhaka zila, Bangladesh

Developing countries are the most vulnerable to climate change, despite contributing the least to global CO2 emission. Subsequently, some developing countries have undertaken exemplary initiatives through their domestic laws and policies to promote green justice in the battle against climate change. Bangladesh, Bhutan, and Kenya are three such countries which have made a remarkable achievement in this battle through the constitution as well as their green laws, and policies. Bangladesh, the ninth most vulnerable country due to climate change, has safeguarded green justice and non-discrimination in regard to race, gender, class, and religion under its Constitution. Whereas, Bhutan is the only zero carbon nation, that has unique environmental constitutional provisions, laws, and policies, making it one of the most environmentally concerned developing countries. Kenya is also among the first group of developing nations to introduce an equitable approach towards gender and the environment through its adequate legal and policy instruments.

Global Homelessness and Climate Change: Post Global

Mikhail Yerkovich, Technician, Fine Arts, Kwantlen Polytechnic University, British Columbia, Canada

The project, Post Global, consists of images that were developed in concert with a research paper exploring two prevailing forces, homelessness/ the under-housed, and the global effects of climate change. Post Global mirrors the research paper, relying heavily on the collaboration of many different individuals, spanning globally across many diverse regions. Post Global is an attempt to bring a visually impactful connection to the research taken up by Sean Kidd, Mariya Bezgrebelna, and their collaborators. The title of the photo project is a slight departure from the paper, but it succinctly arrives at the key concept behind the images. The title, Post Global, is used as a primer for the viewer of the exhibition, suggesting that these issues in one region are issues that others may take up in their own nations. The project relies on our global collaborators’ involvement as experts in their field to collect images that reflect their concerns for homeless/under-housed individuals and the effects of climate change on these populations in their region. With a general guideline, collaborators were given prompts to consider while undertaking the photographic aspect of the project. Because of the nature of the project, working with homeless/under-housed individuals, we wanted to stray away from exploitative images that have been seen all too often in these types of projects. Instead we decided to focus on objects or places that could represent the issues of homelessness, without exploiting a person’s likeness or story for the project’s gain.
Measuring Increased Resilience: The Race to Resilience Campaign

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Roxana Borquez, Center for Climate and Resilience Research Paulina Aldunce, University of Chile

Adaptation has increasingly become one of the key pillars in climate action in the face of growing global climate-related risks and the insufficiency of mitigation efforts to minimize those risks effectively. However, contrary to mitigation, adaptation has never enjoyed a strong consensus in terms of its ultimate goal, indicators, and measurement, so that monitoring and evaluating global adaptation efforts is a significant challenge. Multiple approaches exist, focusing on different aspects and relying on different procedures and data. Moreover, there is an increasing consensus that adaptation and resilience-building are strongly context-dependent endeavors. Both their design and assessment must be adjusted to the characteristics of specific initiatives, sectors, realities, or territories. At the same time, however, a universal, coherent framework is needed to aggregate and validate outcomes and favor collective learning and cross-fertilization between initiatives. In this paper, we review existing frameworks to measure and evaluate adaptation and resilience-building efforts. We identify key challenges, opportunities, and tensions they encounter. We then discuss the experience from the Race to Resilience Campaign that catalyzes actions by non-state actors to build the resilience of 4 billion people from groups and communities who are vulnerable to climate risks, with a particular focus on its Metrics Framework, precisely as an effort to combine global-level needs for data comparability and aggregation with the flexibility required for the heterogeneity of adaptation and resilience-building efforts. We conclude with a reflection on the particular challenge of data validation and quality assurance this endeavor implies.
To date, the participation of environmental stakeholders in climate studies has mostly focused on technical data (e.g., citizen science for species inventories, local monitoring of climate change impacts). Here, we rather describe participatory approaches tackling social and economic issues of climate change. Leaning on study cases of adaptation to climate change in Canadian, Belgian, and French forests, we discuss the benefits and challenges of participatory methods through the lens of our interdisciplinary team (ecology, economics, geography). We draw on a conceptual framework focused on ES, social synergetic, antagonistic, or neutral interdependencies, and collective action. These interdependencies are reshaped by changes in management decisions that modify ES and by new trade-offs in the interests of forest stakeholders. We first show how our serious game and collective workshops allowed for the expression of participants’ daily experience of environmental management, and how this is effective in revealing the actual (informal) governance of climate change. We then outline the prospective use of participatory methods to build alternate scenarios of adaptation to climate change. We illustrate with quotations and pictures, for instance when participants (dis)agreed on shared goals or on their levels of responsibility in paying for adaptation measures. We conclude with recommendations for the best use of participatory methods in climate studies for forest, agricultural, and coastal systems.
Environmental History, Archaeology, and the Political Ecology of Climate Change: Cross-disciplinary Reflections on Boundaries, Borderlands, and Population Displacement in Perpetuity

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Climate change is a global problem but its solutions are still restricted by national borders. Local and national policies often remain unbending and unresponsive to current climate realities. Nothing demonstrates this more than the issue of climate displacement and migration. Everyday across the world, thousands of people are displaced by climate shocks like floods and droughts and are increasingly threatened by slow-onset disasters like sea-level rise. Yet, when people flee for their safety and subsistence crossing national borders, most are denied refuge. Despite growing evidence showing that climate change is driving internal and cross-border displacement, presently neither national immigration laws nor International refugee laws specifically recognize or fully protect people who cross international boarders seeking refuge or asylum due to the effects of climate change. Those who make sometimes dangerous journeys to cross boarders are relegated to desolate borderlands or repatriated back to the disaster sites they fled. So why is it that borders remain so closed off to climate migration? And what does the future hold for the displaced in limbo between boarders and borderlands? Cross/interdisciplinary perspectives that consider the ecologies of human mobility, have something to say. Pulling from case studies on environmental history, archaeology and political ecology, this paper surveys the state of human mobility in the anthropocene - where we are and where we are heading. It contemplates the big history of the displaced in relationship to the rigidity of border sovereignty, and the role cross-disciplinary discourse plays in re-humanizing the international system.

Can the UK Achieve Net-zero Greenhouse Gas Emissions by 2050?

David F. Hendry, Co-director, and Senior Research Fellow, Economics, Climate Econometrics, Nuffield College, University of Oxford, United Kingdom

Net-zero greenhouse gas (GHG) emissions are an excellent target, but difficult to achieve by having to bridge a dramatic energy transition from fossil fuels to renewables, as well as eliminate other sources of GHG emissions from agriculture, construction and waste. A comprehensive strategy for doing so is essential, and although components like renewable electricity generation and electric vehicles are well developed, many issues remain, especially timing the stages in tandem. The key sensitive intervention points (SIPs) are (a) installing sufficient non-GHG electricity, (b) having electric vehicles connected to the grid for large-scale short-run backup storage, (c) utilising intermittent ‘surplus’ energy for nearly free hydrogen production, (d) some liquified for medium-term storage and a high-heat for industry, and (e) other electricity-based uses such as in agriculture. Public support for a purely green economy will wane if the economic costs are too high, so it is essential to maintain employment and real per-capita incomes. Decarbonizing the economy while also dealing with the economic costs of the COVID-19 pandemic can occur by using an integrated stepped approach.
The impacts of climate change on agriculture are accelerating at an unprecedented pace and adaptation actions should not lag behind. Improving adaptation capacity at different levels requires close collaboration among different stakeholders to experience and disseminate best practises and knowledge. However, there are very limited instruments and resources engaging various stakeholders for collaborative action for climate change adaptation in Turkish agriculture. Conventional ways of agricultural dissemination activities have been mainly based on face-to-face meetings and the Covid-19 pandemic disrupted dissemination and monitoring activities for a long while. On the other hand, the pandemic also showed that digital technologies would be highly beneficial for remote management of production and knowledge during the times of crisis. The purpose of the project is to enhance informed decision making for climate resilient agriculture through a well-connected network and platform in Turkey. The project combines a social network and a digital platform to improve communication and dissemination of knowledge on climate resilient agriculture strategies, policies and practices and provide a common ground for collaborative working of different stakeholders. The platform also benefits from citizen science through a smartphone app that allows collecting real time climate related crop loss data, which feeds into the vulnerability mapping tool on the platform. The vulnerability map is an evidence-based decision making support tool to optimize the limited resources for adaptation. The network and the platform will help farmers and the other stakeholder to learn from other’s experience, share their success stories and build collaborations for improving their capacities.
Urban Hydrologics and Climate Adaptation in Tropical Cities: Policies, Narratives, and Emerging Technologies to Accelerate Water Sensitive Urban Design Implementation

Pj Santa, Founder, Urban Hydrologics, Singapore

Water Sensitive Urban Design (WSUD) is an interdisciplinary approach integrating engineering, ecology, planning, and design to restore the natural water cycle in cities. Implementing WSUD policies and projects increases urban resiliency, social-ecological wellbeing, and economic growth in cities. Previous research shows that while awareness favoring climate adaptation is growing, tropical cities are not adequately implementing WSUD and nature-based solutions to match the risks derived from existing climate models. Widespread disinvestment and lack of funding make the existing contributions of private, public, and individual change-makers slow, piecemeal, and inefficient. Adequate case studies and national narratives showing how large-scale WSUD implementation efforts lead to success for the economy, ecology, society, and progress are needed. We use empirical data gathered by Urban Hydrologics, a climate adaptation group registered in Singapore, to describe the evolution, trajectory, and adoption of WSUD approaches and policies in Singapore over the last ten years. Having witnessed firsthand the progressive rollout of WSUD policies, incentives, and regulatory frameworks from 2011-2021, Urban Hydrologics’ research reveals valuable nation scale implementation insights. The group’s findings show how Singapore combined political, financial, educational programs to generate results at scale and within a decade. The findings indicate the right mix of national narratives, policies, and climate tech innovations can enable wider financing, implementation, community participation, and monitoring of nature-based solutions. Illustrated scenarios are showcased through the emerging tech innovation titled ‘Urban Hydrologic Virtual Twin’, with finishing remarks on how it can set in motion a blue-green data economy for tropical cities of the future.
Confronting Climate Change in a Liberal Arts Educational Context

Zoé Strecker, Associate Professor, Art, Transylvania University, Kentucky, United States

A two-year project, currently in progress at Transylvania University in Lexington, Kentucky, called “Crucial Terrain: Ecological Flourishing, Environmental Justice and Regenerative Culture in the Face of the Climate Crisis” aims to cultivate informed, regenerative visions for the future within a liberal arts curriculum and across the college’s community. This project strives to be intergenerational in reach, cross-disciplinary in structure, and transformational in long-term effect. Primary elements of the project include (1) year-long faculty learning communities of 6 members from a wide range of disciplines, (2) public programming including lectures, presentations, short workshops, art exhibitions and performances, delivered throughout each academic year by scholars (internal and external), artists, entrepreneurs, and thought leaders (3) a discussion group comprised of students (who earn partial credit), and other members of the college community (alumni, faculty, staff, administrators, and members of the university’s Board of Trustees and Board of Regents) in a spirit of cross-generational community-building and collaboration (4) an expansion of the existing Environmental Studies minor, currently contributed to by only a few disciplines, to a major that includes courses from all four academic divisions and, (5) for the long-term, plans for an interdisciplinary academic center for environmental arts and sciences that supports creative innovation and changemaking across boundaries of specialization to address urgent contemporary environmental challenges. This session provides an overview of this project-in-progress and invites recommendations for expanding this work and connecting with similar efforts in the liberal arts space.

Ripple Effects: Disseminating Local Climate Action via TV

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The paper presents research into how the efforts of local communities to tackle climate change may be amplified through the medium of local television. In the United Kingdom, public service television had a clear impact in how television was developed around ideas of community cohesion as well as education, information and entertainment (Scannell, 1990). However, when local television was set up in the 2010s, the adopted system was a commercial one. This hampers how communities can engage with local television to make their voices heard. This is particularly problematic in a city where there is a level of disconnect between what local community groups want to achieve and what the local government is willing to support. This paper examines how community-led local television may be able to amplify local voices to inspire change beyond the immediate membership of community groups. It presents the work conducted by Love Wavertree CIC, a local community group based in Liverpool, UK, which is collaborating with Edge Hill University to deliver a series of climate assemblies which will lead to some television content which will then be disseminated via the group’s website and local screenings.
Project: Assessing Impacts in Diverse Ecosystems

Projected Impacts of Climate on Temperature-Humidity Index Under Representative Concentration Pathway Scenarios

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The temperature humidity index (THI) is one of the measures to describe heat stress, especially when animals’ production (meat and milk) is considered. It is expected that THI values will vary due to changes in temperature and humidity in the coming decades. The aim of this study is to investigate the effects of climate change on THI and milk production under Representative Concentration Pathway (RCP) climatic scenarios proposed in the fifth assessment report (AR5) of IPCC in the western region of Iran. The climatic projections required for calculation of THI values during the future period were obtained from EC-EARTH model outputs, downscaled and calibrated for the study region. The suitable equation for calculation of THI was based on the climatic condition of selected study stations. The index values for baseline and future period were calculated and the trend of variation was worked out. Besides, the number of days with different level of heat stress in annual and monthly basis under RCP 4.5 and RCP 8.5 scenarios during four periods of 1981-2010, 2011-2040, 2041-2070 and 2071 to 2100 were calculated and compared with corresponding values of the baseline period. The results reveal that the index would be less affected by climate change during the months of April and May. The trend of milk production affected by climate change, during the future period is decreasing and significant at 99% level of confidence. Such that, by 2100, under RCP 4.5 and 8.5 scenarios, milk production would decrease 1 and 2 kg per year, respectively.
Climate Change Influence on Wildlife Tourism in Maasai Mara National Game Reserve, Kenya

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Richard Makopondo

Climate change impacts through erratic rainfall and temperature have the potential to affect wildlife population in parks and reserves. These parks and reserves are critical in supporting wildlife tourism. Possible impacts of erratic rainfall and temperature patterns on vegetation and wildlife population in Maasai Mara National Reserve (MMNR) were investigated. Explanatory research design including GIS and Earth observation technologies were adopted. Vegetation cover changes were ascertained by satellite imagery using Normalized Difference Vegetation Index (NDVI) method from (1975 to 2018). The Raw Landsat data was processed to generate NDVI from Erdas Imagine Software. Geographical representation of the NDVI was produced by ArcGis. The mean annual rainfall and temperature patterns for the period 1977-2016 were analyzed by time series. Findings reveal that rainfall and temperature variations affect wildlife populations by controlling vegetation distribution as there could be other factors too. Also, Elephant, Wildebeest and Rhino population declined with declines in NDVI as well as rainfall patterns. Therefore, extremely high and low rainfall trends characterized by floods and drought result in declines in vegetation and water. This results to starvation of wildlife and increase wildlife mortality. With declines in Wildlife population, wildlife tourism is highly likely to be negatively affected as tourists could prefer other destinations with abundant wildlife. Kenya Wildlife Service needs to adopt emerging technologies to locate carnivorous wildlife that are undercover during the day and can not be counted. More importantly, focus on robust Wildlife conservation models under changing climatic conditions.

Climate Justice and the Impact of Climate Change on Health in Uganda

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This paper analyzes the impact of climate change on human health in the country of Uganda, specifically regarding alterations in temperature, precipitation, and zoonotic disease transmission. These indicators suggest a disproportionate increase in climate-related environmental changes when compared to higher-income countries, such as the United States of America and Canada, despite a significantly lower contribution to greenhouse gas emissions. This reflects the global pattern of climate injustices, where low and middle-income countries consistently contribute the least to climate change yet experience the greatest environmental and health impacts. Technology-based methods of improving climate change preparedness and adaptation in Uganda are suggested based on the success of interventions in comparable countries. Additionally, a call for high-income countries to take accountability and recognize the “climate justice” movement will be imperative to progression of global climate adaptation funding and policy.
The Effect of Climate Change on the Productivity of Yam Crop in Cote d’Ivoire

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Efforts to improve the productivity of food crops as yam have increased through the implementation of adaptation methods in Cote d’Ivoire. These efforts are aimed at achieving food security as part of the United Nations’ Sustainable Development Goal 2. In fact, food security, which has been the main objective of developing countries for many years, is undermined by climatic variations. However, these climatic variations caused several damages to the food crop, particularly on yam crop which is one of the important food in the country in terms of production. Therefore, in this study, we analyze the effects of climate variations on the productivity of yam crops produced in Cote d’Ivoire. To carry out this study, we were inspired by the Ricardian analysis developed by Mendelsohn. This analysis has been adapted to our concerns by linking a set of climate variables such as temperature and precipitation with the productivity of the yam crops. The data used in this study are time series that covers the period from 1980 to 2015. The results obtained from the error correction model indicate that the productivity of yam crops has as variables that influence its short-run productivity the precipitation, the growth rate of the rural population, crude rate of mortality, and agricultural employment while in long-run all variables include in the model influence it except access to electricity in rural. Also, the relationship between climate variables and the productivity of yam crops studied is non-linear. This relationship is concave for temperature and convex for precipitation.

Bibliometric Analysis of the Climate–work Econometric Literature: What Are the Topics Most Dealt With in the Literature?

Grazia Errichiello, Student, PhD, Università Parthenope di Napoli, Italy

The main focus of this research is to understand which aspects are most taken into consideration in the climate–work econometric literature and which aspects are neglected. A bibliometric analysis was carried out with the VOSviewer software. First of all, a Scopus string was identified, it is suitable for enclosing all the results that deal with the topic. Second we did a review of the literature, subsequently the necessary information was uploaded to the software. In order to see which are the most cited articles and the relevant topics, an analysis of citations and terms was carried out. The results of the analysis show that the most cited article in the literature is that of Dell M. et al. (2014). By terms analysis four clusters was identified, they represent four main topics in climate–work econometric literature: adaptation, migration, economic effects and the effects of weather changes. The two main terms between the words in the clusters are Climate change and income. They represent the principal themes of the research and they are very connected with all clusters. Instead, the term labor market is repeated less times and has fewer connections with other words. The results were also confirmed by the robustness check. Based on these results, the topics most and least dealt with in the climatework econometric literature have been identified.
Participatory Methods for Examining Vulnerabilities to Exogenous Shocks: COVID-19, Climate Change, and Regional Food Systems Resilience

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Participatory processes are integral to sustainability and resiliency planning, as involving diverse stakeholders ensures planning practices and outcomes are grounded in local social, economic, environmental, and cultural contexts and realities. It follows that research and tools supporting planning processes should also be participatory, and such research approaches can lead to useful knowledge for developing appropriate, place-based approaches for addressing critical sustainability issues, such as climate change.

Using the Fraser Valley Regional District (FVRD, British Columbia, Canada) as a case study, this research experiments with participatory methods and tools for supporting long-term food systems planning by examining regional food vulnerabilities and opportunities/needs for building resilience to exogenous shocks. The research involved a series of meetings and workshops supported by an online collaboration platform, CoLabS, which engaged different FVRD stakeholders to first, reflect on what COVID-19 has revealed about regional food systems vulnerabilities, and second, discuss how these insights can be used for integrated long-term planning and increasing food resilience in the face of climate change. In addition to examining vulnerabilities and resilience strategies, workshop participants and collaborators identified key research questions, information gaps, and potential improvements to the CoLabS platform; thus, they shared intellectual leadership, helping guide the exploration in food systems resiliency and long-term integrated planning. Insights from this work include the importance of incorporating flexibility in methods and tools for conducting participatory sustainability research. The work also revealed challenges around maintaining stakeholder engagement and including the appropriate diversity of perspectives and voices in participatory research efforts.
Attendance List

Khair Abul, Human Rights Watch Commission (Bangladesh)
Mohammad Sayed Ahmed, Human Rights Watch Commission (Bangladesh)
Kadio Valere Rodolphe Angaman, WASCAL/UNIVERSITY CHEICK ANTA DIOP (Senegal)
Angela Antosiewicz, University of Michigan (United States)
Laura Arpiainen, Aalto University (Finland)
Boshir Ahmed Awal, Bureau Of Social Watch (Bangladesh)
Jhorland Ayala García, Banco de la República (Colombia)
Sepideh Azizi, Shiraz University (Iran)
Mst.Farida Begum, Voluntary Organization For The Needy (Bangladesh)
Christine Bergeron
Stephanie Bertels
Mariya Bezgrebelna, York University (Canada)
Marco Billi, Center for Climate and Resilience Research (CR)2 (Chile)
Roxana Bórquez, Center for Climate and Resilience Research (CR)2 (Chile)
Nastenka Calle, Pacific Institute for Climate Solutions - Simon Fraser University (Canada)
Heiner Camacho, Seoul National University, College of Engineering, Global R&DB Centre. (South Korea)
Reba Anne Carruth, Georgetown University (United States)
Thomas Clarke
Elizabeth Costa, Common Ground Research Networks (United States)
Jolly Ann Cruz, Marianas Islands Nature Alliance (Northern Mariana Islands)
Benedict Edward DeDominicis, Catholic University of Korea (South Korea)
Gabriela Degetau Zanders, MIT (United States)
Celine Delacroix, University of Ottawa (Canada)
Suzanne Dieringer, University of Tampa (United States)
Marian Leerburger Dr., US Government (United States)
Colin Dring, Royal Roads University (Canada)
Kailie Drumm, Washington State University (United States)
Sarah Elers, Kuva Space Oy (Finland)
Grazia Errichiello, Università Parthenope di Napoli (Italy)
Timothée Fouquieray, Université du Québec en Outaouais (Canada)
Amelia Wen Jiun Gan, Harvard University Graduate School of Design (United States)
Nozar Gahreman, University of Tehran (Iran)
Md Abdul Gofur, Society For Injury Prevention and Control Program (SIPACP) (Bangladesh)
Mariana González, Universidad Tecnológica Nacional – Facultad Regional Bahía Blanca (Argentina)
Christopher Graham, University of Massachusetts Boston (United States)
A.S.M.Ahsan Habib, HIV/AIDS STUDY AND RESEARCH MISSION (Bangladesh)
Probir Kumar Halder, bjsf (Bangladesh)
David F. Hendry, Climate Econometrics , Nuffield College, University of Oxford (United Kingdom)
Attendance List

Blake Hite, Georgetown University Law Center (United States)
S M Alamgir Hossain, Sun Yat-sen University (China)
Belayet Hossain, Transport Sector (Bangladesh)
Monir Hossain, Human Rights Watch Commission (Bangladesh)
Victoria Hurth, Cambridge Institute for Sustainability Leadership (United Kingdom)
Masako Ichihara, Research Institute for Humanity and Nature (Japan)
John Trixstan Ignacio, Ateneo de Manila University (Philippines)
Muhamad Shahidul Islam, Bureau of Social Watch (Bangladesh)
Md Jahirul Islam, Human Rights Watch Commission (Bangladesh)
Mei Ito, Fudan University (China)
Benjamin Bilalam Jabik, Kofi Annan International Peace Keeping Training Centre (Ghana)
Matthew Keller, Forschungszentrum Jülich GmbH (Germany)
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Sean Kidd, Center for Addiction and Mental Health/University of Toronto (Canada)
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Angelica Leti, Common Ground Research Networks (United States)
Carl Lindquist, Superior Watershed Partnership (United States)
Andrew Mackenzie, The Physiological Society (United Kingdom)
Gordon Mc Bean, Western University and Institute for Catastrophic Loss Reduction (Canada)
Nancy McCarthy, LEAD Analytics (United States)
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Alice Miank, Collin College (United States)
Stephanie Midgley, Western Cape Department of Agriculture (South Africa)
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Nicolás Rovira, Santo Tomas University (Colombia)
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Lauren Smith, University of Waterloo (Canada)
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Yali Woyessa, Central University of Technology, Free State (South Africa)
Blank Xu, Seastel Marine System Canada Inc. (Canada)
Mikhail Yerkovich, Kwantlen Polytechnic University (Canada)
Common Ground Research Networks
Founded in 1984, Common Ground is committed to building new kinds of knowledge communities, innovative in their media, and forward-thinking in their messages. Heritage knowledge systems are characterized by vertical separations—of discipline, professional association, institution, and country. Common Ground Research Networks takes some of the pivotal challenges of our time and curates research networks that cut horizontally across legacy knowledge structures. Sustainability, diversity, learning, the future of humanities, the nature of interdisciplinarity, the place of the arts in society, technology’s connections with knowledge—these are deeply important questions of our time that require interdisciplinary thinking, global conversations, and cross-institutional intellectual collaborations.

Common Ground Research Networks are meeting places for people, ideas, and dialogue. However, the strength of ideas does not come from finding common denominators. Rather, the power and resilience of these ideas is that they are presented and tested in a shared space where differences can meet and safely connect—differences of perspective, experience, knowledge base, methodology, geographical or cultural origins, and institutional affiliation. These are the kinds of vigorous and sympathetic academic milieus in which the most productive deliberations about the future can be held. We strive to create places of intellectual interaction and imagination that our future deserves.
The Common Ground Media Lab is the research and technology arm of Common Ground Research Networks. Common Ground Research Networks has been researching knowledge ecologies and building scholarly communication technologies since 1984.

Since 2009, we have had the fortune of being based in the University of Illinois Research Park while building our latest platform – CGScholar. This is a suite of apps based on the theoretical work of world-renowned scholars from the College of Education and Department of Computer Science at the University of Illinois Urbana-Champaign. CGScholar has been built with the support of funding from the US Department of Education, Illinois Ventures, and the Bill and Melinda Gates Foundation.

The CGScholar platform is being used today by knowledge workers as diverse as: faculty in universities to deliver e-learning experiences; innovative schools wishing to challenge the ways learning and assessment have traditionally worked; and government and non-government organizations connecting local knowledge and experience to wider policy objectives and measurable outcomes. Each of these use cases illustrates the differing of knowledge that CGScholar serves while also opening spaces for new and emerging voices in the world of scholarly communication.

We aim to synthesize these use cases to build a platform that can become a trusted marketplace for knowledge work, one that rigorously democratizes the process of knowledge-making, rewards participants, and offers a secure basis for the sustainable creation and distribution of digital knowledge artifacts.

Our premise has been that media platforms—pre-digital and now also digital—have often not been designed to structure and facilitate a rigorous, democratic, and a sustainable knowledge economy. The Common Ground Media Lab seeks to leverage our own platform – CGScholar – to explore alternatives based on extended dialogue, reflexive feedback, and formal knowledge ontologies. We are developing AI-informed measures of knowledge artifacts, knowledge actors, and digital knowledge communities. We aim to build a trusted marketplace for knowledge work, that rewards participants and sustains knowledge production.

With 27,000 published works and 200,000 users, we have come a long way since our first web app twenty years ago. But we still only see this as the beginning.

As a not-for-profit, we are fundamentally guided by mission: to support the building of better societies and informed citizenries through rigorous and inclusive social knowledge practices, offering in-person and online scholarly communication spaces.

Supporters & Partners

As they say, “it takes a village.” We are thankful for the generous support of:

Bill & Melinda Gates Foundation
IES Institute of Education Sciences
Illinois Ventures

And to our Research Network members!

www.cgnetworks.org/medialab
Climate change is one of the most pressing problems facing our world today. It is in the interests of everyone that we engage in systemic change that averts climate catastrophe. At Common Ground Research Networks, we are committed to playing our part as an agent of transformation, promoting awareness, and making every attempt to lead by example. Our Climate Change: Impacts and Responses Research Network has been a forum for sharing critical findings and engaging scientific, theoretical, and practical issues that are raised by the realities of climate change. We’ve been a part of global policy debates as official observers at COP26 in Glasgow. And we are signatories of the United Nations Sustainability Publishers Compact and the United Nations Climate Neutral Now Initiative.

Measuring
In 2022 we start the process of tracking and measuring emissions for all aspects of what we do. The aim is to build a comprehensive picture of our baselines to identify areas where emissions can be reduced and construct a long-term plan of action based on the GHG Emissions Calculation Tool and standard established by the United Nations Climate Neutral Now Initiative.

Reducing
At the same time, we are not waiting to act. Here are some of the “low hanging fruit” initiatives we are moving on immediately: all conference programs from print to electronic-only; removing single-use cups and offering reusable bottles at all our conferences; working closely with all vendors, suppliers, and distributors on how we can work together to reduce waste; offering robust online options as a pathway to minimize travel. And this is only a small sample of what we’ll be doing in the short term.

Contributing
As we work towards establishing and setting net-zero targets by 2050, as enshrined in the Paris Agreement and United Nations Climate Neutral Now Initiative, and to make further inroads in mitigating our impacts today, we are participating in the United Nations Carbon Offset program. As we see climate change as having broad social, economic, and political consequences, we are investing in the following projects.

- Fiji Nadarivatu Hydropower Project
- DelAgua Public Health Program in Eastern Africa
- Jangi Wind Farm in Gujarat

Long Term Goals
We’re committing to long-term science-based net-zero targets for our operations – and we believe we can do this much sooner than 2050. We’ll be reporting annually via The Climate Neutral Now reporting mechanism to transparently communicate how we are meeting our commitments to climate action.

www.cgnetworks.org/about/climate-pledge
Proceedings of the Fourteenth International Conference on Climate Change: Impacts & Responses, 7-8 April 2022. The conference featured research addressing the following special focus: “Responding to Climate Change as Emergency: Governing the Climate Emergency” and annual themes:

· The Nature of Evidence: Why the persistent challenge of universalizing evidence based approaches?
· Assessing Impacts in Diverse Ecosystems: What are the impacts of climate change on natural environments in particular and universal views?
· Human Impacts and Responsibility: How have we been agents of climate change, what does a politics of responsibility reveal?
· Technical, Political, and Social Responses: How do scientists, technologies, policy makers, and community members respond to climate change?