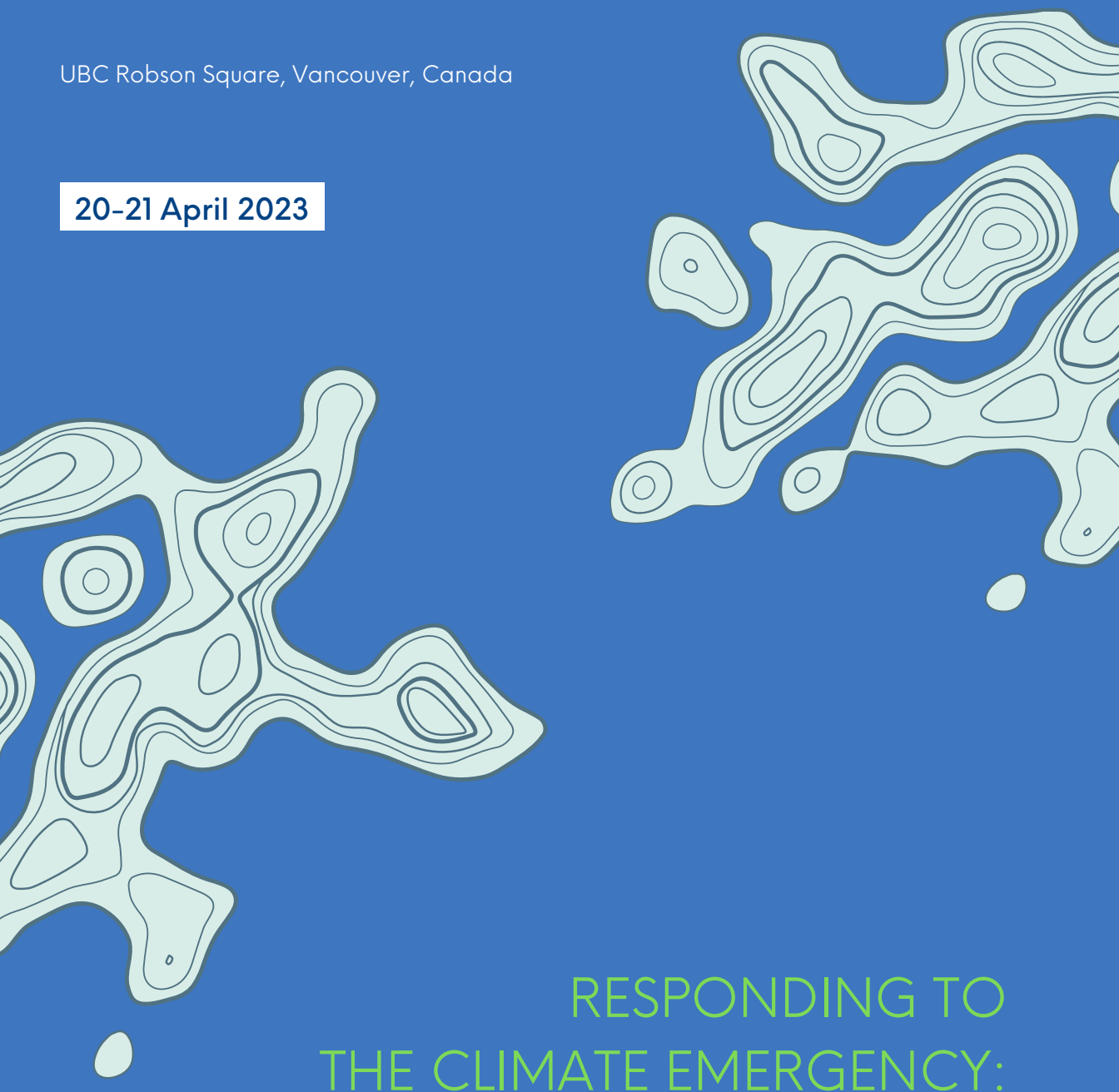
Fifteenth International Conference on
Climate Change: Impacts & Responses

UBC Robson Square, Vancouver, Canada

20-21 April 2023



RESPONDING TO THE CLIMATE EMERGENCY: SCALABLE SOLUTIONS FOR THE CLIMATE-NATURE INTERSECTION

The Fifteenth International Conference on Climate Change: Impacts & Responses Conference Proceedings

https://on-climate.com/about/history/2023-conference

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Welcome Letter

Climate Change:
Impacts & Responses

Dear Conference Delegates,

A very warm welcome to the 15th Common Ground Research Network's International Conference on Climate Change: Impacts & Responses.

With the IPCC stating in March this year that urgent action is needed to secure a livable future for all, the science and realities of climate change are ever more underlining the 'emergency' we are currently facing and living through. As such, the work you are all doing to find real and wise solutions and build your own capacity and abilities has never been more important. Although there will always be value in positive climate action, there is currently a pressing need to lock in positive transformational change in societies around the world to set our world on a better course. In this context, we hope that this year's conference supports you in your contribution to that.

After last year's fully online conference, this year, we have a blended format held in 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 regardless of how you intend to join! While we expect a blended conference to be the norm from now on, 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 otherwise 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 are once again 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. Topics range from "Ubuntu as a Social Response to the Burden of Climate Change" to "Advancement of the Climate Change Adaptation, Resilience-Building, and Sustainability Model in Agriculture in Developing Countries". As always, we are extremely fortunate to have had submissions from around the world, including scholars and practitioners based in counties including Spain, Turkey, South Africa, the USA, Nigeria, Japan, Chile, India, the United Kingdom, Canada, and Brazil.

Our exceptional plenary keynotes in the theme of our topic: 'Responding to the Climate Change: Scalable Solutions for the Climate-Nature Intersect", gives us an opportunity to learn from renowned leaders within from the wonderful city of Vancouver, Canada, as well as from beyond. We will hear from Tony Juniper, CBE, Chair, Natural England, United Kingdom and Kai Chan, Professor and Canada Research Chair in Rewilding and Social-Ecological Transformation, Institute for Resources, Environment and Sustainability, University of British Columbia, Canada. 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 through your professional and personal lives, we hope that you find inspiration in this year's conference. We hope, through this conference, that you will be able to lead, learn, grow and develop the leadership skills you seek to play your part in Governing the Climate Emergency. Please take time to explore the various aspects of this year's online forum and remember you can browse more than 20 interdisciplinary Research Networks Common Ground.

With all best wishes

Victoria Hurth and Stuart Captsick

Climate Change: Impacts & 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 peasantries. 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 Impacts

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?

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 Realties – floods, drought, forest fires, hurricanes, and other events
- Data Politics – the use of climate informatics
- Visons 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 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
- Intrenching Inequality - climate change in the developing world
- Adaptation and Resilience – private, public, and individual change makers
- 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 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
- Intrenching Inequality - climate change in the developing world

Technical, Political, and Social Responses

How do scientists, technologies, policy makers, and community members respond to climate change?

Living Tensions

- Adaptation and Resilience – private, public, and individual change makers
- 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

Victoria Hurth

Fellow, Institute for Sustainability Leadership, University of Cambridge, United Kingdom

Dr Victoria Hurth is 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 organisational 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 PhD (Exeter) on the role of marketing as a driver of sustainable/unsustainable consumption. Her research and practice now focuses on purpose-driven organisations 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 Task force for developing methodology for SDG indicator 12.6.1. and the Convenor of ISO37000 – the first global standard on Governance of Organisations.

Stuart Capstick

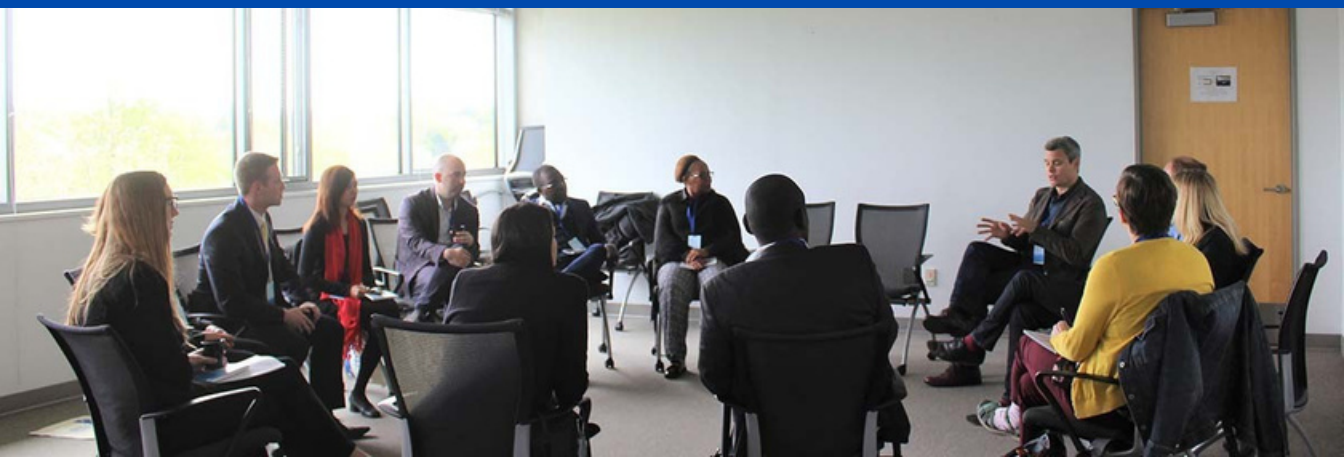
Research Fellow, Deputy Director, and Theme 3 Leader, Centre for Climate Change and Social Transformations, Cardiff University, Cardiff, UK

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.

The **Climate Change: Impacts & Responses Research Network** is grateful for the foundational contributions, ongoing support, and continued service of our Advisory Board.

Fifteenth International Conference on Climate Change: Impacts & Responses



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Past Events

- 2009 - Bharati Vidyapeeth Institute of Environment Education and Research, Pune, India
- 2010 - University of Queensland, Brisbane, Australia
- 2011 - Rio De Janeiro, Brazil
- 2012 - University of Washington, Seattle, USA
- 2013 - Labourdonnais Waterfront Hotel, Port-Louis, Mauritius
- 2014 - University of Iceland, Reykjavik, Iceland
- 2015 - UBC Robson Square, Vancouver, Canada
- 2016 - NU University of Science (HUS), Vietnam National University (VNU), Hanoi, Vietnam
- 2017 - Anglia Ruskin University, Cambridge, UK
- 2018 - University of California at Berkeley, Berkeley, USA
- 2019 - Pryzbyla Center, The Catholic University of America, Washington, D.C., USA
- 2020 - Ca' Foscari University of Venice, Venice, Italy (Virtual)
- 2021 - UBC Robson Square, Canada (Virtual)
- 2022 - UBC Robson Square, Canada (Virtual)

The **Climate Change: Impacts & Responses Research Network** is thankful for the contributions and support of the follow organizations.

ESCP PAU BUSINESS SCHOOL
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International Institute for the Inclusive Museum

THE CATHOLIC UNIVERSITY OF AMERICA

Ca' Foscari University of Venice

Responding to the Climate Emergency: Scalable Solutions for the Climate-Nature Intersect

The climate emergency is now so urgent that for those who understand its seriousness, it can occupy the central place in decision-making. Further for those who don't understand the issues, climate change is often the issue that is most visible, understandable and actionable – because, like finance, carbon has similar features of fungibility and so solutions can appear to fit more neatly into business-as-usual. Collectively we can think of this as 'climate myopia'. Whilst it is true that a wide range of issues will be solved by changing the source of our energy, which is the main driver of climate change. There are a whole range of serious nature-based issues such as soil erosion, biodiversity loss, water scarcity, and nitrogen disruption that are based not on the source of energy but how we use that energy to transform the natural world around us. Research suggests that each issue taken on its own has the ability to undermine the long-term wellbeing of people and planet. Innovation takes time and it seems apparent that we have a narrow window to address these multiple issues simultaneously – we also can't afford to make other issues worse while we deal with a different one. While we need many diverse place-based initiatives, the urgency suggests we need to identify those can be scaled quickly across places. Hence, this year's conference will focus in specifically on scalable solutions that heal and protect both the climatic system and nature. We welcome papers on this special theme from all disciplines, as well as papers covering all the standard network themes.

Kai Chan

Professor and Canada Research Chair in Rewilding and Social-Ecological Transformation, Institute for Resources, Environment and Sustainability, University of British Columbia, Canada

"Responding to the Climate Emergency: Some Provocations"

Kai Chan is a Professor and Canada Research Chair in Rewilding and Social-Ecological Transformation at the Institute for Resources, Environment and Sustainability at the University of British Columbia. Kai is an interdisciplinary, problem-oriented sustainability scientist, trained in ecology, policy, and ethics from Princeton and Stanford Universities. He strives to understand how social-ecological systems can be transformed to be both better and wilder. Kai leads CHANS lab (Connected Human-and-Natural Systems), and is co-founder of CoSphere (a Community of Small-Planet Heroes). He is a former UBC Killam Research Fellow; a member of Canada's Clean16 and Clean50 for 2020; a Leopold Leadership Program fellow; senior fellow of the Global Young Academy and of the Environmental Leadership Program; a member of the Royal Society of Canada's College of New Scholars, Artists and Scientists; Lead Editor of the new British Ecological Society journal People and Nature; a coordinating lead author for the IPBES Global Assessment; and (in 2012) the Fulbright Canada Visiting Research Chair at the University of California, Santa Barbara.

Mike Morecroft

Principal Specialist for Climate Change, Natural England, United Kingdom

"Tackling the Joint Crises of Climate Change and Biodiversity Loss"

Dr. **Mike Morecroft** is Principal Specialist for Climate Change at Natural England, the government conservation agency for England and a Coordinating Lead Author on ecosystems for the Intergovernmental Panel on Climate Change's most recent (6th) Assessment (IPCC Working Group II). His work centres on developing the science of climate change impacts, adaptation and mitigation and applying it to conservation policy and practice. He is currently leading a large science programme on Nature-based Solutions for climate change, working closely with a range of land managers. Mike has contributed to the UK's Climate Change Risk Assessment and National Adaptation Programme on several occasions and is a member of the UK Government's Trees and Woodlands Science Advisory Group. He has published over 160 scientific papers and reports and led a research group at the UK Centre for Ecology and Hydrology before joining Natural England in 2009.

Each year a small number of Emerging Scholar Awards are given to outstanding early-career scholars or graduate students. Here are our 2023 Emerging Scholar Award Winners.

Angel Kennedy
Simon Fraser University, Canada

Kulsum Fatima
University of Calgary, Canada

Dongdong Xiao
University College London, UK

Stephen Chitengi Sakapaji
Hokkaido University, Japan

Magdalena Viktora-Jones
Florida International University, United States

Natalia Dus Poiatti
University of Sao Paulo, Brazil

María Otero-Auristondo
Pontifical Catholic University of Valparaíso, Chile

Vanshika Kirar
University of Delhi, India

Obianuju Patience Ilo
University of KwaZulu-Natal, South Africa

Ignacio Portela Giráldez
Universitat Pompeu Fabra/Maastricht University, Spain

Vitor Manuel Dinis Pereira
Research, Language, Mind and Cognition Research Group (LanCog), University of Lisbon, Portugal

Alejandra Linares Figueruelo
University of Barcelona, Spain

Hassan Ahmad
University of British Columbia, Canada

Philip Egbule
University of Delta, Nigeria

Presentations, Presenters, Participants

Climate Change Litigation: Pathways and Challenges to Justice in Canadian Courts

Hassan Ahmad, Assistant Professor, Peter A. Allard School of Law, University of British Columbia, British Columbia, Canada

This paper explores climate change litigation in Canadian courts in two ways. First, I interrogate the role that provincial and federal Canadian judges play in combating climate change. I canvass a burgeoning literature on 'role morality' and place the Canadian judge in the unique position of being able to modify the behaviour of powerful Canadian actors. Judges are not subject to the political cycle like the elected branches of government. They are also not responsible for maximizing shareholder profits like MNC directors and officers. As such, in theory, they are able to contribute to combatting climate change in a way that other decision-makers cannot. The judge's role morality consequently touches on perennial topics around the separation of powers and corporate purpose, both of which are implicated in climate change litigation. Second, I explore doctrinal challenges confronted by parties and judges involved in climate change litigation. There are a number of tort law, constitutional law, and corporate law doctrinal barriers that litigants have and will continue to face when they decide to sue governments and corporations for their respective contributions to climate change. Among these barriers are formalistic (or even parochial) understandings of, for instance, the corporate veil, the duty of care, foreseeability, causation, and standing. Also, it is unknown how Canadian courts will interpret the Charter of Rights and Freedoms in constitutional claims against governments.

Economic Cost-Benefit Analysis of Investment on Carbon Capture and Storage Technology: An Alternative Approach to Renewable Energy to Achieve Net-Zero Emission by 2050

Nurul Aman, Senior Lecturer, Economics, University of Massachusetts Boston, Massachusetts, United States

The objective of this study is to explore the economic benefit and policy effectiveness in investing Carbon Capture and Storage (CCS) Technology to avoid the Climate Change catastrophe as projected by the experts. The study suggests that renewable energy at it current status seems incapable of achieving net zero emission target by 2050. The cost-benefit approach of investment indicates a promising alternative to achieve Net-Zero Emission target without replacing the existing fossil-fuel infrastructure in the short-run with long run sustainability. Considering CC a global public good, government funding is necessary to achieve the Goal of Net-Zero Emission.

Climate Vulnerability of National Economies and Mobility Challenges: The Case of Egypt and Vietnam

Dimitrios Anastasopoulos, Student, Athens College, Athens College, Attiki, Greece
Saradamoyee Chatterjee, Affiliated Lecturer, Centre of Development Studies, University of Cambridge, Cambridgeshire, United Kingdom

The study attempts a comparative analysis of the economic implications of climate change in two developing countries, namely Egypt and Vietnam, and the subsequent mobility challenges of the population. This study pursues a descriptive, "literature review" approach of identifying, collecting and analyzing data from credible reports and research studies. Egypt and Vietnam have comparable economies. Vietnam has been transformed from being among the world's poorest nations to a lower middle-income nation that aims to become, according to the World Bank, a high-income country by 2045. Egypt belongs to a grouping of countries located in Middle East and North Africa known as "MENA", experienced political and economic transformations, but with a potential for significant future expansion. The analysis shows that Egypt and Vietnam are one of the most vulnerable countries to climate change impacts and face substantial economic consequences. Both countries experience de-escalate growth rates and reduction in GDP. The impacted sectors are housing and property values, tourism sector, agriculture sector, transportation and health. Mainly UNEP prioritizes the mitigation of climate change effects in Egypt since it is home to 7 UNESCO world cultural heritages. The primary climate impacts forcing mobility of population in Egypt include sea level rise, desertification, and soil degradation and extreme flooding for Vietnam. The study states that since significant parts of population are impacted by climate change, mobility is a significant adaptation strategy including governmental relocation programs. The study concludes that the benefits of solid and early action far outweigh the economic costs of not acting.

Scorecard Method to Assess Lock-in Effect in Urban Planning Strategies

Attila Buzasi, Associate Professor, Department of Environmental Economics and Sustainability, Budapest University of Technology and Economics, Hungary

Decision-makers and urban planners must consider climate change issues in current and future planning documents; moreover, the long-term effects of proposed actions are of utmost importance. Lock-in is a path-dependent process that can hinder future urban transformations due to its initial beneficial features and related advantages. Consequently, analyzing the lock-in effect contribute to preventing long-term, hard-to-change trajectories which decrease the climate vulnerability of a given system. This study assesses the lock-in potential of urban planning documents regarding the largest Hungarian cities by applying the scorecard method with predefined thematic categories. The analysis framework considers both direct and indirect impacts in order to reveal and define those urban development actions that would be potentially harmful in terms of climate adaptation issues. Infrastructural, institutional, and behavioral lock-ins are all involved in this study which can enhance planners' and decision-makers' consciousness regarding the long-term effects of urban development goals. The results contribute to a more climate-friendly and conscious urban governance model, which would be crucial in a country like Hungary, facing significant changes in its climatic conditions even nowadays and in the near future.

Integrating Indigenous Knowledge and Climate Smart Agriculture: The Role of Institutional and Policy Enablers

Elias Gaveta, Student, Ph.D., Mzuzu University, Malawi

Climate smart agriculture (CSA) is a holistic approach that aims to enhance agricultural productivity, adapt to climate change, and mitigate greenhouse gas emissions. One crucial aspect of CSA is its compatibility with traditional farming practices, such as conservation agriculture, agroforestry and crop diversity. These practices have been long used in African communities, however to increase the adaptability of these practices, new interventions such as stress-adapted crop varieties, weather-based planting dates and weather forecasting have been integrated. However, a study conducted in Malawi, Kenya and Nigeria, highlights that despite the potential of CSA, the integration of traditional knowledge and CSA is not working as effectively as desired. The scale-up of CSA is hindered by inadequate public sector funding, as well as poorly structured support services. To overcome this challenge, a systematic CSA scaling-up plan across key sectors such as forestry, irrigation, and agriculture is needed. Moreover, efficient, timely, and reliable knowledge systems must be in place to support the implementation of CSA. This includes location-specific foods that are economically viable, nutritionally safe and locally acceptable, as well as policies that protect user rights for land resources, establish community farming institutions and enhance knowledge sharing among farmers.

Impact of Climate Change on Crop Production and Potential Adaptive Measures in the Olifants Catchment, South Africa

Mary Funke Olabanji, Environmental Project Coordinator, Environmental Management, Bokamoso, Gauteng, South Africa
Obianuju Patience Ilo, Student, PhD, University of KwaZulu-Natal, Kwazulu-Natal, South Africa

Climate change is expected to substantially reduce future crop yields in South Africa, thus affecting food security and livelihood. Adaptation strategies need to be implemented to mitigate the effect of climate change-induced yield losses. In this paper, we used the WEAP-MABIA model, driven by six CORDEX climate change data for representative concentration pathways (RCPs) 4.5 and 8.5, to quantify the effect of climate change on several key crops in the Olifants catchment. The study further investigated climate change adaptation such as the effects of changing planting dates with the application of full irrigation, rainwater harvesting, deficit irrigation method, and the application of efficient irrigation devices on reducing the impact of climate change on crop production. The results show that average monthly temperature is expected to increase by 1 °C to 5 °C while a reduction in precipitation ranging between 2.5% to 58.7% is projected for both RCP 4.5 and RCP 8.5 relative to the baseline climate for 1976–2005, respectively. The results also reveal that increased temperature and decreased precipitation during planting seasons are expected to increase crop water requirements. A steady decline in crop yield ranging between 19–65%, 11–38%, 16–42%, and 5–30% for maize, soya beans, dry beans, and sunflower, respectively, is also projected under both RCPs climate change scenarios. The study concludes that adaptation measures such as the integration of changing planting dates with full irrigation application and the use of rainwater harvest will help improve current and future crop production under the impact of climate change.

Environmental Performance in the Philippines and India: Comparative Analysis of the Sustainability Reports of Listed Companies

Francia Santos, Assistant Professor, Marketing and Advertising, Ramon V. del Rosario College of Business (RVRCOB), De La Salle University (DLSU)-Manila, Philippines

In the company setup of large-scale industries, there are such activities that involve environmental degradation. Therefore, it is mandatory for such companies to perform corporate sustainability reporting as part of their compliance to environmental laws and International Standard of Organisation (ISO) 26000. It is a virtue with which company can give back to the society for the environmental damages that they have done in the process of their manufacturing and business operations. This study has analysed sustainability reports of 25 listed companies each from Philippines and India. The study focuses on the environmental parameters such as energy consumption, renewable energy, water consumption, air emissions, generated wastes. The study further aims to develop a framework that involves Public Private Partnership (PPP) model which shows how a systemic approach to environmental sustainability is inclusive and resilient to the barriers to climate change. Implications of this study would be essential for environmental sustainability strategies that will mitigate the negative impact of business operations on society and nature. Relevant findings have significance in terms of climate change adaptation, environmental performance and policy implications. Most importantly, the need to have concerted efforts to resolve this large issue are addressed in this study.

Advancement of the Climate Change Adaptation, Resilience-Building, and Sustainability Model in Agriculture in Developing Countries

Stephen Chitengi Sakapaji, Postdoctoral Research Fellow, Arctic Research Center, Hokkaido University - Arctic Research Center, Hokkaido, Japan

Today, Global Climate Change (GCC) and responses to it are altering the ways food is produced, processed, and consumed. A major threat to many people's ability to access food, particularly in developing countries, has been the agriculture sector's recent history of struggles and challenges brought about by a changing climate. Therefore, finding practical and cutting-edge answers to the problems of climate variability and sustainability in agriculture is essential. The United Nations 2030 agenda places a greater emphasis on the creation and effective application of models, policies, technology innovations, and strategies that call for the full participation of all parties, including local and indigenous people and their experiences, traditions, and cultural practices. However, despite providing clear examples of sustainable lifestyles within their ecological environment, the voices, knowledge, and concerns of both indigenous and local people have remained underrepresented in the climate change and sustainability discourse. This paper thus, advances the climate adaptation, resilience-building, and sustainability (CARS) model in agriculture in developing countries. The CARS model is a model meant for policymakers and hinges on the integration of scientific, indigenous, and local knowledge in the climate change adaptation discourse. The model supports the notion that an understanding of how policies may affect local and indigenous people and their resilience to GCC is critical to opening up an environment that supports community-based efforts to adapt to climate change by giving them options and engaging them in finding innovative, sustainable, and effective ways to adapt to a continuously changing and unpredictable climate.

Combustion Optimization by Magnetic Action Impact on CO2 Concentrations in the Mitigation of Air Pollution: Anthropogenic Climate Change from Mobile Sources Emissions

Raul Guerrero Torres, Professor, Faculty of Engineering, Universidad de Cartagena, Bolívar, Colombia

The purpose of this paper is to present implementation of Combustion Optimization by Magnetic Action (COBMA) as a crucial action to effectively abating air pollution, controlling CO2 emissions, from mobile sources. It is supported by new analyses emissions test results and recent announcements from authoritative sources that are increasingly alarming. Announcements point out the global ineffectiveness on cutting emissions, missing the right path to a sustainable future and thoughtlessly moving away increasingly fast from it, towards a close unstable-equilibrium. Implementation of COBMA and other proven actions constitute an urgent path we must follow right now to keep the planet temperature from rising above 2°C, averting a climate catastrophe. We only will achieve this goal working together but, globally integrated around a more comprehensive view of the Earth-Atmosphere system balance; seeing the Earth as a planet that behaves as if it were alive, at least to the extent of regulating its climate and chemistry. Consequently, in this paper, we analyze the recent alarming reports, highlighting the scientific heritage on diagnosing climate-change evolution; the main roots of global ineffectiveness to guarantee a sustainable future are characterized; the importance of a balanced combustion and its connection with the earth-atmosphere balance is emphasized and, finally, from analysis of periodic tests results in two cars and two motorcycles, is concluded that COBMA, with and without pre-treatment, reduces efficiently CO and HC emissions concentrations controlling CO2 emissions concentrations, keeping them steady after several weeks.

Climate Change an Existential Threat Today

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

This work focuses on the two aspects of climate change, global warming and the increasing incidence and strength of catastrophic weather. The objective of this research is to consider the driver(s) of these aspects of climate change and whether the rate of increase of either or both can be limited and whether the increases in either or both can be reversed. This research was undertaken because of the damages caused and the monumental threat posed by global warming and the tenfold increase in the devastation wrought by catastrophic weather since the seventies. The goal of this work is to add to the teachings on climate change. NOAA global land and sea temperature, global humidity and land precipitation records, satellite measurements of the moisture content of the atmosphere and data on the global impact of catastrophic weather since the seventies were analyzed in accordance with the laws of thermodynamics. The research shows that water vapor, the primary greenhouse gas, is a key contributor to global warming drives evaporation and the increasing moisture content of the atmosphere. This is validated by the match to the historic data. The physics indicate that the recent historic global mismatch between evaporation and precipitation, the resulting increases in the concentration of water vapor and the effects of these increases, that the rate of increase in both global warming and catastrophic weather can be limited and if the rate of precipitation can be increased to exceed the evaporative rate, the effects of both can be reversed.

Assessing Impacts in Diverse Ecosystems

Comparative Analysis of Drought Effects on the Agricultural Industry in the Colorado Basin Region of the United States

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The states of the lower and upper regions of the Colorado River basin are largely dependent on surface water resources for use in areas such as agriculture, industry, and municipal activities. However, a severe drought running well over a decade and other climate change effects, have had lasting effects on the ecosystem, economy, and agriculture of the region leading to the call for timely implementation of conservation efforts to stem present and future losses to human activities in the region. The largest consumer of water in the region is the agricultural sector and it is important to understand what effects the reduced access to surface water resources has had on such a large sector as the agricultural industry. This paper focuses on the river basin to determine the effects of this multiyear drought has had on the cropping decisions made by farmers over time. Land surface temperature and vegetation parameter data are utilized to obtain drought indices over a period covering the years 2000-2022, precipitation data covering the period as well is used to validate the results of the temporal drought analysis. The findings are then compared to crop production data obtained from the United States Cropland Data Layer (USDA-CDL). As such the analysis of the multiyear drought shows the effect it has had on crop production in the region as farmers have had to make conservative decisions on crop acreage and the types of crops planted based on the availability of water in the region,.

Natural Ecosystems and Climate Change: Rehabilitation of Natural Coastal Systems

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In Canada as well as abroad, there is increasing recognition of the important role that nature based solutions can play in both carbon mitigation and climate resilience and adaptation. Rehabilitation of natural coastal systems such as wetlands can provide increased carbon sequestration from the atmosphere; but also provides a host of co-benefits that range for the protection of shoreline stability, through to biodiversity, fisheries, flooding and water quality benefits. This paper outlines several projects BMT Global have been undertaken to explore and embed nature based solutions. This includes coral rehabilitation projects in Island states in the Indian and Pacific, flood mitigation projects in the UK using natural buffers and detention as well as blue carbon accounting and restoration of mangroves, saltmarsh and coastal forests in Australia. Focus is provided on the drivers for the projects, the methods used, the studies undertaken to support rehabilitation strategies and priorities and implementation and governance. Lessons learned will also be evaluated in the context of exploring these sorts of studies and projects in a Canadian context.

An Error Correction Model to Project Sea Level Rise

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Semi-empirical is a standard approach that is widely used by climate scientists to project the sea level rise, for example, work by Rahmstorf (2007, 2009), Grinsted et al. (2009), and Orlic& Pasaric (2013, 2015). The sea level projections from the these past studies tend to vary widely depending on the relationship assumed and the data used. In this paper, we propose a new approach, which is built on a well-known Econometric model, namely the Error Correction Model (Engle and Granger, 1987), to estimate the relationship between the sea level rise and the global warming. The main advantages of our approach are: 1. sound empirical framework as the ECM model is a well established approach in the Economics literature; 2. capable of estimating both the long-term relationship between the sea level and the temperature, and short-term dynamics of such relationship; 3. the framework is flexible enough to accommodate a wide range of assumptions, therefore can be expanded in future research. Using data from 1882 to 2020, our model estimates that for every one degree Celsius increase in global temperature, the sea level will rise by 279 millimeters over the course of 46 years. The magnitude of our estimate is within the range of the past studies.The parameters from our estimates are statistically significant and the model back tests well in the out-of-sample testing. We then construct sea level rise projections corresponding to different IPCC climate paths. At conclusion, we also propose several future research options that can further refine our method.

How Do the Risks of Climate Change Affect the Livelihood of Haor Areas of Bangladesh?: A Study on Hakaluki Haor

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Risks must be addressed in the haor region of Bangladesh in order to meet the challenges posed by climate change. This study identifies the risks of climate change in the haor area of Bangladesh, especially in Hakaluki Haor, as well as the damage that the haor area is facing due to climate change. It is critical to determine how climate change risks affect the people of Hakaluki Haor and, ultimately, how they affect the livelihood of Bangladesh's quality of life. The results of this research will help to understand the impact of climate change on the different wetlands of Bangladesh. In-depth interviews were conducted with 30 residents of Hakaluki Haor to identify the risks of climate change. Journal articles, books, research materials, and internet databases were consulted as secondary data sources. Then the data were subjected to thematic analysis. According to this study, climate change increases the risk of floods, thunderstorms, hailstorms, and heavy rainfall during the monsoon season. These climate risks can cause crop damage, reduced livestock rearing as a source of income, and higher rates of starvation, child marriage, and maternal mortality in the Hakaluki Haor region. This study provides evidence that climate change creates humanitarian disasters in the Haor area of Bangladesh.

Climate Change and Inflation in Eastern and Southern Africa

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This study analyzes the dynamics of key climate change indicators and their implications on food prices in Eastern and Southern African Countries. The study uses descriptive and quantitative analysis of monthly data covering ten countries over the period 2001 to 2020. The descriptive analysis reveals that the sampled countries have experienced various climate change events with increasing intensity in the last two decades. Additionally, three of the countries in the sample ranked in the list of countries most affected by extreme weather events in 2019 are at risk of either frequent events or rare but extraordinary catastrophes. The quantitative analysis showed that supply shocks measured using rainfall amounts and imported food price inflation are the main determinants of food inflation, whereas oil prices, subsidies, and imported inflation are the key determinants of overall inflation. At a macro level, the analysis shows that all countries have various climate change policy initiatives in place but are still vulnerable to climate change risks. This implies a need for sector-specific climate change policy options that are most effective. In addition, the adoption of renewable sources of power such as wind and solar and appropriate irrigation practices is important.

Sustainable Financing, Climate Change Risks, and Bank Stability in Kenya

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This study analyses the impact of climate risk indicators on bank stability in Kenya based on descriptive and quantitative approaches on quarterly data covering thirty-five banks over the period 2009 to 2021. The analysis reveals a distinct warming trend, variable rainfall pattern and an increasing trend in greenhouse gas emissions especially in the agriculture and transport sectors. Banks' climate financing for sustainable projects remains low. Empirical findings using dynamic panel estimation reveals adverse impact of temperature changes and rainfall variability on bank stability and credit risk arising from non-performing loans. The stress testing results reveal vulnerability of the banking sector to climate change as the probability of defaulting increases in moderate, severe, and extreme temperature changes. The results affirm banks' important role in managing financial stability risks while providing sustainable climate financing and the need to strengthen synergies between private and public sustainable financing for target priority sectors.

Morphological Response of Sorghum and Barley Under Drought Stress and Elevated CO2 Concentration: Crop Species Exhibit Different Morphological Responses Under Limited Water Supply

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Sorghum, millet, and barley are cereal crops that are often grown in semi-arid locations where agricultural output is hampered by drought stress. These crops' morphological responses to drought stress differ according to the species, growth stage, and degree of the stress. To deal with drought stress, cereal crops have many morphological adaptations, including modifications in the root, stem, and leaves that reduce water loss through transpiration. Drought is a significant environmental element that influences plant growth and output. The morphological responses of sorghum, millet, and barley to drought stress were studied in this study. The experiment was carried out in climate-controlled growing chambers. Morphological parameters such as shoot and root length, plant height, tiller number, and leaf area were measured. The findings reveal that each of the three crops reacted differently to drought stress. Sorghum and millet were shown to be more drought resistant than barley. As compared to millet and barley, sorghum showed the strongest tolerance to drought stress, with the least drop in shoot and root length, plant height, and leaf area. According to the findings of this study, sorghum, and millet may be preferable candidates for cultivation in drought-prone areas. Further measurements will be continued to study the molecular and physiological mechanisms behind these crops' morphological responses to drought stress.

Preliminary Evaluation of Possible Impacts of two Shared Socioeconomic Pathways in the Nazas River Basin, Mexico: Martonne's Aridity Index and Map Analysis

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Water availability is a limiting factor for the development of natural and human ecosystems. Comarca Lagunera is an arid region in northern Mexico and a young metropolis with great economic growth. However, this development has been at the cost of the deterioration of the natural capital of the Nazas River Basin (BRN). Also, climate change generates great uncertainty regarding its future impacts. Therefore, the aim of this work was to determine the degree of current aridity of the NRB with the De Martonne's aridity index and to make comparisons of the aridity of two shared socioeconomic pathways of greenhouse gas emissions (ssp1-2.6W/m2 and ssp5-8.5W/m2) in two intervals of time (2021-2040 and 2041-2060). For this, maps from the CONABIO and WorldClim databases were used, and the analyzes were performed with QGis Software and Microsoft Excel. Results show that the changes in the aridity of the NRB, with the ssp1-2.6W/m2 scenario in the two intervals, are not significant with respect to the current aridity. However, with the ssp5-8.5W/m2 scenario, the significant changes are shown in the time period 2041-2060, mainly in the upper basin. Compared with the map of vegetation cover and land uses, the possible alterations occur in areas where there are pine-oak forests, natural pastures and rain fed agriculture. The upper basin is the most sensitive part of the water system, because what happens there will have repercussions downstream. This work is a baseline for more complex studies about NRB health, and methods can be used in other sites of interest.

Megadrought in La Ligua and Petorca Basins and the Aspiration of Water Safety: Sociohistorical Lessons of Communal Resilience and Resistance

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The Mega Drought that Chile has experienced in the last decade has increased the sense of socioenvironmental conflicts, mainly due to the unequal access to water in rural areas of its central valleys. Recent studies have analysed the combined effect of changes in climate and consumption of water in basins affected by drought. Yet, studies regarding current or historical responses from communities exposed to droughts are still not sufficiently explored aspects. The case of the basins of the La Ligua and Petorca rivers offer an important case study because the analysis of their communities' behavioural adaptations to drought-prone conditions could indicate resilient responses in the face of hydric conflicts. Such behaviours, in the long run, have the potential to reveal Chilean social clues for the adaptation to processes such as Climate Change. This research is based in mix methods, where interviews and geographic information systems are the principal collection and analysis methods. It is expected to facilitate the identification of a particular form of resilience associated to droughts, which could also contribute to redesign public policies regarding national management of risk due to drought, now, centred in and from the Chilean territories.

The Climate Cost of our Digital Lives: Digital is Physical

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The accelerating wave of digital content is increasing the energy demands on an already overextended planet. There is a perception that digital is less environmentally costly than cutting down trees for paper. Yet the energy costs for our digital lives can be steep. Every byte is energy, and energy has a carbon cost. And our digital footprints are ever-increasing; the world is generating more than 2.5 quintillion bytes of data created annually, no doubt a significant contributor to the fact that the world has almost doubled its energy consumption since 1980. I have developed formulas to calculate the carbon impact of your digital initiatives. These formulas can be applied proactively to new projects to understand the carbon cost of content. All sustainability and communications professionals should keep these numbers in mind when deciding what needs to be communicated, and how. 1. All content has a measurable emissions impact 2. How to assess the equivalent greenhouse gas emissions for everything from websites to emails to video meetings 3. How to incorporate sustainable content metrics into your best practices

Coping and Adapting to Climate Change Impacts from African Perspective: What Complementary Role Could African Indigenous Science Play?

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It is an indisputable truism that in a fragile and conflict-affected setting with limited governance, political instability and visionless leadership, communities are ill-equipped to cope with a changing climate and associated environmental hazards. Although there have being numerous discourses on climate change and the consequent environmental hazards, still a call for proactive approach to halt the envisaged ruin is indispensible. This paper, therefore, is a clarion call on African researchers to delve into their own indigenous science systems for proactive approaches towards addressing climate change crisis. Unfortunately, one major challenge that may likely bedevil this call is the erroneous believe that most African traditional ideas and practices are fetish. This paper argues that climate science, like other branches of knowledge, needs to be broadened and decolonized; that Africa should search within its own knowledge systems for appropriate ideas and approaches to many of its development challenges. In fact, it examines how our growing vulnerability could be addressed through the collaboration of western science/environmental education with relevant indigenous science in Africa. The effects of climate change and environmental hazards on the socio-economic activities in Africans is also reviewed. In conclusion, the paper notes that environmental and socio-economic effects of climate change on Africans include poor health, poverty, increased migration, food scarcity, the occurrence of crime or violence, as well as displacement. However, it expresses optimism that indigenous knowledge and practice can contribute towards managing natural resource management, environmental protection and climate change adaptation in Africa.

Enhancing SDG Literacy through Green Nudges: Examining Climate Change Impacts

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The study assesses the university-wide implementations of SDG in relation to UNEP's Green Nudge book. The existing nudges at the University of Calgary main campus are identified and evaluated for their impact on influencing campus community behavior and decision-making toward resource utilization. For this study, existing SDG applications and knowledge gaps existing in the physical and digital landscape are identified. This helps examine and formulate the future direction of community engagement on climate action and subsequent climate change mitigations. The study focuses on experiential learning opportunities on campus and highlights the campus as a learning lab initiative through campus-wide SDG literacy and green nudges. This includes campus-wide actions under each SDG category involving architecture design, the default setting, social influence, and educational campaigns. These "green nudges" implemented to promote SDG's on campus are intended to instill environmental values to last a lifetime.

Climate Change Refugee Support in India

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The increase in the number of displaced people due to climate change has raised serious questions about the degree to which communities will accept climate change refugees. The present study examines the effects of reason for becoming a refugee (climate change, economic reasons) and ethnicity (Indian, Rohingya) on empathy for the refugee and acceptance of the refugee into the community. The participants were 407 (35% female, 65% male) people who completed the study using MTurk in India. The results show participants report feeling a moderate degree of empathy and moderate concern for the refugee regardless of reason for becoming a refugee or their ethnicity. These findings suggest that there is moderate support for assisting refugees and that participants were not discriminating based on refugee status or ethnicity. Implications of the findings for policy are discussed.

Teacher Agency in Climate Change Education: An Interpretative Phenomenological Analysis

Elijah Jesus De Guzman, Student, Master of Science in Science Education, Ateneo de Manila University, Philippines

Education is crucial in addressing climate change and its impacts. Despite persistent challenges, teachers who educate students about climate change may have several experiences that influence them to strive for agency. This research focuses on temporal and relational factors influencing teachers' agency in climate change education (CCE). Recognizing teacher agency is essential to help teachers and administrators understand how teachers cope with challenges and how teachers are aided and inhibited by their situation, which may strengthen CCE. Following the interpretative phenomenological analysis, the researcher divided the study into two phases: a descriptive online survey that filtered the teachers, for the next phase, which involved semi-structured interviews. After the data analysis, four superordinate themes emerged: (1) Historical situations theme, which are the past patterns of thought and actions incorporated into their routine activities in teaching climate change; (2) Future-oriented projections theme that involves drawing upon past experiences to structure thoughts of action concerning their goals for the future; (3) Response to challenges theme that concerns the teachers' engagement in providing solutions to the current dilemmas in CCE; and (4) Interplay between the chordal triad of agency, which is the interaction between the teachers' past, future, and present dimensions. The study presented no definite agents to achieve agency, only the teachers who were actively engaged with their environments. This implies that teacher agency is a response connected to situations in which teachers take authority in their lives and lead it in a more favorable direction due to a perceived sense of responsibility.

Petromilitarism as a Social Formation

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Petromilitarism is a complex social formation comprising the following elements: consumer patterns that depend on fossil fuels for energy, reliance on military weapons, strategies, and alliances that protect the extraction of fossil fuels, the many features of climate change, and a profound crisis marked by vulnerabilities to the planet, nations, regions, and, ironically, to the US military itself. Petromilitarism also includes cultural attributes that obscure popular appreciation of its overall shape and make it more difficult to formulate viable alternatives. The institutional order of petromilitarism includes energy companies, government agencies, and the Pentagon. There are temporal dimensions, especially as the crisis it contains is evolving rapidly, perhaps more quickly than anyone can fully grasp. And there are spatial features as the social formation is constituted across the global, national, regional, and the local. Understanding petromilitarism as a social formation helps bring these diverse dimensions together in simultaneous and mutual focus, thereby calling attention to the depth and danger of the historical moment. For the purposes of the Climate Change: Impacts and Responses conference, my paper briefly illustrates the main elements that make up petromilitarism and offer some suggestions of how these elements might be considered in their sociological totality. This is a speculative, preliminary outline that attempts to capture the intersections of these elements thereby creating a dynamic and dangerous situation.

Food Literacy as a Path Towards Sustainability: How to Effectively Educate Current and Future Consumers About the Impact of Food Choices on Environmental Health

Karyn Knox, Chief Development and Partnerships Officer, Executive Leadership, Educated Choices Program, United States

We consider scientific knowledge regarding the widespread impact of food choices on planetary health including thier direct connection to deforestation, water pollution and climate change. We focus on how providing food literacy opportunities for student and communities have proven to be effective in inspiring environmentally positive dietary changes and how to implement these programs in schools and communities near you. These programs directly positively impact the environmental struggles we face. Our work enables insight into the motivators for change and perceived barriers to change among different age groups. The session offers fresh and proven ideas of how to be a part of building a just and sustainable food system!

Climate Concern and Eco-anxiety in BC Youth: Findings from the Youth Development Instrument

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Emerging terms in the literature such as eco-anxiety describe heightened concern, fear, and anxiety related to the climate crisis. As the climate emergency grows in urgency, eco-anxiety could precipitate new psychological conditions and worsen existing mental illnesses. This is of particular concern among youth, who are likely to experience repeated stressors related to the climate crisis and are in a developmental period characterized by peak onset of mental health disorders. Recent efforts have attempted to measure eco-anxiety within the population; however, extant research is largely focused on adults. Consequently, this study's objectives were to assess levels of climate concern and eco-anxiety among BC students. To do so, items measuring climate concern and eco-anxiety were included on the Youth Development Instrument, a population-level well-being survey of Grade 11 students in BC. Survey participants included 9255 students (45.8% female; 2.8% gender minorities). Many students were worried about climate change (78.2%) and felt greater action should be taken (82.4%). A smaller proportion reported experiences of eco-anxiety, with at least 42.6% feeling nervous, anxious, or on edge due to the environment in the past two weeks. Climate concern and eco-anxiety is a significant stressor in youth. Developing resources to help youth cope will be a pressing priority in coming years. Schools may serve as a unique opportunity to employ eco-anxiety programming and resources to help support this age group during the climate crisis.

From Plaques to Actions: How Employee Green Behaviors Can Contribute to the Substantive Implementations of Voluntary Sustainability Standards

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Organizations are increasingly seeking Voluntary Sustainability Standards (VSSs) to concretize their organizational sustainability commitment on products, production, and services to their stakeholders via external communications and reporting. However, one of the key aspects of VSSs' success, individual-level behavioral effectiveness, is rarely addressed in academic research, and VSSs are widely criticized as only plaques rather than genuine actions with on-the-ground behavioral change. This paper closes this research gap by conducting a case study of a specific VSS in the real estate sector: green building certification - Leadership in Energy and Environmental Design (LEED). We adopted a qualitative content analysis method, aligning the intents underpinning each credit of LEED certification with a taxonomy of Employee Green Behaviors (EGBs). We explore how EGBs can contribute to the substantive implementation of LEED requirements in organizational contexts. Based on the analysis, we propose a four-step VSS-EGB Alignment Approach for practitioners, in which enactment of post-certification implementations will help to achieve the intended purposes embedded in the VSSs. Based on the findings, we suggest VSSs-setting organizations should involve employee-level representatives in the standards design and governance to ensure the VSSs' operability in real-world business. We also recommend that organizations assign VSS-related tasks to relevant personnel to trickle down green transformation from senior management to employees in order to achieve substantive adoption of VSSs.

Assessing Community Vulnerability to Extreme Events in the Presence of Contaminated Sites and Waste Management Facilities: An Evidence-based Indicator Approach

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Communities across the world are experiencing a myriad of impacts from intensifying extreme heat, flood, drought, and wildfire events due to climate change. Communities near contaminated sites and waste management facilities may experience further impacts from extreme climate events due to the risk of contaminant releases into the surrounding environment. These overburdened communities are disproportionately impacted by these events due to a combination of economic, health, social, and environmental burdens. Because resources are often scarce for these communities, a dependable, evidence-based approach is needed to assist with prioritizing and targeting resources toward areas that may be impacted the most. Here, we present a conceptual framework for collective understanding of key vulnerabilities and exposure pathways. Indicators and maps were developed to represent contaminated sites, waste facilities, contaminant fate and transport (by air and water), and a range of population sensitivities. This transparent and replicable screening method is based on publicly available data and can be used to identify the communities most vulnerable to extreme climate events. We demonstrate the method in Phoenix and Maricopa County, Arizona (USA), where the approach informed plans for preparedness, response, and recovery. This example highlights how evidence can help decision-makers build their communities' capacity to address potential future climate risks. Regional, state, and local decision makers can also use this method to develop targeted strategies for preventing adverse health and environmental impacts of disaster-induced contaminant releases.

The Impact of Preemptive Investments on Natural Disasters in Colombia

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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.

History of Rainfall and Weather Service in India

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The paper considers information related to hydrometeorology which is a major branch of meteorology, which deals with all aspects of water that reaches the earth's surface in the form of rain or snow. Weather plays an important role in various socio-economic activities like agriculture, irrigation, shipping, aviation, off-shore oil exploration, space flights, flood control, expeditions, public health, etc. Accurate forecasts and timely warnings against severe and hazardous weather are some of the most challenging tasks of any national meteorological service. Also, the paper looks at the step-to-step development in the meteorological service of Rainfall Organisation, Rainfall Statistics, Flood Meteorological Organisation, and Weather Service in India.

The Anthropogenic Global Warming Hypothesis and the Causality Principle

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The scientific viability of the Anthropogenic Global Warming Hypothesis (AGWH) has been evaluated in terms of the Causality Principle (CP), which is the foundation of scientific philosophy. The colloquial form of the CP is most appropriate here, especially when presenting to a general audience, as: "Every effect has a cause, and the cause must precede the effect". Furthermore, "for a complex system comprising a series of processes, if any step is non-causal then so is the entire process". It is important to note that the CP is independent of the mechanism of the change just as are the Laws of Equilibrium Thermodynamics for which there exists a close parallel. If this were not the case, a process may appear to be causal via one mechanism but noncausal via another, even though the initial and final states or the declared cause and effect had not changed; an intolerable conflict and one via which al processes could be declared to be "causal" for convenience and in defiance of common sense. Based on the available experimental data, the relationship that is expressed by the AGWH (that rising CO2 concentration in the atmosphere is responsible for global warming (GW) as reflected in the rise in temperature) is noncausal because the alleged cause (the change in the atmospheric [CO2]) lags the effect (rise in the temperature) in violation of the CP and hence the AGWH lacks scientific validity.

Finding the Right Bucket in the Right Place and at the Right Time: A Novel Methodology for Developing Adaptive Flood Mitigation Strategies with Climate Change

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Tim Davies
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Internationally, many coastal cities will face disastrous flooding with climate change; however, it is difficult to plan for it under high uncertainty. Conventional flood mitigation strategies, such as installing defence structures on the front line are expensive and risky. Green stormwater infrastructures (GSIs) on large, developed parcels of land, located in key locations in a catchment, are capable of providing substantial flood mitigation. Networks of GSI can be designed to act in concert and rolled out when and where needed. However, parcels have different flood mitigation capabilities through time depending on their biophysical characteristics, and an effective methodology for evaluating and comparing them is missing. Here, we present the Hydrology-based Land Capability Assessment and Classification (HLCA+C) methodology. It builds on the strengths of existing methodologies and uses a land unit analysis approach, that assesses interdependent hydrological and geographical variables. We demonstrate the effectiveness of this approach in a Christchurch, New Zealand catchment. Its application led to the identification of an adaptive GSI flood mitigation network for the next 80 years that can mitigate flooding just shy of that associated with the major climate change scenario. Effective flood mitigation is a matter of finding the right bucket in the right place and at the right time.

The Role of Clinical Legal Education in Advancing Climate Justice: An Important Case Study

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The Monash University, Climate Justice Clinic (CJC) - a scalable and practical solution for the education and development of climate justice law and movement lawyering. Providing climate justice specific clinical legal education, the CJC offers legal support to a number of leading national organisations within the climate justice movement. The CJC aims to improve and shape Australia's law, policy and action on Climate Change. The CJC is led and supervised by two experienced solicitors form leading national/international law firms, providing a unique opportunity for university law students to be exposed to diverse actors within the Australian climate justice movement, developments in climate litigation, and the intersection of law and policy within the broader socio-political context. The CJC is a unique, scalable and an adaptable solution to practical legal education within the Climate Justice Movement. CJC aims to ensure students enter their legal careers ready and able to assist in responding to the climate crisis. Topics considered include: (1) The need for legal education to cultivate a mature, compassionate, and resilient mindset in students to allow them to pursue climate justice in a healthy and sustainable fashion. (2) the benefits of the CJC's "movement lawyering" approach; (3) importance of inter-disciplinary partnerships within the existing environmental movement; (4) examples of legal work undertaken by the CJC to date and its impact on past students; (5) Importance of in-depth reading and guest speaker program to support students' deepening understanding of the climate crisis and the various roles the law has within that movement.

Climate Change Adaptation: Do Gender Relations Enable or Disable Decisions of Smallholder Women Farmers in Uganda?

Flavia Amayo, Student, PhD, University of Birmingham, Birmingham, United Kingdom

The ability of smallholder women farmers to make decisions about how to adapt to climate change is fundamental to their livelihoods and agriculture performance in the global south. Much as women actively engage in agriculture and it forms their major source of livelihood, a myriad of encumbrances constrain their ability to decide what adaptation strategies to implement. It's worth noting that, the manner in which farmers relate may contribute to how they will respond to climate change and gain from agriculture. Among most smallholder women farmers, gender disparities in resource access and opportunities such as agricultural extension services, training and climate information among other social, political, economic and institution impediments undermine their adaptation decisions. These entwine with power relations, norms and value systems and shape their decisions. Considering the significance of gender and relations in climate response, this research interrogates: how gender relations mediated by institutions contribute to adaptation decisions of smallholder women farmers in Uganda. It focuses on understanding how relations between male and female farmers with respect to resources, responsibilities and power shape women's decisions about what adaptation strategies to implement. Qualitative participatory methods such as semi-structured interviews, focus group discussions, Venn diagram, gender disaggregated seasonal calendar, transect walk and gender resource mapping is adopted to collect data. From this research, more insights about how gender relations links to adaption decisions are elicited. This contributes to climate change policy and practice which aim at enhancing women's adaptation at the local government, national, regional, and international levels.

Ubuntu as a Social Response to the Burden of Climate Change

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I argue that Ubuntu as a philosophy that emphasizes the interconnectedness of all living things and importance of community and mutual support, can be used as a social framework to address the problems of climate change and promote environmental sustainability. I demonstrate that Ubuntu is an ideological concept that encourages collective action on climate change, with the emphasis on individual and collective commitment to taking concrete action to address the problems of climate change. Etymologically, the term "Ubuntu" is from the Bantu languages of southern Africa, which is frequently translated as "humanity" or "human kindness. It is based on the knowledge that an individual's well-being is inseparably linked to the well-being of the community as a whole. Thus, the work would show that Ubuntu can be employed as a social tool that would enhance the cultivation of shared identity and promote the sense of shared response responsibility to develop the resilience to cope with climate change. The study demonstrates the imperative of mutual support and cooperation through the lens of Ubuntu as a human-centered scalable response to the debacle of climate change. I use analytical, critical, and evaluative tools in addressing the topic.

Climate Change Impacts on Marginalized Populations: Key Insights from a Response Framework and Launch of a Knowledge Mobilization Initiative

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The effects of climate change disproportionately impact the health and well-being of marginalized populations, especially those living in poverty as well as the precariously housed and homeless populations. Addressing these issues 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-poverty 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 global response framework and discussing its implications for Canada. 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 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. The knowledge mobilization initiative examines the climate change-poverty-health nexus in Canada, focusing on the implications for policy and research.

Materials for Solid-state Hydrogen Storage: A Dead End or Gateway for Advanced Energy Systems?

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Systems for efficient energy storage are crucial to nivelate the inherently intermittent delivery of energy from renewable sources. In this regard, the two main general concepts imply systems for mechanical and chemical storage of energy. Chemical systems include batteries and hydrogen storage, and they imply various families of materials. For a long time, they are a focus of very vivid research interest, one of the hot topics of contemporary materials science. Despite all of these research efforts, so far no material has been found that meets all the technological requirements to be considered usable for hydrogen storage in real systems. It is important to emphasize here that exclusively technological parameters are considered as criteria for the applicability of the material. Very rarely these materials are considered in broader context of mitigation of climate change, which is a crucial reason of development of technologies for hydrogen storage. In this context, the title should be reformulated to more specific questions: 1. Are the all steps of production and use of a specific material environmentally sustainable? 2. How successful os the material when compared with other options? 3. Is the use of the specific material limited exclusively to hydrogen storage or it is applicable in some other energy-related technologies? By addressing these questions, the materials for solid-state chemical hydrogen storage are critically reconsidered in broader context of climate change mitigation.

Combined Long-term Climate Change Indicator Datasets Show a Deteriorating Unmitigated Global Climate Emergency: Science Organizations Recognize and Recommend How to Respond to Dire Climate Emergency

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The combined long-term datasets of multiple climate change indicators are trending at an increasing rate towards biosphere collapse. Just a few recent (important) tipping point papers have hinted that Northern Hemisphere warming is accelerating, driving disastrously destructive extreme events. Even so, governments continue to support and subsidize GHG-polluting industries. Warming of 1.5°C is unavoidable around 2030, but not acknowledged or prepared far. The UN COP process is not helping. Already committed equilibrium warming, calculated by atmospheric CO2 eq. and radiative forcing, is over 2°C – but not recognized. IPCC (2022) AR6 WG3 calls for immediate rapid global emissions decline, but this message has not been publicized or carried forward. This emissions decline requires immediate unconditional termination of all GHG-pollution subsidies and charging the full pollution costs to central polluters. Based on the IPCC AR6 Synthesis and 2022 Interacademy 'Health in the Climate Emergency' report (notably Appendix 4: Policy Instruments), intervention via formal climate emergency advisories, with policy recommendations, by national science and health organizations to their governments and the U.N. is required (the IPCC does not make value judgements nor make policy recommendations), together with the engagement of scientists in emergency mitigation education and policymaking at the regional level. This paper explains why and how we can make this happen.

A Climate Justice Based Model for Carbon Budget Allocation

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Current Integrated Assessment Models (IAMs) and general carbon budget models do not sufficiently account for climate justice in their allocations of future emissions. To address these limitations, several modeling frameworks such as equal per capita (EPC) and per capita convergence (PCC) that aim to incorporate fairness and justice more comprehensively into emissions attribution and carbon budget allocation have emerged. We propose a novel integrated attribution – allocation (IAA) model construct that robustly incorporates three equity principles of responsibility, capability, and equality into the estimation of carbon budget emissions allocations. Results demonstrate that simple reductions of responsibility for climate action to categories such as global south vs global north and developed vs developing cannot be established a priori as methodologies for fairly and justly assigning emissions rights and mitigation obligations.

Satellite Museums for Sustainable Development: Increasing Sustainability Through International Strategy

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Sustainable development depends on measures taken by public and private organizations. Museums stand out among these organizations due to the controversies arising in connection with their role in society. Museums use resources in order to provide public goods and services, being budgetary subsidies their main sources of income. Unfortunately, those are limited and shrinking. Therefore, during the last years the need for sustainable development of museums was stressed. In order to operate, museums were forced to find ways of increasing their own income and keeping their costs under control. Thus museums have begun to use management strategies similar to those used by private companies, such as internationalisation. By analysing case studies in order to assess how international expansion has helped museums to increase their sustainability, the aim is to trace patterns of convergence in order to develop a global interpretation of the strategy. Methodologically, it is based on the triangulation of qualitative techniques (bibliographic and documentary analysis, interviews, etc) and quantitative techniques (virtual ethnography and social network analysis), taking into account the need to approach the subject from an interdisciplinary approach that reflects the multi-dimensional reality of museology. This research analyses whether and how satellite museums could become sustainable and provide an overview on the models' sustainability by considering why it is necessary to reform the traditional management of museums, which its main development directions are, what sustainable museum development should look like and why museums should implement it.

The Role of the Department of Defense in Reaching Net Zero Emissions

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Military contribution to worldwide CO2 emissions is well-documented. In 2019, the U.S. Department of Defense (DoD) consumed 682 trillion BTUs, which represents up to 77% of U.S. federal government energy use. DoD operational energy use represents approximately 70% of DOD energy use. Operational use demand depends on the type of fuel available in local markets, the tempo of operations, long logistical tails, and need for energy reserves; it also relies heavily on aircraft and ships which are difficult to decarbonize. Given these factors and because operational energy users are less likely to have access to 100% carbon-free energy sources, multiple pathways to net-zero must be analyzed and understood. The 2021 Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad" includes a U.S. goal of net-zero emissions by mid-century and makes this goal an essential element of U.S. national security. To meet these benchmarks, DoD has moved from a focus on high-level goals to identifying achievable pathways that can lead to net-zero emissions. Researchers undertook a broad study of strategies for Naval forces to achieve net-zero global emissions by 2050 to comply with Executive Order 14008 and to enhance mission readiness. This paper shares the current state of net zero efforts within the U.S. DoD, addressing the tensions of energy sources and mitigation, measuring responsibility in light of national security, and the role of public-private policy solutions.

Enforcing Carbon Majors' Liability for Climate Change: A Comparative Study of Tort Law-based Climate Litigation in the Netherlands and Spain

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According to overwhelming scientific evidence, anthropogenic climate change is one of the most pressing threats to human lives, livelihoods, and democratic institutions. Environmental activists have sought to enforce liability for these climatic changes in different fora, and yet, the institutional response has been laggard and suboptimal. The Judiciary, on the other hand, has been successful in enforcing climate change mitigation through a new body of environmental law that combines, inter alia, international, human rights, constitutional and tort law; climate change litigation (CCL). Public actors are the usual focus of CCL to compel them to enact more stringent environmental regulation, but little attention has been given to corporations, especially Carbon Majors, despite being the main contributors to climate change. In the Netherlands, the Milieudefensie et al. v. Royal Dutch Shell plc. case ruled that corporations can be found liable for breaching their Duty of Care and human rights obligations towards Dutch citizens, if they fail to curb Greenhouse Gas emissions responsible for climate change. In Spain, despite being one of the most vulnerable European countries to climate change, and hosting some of the most emitting oil and gas multinationals, no similar legal study has been carried out yet. For this reason, this research fills this detected knowledge gap and contribute to the ongoing Climate Justice scholarship by showing a possible pathway to reach a similar ruling in Spain against a national Carbon Major, following the legal findings of Milieudefensie.

Are Policy Makers Responding to Climate Change?: Considering the Gap between Science and Decision Makers

Maria Camila Gutiérrez, Academic Coordinator, Law and International Relations, CEDEU, Madrid, Spain

It is said that governments and policymakers are not responding properly to climate change crisis but as climate science has advanced, technology has done it by responding to climate change mitigation. However, the social and economic response, and especially decision-makers acts, has not had the same evolution. Why is that happening? One of the reasons is answered by the gap between knowledge and action which is perhaps understandable with an approach to difficulties and limitations that decision-makers have in dealing with uncertainties that science cannot yet confirm. This will ensure the key points where science should facilitate to help decision-makers be more accurate when confronting the situation. On the other hand, it will be necessary to understand the decoupling of science and policy that clarifies the relationship between the IPCC and COP summits. The foregoing will allow us to see a glimpse that there is a gap to close in order to address the challenges posed by Climate Change with greater solidity from a scientific basis.

Screening Government Development Projects for Climate Risk and Natural Disaster: A Case Study of Developing Screening Tools and Methodology for Bangladesh

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Bangladesh is undergoing unprecedented economic growth in recent years. However, considering its geographical location and the resulting vulnerability to climate change and natural disasters, it become a burning question, how to safeguard this development efforts to be sustainable in the long run. To improve the climate change and disaster resiliency of the country as a whole, government as a timely step, developed a methodology to screen the development projects according to risk score. At the first step, a Risk Atlas at district level has been formulated following Intergovernmental Panel on Climate Change (IPCC) guidelines of HEVR model. Ten hazards were selected for the analysis as Flood, Drought, Cyclone & Storm surge, River erosion, Seal level rise, Salinity, Landslide and two future climate change scenarios (RCP4.5, RCP 8.5) of temperature and precipitation. In a GIS platform, through overlay approach, the resulting risk maps were prepared. After then a Climate Risk Screening (CSR) and detailed Climate Risk Vulnerability Assessment (CRVA) tool was developed to conduct the screening of the development projects, in terms of their level of risk that is exposed to during the project period. In a web based platform, disaster risk score of a development project, with proper weightage assigned considering its nature and relation to a particular hazard was done. Depending on the risk score, provision is there to propose appropriate measures for their long term sustainability. Ultimately, it can serve as a guideline or decision making tool for identifying CCA, and DRR options to safeguard government development projects.

Sustainable Development and Foreign Direct Investment Inflows in India: Examining the Role of Sub-national Factors

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This study discusses the relationship between sustainable development and (foreign direct investment) FDI inflows in the context of India. The objective is to explore the impact of environmental performance in attracting FDI on the sub-national level in India by drawing on institutional theory. We chose the context of India, because India is an emerging market that faces the pollution dilemma while attracting 3% of global FDI projects. The country has heterogeneity in its state policies as well other inter-state differences that create complex environment dynamics and distinct institutional pressures legitimizing environmental practices. We propose that states with implemented environmental policies receive more FDI. Furthermore, we propose that the capacity to change and the resistance to change within each state have a bearing on the amount of FDI received by it. This study adds nuance to the international business literature by exploring the importance of sustainable development at the sub-national level and by accounting for the differences in urban governance. Additionally, we create context for policy makers to enable improved targeting of FDI policies. By proposing a sub-national institutional theory which leans heavily on the regulatory pillar, we add theoretical value and contribute to theory on the sub-national level.

Public-private Interaction on Climate Governance: Synergistic Effects

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Natalia Dus Poiatti, Professor, IRI, University of Sao Paulo, Brazil

Considering the urgent need of well-designed policies to reduce global warming, this paper analyzes the interaction of transnational private authority and public policies designed to reduce GHG emissions and, if any, to highlight the synergistic effects between public and private initiatives, which would be translated into a reduction in GHG emissions greater than the sum of the reductions caused by private and public governance acting independently. The goal is to examine GHG emissions outcomes vis-à-vis the interaction between national policies (carbon tax and ETS), enacted in some of the companies' jurisdictional operations worldwide, and the adoption of transnational initiatives by mining companies to improve their sustainability performance, among them the affiliation to International Council on Mining and Metals (ICMM) affiliation. We aim to answer the following questions: 1- Do enacted national policies (carbon tax and ETS) interact with transnational initiatives driven by private actors, in a complementary, competitive, or coexistent way? 2- If complementary, is there any synergistic effect in GHG emissions reduction? Hypotheses are built upon the claim that pressures from globalization, non-governmental organizations and other independent organizations encouraged responsible corporate and governmental behavior suggesting complementarity between public and private initiatives with possible synergistic effects.

Advancing Intergenerational Collaboration in Climate Change Responses to Achieve Health and Environmental Co-benefits

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Children/youth experience increasing levels of mental health distress from direct and indirect effects of the climate crisis. This underscores the need to work upstream through an intergenerational climate justice, equity, and eco-social lens to promote the resilience, health, and wellbeing of children and youth. Youth are a significant stakeholder in the climate crisis yet continue to be excluded from playing meaningful roles in shaping climate governance and designing sustainable futures. This research, therefore, explores how taking intergenerational approaches to climate change mitigation strategies can foster the co-benefits of creating more equitable, creative, and asset-based sustainability pathways and improving the mental health of youth; and summarize existing principles to guide effective intergenerational climate change collaborations. I will describe findings from a suite of two sub-projects: (1) a scoping review of literature on intergenerational collaborations for climate change; and (2) semi-structured interviews with educators about how to approach grounded hope-based climate change education. Findings from the scoping review and interviews provide insights into how to integrate intergenerational collaborations in climate change decision-making, as well as opportunities for linking art and creativity to environmental efforts to foster co-benefits for youth. This suite of projects moves to action a growing body of evidence on advancing collaborative, intersectoral and governance relevant initiatives that generate meaningful change at the local level through bolstering children and youth's mental health resilience, intergenerational climate justice, and children/youth in all policies.

Insights on the Perception and Engagement of Citizens to the Action Plan of the Declaration of Climate Change Emergency by the City Councils: The Case of Sant Cugat del Vallès

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Climate change threatens the quality life of human communities and the balance of the planet's ecosystems. Greenhouse gas emissions caused by human activities are growing constantly, contributing to earth heating above 1C since pre-industrial age and the manifestation of extreme natural events. As a response, city councils around the world declare the climate emergency and are committed to action plans to reach zero net emissions. To study the impact of risk perception of climate change on the acceptance and engagement of local communities to these initiatives, we conducted a survey addressed to the population of Sant Cugat del Valles, a middle size town in Catalonia that declared the Climate Emergency. Correlation analysis demonstrated that the emotions of concern or anxiety about climate change and the perception of personal responsibility to take action are associated with higher support for the Action Plan. However, more people remain indecisive if they are called to participate actively in the planned actions whereas mistrust to local authorities is shown to undermine the confidence of the population on the completion of the goals. Instead, the respondents trust mostly the experts on receiving information about climate change. Another alarming evidence was the almost null participation of young people in the survey, despite being open to all population ages over 16. The implication of these results on the communication strategy of the local government are discussed.

Bio-Char Sequestration in Mine Backfill as a Route to Net-zero Carbon Emissions

Richard Maguire, Director, RS2A Limited, United Kingdom

Over 90% of world GDP is now covered by net zero commitments; a total of 153 countries have put forward new 2030 emission targets (NDCs). The Glasgow Climate Pact accelerated the drumbeat and puts in place the underpinning rules and systems. Climate change is a global challenge, requiring global collective action. This paper presents a series of recommendations to sequester bio-produced Carbon into available ground space using existing industrial processes, to move towards a net-zero Carbon emission position. We present a scientific and engineering jigsaw representing technologies and industries that creates a wider system of systems, that fit together to produce an easy and economic Carbon sequestration solution. A series of jigsaw pieces is proposed to complete a new, innovative process of Carbon sequestration using mine backfill as a vehicle, that is able to progress the commitments that have been made towards net-Carbon zero emissions.

Bucket Up!: Can Large Private Properties Provide Substantial Coastal City Flood Mitigation under Climate Change?

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Protecting vulnerable coastal cities from flooding under climate change is challenging. Many studies have demonstrated that conventional approaches, like the installation or reinforcement of front-line defence structures (e.g., walls and dykes), will be inadequate, and there is a risk of under or over investment under climate change uncertainty. An alternative is to provide additional green stormwater infrastructure facilities, or 'buckets,' for holding the additional surface water. However public land capable of serving as such is often missing. While many cities are now requiring private landowners to install small buckets on their land, regardless of their capability for mitigating flooding, their impact may be minor as implementation is too slow. We need a more cost effective and strategic approach for installing larger buckets to ensure our communities and central business districts are protected. Can private properties with large areas of open space, like industrial lands, provide a better solution? Here, we apply a hydrological and spatial analysis methodology to assess the potential of large industrial parcels across catchments in Christchurch, New Zealand, to provide substantial flood mitigation under different climate change projections. We find industrial parcels could provide substantial flood mitigation within three of six study catchments, reducing the severity of climate change-induced increased runoff volume to the current flood protection level under any climate scenario in the immediate future (2030-2050). Industrial land in two of these catchments could also reduce runoff to this level in the distant future (2080-2100), and under larger storm events, though not under all climate scenarios.

Sociotechincal Assemblages in Local Food Systems Innovation: Answers to Climate Change

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Climate change threatens food security and intensifies risks, especially for the most vulnerable populations, causing instability and directly and indirectly impacting peasant agri-food systems. This paper proposes an ontological-methodological framework to understand how innovations happen in peasant agricultural communities, while they face climate change and ensure food security. The framework is focused in investigating and describing the territorialized socio-technical innovations as processes of agri-food production. First, we situate agri-food systems and climate change discussion within the innovation studies. Second, we present our theoretical outline and mobilize three key concepts: (a) centrality in social actors; (b) assemblages; and (c) sociotechnical innovation. Together, they form the structure of our proposal. Finally, we do some reflections on how to apply and construct this framework empirically and for what proposes. We defend that actor-oriented research, in peripheral regions, with extreme environmental and life conditions, can even give us clues on how we are going to experience situations in other regions of the planet.

Compounding Disasters and Adaptive Governance: A Case from an Indian State

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The climate-induced shocks, coupled with the pandemic, lead to complex and intersecting disasters. This work presents the success story of adaptive governance in managing compounding disasters. Adaptive governance helps address the challenges of climate-induced natural disasters and pandemics through its approach, which entails flexibility, collaboration, and continuous learning. The state of Odisha in India is considered to be one of the disaster hotspots states in India. Odisha has faced the wrath of many disasters, and the devastation caused by the super cyclone 1999, which killed around ten thousand people, has been the most severe. However, since then, the Government of Odisha has set an example for other states and countries to emulate its disaster management model. This paper explores how the Government of Odisha has been successful in dealing with compounding disasters through its adaptive model of governance. The methodology comprises a desk review of its disaster management policies for the state and on-field discussions with a wide array of stakeholders ranging from Government officials, INGOs, NGOs, people representatives and communities for understanding measures, processes followed, governance and its disaster model. The implications of this research will help other developing countries learn and replicate Odisha's success story in dealing with compounding disasters.

Nashville Transportation and Climate Action in Tennessee State University: Reducing Carbon Footprint

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Climate change caused by human activities is overbearing with its impact destructive to nature. Nashville, a vast developing city and capital of Tennesse recently has an influx of people within and outside of the United States because of the private and public establishments sited in the metropolis. The Metropolitan Transit Authority (MTA) known as WeGo engaged in Employee Services which encouraged Employers to enroll staffs in the public transportation scheme to reduce; the cost incurred on transportation, carbon emission by automobiles and the carbon footprint in the metropolitan area. The research focuses on the climate action in Tennessee State University and the community response to climate innovations. Recently, the College of Agriculture Graduate Students Association enrolled 50 students, faculty and staffs across the institution as a pilot phase on the MTA/WeGo yearly bus pass which was subsidized to a tune of 97 percent. The use of the subsidized bus pass has been widely publicized and has received commendation for campus wide acceptance. Sustainable agriculture practices and promotion of other ecofriendly alternative power source are currently ongoing in the University. Policies that promote sustainable practices by MTA was examined and the climate action currently institutionalized at Tennesse State University was reviewed.

International Cooperation and Climate Change: Case of The Conference of The Parties

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Climate change is a collective problem that should be resolved by a collective solution. The International Cooperation should be the obvious pathway to address this collective problem. In my analysis, I focus on the Conference of the Parties, known as COP, by considering the following question : How effective are these conferences ?

Climate, Energy, and Environmental Education: A Discourse Analysis of Digital Pedagogy in Alberta Museums

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Cultural institutions and educators are increasingly recognizing their role in intersectional climate education. As digital technologies continue to advance, these institutions are increasingly taking advantage of new opportunities to connect with learners online on issues of climate and environment. Current scholarship suggests that cultural institutions, which are often seen as community-centered and benefiting from reputations as authoritative sites of knowledge, play an interesting role in advancing environmental education. Museums, in particular, are uniquely situated to effectively broach both difficult topics and contested knowledge fields. However, this position is not without conflict; museums exist in relation to their communities and their stakeholders, which can result in complex funding relationships, conflicting political and social objectives, and a lack of sector-wide cohesion. As such, how museums approach climate and energy education is a complicated pedagogical phenomenon to observe. Drawing on Eisner's three curricula, this study utilizes discourse analysis to examine the various dynamics and tensions present in digital museum contexts related to climate and energy education. The study focused on websites, blogs, social media, and other digitally mediated and remotely accessible material. The institutions studied are of various sizes and settings, but all are located in Alberta, Canada and have foci on science, environment, energy, or conservation. As a long-standing energy economy, Alberta provides an interesting, and often contested, setting to observe climate and energy education in practice at museums, many of which exist in communities and within governance and stakeholder networks which are connected to the energy industry.

Worth Living Urban Life

Vitor Manuel Dinis Pereira, Researcher, University of Lisbon, University of Lisbon, Lisboa, Portugal

Urban life is not worth living because the concept of home is mistakenly understood to fall under the concept of economy. For example, if we intend to buy a house, we typically apply for a bank loan, because the income from our work is intended to be insufficient for us to buy it outright. But on the contrary, it is the concept of economy that falls under the concept of home. The concept of economy derives from the organisation of our lives at home. Without a house, there is no economy. But as things are misunderstood, as the economy is misconceived as coming before the house, the city houses we live in (for example, Lisbon, Portugal) don't have any quality beyond, say, a certain kind of heap of bricks. The city houses we live in (for example, Lisbon, Portugal) are prone to heat waves in summer and cold waves in winter; their humidity and mould are not healthy. In addition to making us sick inside our homes, the typical noise of cities is not just on the streets of the city; it is also inside our homes (and, because it's so difficult for us to sleep, we get sick inside our homes because we don't sleep healthily). However, if the house was conceived before the economy, the city houses we live in (for example, Lisbon, Portugal) would have qualities such as being thermally and acoustically insulated. For example, they could include a rainwater pipeline for sanitary water.

Public Investment in Hazard Mitigation: Effectiveness and the Role of Community Diversity

Ivan Petkov, Assistant Professor, Economics, Northeastern University, Massachusetts, United States

I estimate the loss-reducing effect of local public investments against natural hazards with new measures of damages, weather risk, and spending for a panel of 904 US coastal counties in 2000-2020. I distinguish federally- and county-funded projects and rely on a quasi-experimental strategy, matching counties by economic development, population, and weather risk. Risk predictions come from the random forest learning algorithm, using granular data on resident vulnerability and severe weather frequency. Public spending on adaptation is effective – the average high-spending county avoids a significant portion of losses – and efficient – $1 prevents up to $3 in losses over 20 years. The evidence suggests that federal spending is focused on high-risk areas, while local spending is effectively implemented in medium-risk counties. Finally, I show that fractionalization among residents about the priority of climate-change policy can be a limiting factor in adaptation spending. Total spending is significantly lower in areas with high diversity in policy preferences, and more so when opinions are equally split.

Teaching "Food Physics": One Scientist's Response to Improving Climate Change Literacy by Transforming the Kitchen into a Climate Mitigation Makerspace

Carla Ramsdell, Practitioner in Residence, Physics and Astronomy, Appalachian State University, North Carolina, United States

The physics of food and cooking (PHY 2220) is a relatively new general education course offered in the physics and astronomy department at Appalachian State University and connects our food system to climate change. Requiring no prior physics knowledge and taught in a mainly conceptual fashion, it attracts students from diverse backgrounds to become agents of change for the climate change solution. This course content provides literacy of basic thermodynamics such as specific heat, modes of heat transfer and phase change using the approachable topic of cooking to which most students can easily relate. Once this basic literacy has been established, it can then be applied to the climate system, providing firm foundational knowledge of the climate crisis. Additionally, the evolution of this course has had farther-reaching impacts. During the COVID-19 pandemic, this course had to be converted to an online course. Students purchased basic laboratory equipment and met on zoom, each from their kitchen as we cooked together and gathered data. This provided a community at a time when student communities were especially difficult to foster. Based on the success of this online transition, a new program has been initiated on our campus to help improve the cooking skills of a broader student population via zoom cooking classes. These voluntary classes target food-insecure students. Our hope is that this class can be scaled to other campuses to improve climate literacy and make students more resilient in their food knowledge, lessening food's negative impact on our planet.

School Solar Power in Belize: Students Building Solar Power Systems in Schools Central America

James Skon, Professor of Computer Science, Mathematics, Kenyon College, United States

This workshop considers our experience in creating and operating an ongoing college student project to build working grid-tie solar power systems for schools in a developing country (Belize). One goal for this project is to teach our college students and our Belizean partners about the concepts, values and utility of solar power. Another is to demonstrate through our activities that volunteer efforts can make a difference in mitigating climate change, as well as serving the needs of students and teachers globally. In addition, we emphasize cultural engagement for our students, many of whom have never visited a developing country. This workshop covers how we made contacts with the government of Belize and developed those relationships, how we procure and pay for the needed materials, how we train and prepare students, how we assure the students and our school collaborators safety, as well other lessons we have learned. Students' construction, creation, and operation of solar power systems, as well as training for safe work on rooftops and with electrical systems. Our team can install a 1-2KWh system in a single day, and can install 5 systems per trip. So far we have installed systems in 21 schools. We have also built a custom monitoring web-based system to view the data on power generation by hour, day, and month. This workshop shares the process involved in creating such an experience. It is our hope that other colleges and universities can learn from our work and replicate such efforts.

Conservation, Climate, and Security: Strengthening Governance in the Eastern Tropical Pacific Marine Corridor

Adam Smith, Judge Advocate, United States Navy, Florida, United States

This study examines governance and security implications of recent decisions by Costa Rica, Ecuador, Panama, and Colombia to expand the Eastern Tropical Pacific Marine Corridor (CMAR) and create a unified marine reserve within their exclusive economic zones. CMAR has existed since 2004 with the goals of resource management and protection of biodiversity within the waters encompassing member states' marine protection areas. However, relatively weak normative structure and limited enforcement capacity have limited its effectiveness, as have recent increases in illegal, unregulated, and unreported (IUU) fishing, often from Asiatic distant-water fleets. Between 2021 and 2022, CMAR announced dramatic increases in its scope, expanding total protected area to over 200,000 square miles, broadening no-take zones, and framing its mission within the context of climate change. While consistent with CMAR's historic goals, explicitly aligning itself with the global governance challenges of IUU fishing and climate change represents a notable shift. Since then, international support for CMAR has increased, specifically from the United States, which signed a memorandum of understanding with CMAR in 2022. The U.S. Department of State has committed to provide financial support to CMAR, and representatives from the U.S. Department of Defense have highlighted CMAR in the context of combatting IUU and transnational criminal organizations suggesting possible material support. This paper considers CMAR's recent development and argues the decision to frame its mission within larger geopolitical tensions may allow CMAR to emerge as a more robust ocean regime and overcome previous capacity and governance limitations even within its current normative framework.

Judicial Responses to Climate Change

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The matters arising out of the issues relating to climate change are on the rise world-over, including India. The Indian Judiciary and Green Tribunal are encountering an increasing number of matters that are induced by climate change, such as melting of glaciers, displacement and migration due to climate change, addressing loss and damage caused by climate change etc. In the absence of a specific law on climate change, the adjudication of climate matters become uncertain and undetermined. In this context, this paper explores how the Indian courts are applying the principles of international law and the domestic environmental law on air pollution, water pollution etc. for deciding the climate change issues before them. It highlights various principles of environmental law that are being applied by the courts in fixing the liability for compensation; giving relief to the climate victims and for restoring the damaged environment. To meet the demand of climate justice, this paper argues for the enactment of a dedicated law on climate change.

Climate Change and COVID-19: Lessons from the Pandemic for Ameliorating the Effects of Climate Change

Gary Wilson, Programme Leader & Senior Lecturer, School of Law, Liverpool John Moores University, United Kingdom

It is increasingly accepted that climate change constitutes a threat to international peace and security, which derives from the manner in which its effects operate and interact with other triggers which endanger global stability. However, notwithstanding its otherwise harsh consequences for human mortality and health, as well as broader economic, social and cultural indicators, an inadvertent outcome of the COVID-19 pandemic has been to see a positive shift in respect of some of the factors which mitigate the worse effects of climate change. These have essentially arisen as a result of restrictive measures introduced by governments, and ensuing changes seen in working and social practices more generally.

With reference to published official data, this paper attempts to draw lessons from developments to have taken place during the pandemic to consider how these might inform longer term efforts to mitigate the causes and effects of climate change. Whilst it is acknowledged that the gradual return to relative normality will inevitably mean that many measures which indirectly contributed towards positive gains in the fight against climate change will need to be removed, it will nonetheless be argued that experiences during the period of the pandemic have served to demonstrate that some things can be done differently with relative ease while carrying positive environmental effects. The key issue to address moving forward is to determine how some of these experiences can serve to inform the creation of a blueprint for societal change.

The Powers in the Geography of Waste and Climate Change: Red Lacre and University of São Paulo Interfaces

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Climate change is related to several factors, such as greenhouse gas emissions. Although the main source of greenhouse gas emissions is the burning of fossil fuels, other sources need to be considered. Organic matter and inert materials discarded as waste (e.g., food scraps and plastics) – can become aggravating the greenhouse effect. Red Lacre emerged from the articulation of recyclable material collectors' movements in 17 Latin American countries. The municipality of São Paulo (MSP) – Brazil is one of the central points of Red Lacre. The MSP and the University of São Paulo (USP) in particular, through the search for the management of their municipal solid waste (MSW), interrelate with Red Lacre members by supporting waste pickers. Therefore, analyzing Red Lacre and its interfaces with the MSP, the university, as well as the city, leads to an international dimension of MSW management, with emphasis on waste pickers . Hence, the following question is defined: what are the actors that USP articulates when promoting the management of its MSW in the MSP? Given the statement presented, the summary aims to answer the question presented. The methods used for the development of the research are: to collect and research bibliographic bases and quantitative and qualitative data in secondary sources on Red Lacre, in the management of MSW, such as: emission of gases, treatment and disposal; and verify through documentary research the participation of Red Lacre and USP in the management of MSW.

Attendance List

Hubert Algie, Monash University
Ossai Alu, University of North Dakota
Nurul Aman, University of Massachusetts Boston
Flavia Amayo, University of Birmingham
Dimitrios Anastasopoulos, Athens College
Jhorland Ayala García, Banco de la República
Gabriel Ayayia, Oregon State University
Jody Ballah, University of Cincinnati - Blue Ash College
Mariya Bezgrebelna, York University
Nikola Biliskov, McGill University
Alisa Bonsignore, Clarifying Complex Ideas, LLC
Virginie Brunetaud, Core6 Environmental Ltd.
Rachel Burckhardt, American Society for Microbiology
Attila Buzasi, Budapest University of Technology and Economics **Stuart Capstick,** University of Cardiff
Peter Carter, Climate Emergency Institute
Kai M.A. Chan, University of British Columbia
Saradamoyee Chatterjee, University of Cambridge
Elijah Jesus De Guzman, Ateneo de Manila University
Felicia De La Parra, UBC
Asha De Lisle, Town of Creston
Vitor Manuel Dinis Pereira, University of Lisbon
Natalia Dus Poiatti, University of Sao Paulo
Philip Egbule, University of Delta, Agbor, Nigeria
Natasha Ewashen, Town of Creston
Malcolm Fabiyi, Optimabiome LLC
Aitazaz Farooque, Canadian Centre for Climate Change and Adaptation
Kulsum Fatima, University of Calgary
Jaret Fattori, BMT Canada
Pablo Fernández Cabrerizo, Common Ground Research Networks
Kristen Fletcher, Naval Postgraduate School
Meridith Fry, US Environmental Protection Agency
Qiang Fu, Wells Fargo
Elias Gaveta, Mzuzu University
Tamsyn Gilbert, Common Ground Research Networks
Darby Graf, Western Washington University
Isobel Graham, Monash University
Raul Guerrero Torres, Universidad de Cartagena
Maria Camila Gutiérrez, CEDEU
Md Amdadul Haque, Shahjalal University of Science and Technology
Victoria Hurth, Cambridge Institute for Sustainability Leadership
Obianuju Patience Ilo, University of KwaZulu-Natal
Dr. Md. Sirajul Islam, North South University

Paul Joseph, Tufts University
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Tony Juniper, CBE, Chair, Natural England
Phillip Kalantzis-Cope, Common Ground Research Networks
Angel Kennedy, Simon Fraser University
Muhammad Hassan Khan, University of Calgary
Sean Kidd, Center for Addiction and Mental Health/University of Toronto
Vanshika Kirar, University of Delhi
Karyn Knox, Educated Choices Program
Rachil Koumproglou, International University of Valencia
Bilal Kureshi, University of Waterloo
Marina Lesse, Naval Postgraduate School
Alejandra Linares Figueruelo, Universitat de Barcelona
Gregory Lowan-Trudeau, University of Calgary
Martha Ly Arrascue, WSP Golder
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Richard Maguire, RS2A Limited
Anita Malekian, University of Calgary
Amy Mc Elhinney, University of Mount Union
Wendy Mc William, Lincoln University
Maria Alice Mendonca, Federal University of Vicosa (UFV)
Thomson Midzi, University of Calgary
Souryabrata Mohapatra, University of Auckland
Fatemeh Mokhtarzadeh, BC Public Service
Suphicha Muangsri, Lincoln University
Tran Nguyen, University of California - San Diego
Vaishali Nijampatnam, Edward's Lifesciences
Maureen Odongo, Central Bank of Kenya
Ojetunde Ojewola, University of Missouri
Mustapha Olawuni, Tennessee State University
Emmanuela Opoku, Minnesota State University
Emmanuel Opoku, Global Change Research Institute CAS (CzechGlobe)
María Otero Auristondo, Pontifical Catholic University of Valparaíso
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Alex Pate, Common Ground Research Networks
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Jessica Pawlovich, New Relationship Trust
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Stephen Chitengi Sakapaji, Hokkaido University - Arctic Research Center
Jillian Salomon, Common Ground Research Networks
Francia Santos, De La Salle University (DLSU)-Manila
James Skon, Kenyon College
Catherine Slater, Quadra Island Conservancy and Stewardship Society
Adam Smith, United States Navy
Peta Stilgoe, Land Court of Queensland
Sunshine Swetnam, Colorado State University
Usha Tandon, University of Delhi
Renata Trisilawati, The Northglenn Sustainability Committe
Jerome Vallar, California Climate Exchange
William Van Brunt, JFA, LLC
Nina Venkataraman, National University of Singapore
Magdalena Viktora Jones, Florida International University
Peter Wamalwa, Central Bank of Kenya
Gary Wilson, Liverpool John Moores University
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Dongdong Xiao, University College London
Luciana Ziglio, University of São Paulo

Common Ground Research Networks

COMMON GROUND

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.

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www.cgnetworks.org

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:

And to our Research Network members!

www.cgnetworks.org/medialab

COMMON GROUND

United Nations Climate Change

CLIMATE NEUTRAL NOW

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 Seventeenth International Conference on the Arts in Society, hosted by the UBC Robson Square, Vancouver, Canada, 20-21 April 2023. The conference featured research addressing the following special focus: "Responding to the Climate Emergency: Scalable Solutions for the Climate-Nature Intersect" and annual themes:

- Theme 1: The Nature of Evidence
- Theme 2: Assessing Impacts in Diverse Ecosystems Themes
- Theme 3: Human Impacts and Responsibility Theme
- Theme 4: Technical, Political, and Social Response