Environment for Development

The 17th EfD Annual Meeting

Proceedings

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Photography: Emmanuel Richardson.

“There’s no better network to call upon to take on the challenge of coming up with new methodologies rebasing economies based on their natural capital and the eco-system services provided by nature’s infrastructure than the EfD network.” –

Prof. Kevin Chika Urama,
AfDB Vice President and Chief Economist

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About EfD

The Environment for Development Initiative (EfD) is a global network of environmental economics research centers tackling the world's most challenging problems at the intersection of poverty, the environment, and climate change. We strive for inclusive and sustainable economic development, in which everyone can participate and benefit from advancements.

We focus on policy-relevant research, at the intersection of the environment and development, while our ambition for 2021-2025 is to further develop EfD as a dynamic and impactful international organization that fills critical societal gaps in:1) human capital (i.e. capacity), 2) research, 3) meaningful communication with policy actors, and 4) institutional development.

Our specific intervention is to build local capacity, by developing a vibrant community of scholars in the Global South who devote their careers to solving central sustainability challenges in their societies. Our scholars are equipped to create knowledge with high-quality research, educate future generations, and advise policy leaders on the evidence-based management solutions needed to get development right so that it both reduces poverty and is environmentally sustainable.

EfD 's vision

Inclusive sustainable development in the Global South is founded on evidence-based management of the environment, natural resources, and climate change impacts.

EfD 's overarching objective

Through integrated capacity development, research, and policy engagement we contribute to evidence-based domestic and international policies for poverty reduction, environmental and resource management, and climate change impacts in the Global South.

Contributions to filling the identified pillars:

- Capacity development.
- Policy-relevant research.
- Policy engagement.
- Institutional development.

EfD centers are hosted by leading local academic research institutions in 12 countries: Chile, Colombia, Central America, Ethiopia, Ghana, India, Kenya, Nigeria, South Africa, Tanzania, Uganda, and Vietnam.

The EfD Global Hub coordinates the network from the School of Business, Economics, and Law, University of Gothenburg, Sweden.

Financial support is provided by the Swedish International Development Cooperation Agency (Sida).

The Annual Meeting

The EfD Annual Meeting has evolved to become one of the largest and most vibrant conferences in the Global South on the application of environmental and resource economics.

This is a forum for EfD researchers, research collaborators, and other key stakeholders to interact and exchange research ideas, seek collaborations, discuss research proposals, and shohcase research results from EfD projects.

The meeting host alternates among the 12 centers. On October 5-8, 2023, the 17th Annual Meeting was held in Accra, Ghana, hosted by ENRRI-EfD Ghana organized the meeting.

ENRRI-EfD Ghana is hosted by the Institute of Statistical, Social and Economic Research (ISSER) at the University of Ghana (UG), with the collaboration of the School of Research and Graduate Studies (SRGS) at the Ghana Institute of Management and Public Administration (GIMPA).

The four-day program comprised keynotes, parallel sessions, and social interactions.

Keywords – Acronyms and Abbreviations

BlueRforD - Blue Resources for Development

CATIE - Tropical Agricultural Research and Higher Education Center

CECFEE - Center for Research on the Economics of Climate, Food, Energy and Environment

EEPSEA - Economy & Environment Partnership for Southeast Asia

EDF - Environmental Defense Fund

EDRI - Ethiopian Development Research Institute

EfD - Environment for Development

EPfD - Emission Pricing for Development

FC - Forestry Collaborative

GIMPA - Ghana Institute of Management and Public Administration

GU - University of Gothenburg

IEG - Institute of Economic Growth

ISID - Institute for Studies in Industrial Development

ISI - Indian Statistical Institute

MCC - Mercator Research Institute on Global Commons and Climate Change

NatCap - Natural Capital Collaborative

TSE - Toulouse School of Economics

SETI - Sustainable Energy Transitions Initiative

SCOPE - Sustainable Consumption and Production

WinEED - Women in Environmental Economics for Development

Committees

Organizing Committee

Gunnar Köhlin Director, EfD	**Susanna Olai** Program Manager, EfD	**Franklin Amuakwa-Mensah** Research Manager, EfD
Alejandro Jose Lopez-Feldman Coordinator – Collaborative Programs, EfD	**Wisdom Akpalu** Director, ENRRI- EfD Ghana	**Anna Mellin** Policy Engagement Coordinator, IGE Program

Research Committee

Prof. Emi Uchida Research Committee/ University of Rhode Island	**Prof. Vic Adamowicz** Chair, Research Committee/ University of Alberta, Canada	**Prof. Subhrendu K. Pattanayak** Collaborative Programs Committee/ Duke University
Dr. Jessica Coria Research Committee/ University of Gothenburg, Sweden	**Prof. Pam Jagger** Research Committee/ University of Michigan, USA	**Dr. Menale Kassie** Research Committee/ Senior Scientist, Icipe Kenya

Local Organizing Committee

Wisdom Akpalu Director, ENRRI-EfD Ghana	**Peter Quartey** Deputy Director,	**Anatu Mohammed** Co-ordinator
Mark Senanu Kudzordzi Data Manager	**Vicentia Quartey** Communications Officer,	**Francis Atsu** Research Fellow
Kudjo Sogbey Center Staff	**Daniel Twerefour** Research Fellow	**Ebo Turkson** Research Fellow

Description of Collaborative Programs' Meetings

SCOPE

The Sustainable Consumption and Production (SCOPE) collaborative program aims to contribute, through substantial policy-impacting research, to the achievement of transformative changes in lifestyles, food consumption, waste, and circularity. Given the current consumption and production patterns, we recognize that our planet's resources (air, water, soil, minerals, fuels, plants, and animals) are under formidable pressure. In this sense, our research program aims to identify leverage points and associated interventions for triggering and enabling transformative changes that are both in harmony with the natural environment and promote sustainable and just prosperity. Our group's research interests focus on three thematic areas: food waste, sustainable lifestyles, and the circular economy. During the open session of SCOPE, the discussion will revolve around generating high-quality scientific research in these areas, exploring mechanisms to enhance policy impact, and examining additional prospects for networking and funding.

EPfD

The Emissions Pricing for Development (EPFD) collaborative session at the EfD Annual Meeting is open to all members of the collaborative program as well as any researchers who are interested in our work on climate policy and emissions pricing, in particular. Our goal is to present an overview of the collaborative, recap EPFDs work, and plan ahead when it comes to joint publications, fundraising and other activities. Highlights will include work on a new Carbon pricing incidence calculator tool, CGE modeling for carbon market design, and a Voluntary carbon market initiative for Africa. We are also keen to hear from all of you about initiatives in your countries for emission pricing and particularly the economic and social effects of carbon pricing policy in your countries. Welcome to an interesting and important session!

Forest

The session will be moderated by Yuanyuan Yi, Randy Bluffstone, and Jintao Xu. We will provide a brief background on past FC activities and accomplishments. We will also introduce the upcoming changes in the FC, and discuss the EfD activity and potential for participating in the African Forest Landscape Restoration Initiative (WRI) and the IDRC project on Voluntary Carbon Markets. We welcome your participation and brainstorming for the next topics of common interest!

SETI

This year's Sustainable Energy Transitions Initiative (SETI) collaborative session at the EfD Annual Meeting is open to all members of the collaborative program as well as any researchers who are interested in our work on energy transitions, and/or willing to participate in our vibrant network. Our goal is to present an overview of the collaborative, recap SETI's work over the past few years (especially during the last year), and to ideate with members in the network on opportunities for leveraging and extending our work, via joint proposals, exchanges and virtual seminars/meetings, accessing policy funds, etc. We will discuss potential venues for future collaborations, such as the collaboration between SETI and EfD's Inclusive Green Economy Program (IGE), and provide examples of other multi-investigator, multi-center collaborations, allocating time also for group break-out sessions to brainstorm proposal writing ideas and leadership. Let's mingle and bring research and policy interaction ideas!

WinEED

This session is open to all members of the EfD community interested in our work on gender equality and interested in participating in our network. In the session, we will present WinEED's work during the last year, as well as new data that we collected on gender balance by center, grants, and participation in the EfD network. We will highlight improvements and weaknesses. We will also discuss gender analysis in Environmental Economics, identify strategic issues in gender analysis in the field, and highlight EfD efforts in closing the gender gap.

NatCap

The Natural Capital (NatCap) collaborative program's overreaching aim is to stimulate policy action across the Global South to implement research-based sustainable practices for biodiversity and ecosystem services, water systems, and sustainable agriculture to address key challenges around these areas. This will be done through collaborative research within EfD centers and with researchers outside the EfD network but with interest in the above areas of focus and policymakers in the Global South. The group's research interest is currently organized under three themes: Biodiversity & Ecosystem Services, Water Systems, and Sustainable Agriculture. In this year's NatCap collaborative open session, we will present an overview of NatCap's work, open discussion with participants on future interesting areas and opportunities for joint work in terms of research proposals, research visits, seminars, and funding opportunities outside the EfD network that may be relevant for "big" collaborative research project(s). We will also discuss best ways to leverage our network with policymakers to contribute to the outreach of our work in contributing to the UN's Sustainable Development Goals (SDGs), particularly the societal goals of poverty reduction (SDG1) and gender equality (SDG5).

Blue RforD

The main focus of the Blue Resources for Development collaborative program (BlueRforD) is to contribute to increasing knowledge regarding the use of aquatic resources, including the development of sustainable capture fisheries, aquaculture, and marine spatial planning, and their links to blue growth, food security, poverty alleviation, and gender perspectives. During our open discussion, we wish to explore several key areas of interest. Firstly, we aim to identify potential collaboration opportunities within the EfD network and beyond, including potential funding sources and strategies for fostering the growth of BlueRforD. Additionally, we discuss the feasibility of conducting a global survey and its scope. This discussion will help determine the priority areas for future research. We will also consider the various types of studies that could be employed, whether conventional surveys, experimental work, or choice experiment surveys, and successfully identify the countries and representatives who are willing to participate in this endeavor. Lastly, financial considerations will be discussed to ensure the successful execution of this project.

Program

Thursday, October 5, 2023		Thursday, October 6, 2023	
08:00 – 08:30	Registration	08:00 – 08:10	Registration
08:30 -10:00	Parallel Sessions 1	08:10 -10:10	Parallel Sessions 3
10:00 -10:30	Coffee Break	10:10 -10:30	Coffee Break
10:30 -12:00	Parallel Sessions 2	10:30 -12:00	Parallel Sessions 4
12:00 - 01:15	Lunch	12:00 - 01:15	Lunch
01:15 - 02:00	*Official Opening* – Kevin Chika Urama	01:15 - 02:00	*Policy Talk* - On carbon offsets from forest conservation – by Erin Sills
02:00 - 03:00	*Policy Talk* - AI for a green transition – By Erik Sterner	02:00 - 03:00	*Keynote* (Panel Discussion) - Emissions Pricing and Carbon Exit by EPfD
03:00 - 03:15	Coffee Break	03:00 - 03:15	Coffee Break
03:15 – 04:45	Collaborative Program - SCOPE	03:15 – 04:45	Collaborative Program - EPfD
04:45 – 05:00	Healthy break	04:45 – 05:00	Healthy break
05:00 – 06:30	Collaborative Programs	05:00 – 06:30	Collaborative Program - Forest
07:00 – 09:00	Dinner	07:00 – 09:00	Dinner
08:00 – 08:30	Registration	08:00 – 08:10	Registration
08:30 -10:00	Parallel Sessions 1	08:10 -10:10	Parallel Sessions 3
10:00 -10:30	Coffee Break	10:10 -10:30	Coffee Break
Thursday, October 7, 2023		**Thursday, October 8, 2023**	
08:00 – 08:10	Registration	08:00 – 08:10	Registration
08:10 -10:10	Parallel Sessions 5	08:10 -10:10	Parallel Sessions 7
10:10 -10:30	Coffee Break	10:10 -10:30	Coffee Break
10:30 -12:00	Parallel Sessions 6	10:30 -12:00	Parallel Sessions 8
12:00 - 01:15	Lunch	12:00 - 01:15	Lunch
01:15 - 02:00	*Policy Talk* - Economics in Conservation Practice – by Priya Shyamsundar	01:15 - 02:00	*Policy Talk* - How to do Environment and Development Economics research: A view from the trenches
02:00 - 03:00	*Keynote* - Trade-Offs Between Communities' Welfare and Wildlife Conservation in Africa - by Edwin Muchapondwa	02:00 - 03:00	*Keynote* - Changing Social Norms: Effectiveness of Participatory Theatre
03:00 - 03:15	Coffee Break	03:00 - 03:15	Coffee Break
03:15 – 04:45	Board Meeting and Collaborative Meeting - SETI	03:15 – 04:45	CDC, RC, and Collaborative Meeting - NatCap
04:45 – 05:00	Healthy break	04:45 – 05:00	Healthy break
05:00 – 06:30	Collaborative Program - WinEED	05:00 – 06:30	Collaborative Program – Blue RforD
07:00 – 09:00	Dinner	07:00 – 09:00	Dinner and Awards Ceremony

Official Opening, Keynotes, and Policy Talks

Prof. Gunnar Köhlin, Director EfD chaired the Official Opening, while Prof. Kevin Chika Urama the Vice President, and Chief Economist at the African Development Bank (AfDB) delivered the keynote address. Prof. Wisdom Akpalu, EfD Ghana - Center Director and Chairperson of the local organizing committee together with Alejandro López-Feldman, Coordinator, Collaborative Programs, and Franklin Amuakwa-Mensah, EfD Research Manager also joined the panel and made remarks about the event, collaborative programs, and EfD research performances.

In his remarks, Prof. Kevin Chika Urama rallied the EfD network to unconventionally support African countries in creating feasible policies and strengthening institutional capacities while moving towards green transitions and inclusive growth. Watch full remarks

Prof. Kevin Chika Urama

Gunnar Köhlin

Prof. Wisdom Akpalu

Alejandro López-Feldman

Franklin Amuakwa-Mensah

Keynote and Policy Talk Speakers

AI for a green transition - Erik Sterner

On carbon offsets from forest conservation - Erin Sills

Economics in Conservation Practice - Priya Shyamsundar

How to do Environment and Development Economics research: A view from the trenches – Subhrendu Pattanayak

Changing Social Norms: Effectiveness of Participatory Theatre - Dr. Jyotsna Jalan

Trade-Offs Between Communities' Welfare and Wildlife Conservation in Africa - Edwin Muchapondwa

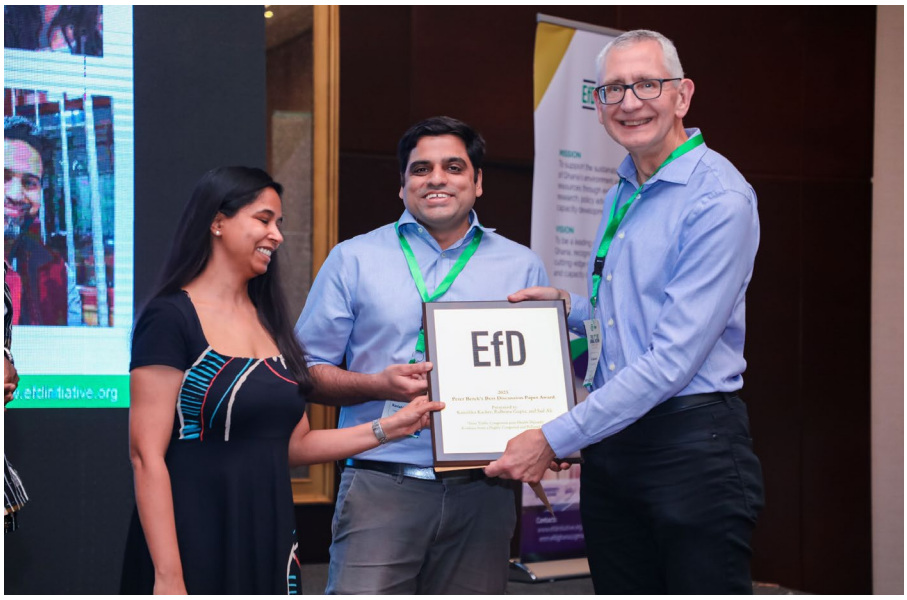
Awards

Peter Berck Best Discussion Paper Award

The Peter Berck Best Discussion Paper award went to **Kanishka Kacker**, **Ridhima Gupta**, and **Saif Ali** for their paper titled: *Does traffic congestion pose health hazards? Evidence from a highly congested and polluted city*.

Criteria:

- Involvement of researchers in Global South (EfD-funded project, young researcher)
- Policy relevance
- Research design
- Analysis



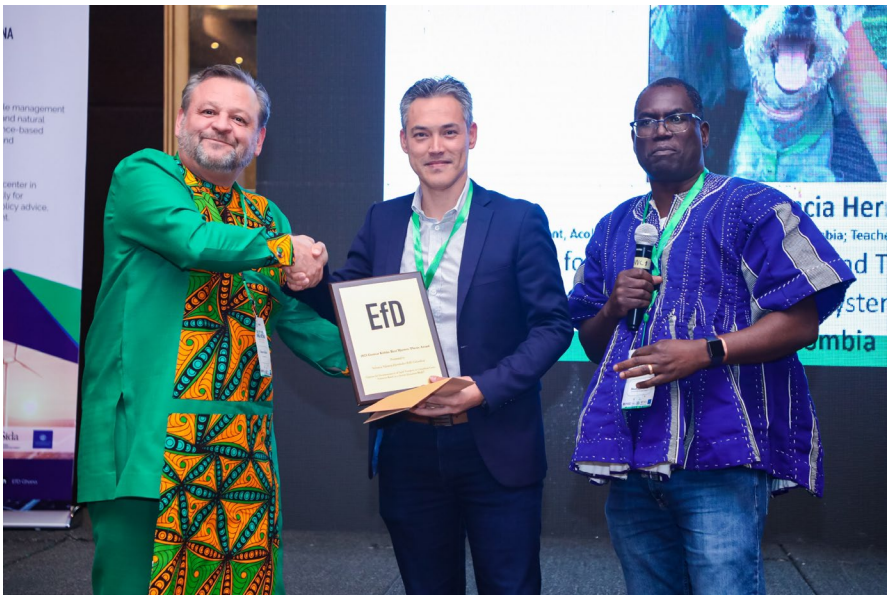
Kanishka Kacker and Ridhima Gupta receive the award from Vic Adamowicz, Chair Research Committee.

Gunnar Köhlin Best MSc. thesis Award

The Gunnar Köhlin Best MSc. thesis Award was awarded to **Veŕonica Valencia Hernández**, for her thesis *Options for Decarbonization of land transport in Colombian cities: Scenarios based on a system dynamics model.*

Veŕonica's submission was through EfD Colombia.

Criteria:
• Rigor in the application of environmental economics,
• Relevance in affecting policy to reduce poverty and increase sustainability,
• Clarity in writing that makes the text easily accessible and fun to read.



Jorge Bonilla receives the Gunnar Köhlin Best Master Thesis Award on behalf of Veŕonica Valencia Hernández, EfD Colombia. (Gunnar Köhlin to the left and Edwin Muchapondwa to the right.)

EfD Policy Impact Award & recognitions

The Policy Impact Award was presented to Wisdom Akpalu, EfD Ghana, for his work to achieve Policy change for sustainable fisheries in Ghana.

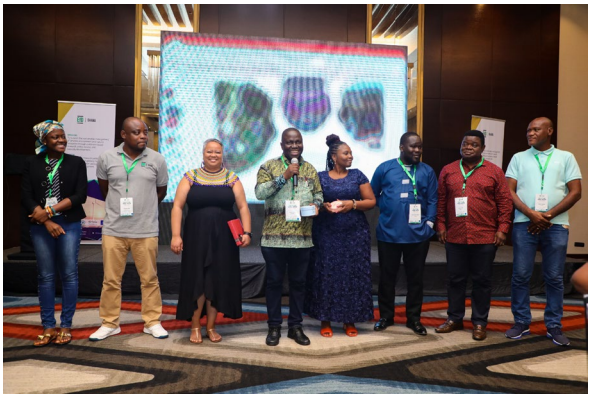
Wisdom Akpalu, winner of the EfD Policy Impact Award.

Award Motivation

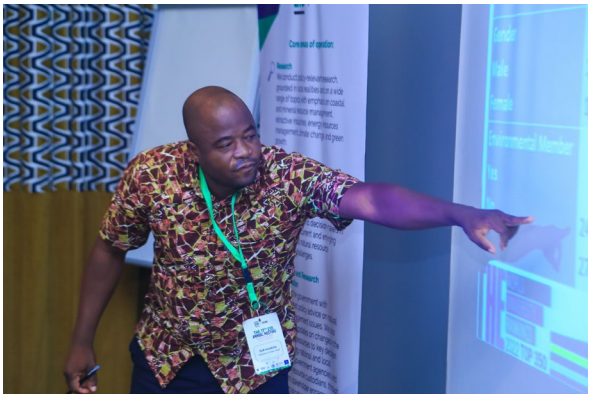
Winner: **Prof. Wisdom Akpalu**
Prof. Wisdom Akpalu 's research and policy engagement played an instrumental role in developing and implementing policies to make fisheries practices in Ghana more sustainable. Policy changes to which Prof. Akpalu made important contributions include using video monitors on industrial trawlers, changes in mesh sizes, an alternative livelihood training support program, and the establishment of a Scientific and Technical Committee under the Fisheries Commission. His work on these politically sensitive topics, including harmful subsidies, is solidly built on facts and figures, and he has thereby gained the respect and trust of government officials and artisanal fisheries organizations.

Recognition: **Dr. Bonilla, Dr. Aravena, and Dr. Morales**
The development of socioeconomic indicators for evaluating air quality policies by Dr. Bonilla, Dr. Aravena, and Dr. Morales has been central in developing Bogota´s Better Air Zones Policy, particularly in areas with the most vulnerable population. This work was also influenced the location of specific road improvement projects in Bogotá to areas close to schools and childcare facilities to maximize the socio-economic benefits of improved air quality. The team has shown how the development of an excellent research paper, Assessing Multiple Inequalities and Air Pollution Abatement Policies (ERE, 2023), combined with proactive policy engagement, can lead to substantial impacts.

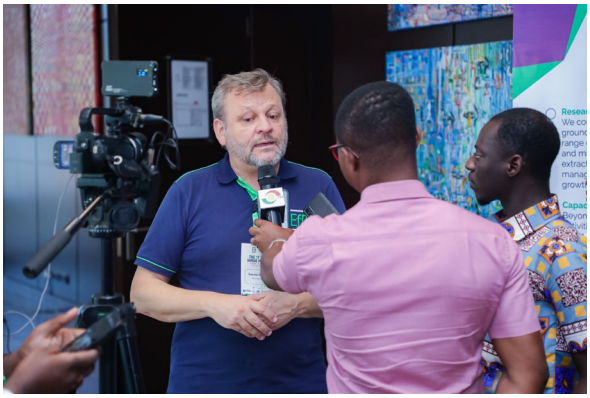
Highlights through the Lens



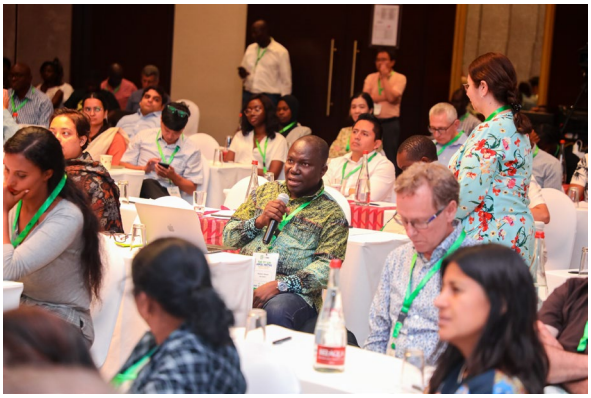
The Local organizing team led by Prof. Wisdom Akpalu (Holding mic)



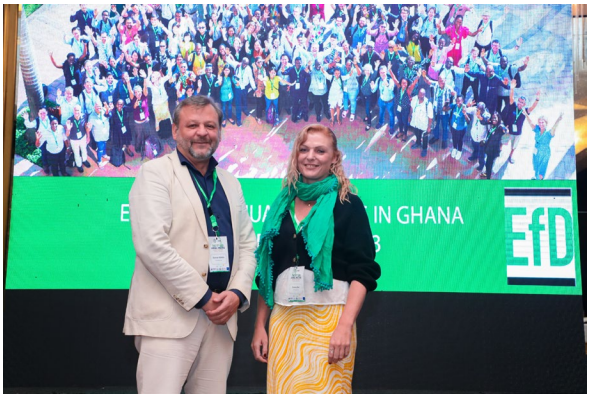
Kofi Vondolia a researcher from the University of Cape Town making a presentation.



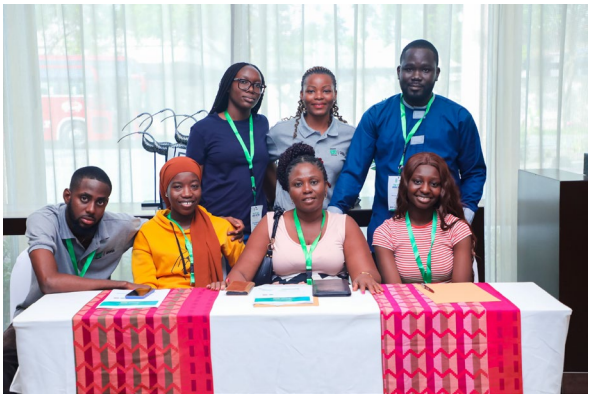
EfD Director Gunnar Köhlin addressing the media.



Participants during an interactive panel session



EfD Director Gunnar Köhlin and the Program Manager Susanna Olai



The Local organizing support team

Parallel Sessions – Abstracts

Parallel Session 1A: COOKING ENERGY & HEALTH (SETI) | Chair: Solomon Aboagye

Presenter	Title	Discussant
Kwame Adjei-Mantey (University of Environment and Sustainable Development)	**Examining Household Air Pollution and Stunting: Can Households Stem the Tide on their Own?** We create a novel road surface condition dataset by applying artificial intelligence to high-resolution satellite images. Combining a range of remote sensing data and ground surveys, we study the effect of road improvement on economic and environmental outcomes in Zambia. We find that market access increases the size of urbanized areas measured by built-up, at the cost of increasing air pollution and deforestation. Improvements in market access do not improve income and even reduce average income in large cities, in line with the "urbanization without growth" phenomenon commonly observed in the African context.	Solomon Aboagye
Solomon Aboagye (University of Cape Town)	**Cooking and Household Health: Insights from The Attributes of Modern Cooking Solution and Gender Perspectives** The widespread cooking practice of burning biomass in traditional cookstove has been linked with various health complications. Despite the growing body of evidence, the aspect relating to the isolated effects of the individual attributes of cooking solution still remains largely unexamined in the ongoing discourse. This study, which embraces aspects of the Sustainable Development Goals (SGDs) 3 and 7, therefore conducts a comprehensive analysis into the attributes of modern cooking solution. The objective is to examine how these attributes, individually and/or jointly, affect respiratory health particularly cough and total health expenditure at the household level. Utilizing the probit and Tobit models respectively to the cough and expenditure specifications the study observes that attributes such as exposure and safety of primary cookstove are critical catalyst to exerting downward pressure on both health outcomes. At the positive limits of fuel availability and affordability attributes households also experience declines in both cough incidence and total health expenditure. Similar qualitative findings are established for cooking convenience attribute. Nevertheless, lower levels of fuel availability and cooking efficiency attributes tend to increase both health outcomes. Ultimately, household's	Salome Amuakwa-Mensah

	overall access to modern cooking solution is associated with reduction in both cough incidence and total health expenditure especially for households in higher tiers of access. In the process, the study has revealed the attributes that could serve as critical catalyst in exerting downward effect on two major health outcomes which present vital lessons on policies intended to improve household's health outcomes resulting from cooking. These important insights could not by no means have been learnt if the attribute dimension of the debate had not been evaluated.	
Salome Amuakwa-Mensah (Luleå University of Technology)	**Cooking fuel choices and respiratory health concerns in Uganda** Compared with the 68% use in 2010, cooking with biomass fuel in rural communities declined to 52% in a decade (International Energy Agency et al., 2018). In 2022, the World Health Oraganization (WHO) postulated that about 2.4 billion people, making around one third of the world population use inefficient cooking stoves and hence biomass fuels in cooking (International Energy Agency et al., 2018). The use of inefficient cooking stoves and fuels emit harmful substances which are a major cause of household air pollution (HAP) resulting that caused about 3.2 million deaths in 2020 (WHO, 2022). HAP causes the most significant challenges to indoor air quality in the world at large because of the variety of the pollutants involved and given that humans breathe indoor air for about 80% of their lifetime (Jeuland et al., 2015).	Kwame Adjei-Mantey

Parallel Session 1B: GENDER, ENERGY AND NATURAL RESOURCES (WiNEED) | Chair: Virginiah Wango

Presenter	Title	Discussant
Thomas Klug (Mercator Research Institute of Global Commons And Climate Change)	**The Political Economy of Gender Mainstreaming in Energy Access in Senegal** In June 2017, the Presidents of all 15 member states of the Economic Community of West Africa States signed on to the Policy for Gender Mainstreaming in Energy Access. This policy, the first regional gender policy in energy in the world, aims to improve understanding at the nexus of gender and energy, improve the inclusivity of energy policies, programs, and initiatives, and increase women's participation in the field of energy in the public and private sectors. Each member state developed a National Action Plan that would set out the activities that national actors would take to reach those goals. This study uses a political economy framework to understand how Senegal's economic and political structures, history, and social norms contributed to development of its National Action Plan. In doing so, we outline the major objectives of key actors' involvement in policy development, which are summarized as: 1) rural electrification, 2) energy for women's economic development, 3) access to clean fuels and technologies for cooking, and 4) improve the valuation of women's roles and status in society. We find that Senegal's National Action Plan is unique from other country plans in its attempt to expand energy access to women and women-owned enterprises and integrate the policy in the state's long-term energy and development agenda.	Virginiah
Phindile Nkosi (University of Witwatersrand)	**Women Access, Use, Management and Governance of Water in East Africa: A Systematic Review.** An important relationship exists between gender and water resources. This working paper presents a systematic review of the existing literature on the connection between gender and water resource access, use, and governance in East Africa. We review published empirical literature that explicitly uses association and causal methods to study these relationships. To develop our research framework, we first fragmented into three key themes: water use, access, and governance. We then identify and map water functions within each theme to identify key indicators in our study. Using this framework, we aim to search a comprehensive literature that will characterize women by key themes and functions and, subsequently, identify gaps in the key linkages. Insights from this study can further be used to guide future research intersecting gender equality and water resource management.	Maria

Marc Jeuland (Duke University)	**Characterization of Women's Access, Use, Management, and Governance to Land and Water in the Andean Amazon: A Systematic Review.** This project aims to explore the relationship between gender equality and natural resources, specifically water and land, in the Andean Amazon region. Specifically, the countries of interest are Colombia, Peru, Ecuador, Brazil and Bolivia. The study examines governance structures, institutional factors, and power dynamics that contribute to gender gaps in resource use. It also highlights the challenges women face in accessing and controlling water and land resources, such as unequal distribution, health burdens, time constraints, and limited access to productive resources. The study further addresses the impact of policies and interventions on gender-water and gender-land relationships. Through a systematic literature review, the project identifies key knowledge gaps and establishes a network of researchers to build dialogue, coordination and the creation of public policies that have a gender approach. The preliminary results highlight the importance of defining and defending women's rights, joint ownership, and adherence to social norms for ensuring women's access to land. They also reveal gender inequities in water usage for economic activities and the projected impact of climate change on resources and livelihoods, particularly for women.	Thomas

Parallel Session 1C: PROPERTY RIGHTS & MARKETS (BlueRforD) | Chair: Leonardo Salazar

Presenter	Title	Discussant
Juan Rosas-Munoz (University of Bio-Bio)	**When Should the Regulator Be Left Alone in the Commons? How Fishing Cooperatives Can Help Ameliorate Inefficiencies** Fishing cooperatives and Territorial Use Rights for Fishing (TURF) programs have received more attention in the last decades, suggesting that their coexistence with a regulator can help the latter better protect the fishing ground or, generally, any other common pool resource. We seek to understand the effect of having two regulatory agencies (any form of artisanal organization and the regulator), identifying in which contexts having only one of the agencies managing the resource is socially optimal and in which cases, instead, having both agencies may be preferable. In the US, for instance, the National Oceanic and Atmospheric Administration (NOAA) coexists with at least five cooperatives (i.e., PCC & HSCP, Pollock mothership, and Chignik salmon, among others). In Norway, the Institute of Marine Research coexists with the Norwegian Fishermen's Sales Organization; and in Japan, the Ministry of Agriculture, Forestry and Fisheries coexists with around 456 fishing cooperative associations (FCAs) as reported by Uchida and Makino (2008).	Jorge

Jorge Luis Montero Mestre (Universidad De Los Andes)	**Unmasking the Threat to Property Rights: Unauthorized Fishing Activity During the Covid-19 Pandemic.** This paper examines the impact of the COVID-19 pandemic on property rights in the context of unauthorized fishing activity. The global health crisis has disrupted economic activities and imposed significant challenges on fisheries management and enforcement. This study investigates the extent to which the pandemic has facilitated an increase in unauthorized fishing, potentially undermining existing property rights regimes. By ana-lyzing comprehensive data on fishing activities and using causal empirical methods, this research sheds light on the consequences of the pandemic for marine resource governance. The findings provide valuable insights for policymakers and stakeholders seeking to protect and strengthen property rights in the face of unforeseen disruptions.	Leonardo
Leonardo Salazar (Universidad De Concepción)	**Import Price Determination in the Chinese Seaweed Market: What are the Projections?** The non-food segment of the Chinese seaweed market, which is crucial for developing the hydrocolloid industry, relies heavily on the seaweed supply from Chile, Peru, and, to a much lesser extent, Indonesia. The Law of One Price holds, and this market is fully integrated, implying that import prices move in tandem over time. Furthermore, in the Chinese seaweed market, the import price from Chile and Indonesia follows the lead of the import price from Peru. As the hydrocolloid industry develops in China, further pressure on seaweed from Chile and Peru is expected, which increases the extraction of seaweed from natural beds. This situation will be unsustainable if Chile and Peru continue relying their production primarily on wild extraction, jeopardizing China's hydrocolloid industry's development.	Juan

Parallel Session 1D: CLIMATIC SHOCK AND TECHNOLOGY USE (NatCap) | Chair: Yonas Alem

Presenter	Title	Discussant
Johannes Gallé (Mercator Research Instiute on Global Commons And Climate Change)	**Indian Agriculture Under Climate Change: The Competing Effect of Temperature and Rainfall Anomalies** The latest generation of global climate models robustly projects that monsoon rainfall anomalies in India will significantly increase in the 21st century due to global warming. This raises the question of the impact of these changes on the agricultural yield. Based on annual district data for the years 1966-2014, we estimate the relationship between weather indices (amount of seasonal rainfall, number of wet days, average temperature) and the most widely grown kharif crops, including rice, in a flexible non-parametric way. We use the empirical relationship in order to predict district-specific crop yield based on the climate projections of eight evaluated state-of-the-art climate models under two global warming sce-narios for the years 2021-2100. We find that the loss in rice yield by the end of the 21st century lies on average between 3 - 22% depending on the underlying emission scenario. Potential gains due to increasing rainfall are more than offset by the negative impacts of increasing temperature. Adaptation efforts in the worst-case global warming scenario would need to cut the negative impacts of temperature by 50% in order to reach the outcome of the sustainable scenario.	Chalmers
Chalmers Kyalo Mulwa (University of Cape Town)	**Weather Uncertainty and Demand for Information in Technology Adoption: Case of Namibia** In recent years, environmental degradation has been the leading cause of concern due to the severe impact of climate change. This study uses panel data of 64 countries (comprising a set of African countries and some from the rest of the world) from 2005 to 2020 and the general method of moments (System-GMM) technique to determine the comprehensive impact of industrialization on CO_2 emissions, as well as the role of institutions and financial development in moderating this relationship. Our results allude to an effective role of both institutions and financial development in general. In details, we found that first: institutions and financial development seem to play a stronger role both in direct and mediating effect in middle-income countries than they do in the low-income countries. Secondly, the study also found that technology intensity matter, medium-high technology intensive countries seem to reduce CO_2 emissions compared to low technology intensive countries. Finally, institutions and financial development play a very significant role in moderating the impact of manufacturing VA on CO_2 emissions and this is consistent also for income level as well as technology intensity. Moreover, the results imply that it is possible to industrialize while protecting the environment. Therefore, while direct recommendations can be made to policymakers (government) to ensure that they improve their institutions, the financial industry is also tasked with enhancing its financial products. This can be accomplished in a number of ways, including the establishment of a sovereign fund	Yonas

	for the environment by the governments and the reduction of interest rates for pro-environment investments by the respective Central Banks.	
Yonas Alem (University Of Gothenburg)	**The Impact of a Major Climatic Shock on Technology Use: Exploring The Mechanisms** The 2015-16 El-Niño-induced drought affected over 60 million people globally. We estimate the impact of the drought on the use of productivity-enhancing technologies and labor allocation of smallholder farmers. The availability of nationally representative panel data collected before and after the drought allows the identification of the impact of the drought using alternative versions of the difference-in-differences estimator. Contrary to the expectation, we find that the drought significantly increased the application of fertilizer and pesticides, but it reduced the application of improved seeds. We show that the primary mechanism that explains the increase in fertilizer and pesticide use is the reallocation of agricultural land from pulse cultivation to cereals, which is fertilizer intensive, and the break out of pests during drought, respectively. We also find a considerable reduction in the allocation of household labor to own farming and a comparable increase in labor allocated to wage work and productive safety net programs. Taken together, the results suggest that by responding quickly, farmers may have reduced the adverse impact of the drought. Our findings have important implications for formulating appropriate adaptation strategies because climate change is predicted to increase the frequency and intensity of El-Niños.	Johannes

Parallel Session 1E: RESEARCH PROPOSALS | Chair: Franklin Amuakwa-Mensah

How Effective is Ethiopia´s Agricultural Growth Program at Improving Household's Food and Nutrition Security? Panel Data Evidence

Abebe Beyene Damte (Environment and Climate Research Center)

Horticulture farmers' exposure to pesticides: Possible health risks and interventions for improvement

Martin Julius Chegere (University of Dar es Salaam)

Empowering Households for Clean Energy: The Impact of Women Empowerment on Sources of Cleaner Fuel

Nikita Sangwan (Indian Statistical Institute

Parallel Session 2A: ENERGY SECTOR IN AFRICA (SETI) | Chair: Emmanuel Y. Gbolonyo

Presenter	Title	Discussant
Amin Karimu (University of Cape Town)	**A Benefit-Cost Analysis of Energy Investment in Africa** This study examines the effects of economic complexity (ECI) and energy consumption on inclusive green growth (IGG) in Africa. The study also investigates whether energy consumption moderates the relationship between ECI and IGG. Our contribution is novel and relies on macro data from a panel of 22 African countries, covering the period 2008-2020. We employ dimensional reduction techniques, the dynamic system GMM and Driscoll-Kraay pooled least squares estimators to establish the following key findings. First, out of the 22 African countries we examine, only nine (9) are experiencing a growth trajectory that is both green and inclusive. Second, we find that economic complexity and energy consumption promote IGG in Africa. When we disaggregate energy consumption, we find that while renewable energy positively contributes to IGG, non-renewable energy has a detrimental impact on IGG. Third, our interactive analysis reveals that non-renewable energy diminishes the IGG-inducing effect of ECI, whereas renewable energy amplifies it. Finally, when we decompose IGG into environmental and socioeconomic sustainability components, we find that the interaction between ECI and energy consumption has a greater impact on the latter rather than the former. We conclude that investments directed towards enhancing Africa's productive knowledge and renewable energy capacities play a vital role in fostering IGG.	Andrés
Martin Andrés Riquelme (Universidad De Talca)	**Impact of Power Sector Reforms on Access to Electricity in Sub-Saharan Africa** Over 50% of sub-Saharan African households do not have access to electricity. At current rates, achieving the Sustainable Development Goal of universal access to electricity will not be possible, falling short by 7% of the world's population still without access to electricity by 2030. Power sector reforms may be an effective tool to improve energy access and the electricity sector's performance. This paper builds on previous research and investigates whether power sector reforms are effective policy instruments for delivering universal electricity access in Sub-Saharan Africa. In particular, we examine whether reforms' effectiveness depends on other factors such as population, population density, GDP, and political stability. Ultimately, this research sheds light on the importance of context when considering the success of power sector reforms in improving access to electricity in sub-Saharan Africa. We find that power sector	Emmanuel

	reforms positively and significantly impact access to electricity in sub-Saharan African countries ranging between 1.7% and 2.3% depending on the econometric specification. These coefficients for sub-Saharan African countries are smaller than those in Dertinger and Hirth (2019) for 108 developing countries, who found a coefficient of 2.5%. The more effective regulations are those intended to give independence to the power producers and the regulatory agencies. The effect of the reforms depends on the political stability and population, showing a positive impact on energy access.	
Emmanuel Y. Gbolonyo (University of Cape Town)	**Effects of Economic Complexity and Energy Consumption on Inclusive Green Growth** In the Global south, Africa, particularly, Sub-Saharan Africa (SSA) is one of the least performing regions in terms of economic performance measured in GDP per capita. Available data indicates that SSA's average GDP per capita ($1,533.23) for the period 2000 to 2021 is one of the least in the world, only better than that of South Asia ($1,287.14 in 2015 prices) (WDI,2022). Energy consumption per capita in Sub-Saharan Africa (SSA), excluding South Africa is about 180 kWh relative to about 6,500 kWh in Europe as reported by the African Development Bank (AfDB, 2021). Furthermore, statistics from the International Energy Agency (IEA,2022) suggest that close to 590 million people in SSA were without electricity access in 2021 and more than 970 million people had no access to clean cooking fuels and technologies in developing countries, majority of which are in Africa. There is significant evidence on the role of energy in economic growth and development for the global North countries (e.g., Böhringer et al. 2013; McCollum et al.2018). Despite this, current environmental challenges tend to reduce efforts in investment to scale-up Africa's access to reliable and affordable energy, aid its growth and development prospects.	Amin

Parallel Session 2B: AGRICULTURE & FOOD SECURITY (NatCap) | Chair: Simon Wagura Ndiritu

Presenter	Title	Discussant
Leida Yali Mercado (Catie)	**It's Not Just What You Have, But What You Do With It: Relations Between Production Diversity and Dietary Diversity in Central America Over a 5 Year Period** In this study we assess the relation between the diversity of on-farm produce and the diversity of foods consumed by smallholder farmers in two regions in Central America: Trifinio-Dry Corridor (the Guatemala, Honduras, and El Salvador border zone), and Central Nicaragua. Over a 5-year period we evaluate the effectiveness of a nutrition focused agricultural development program, MAP-Norway (Mesoamerican Agro-environmental Program). The key interventions of the program were nutritional education and improvements in home garden production through diversification and productivity strategies, using a gender equity approach. Our analyses indicate that these interventions improved the nutrition of their target families. We found that dietary diversity scores increased significantly after implementation of these interventions, with both food purchases and consumption of self-produced foods contributing to this increase. In both regions, the food groups that showed increased consumption were the vegetable and livestock derived foods. However, these increases in consumption were not associated with an increase in the diversity of on-farm vegetables or livestock produce in either region. The cause of the increase in dietary diversity seems to lie in the strengthening of the relation between production diversity (vegetables, livestock and in some cases crops) and dietary diversity and its components over time. This indicates that especially the education focused intervention, including nutritious and gender equitable education, positively influenced the way the households were using their produce. The results further illustrate that the relation between production diversity and dietary diversity is not a straightforward one, and that development projects focusing on production diversity with the aim to improve nutrition in smallholder systems first need to analyse carefully the intrinsic factors influencing diets to ensure their intervention will be appropriate.	Simon
Simon Wagura Ndiritu (Strathmore University)	**Understanding the Adoption of Appropriate Sustainable Regenerative Agriculture Practices in Kenyan Semi-Arid Lands: The Role of Village-Based Advisors** Implementation of regenerative agriculture practices (RA) has been widely regarded as a progressive countermeasure to curb soil degradation that is dwindling agriculture yield amidst increasing food demand. Despite their proven benefits in soil restoration, the uptake of RA practices has been low and slow.	Leida

	This study has pioneered research into implementation of appropriate RA practices and has empirically examined the role of village-based advisors (VBAs), also known as lead farmers in their respective farming community, in the uptake of RA practices. The research aims at identifying the state of adoption of appropriate sustainable RA practices with emphasis on farmers' soil perception and the role of VBAs in their adoption. Data for the study was collected in 2022 from 3,037 farmers from Kitui, Makueni, Embu, and Tharaka Nithi counties through structured survey questionnaires administered by trained field enumerators. It was analyzed using Multi-Variate Probit Model. The findings of our research indicate that soil perception attributes such as soil fertility and depth predisposed the adoption of RA practices. In addition to it, extension services provided by VBAs led to increase in uptake important RA practices such as appropriate cover crops and manure application. To promote wider adoption of these practices, a comprehensive approach involving extensive service provision by VBAs and knowledge creation among farmers to improve soil characteristics of their plots is recommended.	

Parallel Session 2C: AQUACULTURE (BlueRforD) | Chair: Thong Ho

Presenter	Title	Discussant
Carlos Chávez (Universidad De Talca)	**Assessing the Aquaculture Performance Indicators (APIS): Evidence from Aquaculture Production Systems in Chile** We evaluate the Aquaculture Performance Indicators (APIs) methodology by applying it to three aquaculture production systems in Chile. Our analysis considers the production of mussels, algae, and northern scallops. Our basic analysis model is a production function framework where the performance outcomes result from the available inputs. We measured all API categories (outcomes and input metrics) and then grouped the metrics into different dimensions suitable for analysis. We obtained the value of each metric from various sources using expert evaluation and secondary information to calculate aggregated measures for each production system. We compared the results for each production system and tested the equality of matched pairs of observations. Then, we evaluate the performance of the three production systems using the frame of a separable multiproduct production function. We found statistically significant differences in the aggregated performance and inputs between mussels and algae and between mussels and the northern scallops; however, we did not find statistical differences in the outputs. The results suggest that mussel production has a higher (average) level	Nicolas

	of sustainable inputs than the other production systems. This difference in inputs, however, is not fully reflected in output differences. We discuss possible explanations for our findings.	
Nicolas Valbuena (University of Hohenheim)	**Examining The Success of the Tilapia Industry in Huila, an Emerging Aquaculture Hub in the Colombian Southwest** Over the past two decades, production of tilapia (Oreochromis sp. and Oreochromis niloticus) in Colombia has experienced remarkable growth, establishing itself as the foremost cultured fish in the country. This study relied on the Aquaculture Performance Indicators (API) methodology to evaluate and compare the performance of export-oriented against domestically oriented tilapia production sectors in the department of Huila, which serves as the primary center for tilapia production in the country. The API evaluations relied on expert assessments, data, and collected secondary information. Differences among production sectors were formally analysed with statistical tests. Results revealed statistically significant differences in aggregate performance and outputs; however, significant differences in inputs were not identified. Due to varying production and investment capacities, costs, risks, and vulnerabilities among production sectors, these differences could be amplified in the future. Importantly, economic advantages enjoyed by export-oriented producers are likely to enhance resilience against environmental and economic shocks, possibly causing smaller producers to exit the business. To improve overall performance, the industry must prioritize the enhancement of key input factors such as property rights, management, co-management, and production.	Thong
Thong Ho (University of Economics Ho Chi Minh City)	**Shrimp Farming Industry in Vietnam: An Aquaculture Performance Indicators Approach** This study examines the interplay between the shrimp farming industry and the degradation of mangrove forests in Vietnam. Using a comprehensive approach that includes data collection, surveys, and analysis through the Triple Bottom Line (TBL) framework, the study evaluates various indicators to assess the industry's performance. Findings indicate strengths in areas such as land rights and market institutions, while highlighting challenges in environmental management and economic factors. These insights offer valuable guidance for policymakers and stakeholders in developing targeted strategies for sustainable shrimp farming practices. The study emphasizes the vital role of mangrove forests in supporting the industry and underscores the urgent need to address their degradation.	Carlos

	Mangroves provide essential ecosystem services, and their loss poses significant risks to the industry's future. By shedding light on the interconnectedness between the shrimp farming industry and mangrove forest preservation, this research contributes to a deeper understanding of sustainable practices. The findings serve as a foundation for further research and collaboration among stakeholders to develop effective strategies that balance environmental conservation, economic growth, and social well-being within the shrimp farming sector in Vietnam.	

Parallel Session 2D: CLIMATIC SHOCK (NatCap) | Chair: César A. Salazar

Presenter	Title	Discussant
Meseret Birhane Abebe (Addis Ababa University)	**Drought, Livestock Holding and Milk Production: A Difference-In-Differences Analysis** This paper examines how extreme heat affects milk production and cattle holding of subsistence farmers. Using large panel data from Ethiopia, we find that heat stress above a certain threshold reduces daily milk production per cow, total annual milk production, and cattle holding. A one day increase in humidity-adjusted temperature reduces daily milk production per cow, total annual milk yield, and total cattle holding by about 14%, 25%, and 12%, respectively. The reduction of cattle holding due to heat stress can be explained through birth reduction and cattle death. Livestock extension participation plays a vital role in reducing heat stress's impact on milk production and cattle holding. Using our estimates, we showed that policymakers should consider cattle breeds, production systems (nomadic & non-nomadic), herd size, and lactation periods in developing climate change and cattle related policies.	Peter
Peter Babyenda (Makerere University)	**The Role of Information in Long-Term Adaptation to Climate Variability: Evidence from Lab-In-The Field Experiment** Kenya as a country and Machakos county in particular is characterized by frequent occurrences of droughts and floods which adversely affect farming, the primary source of livelihood for the majority of households in the country. Given the rapidly changing climate, more extreme events are likely to become more pervasive and intense further threatening the agricultural livelihoods and food security. Against this background, the study assesses the role of information provision on long-term adaptation to climate variability information on the decision to adapt to climate variability using a lab in the field experiment. The findings indicate that, information alone is not enough to trigger long-term adaptation to varying climate.	César

	Therefore, there is need for a comprehensive package of policy incentives to influence farmer's adaptation decision.	
César A. Salazar (Universidad Del Bío-Bío)	**Drought Shocks and Price Adjustments in Local Food Markets in Chile. Do Product Quality and Marketing Channel Matter?** Lately, economies have been facing an increase in the frequency and magnitude of droughts, which come with potential consequences on food prices. This paper aims to analyze how drought disturbances affect price differences in local food markets. Special attention is paid to differences in product quality and marketing channels. To study the mechanism behind price differences, our analysis is framed within the food market integration theory. Our methodology follows a dyadic regression approach, which allows us to exploit the panel data structure of our market price data. We use monthly Asterix potato and long shelf-life tomato market prices from traditional markets and supermarkets in Chile. To measure drought intensity, we use remote sensing data to construct a drought index. Results show that drought shocks reduce market price differentials around harvesting and commercialization periods, which is supported by the existence of market integration. We also find that prices of high-quality products, less perishable products, and those taken from traditional markets respond more intensively to droughts and take more time to be transmitted. A direct link between droughts and crop quality, as well as supermarkets' larger capacity for buffer stock, may be behind these interpretations. Product differentiation and retail price rigidity arguments are also discussed.	Meseret

Parallel Session 2E: RESEARCH PROPOSALS | Chair: Franklin Amuakwa-Mensah

Climate-related Risks and Sustainable Cage Fish Farming in Vietnam and Uganda
Abebe Hoa Le Dang (Nong Lam University)

Coping with Natural Hazards: Coastal Ecosystems' Protective Services and Role in Shaping Informal Risk-Sharing and Shock Coping
Pham Khanh Nam (University of Economics Ho Chi Minh City)

Assessing adoption of practices for the reduction of greenhouse gas emissions amongst pastoral communities of Uganda
Paul Aseete (Makerere University)

Parallel Session 3A: ENERGY, HOUSEHOLDS AND FIRMS (SETI) | Chair: Selamawit Kebede

Presenter	Title	Discussant
Kenneth Kigundu Macharia (Chuka University)	**Effects of Energy Efficiency on Firm Productivity in Kenya's Manufacturing Sector** There is concern about probable energy efficiency and economic performance trade-off, particularly in developing countries which often require more energy consumption to spur their economies. This study assesses the relation between energy efficiency and total factor productivity in Kenya's manufacturing sector by applying a sample of firms in the World Bank Enterprise Survey. Energy intensity is used as a proxy for energy efficiency while total factor productivity is estimated using the Levinsohn-Petrin Algorithm. A dynamic panel data model is applied in the analysis of the energy efficiency and total factor productivity relationship which is at the sub-sector and firm size levels. The sub-sectors of concern are: chemicals, pharmaceuticals and plastics, food, textile and garments, and paper and other manufacturing sub-sectors. Firm sizes of interest are: small, medium, and large. The findings show heterogeneity in energy intensity across sub-sectors. Total factor productivity is also found to be heterogeneous across sub-sectors and firms of different sizes. The estimates show that in general, energy efficiency significantly promotes total factor productivity. Other factors that promote total factor productivity include capital intensity, age, size, top manager's years of experience, foreign ownership, and exporting status. However, the effect of these variables varies across the sub-sectors and firm sizes. The study findings suggest that policies to improve energy efficiency should be accorded additional emphasis jointly with improvements in total factor productivity.	Selamawit
Sulemana Abubakari (Kintampo Health Research Centre)	**Electricity Use in Developing Countries: What Happens After Households and Businesses are Connected to the Grid?** Investments in electricity access have increased remarkably in the past decade in low- and middle-income countries (LMICs). The foundation for these investments is the promise that connecting house-holds and businesses to the grid can improve people's lives and stimulate economic development. This relies on the assumption that people will indeed use electricity at minimally productive levels post-connection. We use data from prepaid meters in central Ghana to show that residential and commercial accounts use very little electricity even after up to seven years with a prepaid meter. We then explore the potential of price policies to promote electricity use. We estimate price elasticities of -0.124 and -0.259 for residential and commercial accounts, respectively.	Kenneth

	The absolute value of residential elastic-ities is decreasing in consumption, suggesting that residential subsidies are the least effective among low users. On the other hand, businesses are considerably more price elastic than households, which offers hope for subsidies targeted at commercial accounts to incentivize clean energy transitions and economic growth in LMICs.	
Selamawit G. Kebede (Ethiopian Policy Study Institute)	**Energy and Productivity: Evidence from Manufacturing** This study attempts to comprehend the empirical effect of energy use in productivity. The role of energy use in manufacturing growth and productivity is examined using a balanced panel data from Ethiopia. Results show that labor intensive manufacturing has the lion share production and establishment contribution in the sector. Labor, capital, and technical change are key factors to explain the variation of manufacturing growth and productivity. The contribution of energy use to performance and productivity in Ethiopian manufacturing is positive. The dynamic panel estimator shows that energy efficiency also induces manufacturing productivity in the country.	Sulemana

Parallel Session 3B: WATER BILLING (NatCap) | Chair: Jie-Sheng Tan-Soo

Presenter	Title	Discussant
Anthony Amoah (University of Environment and Sustainable Development)	**Water Access and Billing Issues in a Developing Country** Towards sustaining the water sector to produce safe drinking water for the people of Ghana as a fundamental human right in line with Sustainable Development Goal 6, this study is motivated by the differences in the payment behaviour of households for water consumed and billed either by the public sector supplier or a private sector vendor. Using the Ghana Living Standard Survey 7, which is a nationally representative survey collected by the Ghana Statistical Service (2017), and the double hurdle and quantile distributional regression analysis, we show evidence that the majority of households connected to the national grid do not pay bills regularly to the water supplier. In addition, socio-economic, behavioural, and water-related factors are identified as determinants of the probability that a household will pay for supplied water regularly, and the amount they paid for their last water bill. From this study, lessons for policy direction are drawn for the sustainability of household water supplies and the only urban water company in Ghana.	Jie-Sheng

David Fuente (University Of South Carolina)	**Improving Payment for Essential Services – A Field Experiment In Nairobi, Kenya** Utilities across the global require stable and sufficient revenue streams to provide customers access to high quality energy, water, and sanitation services. This requires that prices be set to cover costs, encourage the wise use of resources, and ensure services are affordable for the poor. It also requires that customers pay their bills on time and in full. Historically, utilities have used disconnections, or the threat of disconnection, to compel customers to pay their bills on time. However, the increasing recognition of the human rights to water and sanitation by many governments and the COVID-19 pandemic have led some utilities to discontinue or curtail disconnections. Reducing arrears and encouraging on-time bill payment is an important component of getting utilities in the Global South on the path to financial sustainability. In the absence of disconnections, how can utilities compel customers to pay their bills on time? This study tests the impact of a set of simple, low-cost reminders on customer bill payment behavior in Nairobi, Kenya. Preliminary results suggest that SMS-based bill payment reminders may not be an effective means of encouraging on-time payment among customers and may, indeed, have unintended consequences. However, our results are preliminary and subsequent analysis will provide more insight into whether these initial observations hold for the study period. Regardless of the magnitude and direction of the impact identified in this study, the results will provide useful information on the potential efficacy of a potentially low-cost method utilities can employ to improve bill payment among customers.	Anthony
Jie-Sheng Tan-Soo (National University Of Singapore)	**Varied Impacts of Different Types of Water Tariffs Reforms on Household Water Usage** Water tariffs is one of the most common ways policymakers use to regulate water usage. However, there are many ways in which water tariffs can be structured, and evidence from other literature show that consumers do not always behave rationally especially when confronted with complicated or unfamiliar options. Here, using a dataset of household-daily water usage spanning across multiple counties and years, we investigate the relationship between tariff structure and water usage in China. We find that households tend to overestimate tariff impact if the change is from flat to tiered rates, as usage rebounds quickly in the longer-term. In contrast, when the tariff change is within-tiers, households are much better at estimating its impact as water usage reduction is bound between 5-7% from short- to long-term. Lastly, we find that households do not respond toward wastewater	David

	treatment fees even though this is a relatively straightforward change. In all, this study demonstrates that even though different water tariff structures have the same effect on water bills, households react to them in different ways.	

Parallel Session 3C: GENDER, EDUCATION AND ENERGY (SETI & WiNEED) | Chair: Sydney Kabango Chishimba

Presenter	Title	Discussant
Marc Jeuland (Duke University)	**Time-Money Tradeoffs and the Value of the Time That Women Spend Obtaining Firewood** Rural households across much of the world rely heavily on biomass, especially firewood, as their primary fuel for cooking, lighting, and heating, and women provide much of the household labor for gathering such fuel from the environment. Interventions aimed at reducing the amount of biomass needed, or transitioning households away from biomass entirely, have the potential to deliver substantial time savings in addition to their more frequently studied health and environmental benefits. Accurately estimating the value of the time (VOT) that households, and women in particular, might save from such an intervention is central to understanding its full social benefits, as well as the full social cost of traditional energy use. Unfortunately, there has been little work to explicitly estimate the VOT in fuel collection. We therefore analyze the time-money tradeoffs that rural households make in four African countries (Malawi, Zambia, Tanzania, and Kenya), when deciding how to obtain firewood. In using two nonmarket methods – stated and revealed preference – to estimate the VOT, we are able to explore how our results vary both across methods as well as across contexts. We find that households generally make logical tradeoffs between money and time, and the analysis also shows that several other factors, particularly socioeconomic status and the identity of the person collecting firewood, play an important role in the revealed preference choice patterns. Our VOT estimates are considerably higher than 50% of the unskilled wage rate, which is often used as a 'rule of thumb' for valuing the opportunity cost of time in developing country contexts.	Aparajita
Aparajita Dasgupta (Ashoka University)	**Learning Outcomes Under Rainfall Shocks: The Role of Norms Around Female Labor Force Participation** In this paper we examine how exposure to early-life and contemporaneous rain-fall shocks shape learning outcomes in rural India by the gender institutions of the se‰ing. Speciÿcally, we leverage variation in soil texture (loaminess) at the district	Anthonia

	level that relates to the relative participation of females in agricultural work, to study how norms around female labor force participation (FLFP) mediate the im-pact of shocks on children's learning outcomes. We harmonise rich data on learn-ing outcomes for over three million children with high frequency grid level data on rainfall shocks and soil-texture at the district level to employ a di‡erence-in-di‡erences estimation framework. Strikingly, we ÿnd contrasting results of shocks on children's schooling outcomes by the soil texture in a district. For relatively high loam (low FLFP) areas, early life exposure to positive rainfall shocks signiÿcantly beneÿts schooling and learning outcomes . ,ese beneÿts are further magniÿed under a contemporaneous positive rainfall shock in these regions. In contrast, ex-posure to early-life positive shocks in low loam (high FLFP) areas is associated with a higher likelihood of children dropping out from school. Furthermore, we ÿnd the highest learning losses for female children in low loam areas who have faced pos-itive shocks in early life. ,us, while early-life positive shocks improve schooling outcomes for both boys and girls in high-loam regions there is no such e‡ect in low-loam regions. We investigate the potential mechanisms by studying the labour market impacts of shocks on children in these regions. Our results have important insights for policy design in addressing climate induced vulnerabilities on learn-ing outcomes. Importantly, we show the gains or losses in learning outcomes are systematic to FLFP norms in a region, which in…uence the relative di‡erences in opportunity cost of schooling under shocks.	
Sydney Kabango Chishimba (University of Cape Town)	**Gender and Cooking Energy Access in Zambia; Choice, Expenditure and Welfare Effects** Access to improved cooking energy solutions in Zambia remains low with majority households relying on tradition energy solutions especially in rural areas. The low access rate has direct impact on human welfare especially children and women who are directly exposed to indoor pollution. Further, the physical burden experienced by women in rural areas from walking long distance to collect firewood affects their physical health overtime as they frequently collect firewood for cooking compared to men. Therefore, this study aims at investigating the gendered effect of households' access to multitier cooking energy solutions on health outcomes and time allocation to various activities. However, the study starts by understanding the gendered effect of decision-making indicators on household choice and expenditure on cooking energy solutions. The study uses data from World Bank/ESMAP (2018) on household access to energy in Zambia. The data captures seven energy attributes for lighting and cooking and defines a household tier of access to cooking energy solutions. And after adopting the probit method, Heckman-selection, and inverse probability regression adjustment (IPWRA) with generalized propensity score as estimation strategies, the study	Marc

	found that female adults at household level promote increased expenditure given that they choose improved cookstove while adult men promote reduced expenditure at household level regarding cooking energy fuels. Economic status defined by employment and economic activities of female household are important decision-making indicators that promote household choice and expenditure on improved cooking energy at household level. Further, the results show heterogeneity in the effect among women and men and general improvement in multitier access to cooking energy solutions. The disaggregated gender effect is key in understanding how access to multitier cooking energy solutions affect health outcomes, time allocation to various activities and drudgery among women and men. Therefore, household transitioning across tiers (0-5) led to differential effects across gender and location among adults.	
Anthonia Achike (University of Nigeria)	**A Gender Analysis of the Determinants of Choice of Coping Strategies Against Flood Risks In Kogi State, Nigeria** Flooding has become a global threat to livelihoods and human lives with severe developmental consequences especially attainment of SDGs 1, 2, 3, and 15. It is not clear how the gender issue moderate the ability of households in flood prone areas in Nigeria to cope with the recurrent episodes of floods in Nigeria. In a bid to provide policy evidence for a gender balanced interventions to policy makers and funders, this study was designed to assess the coping strategies of household heads in Kogi State, Nigeria, a state noted for persistent annual flooding since 2012 with a gender lens and to ascertain the determinants of choices of coping strategies against flood in the area. Six hundred and thirty (630) households split into 420 rural households and 210 urban households were sampled in a ratio of 2 rural households to 1 urban household. In each of the 7 selected LGAs, 90 households comprising 60 rural and 30 urban were sampled. Qualitative and quantitative survey approaches were adopted including use of descriptive statistics, inferential statistics including t test and multinomial logistic regression model (MLM) which assessed the coping strategies determinants before/during flood and after. Several coping strategies were adopted ranging from early warning information use, savings for pecuniary caution, migration, early harvesting of crops, to repair of damaged buildings and assets after flood among others. It was found that significant differences exist across gender in the choices of coping strategies among female and male headed households. Gender too was found to be one of the major factors that determined the probability of the decision to choose some of the coping strategies to flood before, during and after flood episodes. Several relevant recommendations were made based on findings and the need to design gendered sensitive interventions to address the risks of flood in flood prone areas was stressed.	Sydney

Parallel Session 3D: NATURAL RESOURCES | Chair: Adrian Saldarriaga-Isaza

Presenter	Title	Discussant
Charlotte Sophia Bez (Pik Potsdam)	**A Political Backlash to Shifts in Mining in Colombia?** Phasing out coal is a pivotal part of transitioning to an economy less reliant on fossil fuels that is compatible with a 1.5°C climate pathway. Potential socio-economic impacts of declining mining activity include losses in income and employment, outward migration, and generally regional economic contraction. However, the political implications of mine closures in industrializing countries are yet to be understood. Indeed, shifts in mining activity and employment are potential contributors to increased political polarization. We investigate the case of Colombia, a country heavily dependent on coal exports that recently elected a left-wing president who announced a complete phasing-out of fossil fuels. Using a unique data set, we analyse how municipality-level changes in extracted coal and associated mining employment interact with voting outcomes, looking at presidential elections from 2014 - 2022. Our findings show that changes in mining are associated with support for more economically right policy platforms and conservative parties, but also with increased support for socialist parties, hinting at political polarization. Voter backlash hence can pose a political economy barrier to the public acceptability of phasing out fossil fuels that is crucial to be taken into account when designing just transition policies.	Adrian
Mauricio Oyarzo (Universidad De Concepción)	**How the Distribution of Mining Windfall Mechanisms Shapes the Spatial Economy of Extractive Countries?** The mining industry plays a crucial role in extractive economies by providing essential resources for economic development. However, mining activities often generate concerns about their environmental impacts and social implications for local communities. In order to ensure the long-term stability of mining, it is essential to strike a balance between supporting the sustainable development of mining activities and fostering a positive impact on the local quality of life. We assess the extent to which mining windfalls generate welfare gains by optimizing the current compensation mechanism scheme to distribute windfalls among municipalities through a quantitative spatial economic model that incorpo-rates environmental consequences due to mining activity. By integrating environmental externalities and additional revenues into a calibrated spatial economic model, our results will provide a novel ex-planation for studying the poor performance of mining windfall	Jorge

	compensation for negative externalities and potential welfare gains if an optimal design were implemented.	
Jorge Higinio Maldonado, Universidad De Los Andes	**Small-Scale Gold Miners' Preferences on Formalization: First Steps Toward Sustainable Supply Chains in Colombia** Artisanal and small-scale gold mining employs millions of poor people, globally, yet also significantly degrades the environment. Support from conscientious buyers, based on the information within certifications, could lower environmental impacts and raise incomes, leading miners to be willing to incur costs to participate in sustainable supply chains. As supply-chain certification may require formalization, we explore miners' motivations for and barriers to formalization within a choice experiment in two Community Councils in Afro-descendent areas of Colombia's Pacific Region: Yurumangui, in Valle del Cauca; and San Juan, in Choco. Community Councils have collective land rights—which might make them more willing to engage in collective actions often required for formalization. We find that while all miners prefer to leave their status quo, the Councils differed in miners' views of formalization. Given the options we offered, Yurumangui expressed more interest overall, perhaps due to negative past formalization experiences in San Juan. Yurumangui was also more willing to form or join an association to formalize, very likely due to its positive past outcomes from organization. We found no consistent effect of gender regarding preferences, though prior voluntary restoration correlates with individual miners' willingness to restore sites, one requisite of formalization. Our results inform interventions to support formalization in small-scale gold mining communities, as we found miners willing to try formalization yet perceiving costs that can hinder adoption and in ways that vary with Council legacies.	Mauricio
Adrian Saldarriaga-Isaza (Universidad Nacional De Colombia)	**Impact of Gold Mining on Social Accountability, Mediated by Social Capital: An Empirical Approach in Colombia** The extraction of mineral resources is necessary for the economy and the progress of societies. However, positive and negative effects of this activity have been observed, both at the national and local scales. These effects lead to conflicts that can be detrimental to human well-being. In this research, we aim to understand the impact of potential gold mining on social accountability mediated by social capital. We proposed an impact evaluation in the department of Antioquia, Colombia, with an empirical strategy that allows comparing gold mining and non-gold mining municipalities. We used the Mediation Analysis method. The estimation of our model considered a set of indicators, grouped into two categories, Social Accountability, and Social Capital, and computed using	Charlotte

	Principal Component Analysis. We found a positive effect of gold mining on social accountability, which means that in the gold mining municipalities, there is greater use of the tools of participation, surveillance, and control by the local community. Social capital mediates 50% of the total effect. Thus, social capital would explain why people from gold-mining municipalities implement social accountability.	

Parallel Session 3E: RESEARCH PROPOSALS | Chair: Franklin Amuakwa-Mensah

Examining the Potential of Air Purifiers and Behavioural Interventions in Mitigating the Impact of Air Pollution on Children in the Global South

Nikita Sangwan (Indian Statistical Institute)

Thermal Imaging as Information Intervention for Saving Energy for Cooling: An Experiment in China

Xiao-Bing Zhang (Technical University of Denmark)

Can revenue recycling make fossil fuel subsidy reform and carbon tax socially acceptable? A case study on Colombia

Jorge Garcia (Universidad de Los Andes)

Parallel Session 4A: METHODS AND APPLICATIONS (SETI) | Chair: Gunther Bensch

Presenter	Title	Discussant
Marc Jeuland (Duke University)	**Validation of a Survey-Based Measure of Bargaining Power** This study assesses the validity of a novel survey-based measure of bargaining power among natural resource-dependent, rural households. Data were collected on a sample of 1000 dyads composed of women primary cooks and their husbands in four countries – Kenya, Malawi, Tanzania, and Zambia. We elicit the household budget from each dyad member privately and then jointly. In a first phase, each respondent privately allocates the household's actual budget, a windfall budget equivalent to a third of the household's income, and their preferred budget; and in the second phase the couple jointly allocates the household's actual budget, and the windfall budget. We develop a noncooperative bargaining model that incorporates the partners' respective level of involvement in decisions regarding the purchase of commodities included in the budget. We find evidence that spouses respond to each other's investments in their individual spheres; when wives are responsible for spending on children, husband's investments in other commodities are positively correlated with wives' investments in children. Similarly, when husbands are responsible for agriculture, wives' investments in other commodities are positively correlated with husbands' investments agriculture.	Gunther
Gunther Bensch (Leibniz Institute for Economic Research)	**Spotlight on Researcher Decisions – Infrastructure Evaluation, Instrumental Variables, and Specification Screening** This paper revisits the instrumental variable (IV) approach in Lipscomb et al. (2013, 2021, LMB) to study the impacts of electrification. We first make corrections to the construction of the dataset, including the modelled IV. Revised estimates on main outcomes and mechanisms are statistically insignificant, with substantially lower effect sizes. We second develop a framework that accounts for weak IVs and discourages specification screening. Applying it to LMB, we find that most theoretically justified specifications yield insignificant results. The proposed framework is transferable to other IV applications to reduce potential bias stemming from researcher's or replicator's discretion.	Nassibou
Nassibou Bassongui (University Of Abomey-Calavi)	**A Behavioural Model for Energy Choice Under an Optimal Control Framework: Application to Benin's Households** This study analysed the behavioural drivers behind household energy choices. Firstly, we proposed an energy choice model for	Marc

	households within an optimal control problem framework to establish our research hypotheses. Subsequently, we employed generalised structural equation modelling to empirically test the proposed model, utilizing a nationally representative dataset from the Harmonized Survey on Living Conditions of Households in Benin in 2019. The results indicated that households' time discounting and spatial discounting negatively affect the adoption of cleaner cooking energy options. Additionally, our findings revealed heterogeneous effects of spatial discounting between rural and urban residences. These findings have implications for the implementation of targeted energy policy incentives to facilitate the transition to cleaner cooking energy sources at the household level.	

Parallel Session 4B: EMISSIONS PRICING FOR DEVELOPMENT (EPfD) | Chair: Thomas Sterner

Work session, no papers were presented.

Parallel Session 4C: SUSTAINABLE FOREST MANAGEMENT (FOREST) | Chair: Zenebe Gebreegziabher

Presenter	Title	Discussant
Jorge Marco Renau (University Of Los Andes)	**Bioeconomic Model for Sustainable Forest Management of Three Commercial Species in the Colombian Amazon** Sustainable Forest Management (SFM) is based on a rational planning process for forest supply and norms and regulations for the protection and sustainability of natural forests. In Colombia, SFM has been identified as a strategy to avoid deforestation and to favor the economy of households living in forests. However, timber harvesting of natural forests is currently carried out as a subsistence activity, generating low income and negative impacts on ecosystems. This study develops a discrete time bioeconomic model for SFM, with an objective function that is based on the economic impact on timber extraction yields of three commercial species, Achapo (Cedrelinga cateniformis), Cabuyo (Eschweilera coriacea) and Dormidero negro (Parkia discolor), located in the Guaviare region (Colombian Amazon). Our results show that the maximum benefits from sustainable forest harvesting of the three species are achieved in a 25-year span, with net benefits per hectare of USD 498.3, for a planning horizon of 50 years. Sustainable forest harvesting was found to be robust with respect to a number of assumptions in the model. These results	Nnaemeka

	provide a scientific basis for harvesting authorizations and permits. Policy implications are discussed.	
Nnaemeka Andegbe chukwuone (University of Nigeria)	**Sustainable Forest Management for Climate Change Mitigation: Would Households Be Willing to Participate and Contribute Labour Days for Future Redd+ Projects In Nigeria?** This study, determined households' willingness to participate in future REDD+ projects, the type of REDD+ project interventions they would be willing to participate in and, equally, estimated their willingness to contribute labour days to REDD+ interventions involving forest conservation and sustainable forest management activities. Multistage sampling procedure combining random and purposive sampling was used to sample 540 households used for the study, Structured interview questionnaire was used for data collection. Double bounded dichotomous choice (DBDC) CVM was applied to elicit households' willingness to contribute (WTC) labour for REDD+ interventions involving forest conservation and sustainable forest management activities. A probit model, multivariate probit model, double bounded logit model and seemingly unrelated bivariate model were applied in data analysis. The result shows that the majority (95.00 percent) of the respondents were willing to participate in future REDD+ interventions for sustainable management and conservation of forests. Having forest management committee (FMC) in community and the number of years of experience in forestry activities significantly increase the likelihood of households' willingness to participate in future REDD+ projects by 5.6 percent and 0.2 percent respectively. The likelihood that households would prefer REDD+ future projects involving restriction of forest access and conditional livelihood enhancement significantly decreases with having participated REDD+ pilot projects. Poorer households would support REDD+ future projects that provide access but enhance the forests. The results also show that participation in previous REDD+ pilot project and having heard of REDD+ positively and significantly influences the likelihood of accepting labour contribution choice. The estimated mean labour contribution was 16.61 man days/month. Based on the findings, it is recommended that future REDD+ project interventions should consider the ones that would provide forest access to households, provide environmental education and enhance the forests. Future projects should also consider the use of labor days from households in order to lower the cost of interventions.	Zenebe

Zenebe Gebreegziabher (Mekelle University)	**Devolution And Sustainable Management of Forests in Developing Countries: Quasi-Experimental Evidence From Household Level Data in Ethiopia** This research aims to evaluate Elinor Ostrom's principles of the role of devolution of forest tenure rights on sustainable management of forests in developing countries at a deeper level using data from a sample of 600 households in four major regions of Ethiopia. Specifically, the study empirically investigates the impacts of devolving forest tenure rights towards local communities on forest quality employing a quasi-experimental approach and comparing FUGs and non-FUGs. It also analyzes the individual households' perception and understanding of forest institutions and the devolution of forests in the country. In particular, the paper uses four outcome variables as measurable indicators of forest quality in the empirical analysis. Findings suggest that FUGs membership had robust and positive impact on harvest of various forest products. Findings also reveal that the overall beneficiary households' understanding of forest institutions and the devolution is very low and there is a need for clearly written by-laws that should be issued based on full participation of beneficiary households.	Jorge

Parallel Session 4D: WASTE (SCOPE) | Chair: John Sseruyange

Presenter	Title	Discussant
Cristóbal Alejandro Vásquez-Quezada (University Of Concepcion)	**Spatial analysis of the location and generation of industrial waste in Chile from the perspective of Intersectionality and Environmental Justice** Waste generation by different economic agents and the negative externalities related to their incorrect and uneven disposition constitute a global-scaled problem that has been reinforced by population growth and the increased consumption of goods and services in the last decade. According to the World Bank, 0.74 kilograms of waste per capita are generated in the world each day, which is highly correlated with income and urbanization levels, and that will lead to the worldwide generation of 3.4 billion of waste in 2050 (Kaza et al., 2018). It is expected that the group of middle-income countries will be the main contributors to this problem, generating 1,223 million tons of waste per year, while high- and low-income countries will be responsible of the generation of 879 and 283 million tons of waste per year, respectively.	Francisca

Francisca Trujillo (University of Talca)	**Interactions Between Fixed and Mobile Recycling Facilities: Do personal norms matter** Solid waste management is today one of the most significant global environmental issues, as rapidly increasing production of disposable goods overcomes the capacity of available infrastructure. Recycling can help to reduce the level of pollution, while also reducing the amount of waste that goes to landfills, preventing their collapse. This paper designs and implements a field experiment aimed at evaluating the impacts of pecuniary and non-pecuniary incentives reducing the costs of households' participation in recycling schemes. Our intervention took place in southern Chile. We study the effect of providing a door-to-door service on recycling plastic and sorting waste by households once open-access street containers are available. Special attention is given to the interactions between both types of infrastructure. We also explore whether appealing to personal norms reinforces households' behavior regarding recycling plastic and waste sorting. Our results show that adding a door-to-door recycling service to a drop-off system increases plastic recycling, and both types of infrastructure are complementary. Results evidence the absence of reinforcement effects when normative messages are provided after introducing door-to-door recycling services and that mobile recycling infrastructure increases the amount of non-recyclable waste in fixed infrastructure. This is most likely due to the higher chance that people recycling through the door-to-door recycling service can be discovered as recycling improperly.	John
John Sseruyange (Makerere University)	**Public Acceptance of Policy Instruments to Reduce Plastic Pollution in East** Plastic pollution is a growing global problem and many low-income countries face particular challenges due to inadequate waste management facilities. As a response, countries like Rwanda have implemented forceful bans on plastic carrier bags and single use plastics while Kenya and Tanzania have banned plastic carrier bags. However, as plastic production is projected to increase drastically, it is likely that governments will have to implement even more forceful policies to address plastic pollution. In that perspective, the public acceptance and support of such policies is crucial. In this paper, we study the public acceptance of three different policy instruments aiming at reducing plastic pollution in five East African countries (Ethiopia, Kenya, Rwanda, Tanzania and Uganda). Based on a population survey with close to 5000 respondents (1000 per country), we analyze the public acceptance for a ban on plastic carrier bags, a ban on single use plastics and a tax on single use plastics. Besides identifying and comparing the level of public acceptance for plastic policies across countries, we also try to expose the factors associated with public acceptance. Finally, we analyze if the identified	Cristóbal

	factors for public acceptance hold a similarity with the factors that influence environmental and climate policy support as documented in Bergquist et al., (2022), Drews & van den Bergh, (2016) and Ejelöv & Nilsson, (2020). Our main findings suggest a large portion of the respondents is concerned with water pollution (70%) and littering (67%) and a relatively strong support for all three policy instruments. The largest support of a ban on plastic carrier bags was found in Kenya (80% strongly or somewhat in favor), Rwanda (75%), and Tanzania (67%) — the countries with the most stringent policies. The same pattern was found for a ban on single use plastics. This could indicate a possible learning effect, in a sense that people learn to live with a ban and perhaps discover that there are other workable alternatives. The support for tax on single use plastics (50% strongly or somewhat in favor) was lower than the levels of support for the other two types of bans. This could be due to the limited experiences with the instrument, or perhaps to a general skepticism of using price based instruments in countries with high level of corruption. Further, we find interpersonal trust to be an important factor in influencing the acceptance of policy instruments for reducing plastic pollution in East Africa while trust in environmental authorities is important for the acceptance of bans on plastic carrier bags. In line with the literature on environmental policy support, we find that concern for littering and water pollution is positively associated with policy acceptance, and that frequent use of plastics is negatively associated with acceptance. However, there is a large heterogeneity in associations across countries, and caution is warranted in generalizing the results from our sample to the East African population.	

Parallel Session 4E: RESEARCH PROPOSALS | Chair: Franklin Amuakwa-Mensah

Gendered impact of multiple climate-smart agricultural (CSA) practices on nutritional outcomes and multi-dimensional poverty status of cassava farmers in Nigeria

Chinasa Sylvia Onyenekwe (University of Nigeria)

Assessing the Public Acceptability of Carbon Tax in Nigeria

Chikaosolu Maryqueen Ileka (University of Nigeria)

Assessing incentive-based policy options for plastic waste reduction: experimental evidence from Nigeria.

Amaka Precious Nnaji (University of Nigeria)

Parallel Session 5A: ENERGY (SETI) | Chair: Matilda Ntiyakunze

Presenter	Title	Discussant
Isaac Kwamena Nunoo (University of Cape Town)	**Energy Poverty and Fuel Stacking: The Role Of Policy Instruments In South Africa** Energy poverty is a major global issue and has implications for the welfare of individuals and society. The main drivers and barometer in measuring this phenomenon have varied across specific indicators and country-specific case studies. An often underexplained cause is the payment systems constraining electricity consumption in multiple fuel use resulting in fuel switching. We use the General Household Survey data of South Africa to explain the impact of prepaid payment systems on energy poverty. Applying fractional probit regression and other robustness methods, the results show that using prepaid meters potentially increases the probability of being energy poor between 0.03 and 0.06 percentage points. Using Propensity Score Matching (PSM) to address endogeneity and enable impact analysis through quasi-experimental methods, the study found that households using prepaid meters had a 3.35% higher likelihood of being energy-poor than those using postpaid meters. The study further revealed households become energy deprived by switching to unclean energy sources for cooking and heating when given prepaid meters. Specifically, prepaid meters led to a 5.7% increase in biomass for cooking, a 10.9% increase in space heating, and a 4.3% increase in room heating. The results also showed that vulnerable groups or poor South Africans suffer most from energy poverty using prepaid meters. Joint use of prepaid meters and Free Basic Electricity (FBE) could reduce energy poverty. Additionally, the study highlights the combination of the Reconstruction and Development Programme (RDP) housing scheme with prepaid meters is an effective pro-poor policy in reducing energy poverty. The study's policy implications suggest increased energy subsidies and targeted policy interventions to mitigate energy poverty.	Matilda
Matilda Ntiyakunze (Ardhi University)	**Fuel-Stacking Behaviour Among Households in Dar Es Salaam, Tanzania** In many developing countries, modern energy sources are seen not only as cleaner and more efficient than traditional fuels, but also important for achieving socio-economic development in the country. Hence, from an energy policy perspective, households should switch towards modern energy sources use. However, despite the availability of modern energy sources in the city of Dar es Salaam, many households continue to use traditional fuels for cooking, often in combination with their modern counterparts. Therefore, this study contributes to the existing literature by describing and analysing this so-called energy mix in the city as well as the effects of households' experience with using various fuels. A comparison of multinomial logit specifications yielded different results, which implies that the analysis of the energy mix is sensitive to the way households are categorised in the research;	Manuel

	households are much more likely to shift most of their energy use to new fuel types in response to changing conditions than to shift all of it. The results also show that households' fuel choices were sensitive to their fuel-use experience. Both findings have implications for energy policy; achieving shifts to new fuel types is easier if the goal is to achieve widespread, rather than total, shifts in household energy use, and achieving shifts to new fuels is easier if households have had at least some prior experience with those fuels.	
Manuel Estay (Universidad De Concepción)	**Navigating The Social Acceptability of Emerging Energy Sources: Evidence From Marine-Based Energy Projects** Any decrease in global warming and its effects can only occur with a substantial reduction in anthropogenic CO2 emissions. In this context, renewable energy sources, and specially emerging energy sources, may play a central role in accelerating the transition from fossil fuels to cleaner energy sources. Emerging energy sources are renewable sources with the potential to reduce global warming emissions, but they are in earlier development stages. These technologies include enhanced geothermal, artificial photosynthesis, and marine energy. In this paper, we assess which are the main attributes determining the social acceptance of marine energy projects, highlighting the individuals' preferences heterogeneity for these projects. We found that energy generation, ecological impact, job creation, co-ownership and distributional justice are relevant elements for supporting or not a project. Still, individuals' preferences are highly heterogenous. The existence of distinct classes with different preferences for marine energy attributes indicates that a one-size-fits-all approach may not be appropriate. Instead, policymakers and energy producers should tailor their proposals to meet the needs of both groups, taking into account their preferences and concerns.	Isaac

Parallel Session 5B: EMISSIONS PRICING FOR DEVELOPMENT (EPFD) | Chair: Raavi Aggarwal

Presenter	Title	Discussant
Samson Mukanjari (Lund University)	**Not Just Transition** Climate finance is contentious. Wealthy countries pledged to support energy transitions in developing countries in Copenhagen in 2009, but have so far not delivered their promise. At the COP in Glasgow one of the most important announcements was a deal between the EU and South Africa to speed up the energy transition. Usually promises of large financial transfers are positive news for the recipient country. However, one wonders whether they do imply a more ambitious climate policy or is just window-dressing. We examine the impact of the Just Energy Transition Partnership (JETP) on the market value of coal companies in South Africa. Our analysis shows that the value of coal firms falls indicating that there really is a true climate effect.	Govinda
Govinda R Timilsina (World Bank)	**Distributional Effects of Carbon Tax in Ethiopia: A Computable General Equilibrium Analysis** Developing countries are increasingly giving attention to carbon pricing to reduce their emissions, particularly in meeting their nationally determined contribution (NDC) under the Paris Climate Agreement. However, they would like to understand the potential economic, distributional, and environmental impacts of carbon pricing policies before they consider implementation. Using a computable general equilibrium model of Ethiopia, this study examines the effects of a hypothetical carbon tax (US$20/tCO2) under several alternative schemes to recycle carbon tax revenue to the economy. The study finds that carbon tax would be regressive in all schemes considered except those when the tax revenue is recycled, as a cash transfer, to household income groups either equally or inversely proportional to their incomes. The schemes that make the carbon tax progressive also cause a higher reduction of CO2 emissions, thereby ensuring the alignment of equity and environmental outcomes of the carbon tax. However, these schemes are not necessarily economically efficient because they cause higher reductions of GDP compared to other options considered.	Raavi

Raavi Aggarwal (MCC & Indian Statistical Institute)	**Optimal Emissions Pricing in LMIC Accounting For Household Emissions From Traditional Cooking** Carbon pricing is suggested as a global policy instrument to deal with climate change but risks having perverse and negative effects when ap-plied in those settings where many people use biomass for cooking. We evaluate carbon pricing in the presence of local health effects from indoor air pollution following biomass burning. We examine the rise in solid fuel consumption associated to higher fossil fuel prices that would result from a carbon price, and quantify the health damages from pollution for a sample of six lower middle-income countries. Estimating price elastic-ities of demand for fuel consumption using micro-scale survey data, we find substitution from costly fossil-based energy towards solid fuels in the majority of our sample. Fossil taxes pose significant local health costs in some countries, while yielding health "co-benefits" in others, as house-holds transition towards higher quality biomass. Redistribution of carbon pricing revenue can partially mitigate the rise in biomass consumption.	Jan
Jan Steckel (Mercator Research Institute)	**How Revenue Recycling Affects Public Support for Explicit And Implicit Carbon Pricing Policies – A Systematic Review and Meta-Analysis** Identifying conditions that promote positive public attitudes is critical for implementing effective direct and indirect carbon pricing policies. A growing body of empirical studies finds that favourable public attitudes hinge critically on how public revenues generated from these policies are used. The current study seeks to contribute to the literature by conducting a systematic review and meta-analysis of survey-based literature that examines the change in public support for explicit and implicit carbon tax policies when different revenue recycling options are presented to respondents. Following a comprehensive, systematic and transparent machine-learning assisted screening of the literature, our dataset comprises 35 peer-reviewed articles and working papers containing 69 surveys across 26 countries. The different revenue recycling schemes are classified into five categories: (1) green spending; (2) compensation – entire population; (3) compensation – targeted population; (4) corporate taxes; and (5) government budget. We apply a logit meta-analysis framework to analyse the determinants of the change in support for a policy when revenue recycling schemes are introduced. Results from the meta-regression indicate that only green spending significantly increases public support for carbon	Samson

	pricing policies when compared to an allocation of the revenues to the government's budget. This is in contrast to previous literature, which emphasises the role of revenue recycling options directly aimed to benefit the population – whether all or targeting low-income households and disproportionately affected people. Our findings moreover suggest that the effect of revenue recycling options on public support depends on the region in which the survey is conducted, and is stronger in Asia/Pacific, Latin America/Caribbean and Middle East/Africa than in Europe and North America.	

Parallel Session 5C: DEVELOPMENT & EXPERIMENT | Chair: Lydia Chikumbi

Presenter	Title	Discussant
Lydia Chikumbi (University of Cape Town)	**Natural Preservatives for Wine: A Discrete Choice Experiment & Environmental Valuation -(MS- 1559) - Discussant** The approach and survey used to examine non-market value in a stated preference study can influence the outcomes and impact the validity and reliability of value estimates. While prior research has investigated the impact of 'price framing' on decision-making in other disciplines, (i.e. marketing & psychology), little is known about its validity and reliability in Discrete Choice Experiments (DCEs) and environmental valuation. The study explores the effect of 'price framing' on DCE measurements. The tests are carried out using data from a choice experiment on preferences for natural preservatives in wine. The same respondents completed a nearly identical DCE survey, one with a real price and another with a percentage price change as cost attribute. 611 respondents completed the survey, and a panel mixed logit model was used for the analysis. Results demonstrate that 'price framing' remarkably influenced respondents WTP changes in attributes. The data reveals that while the rank order of importance of attributes, signs, and significance levels are similar for the two samples, they differ in the parameter magnitudes. The study sheds light on the establishment of guidelines for developing valid cost attributes in DCEs studies.	Zhi
Zhi Li (Xiamen University)	**Alternative Assurance Mechanisms in Threshold Public Goods Provision: Theory and Experiment Evidence** We propose a generalized assurance mechanism (GAM) that unifies three existing assurance payment schemes, including the dominant assurance contract (DAC, Tabar-rok (1998)), refund bonus (RBM, Zubrickas (2014)), and assurance payment (APM, Li	John

	et al. (2014)). We characterize the equilibrium set of GAM and construct a general theory framework to experimentally compare these three mechanisms on the coordination of threshold public goods provision. Theoretically, all mechanisms encourage commitments to contribute by offering assurance payments to would-be contributors if the group fails to provide the good. DAC specifies an assurance for a take-it-or-leave-it order and includes a predetermined contribution for provision and the minimum number of acceptance, RBM rewards contributors proportional to their contributions, APM pays an assurance payment once a minimum order level is reached in case of provision failure. Lab experiments show that APM and DAC perform better in provision rate with both homogeneous and heterogeneous agents, while RBM leads to a higher distributive efficiency. Our results suggest a fixed and explicit assurance payment in APM and DAC plays an effective role in coordinating individual and group contributions as well as improving the provision of public goods.	
Anna Norden (Jönköping International Business School)	**Do Signals of Anti-Corruption Norms Make People Less Short-Sighted and More Solidaric? Testing Preferences Towards Climate Policy Revenue Use in East-Africa** We investigate if signals of anti-corruption norms (e.g., a clear majority strongly condemn corrupt practices) affect the respondents' preferences for different types of public revenue use. We do this focusing on the case of climate financing for climate adaptation through a carbon pricing policy (subsidy removal or introduction of carbon taxes) that generates public revenues in three East-African countries; Kenya, Uganda and Tanzania. Based on previous research, we hypothesize that signals of anticorruption norms will trigger trustworthiness (e.g., trust in institutions as well as people in general) which will make people prefer long-term investments to short-term financing on public transportation. Furthermore, research shows that trustworthiness makes people more solidaric/less egoistic, therefore we hypothesize that people will prefer larger transfers to other regions than their own that suffer from drought (due to climate change) to transfers of resources benefiting their own household. Finally, we test whether signals of anti-corruption norms also make respondents' to a larger degree prefer the financing of public goods compared to private goods. We use a survey experimental design to test our hypotheses.	Lydia
John Loeser (World Bank)	**Consumer Surplus With Incomplete Markets: Applications to Savings and Microfinance** The household welfare gains from financial inclusion are empirically elusive. I establish that household welfare gains from a financial technology are equal to the area under dynamically compensated demand in a household model with incomplete financial markets, and general technology, preferences, and choice sets. I then estimate compensated demand for retirement savings	Anna

	in the United States, commitment savings in the Philippines, and microcredit in Mexico, leveraging three randomized control trials that introduce experimental variation in interest rates. Welfare gains per dollar lent or saved are small as compensated demand elasticities are large, but still correspond to large aggregate welfare gains from financial inclusion.	

Parallel Session 5D: IMPACT OF CLIMATE CHANGE | Chair: Jie-Sheng Tan-Soo

Presenter	Title	Discussant
Chalmers Kyalo Mulwa (International Potato Center)	**The Role of Adaptive Capacity in Mediating Climate Shock Effects in Smallholder Households in Tanzania** While most developing countries lie in regions projected to experience the worst effects of climate change, these countries also have the least ability to cope with such climate change impacts. Understanding the role of adaptive capacity in ameliorating the negative impacts of climate-related shocks, and the relative role played by different aspects of adaptive capacity, is important in efforts to create resilience to shocks in smallholder farming households. This study utilizes five waves of the Living Standards Measurement Surveys (LSMS) dataset from Tanzania to evaluate the impacts of rainfall anomalies on household wealth indicators, and the role played by household-level adaptive capacity in mediating these impacts. Four measures of adaptive capacity are utilized in the study including economic resources, institutions, technology and social capital while long-term household assets are used as wealth indicators. In the analyses, stepwise principal component analysis (PCA) was utilized to derive an adaptive capacity index for each household while a reduced form equation was estimated in an econometric analysis of the dynamic effect of climate shocks and adaptive capacity on household wealth status. Results of the study show that climate shocks lead to lower wealth status in subsequent periods, with the reduction being more pronounced among households with lower adaptive capacity. Similarly, households with higher levels of adaptive capacity are shown to accumulate more wealth in subsequent time periods despite covariate climate shocks, indicating the importance of building components of adaptive capacity in vulnerable households for resilience to climate change.	Jie-Sheng
Ridhima Gupta (South Asian University)	**Impact of Climate Change on Food Consumption Patterns in India.** High temperatures are associated with a loss in incomes at the country level [Burke et al., 2015,Dell et al., 2012], as well as at the firm level in the manufacturing sector [Chen & Yang, 2017, Zhang et al., 2018, Adhvaryu et al., 2020, Somanathan et al., 2021]. Losses per degree C have been estimated to be of the order of 1 or 2%. However, these estimates pertain to the formal economy. 63% of the world's	Saudamini

	labor force is in the informal sector with this percentage rising to 82% in low-income and lower-middle-income countries [ILO, n.d.]. Altogether, there are 1.9 billion people working in the informal sector worldwide. However, very little is known about the effects of heat on informal sector workers' earnings. An exploratory study found that informal sector self-employed workers reduced work time by 1.19 hours and spent around 1.4% of monthly income for adaptation on a heat wave day compared to a normal summer day in India [Das, 2015]. Here we estimate the impact of an increase in temperatures during the summer of 2019 on incomes and other measures of the welfare of workers in the urban informal sector using primary daily surveys in Delhi, India.	
Saudamini Das (Institute Of Economic Growth)	**The Impact of Heat on the Welfare of Informal Sector Workers: Evidence from India** Anthropogenic climate change-induced temperature rise and extreme weather events have been hypothesized to lead to a disruption of the food production and consumption patterns across the world (Lesk et al., 2016; Springmann et al., 2016). According to the IPCC's fifth assessment report, "climate change will affect food security by the middle of the 21st century, with the largest numbers of food-insecure people located in South Asia" ((IPCC, 2014), Chapter 24). It is thus important to understand how changes in temperature and the incidence of extreme events affects nutritional status and food consumption of households. In the paper we use four rounds of data from the nationally representative consumption data from India, to study the effect of temperature on food consumption in India. Our initial findings suggest that average mean temperatures during the survey recall period of past 30 days affect the consumption of calories, protein, fats and food diversity and diet diversity in both rural and urban India. But the estimated effects although statistically significant are not large. Our findings therefore suggest that households have opportunities for smoothing consumption due to supply side shocks.	Ridhima
Jie-Sheng Tan-Soo (National University Of Singapore)	**Climate-Induced Rural Migration in China** Due to their economic reliance on agriculture, rural population are likely to be more affected by climate change. Here, we use a year-county longitudinal dataset that is representative of China to uncover new findings between climate change and rural migrants. We first show that an additional growing degree day (GDD) above 31°C will cause a 12.7% increase in outflow of rural migrants. We further use migrants' destinations to reveal more insights. We find that rural migrants greatly prefer to move to urban areas located within their home counties, thus implying that weather is a push, rather than pull factor. Moreover, such movements are more pronounced at counties at rural-urban wage gaps are largest. Further heterogeneity analyses reveal that younger and high-educated segments of the population are more likely to be induced	Chalmers

	by adverse weather to migrate. In turn, climate change has the impact of skewing rural population composition toward older and less-educated. Lastly, we pair our dataset with farming practices, and show that climate adaptation measures (such as irrigation machinery, and crop switching) can to a large extent, alleviate the impact of climate change on rural outflow. Our findings have important policy implications as China, and much of the world, is facing rapid urbanization and aging population.	

Parallel Session 5E: RESEARCH PROPOSALS | Chair: Franklin Amuakwa-Mensah

Climate Change Feedback Effects on Payments for Ecosystem Service Contract Adherence
Martine Visser (University of Cape Town)

Understanding and Improving Bill Payment in Ghana
Anthony Amoah (University of Environment and Sustainable Development)

Agricultural crops productivity shocks, adaptation pathways, and implications for household welfare outcomes in Nigeria
Chukwuemeka Chiebonam Onyia (University of Nigeria)

Parallel Session 6A: AIR POLLUTION AND ENERGY (SETI) | Chair: Jorge Bonilla

Presenter	Title	Discussant
Jorge Bonilla (Universidad De Los Andes)	**Climatic Shocks, Air Quality, and Health at Birth in Bogota** We jointly investigate the effects of El Ni˜no Southern Oscillation (ENSO), pollution, and local weather on health. Using information on pollution, ENSO events, and vital statistics for Bogota, we find that ENSO affects birth weight and the probability of low birth weight after separating pollution and local weather impacts. Exposure to ENSO may decrease birth weight up to 1.3%, while an increase of 1 ppb of SO2 or 1 µg/m3 of PM2.5 might reduce birth weight up to 0.3% or 0.14%, respectively. Estimations show that regardless of the pollution measure employed, the impacts of climatic shocks via ENSO events dominate.	Bishal
Bishal Bharadwaj (Curtin University)	**Peace Agreement Accelerates Energy Access in Nepal.** The population without electricity in Sub-Saharan African countries saw an increase in 2022, coinciding with ongoing armed conflicts in many of these nations. To examine whether peace agreements accelerate energy access in conflict-affected areas, we analyse Nepal as a case study. Nepal's comprehensive peace agreement ended a decade-long armed conflict, resulting in approximately 17,000 casualties. Descriptive analysis of renewable energy technology adoption and conflict-induced casualties from 2000 to 2015 in 4,000	Marc

	Nepalese villages reveals that the peace agreement accelerated the adoption of renewable energy technologies (RET) in locations affected by conflict. This acceleration was facilitated by increased social mobilization, as evidenced by a higher number of registered NGOs, Community forest user group (CFUG) and Cooperatives. We underscore the significance of peace as a prerequisite for achieving Sustainable Development Goal 7 (SDG7) in conflict affected areas, which focuses on universal access to affordable, reliable, sustainable, and modern energy.	
Marc Jeuland (Duke University)	**The Effect of Fuel Scarcity For Domestic Energy on Irrigation Labour Supply In Rural Ethiopia** Rural households in Ethiopia mainly depend on agriculture for their livelihood and nearly 90% of them rely on traditional biomass energy for domestic use. Using data collected on 934 rural households and their 2543-Meher plots (cultivated during the main rainy season), 754-irrigated plots and 971-Belg plots (cultivated during the short rainy season) in four regions of Ethiopia, this study explores the effect of biomass fuel scarcity on agricultural labour supply in the three-cropping seasons. Our result show that the scarcity of fuel for domestic use, proxied by shadow price, has a negative and significant effect on the labour supply in all three-cropping seasons in Ethiopia. This highly suggests the importance of addressing domestic fuel scarcity in rural areas to accompany efforts to enhance agricultural production and productivity through introducing promising technologies such as irrigation. Emphasis should be given to interventions that increase the supply of fuel wood and its substitutes, including expansion of community forests and dissemination of fuel-saving cook stoves as well as enhanced access to clean cooking fuels and technologies.	Jorge

Parallel Session 6B: SOCIO-ECONOMIC DYNAMICS OF FOREST (FOREST) | Chair: Yuanyuan Yi

Presenter	Title	Discussant
Lilian Arthur (Ghana Communication Technology University))	**The Effect of Superstition on Household Preferences For Restoring The Bonsa River Forest Reserve** Forest restoration has become a worldwide phenomenon to minimize the effects of climate change and global warming. In most cases, especially in Africa, communities around the forest usually have cultural attachment to the forest. Consequently, the preferences of fringing communities are important to ensure the maximization of welfare. However, there seems to be a lack of understanding about how superstition may affect local communities' forest restoration preferences. This study aimed to examine the effect of superstition on household preferences for restoring the Bonsa River Forest Reserve (BRFR). Primary data was sourced from 611 respondents in the Prestea-Huni Valley Municipality (PHVM) and were analyzed using mixed logit (ML) and generalized multinomial logit (G-MNL) models. The findings reveal that very superstitious respondents prefer exotic trees, indigenous trees, and a combination of both indigenous and exotic trees but have disutility for cost, fertilizer, compost, the combination of fertilizer and compost, backfilling of mined-out areas, and high biodiversity. Local community's superstitions should be incorporated in the planning and decision-making process regarding forest restoration management.	Yuanyuan
Xing Chen (Fudan University)	**Land Reform, Imperfect Democracy and Political Trust: Evidence from China's Collective Forest Tenure Reform** This study explores how the application of democratic rule in land reform decision-making determines villagers' political trust and satisfaction towards different levels of the government in China. Based on analyses of a two-period household survey data we find that in China's most recent Collective Forest Tenure Reform, the use of democratic rule improves villagers' trust for town and county cadres, whereas the impact on trust towards village cadres is only significant for the democracy involving all the villagers or households in a village. This pattern of trust is partly explained by our findings that the democratic process helped decrease the unresolved inter-village forestland disputes which usually requires town or county level cadres' intervene, whilst there seems no such impact on the within-village land disputes. Heterogeneity analyses show that democratic decisionmaking has a more pronounced effect in improving trust for villagers with lower income, and those without affiliation with the Chinese Communist Party (CCP) or to the village committee.	Lilian

Yuanyuan Yi (Peking University)	**Forest Mitigates Short-Term Health Risk of Air Pollution: Health Benefits from Forest Ecosystem in China** This study assembles satellite data, individual-level death records, and local air quality data to estimate forest and trees greenness impact on air pollution and health outcomes in China. We find that a 10 additional percentage-points increase in county forest cover rate is significantly associated with 3.3 points decrease in annual average AQI. A 10 percentage-points increase in NDVI predicts decreases in seasonal cardiorespiratory deaths by 1.09% (9.5 people), and in non-cardiorespiratory deaths by 0.87% (7.3 people), holding the current average air pollution level. Also, forest has a mitigating effect of reducing the mortality risk as we find that an additional greenness of the 10-percentage-point increase in NDVI contributes to a reduction in cardiorespiratory deaths by 0.04%. The elderly and especially the elderly males are more likely to benefit from the mitigation by forest and trees conditional on that they have more exposure to air pollution and forest greenness. A back-of-the-envelope calculation indicates that doubling the greenness of forest would bring about a health benefit that is far beyond an order of magnitude larger than the cost of forest conservation efforts.	Xing

Parallel Session 6C: AGRICULTURE (NatCap) | Chair: Obrian Ndhlovu

Presenter	Title	Discussant
Chidi Nzeadibe (University Of Nigeria)	**Community Participation in Flood Risk Mapping in Agrarian Mid-Lower Niger Basin: Implications for Integrated Flood Planning and Management** In recent years, flood events have been annual occurrences in Nigeria with the 2012 and 2022 flooding being ranked as the most disastrous, resulting in a loss of physical and durable assets in the twelve most affected states, equivalent to US$9.5 billion. Over 70% of inhabitants of Kogi state of Nigeria are engaged in small-scale crop production or artisanal fishing as a livelihood. These farmers and fisher folks, therefore, remain vulnerable to flood risks as vulnerability remains a complex situation in relation to flood studies in Nigeria. While there has been some awareness about the Sustainable development goals (SDGs), particularly gender-related SDGs, and their linkages with flood risk, participation of local community stakeholders in data collection and mapping of flood risk in affected areas is unfortunately inadequate. Thus, regardless of the magnitude of the flood risk vulnerability, very little is known about ways in which communities perceive and respond to the flood risk while policy responses to flood risk vulnerability in these communities have remained undocumented. In sum, such community participation	Virginiah

	in mapping of flood risk which could to inform and support adaptation policy and action is unfortunately non-existent in Nigeria. This paper deploys a geospatial analysis and mixed methods to integrate community participation in flood risk mapping and to assess flood vulnerability in Kogi State in order to support integrated flood planning and flood risk management in Nigeria.	
Virginiah Wango (University of Nairobi)	**Assessing the Impact of Agricultural Programs On Awareness, Access and Use of Weather and Climate Information Services In Kenya: A Case Study** Weather and Climate information services exist to produce and deliver weather and climate information to diverse users to support decision making under changing and uncertain climate and weather. (Vaughan et al., 2019). These services have an important role in adaptation to climate change and variability for smallholder farmers in Sub-Sahara Africa (Serra and McKune, 2017). To support integration of scientific and traditional knowledge into farmer decisions, innovative co-production models that bring together multidisciplinary teams consisting of farmers, meteorologists, traditional knowledge and extension agents have been used to promote provision, delivery and uptake of weather and climate services. Examples of co-production initiatives to provide reliable, accurate and timely weather and climate information include the PICSA model in Senegal and Mali (Dayamba et al., 2018), Ghana (Clarkson et al., 2019), Rwanda (Coulibaly et al., 2017; Birachi et al., 2020), and the GFCS Adaptation Programme for Africa in Malawi and Tanzania (Stats4SD, 2017). The goal of these initiatives is to improve provision, dissemination and use of weather and climate information in order to build resilience and mitigate adverse effects of climate variability on farmers' livelihoods (Vaughan et al., 2019). The co-production process jointly creates and disseminate knowledge among stakeholders to facilitate efficient decision-making and risk management. According to Vincent et al., 2018, co-production should yield decision-driven, process-based, time managed services and the co-creation process must be inclusive, collaborative and flexible. Climate services in this setting are distinguished by continuous monitoring of outcomes, knowledge sharing and learning which leads to optimal application of weather and climate information (Vincent et al., 2018). Through co-production, weather and climate information is translated into actionable ideas that can inform livelihood and farm management decisions.	Obrian

Obrian Ndhlovu (University Of Cape Town)	**Zambia's Agricultural Input Subsidy Program: Estimating the Impact of E-Voucher Delivery System on Crop Diversification** This paper employs a treatment effect approach to evaluate the impact of the electronic-voucher reforms to Zambia's Farmer Input Support Programme on household-level crop diversification and rotation. The paper combines a two-wave panel of rural household survey data, high-resolution satellite rainfall data, and primary qualitative data from in-depth interviews with key informants to provide answers to questions around the effectiveness of the reforms in promoting climate adaptation through crop diversification and the practice of crop rotation. The results however do not show any positive impact of the reforms on outcome variables. Instead, the reform is seemingly associated with a negative change in outcome variables. Our key informant evidence point to rigidities in private sector markets and cultural barriers as major hindrances to the effectiveness of the electronic-voucher reforms in enhancing crop diversification and rotation. This raises important policy implications on the need for broader reforms including the promotion of markets for alternative crops and enhanced extension services.	Chidi

Parallel Session 6D: RESEARCH PROPOSALS | Chair: Franklin Amuakwa-Mensah

Electric cooking in the energy transition: How much subsidization is needed?
Aisha Nanyiti (Makerere University)

Fishing for insurance among small-scale fisheries in Ghana
Godwin Kofi Vondolia (University of Cape Coast)

Attitudes towards adaptive changes in lifestyles: beliefs and facts
Pablo Evia (CATIE)

Parallel Session 7A: ENERGY PRICING (SETI)| Chair: Monica Marcela Jaime Torres

Presenter	Title	Discussant
Kanishka Kacker (Indian Statistical Institute)	**Subsidies for Solar-Based Electricity Generation: Evidence from India** The massive worldwide reduction in the costs of solar photovoltaic panel cells is one of the most striking developments in energy markets in the last decade. These cells are the primary input for electricity production using solar energy; a major fall in their cost implies a major fall in the price of solar energy. From nearly $5 per watt on average in 2008, they are now less than 30 cents per watt (Our World in Data, 2023).1 This fall continues a decades long decline and suggests very strongly that solar energy has the potential to be a major, if not the predominant, source of electricity supply for most of the world. Simultaneously, the solar photovoltaic sector has grown rapidly with total global installations reaching 843 GW by 2021. Driven by developing countries, the top three solar markets are China, India, and Spain. This paper concerns itself with the solar market in India. Despite the immense potential of solar, coal continues to be the major source of electricity in India: renewables contributed 11% of total electricity generation in 2022 (Central Electricity Authority 2022).	Monica
Lunyu Xie (Renmin University of China)	**Households' Participation in Energy Transition and Sustained Use of Clean Energy: Evidence from China's Clean Heating Program** Household energy transition is a critical tool for air pollution mitigation and energy inequality reduction. The effectiveness of the transition largely relies on not only households' decision to participate but also their sustained use of clean energy after participation. However, the sustained use of clean energy has not yet received sufficient attention in policy making and in literature. This study examines China's Household Clean Heating program, which has switched millions of households' heating energy sources from coal to electricity and gas. We focus on both households' adoption and coal substitution behavior in the program. Based on the large-scale household survey conducted in rural areas of Northern China, we find that both high subsidies and compulsory measures effectively increased the household adoption rate; however, the latter did not guarantee sustained use of clean energy. We also find that In-person and repeated dissemination of program information had a better effect on involvement than passive announcements. Moreover, lower-income households were less likely to participate. Our findings suggest effective implementation approaches and supplementary measures to promote household energy transition, with fewer negative consequences for participants, particularly for the participants with lower income.	Megan

Megan Lang (World Bank)	**Agricultural crops productivity shocks, adaptation pathways, and implications for household welfare outcomes in Nigeria** Prepaid electricity contracts lower enforcement costs but may bur-den consumers, limiting the benefits of electrification. Liquidity con-straints and transaction costs can exacerbate such burdens. I randomly offer 2,000 rural Rwandese consumers a line of credit for electricity pay-ments that simultaneously lowers liquidity constraints and transaction costs. Twenty percent borrow and demand for the credit is inelas-tic; however, it does not change demand for electricity. The primary mechanism appears to be time savings: treated consumers make 8%–18% fewer transactions. The results strengthen arguments supporting prepaid utility contracts but highlight opportunities to provide greater flexibility for consumers without lowering firm profits.	Lunyu
Monica Marcela Jaime Torres (University Of Concepcion)	**Estimating Residential Natural Gas Demand Under Decreasing Block Prices in An Emerging Economy** Natural gas demand is at the core of households' energy transitions, especially in the context of middle-income economies. Because of its potential as a substitute of fuelwood for residential cooking and heating, this cleaner energy source has been regarded as an alternative to mitigate air pollution problems. This paper estimates residential natural gas demand and price elasticities for a southern city of Chile. Residential natural gas in this city is priced through a multiple-block tariff system. By using a panel sample of residential customers over the period 2004-2015, we estimate a discrete-continuous choice model. These models take account of not only the price structure and individual characteristics of households, but also the simultaneity that households face when choosing the amount to consume and the price to pay for a unit of energy. Results indicate that the estimated natural price elasticity is -0.4310. This figure is almost half of the estimated in the baseline model. Although the magnitude of the estimated elasticities is in line with previous literature, suggesting that natural gas demand is inelastic, the observed differences suggest that households' responses to pecuniary policies can be overestimated when the price structure is disregarded. Findings shed light on the importance of relying on feasible measures of price elasticities as inputs for policy design.	Kanishka

Parallel Session 7B: COVID-19 | Chair: Alejandro Lopez-Feldman

Presenter	Title	Discussant
Hang Yu (Peking University)	**Correcting Misperceptions About Support for Social Distancing to Combat Covid-19** Can informing people of high community support for social distancing encourage them to do more of it? We randomly assigned a treatment correcting individuals' underestimates of community support for social distancing. In theory, informing people that more neighbors support social distancing than expected encourages free-riding and lowers the perceived benefits from social distancing. At the same time, the treatment induces people to revise their beliefs about the infectiousness of COVID-19 upwards; this perceived infectiousness e˙ect as well as the norm adherence e˙ect increase the perceived benefits from social distancing. We estimate impacts on social distancing, measured using a combination of self-reports and reports of others. While experts surveyed in advance expected the treatment to increase social distancing, we find that its average e˙ect is close to zero and significantly lower than expert predictions. However, the treatment's e˙ect is heterogeneous, as predicted by theory: it decreases social distancing where current COVID-19 cases are low (where free-riding dominates), but increases it where cases are high (where the perceived-infectiousness e˙ect dominates). These findings highlight that correcting misperceptions may have heterogeneous e˙ects depending on disease prevalence.	Alejandro

Parallel Session 7C: NATURAL RESOURCES AND ENERGY TRANSITION | Chair: Adolfo Uribe

Presenter	Title	Discussant
Chukwuma Ume (University of Nigeria)	**The Curse of Natural Resources in Nigeria: Are Natural Resource Abundance and Human Development Linked?** The natural resources curse narrative alludes that regions with abundant natural resources tend to experience sluggish economic growth. This study empirically investigated the relationship between crude petroleum exploration and human development using the Nigerian state as a case study and proffered solutions on how to utilise natural resources for inclusive growth in the country. Previous studies usually investigate the link using GDP as a proxy for economic growth, hence ignoring the aspects of poverty and inequality within the context of a growing economy. This study employs the Human development Index (HDI) to capture different key dimensions of human development. HDI as dependent variable captured the health, education and per capita income at the state level. Specifically, we use a state level data to generate a composite index based on three dimensions of human development (education, per capita income, and health) for the period (2000-2022). The	José

	petroleum producing states include Delta, Bayelsa, Akwa-Ibom, Rivers, Ondo, Edo, Imo, Lagos and Abia states. We implemented the Difference-in-Difference estimation using a balanced panel of 36 Nigerian states, covering the period 2000 to 2022, to links presence of full-scale international petroleum exploration to human development at the grid-level (0.1 × 0.1 degree pixels). We study whether presence of petroleum lead to an increase or decrease in HDI at the state level for petroleum producing states (”treated” state). Controls at the pixel-level are Grid-level data comprising of Conflict data, Nightlight data (Economic activities), Precipitation data, unemployment rates, presence of refineries, number of banks, number of police stations, presence of an airport, population, and political party of the incumbent governor. We find that natural resource has a direct negative impact on Human Development Index. The relationships were found to be statistically significant (P-Value = 0.01). This finding suggests that conflict management, resolution, and prevention can be closely linked to natural resource management.	
José Jeremias Ganhane (Luleå Technology University)	**Resource Rents, Genuine Savings and Sustainable Development: Revisiting the Evidence** Sustainable development theory suggests that resource-rich countries should reinvest the rents from natural resource extraction in other forms of capital to ensure that future consumption is greater than or equal to the level of current consumption. The World Bank's Genuine Savings (GS) estimates are the most widely used in the literature to study empirically whether countries are on a sustainable development path. A number of seminal papers in the early 2000s indicated that the link between genuine savings and future consumption was weaker than predicted by theory, at least when genuine savings is measured using the World Bank estimates. In this paper we revisit the issue and replicate two of those earlier studies in order to see whether the link has become stronger over time, with changes in policies in resource rich countries and with revisions to the World Bank estimates. We find results that are largely similar to those in the earlier studies and find that the link between genuine savings and future consumption is even weaker in Sub-Saharan Africa than in other countries.	Adolfo
Nuredin Juhar Mahammednur (Policy Studies Institute)	**Returns to Grid Electricity on Wood Use and Wood Collection Time: Application of Instrumental Variable Method** Policies related to reducing the emission of greenhouse gases (GHGs) are changing the con-ventional role of forests, which is a resource for consumption, to that of a carbon sink. This study uses three waves of Ethiopia Socioeconomic Survey to investigate the impact of rural electrification on firewood collection time and firewood use for cooking. Using land elevation and distance to major road as instrumental variables (IVs) for electrification, we find that ac-cess to electricity decreases wood collection time by 0.304 hours per day. The finding in the first stage showed while the elevation of	Chukwuma

	households' residences significantly affects access to grid electricity, it does not significantly affect wood collection time. The result revealed that access to electricity decreases the probability of firewood use by 0.732. Investigation of the un-derlying mechanisms shows that owning electric stoves decreases time spent in wood collection by 0.33 hours per day. The study also revealed that women spent 0.21 more hours per day than men in wood collection. The policy implication of this study is that rural electrification de-creases greenhouse gas emission on the one hand and decreases forest degradation on the other.	
Adolfo Uribe (Universidad De Talca)	**What Drives Monitoring, Enforcement, and Environmental Compliance? An Empirical Investigation in a Transitional Economy** This work analyzes the complete sequence of inspections and compliance of environmental regulations, impositions of fines, payment of fines, and delay of payment in the context of a transitional economy. The analysis is conducted for the case of 6,790 facilities that belong to different economic sectors between the years 2013 and 2019 in Chile. This work demonstrates that inspections and compliance are conducted differently across sectors, and both are related to some specific facilities' characteristics. This paper also displays that the impositions of fines increase the probability of compliance, and that is transmitted as a spillover effect to facilities sharing the same firm owner and in facilities that belong to the same sector located in the same commune. Furthermore, this work shows that presenting a compliance program is less likely on the small size facilities, the severity of the violation correlates positively with the size of the fine, and finally, the fine's payment positively correlates with the size of the facility. This work concludes that monitoring efforts carried out by the regulator in Chile are effective, but relatively low. The main findings of this work may be used the design of enforcement strategies, especially at context that face limited budget and resources.	Nuredin

Parallel Session 7D: DEVELOPMENT AND SHOCKS | Chair: Tanu Gupta

Presenter	Title	Discussant
Florence Lwiza (Makerere University)	**Fuel Prices, Weather Shocks, and Staple Food Prices** This paper examines the effect of changes in fossil fuel prices and weather conditions on the prices for our staple food products. We merge fuel price data with food price data for 43 markets of Uganda, and also location-specific weather variables for the years between 2012 and 2022. To control for autocorrelation, we analyze the data using a systems Generalized Methods of Moments estimators. The findings show that changes in the precipitation amounts and changes in petrol (gasoline) prices had significant effects on the prices for the food products. However, the significance and direction of the effects	Tanu

	differed for the different food crops. The results were robust when other GM estimation methods are used. The findings provide the evidence of fuel prices and weather variables as possible drivers of food prices, and also presents policy recommendations to reduce and mitigate the occurrence of food price risks.	
Amaka Precious Nnaji (University of Nigeria)	**Shock-Mitigating Role of Mobile Money Adoption on Household Expenditure, Poverty, and Inequality.** In this paper, we examine the impact of mobile money adoption on expenditure patterns, poverty, and inequality in the aftermath of drought shocks. This research extends the literature on the consumption smoothing capacity of mobile money adoption to its capacity to moderate inequality across local communities over the long-term. We use household survey datasets from the Tanzanian National Panel surveys (TZNPS) between 2010 and 2020. The study explores the spatial distribution of drought shocks from extremely high temperature patterns and low rainfall across waves of panel localities while investigating the adaptation mechanisms through increased mobile money agent distribution over the same period in a difference-in-difference framework. Our findings show that access to mobile money agents enhances preference of consumption smoothing towards food, relative to non-food items. This is supported by evidence of results for poverty outcomes. More importantly, the results showcase a mitigating pathway for the inequality-increasing impact of droughts across localities. Our findings are consistent with the effectiveness of basic technological tools for the improvement of economic welfare after an extended period.	Florence
Tanu Gupta (Indian Statistical Institute)	**Learning from Diversity: "Jati" Fractionalization, Social Expectations and Improved Sanitation Practices in India** Prevalence of open defecation is associated with adverse health effects not only for the individual but also the community. Therefore, its characteristics often can influence collective pro-social behavior like improved sanitation practices. This paper uses primary data collected from rural and urban areas of Bihar to study how "jati" (sub-castes) level fractionalization within the community affects toilet ownership and its usage for defecation. We account for the potential unobserved heterogeneity by using exogenous variation in community level socio-religious fractionalization. We further use bias adjusted treatment effects that allows for unobservable confounders and also estimate the bounds by assuming the IVs to be "plausibly exogenous", through which we relax their exogeneity conditions. The finding indicates a diversity dividend wherein jati fractionalization is found to improve toilet ownership and usage significantly. While exploring the channels, we find social expectations to play an important role, whereby individuals from diverse communities are more likely to perceive about higher prevalence of toilet usage within the community, which can be falsely biased too. To assess the reasons for existence of these social expectations, we use data from	Amaka

	an ego-centric network survey on a sub-sample of the households. The findings indicate that the inhabitants in fractionalized communities are more likely to interact with people from different jatis having higher prevalence of toilet usage and discuss about sanitation behavior with their neighbors, which indicating a discernible role of social learning. The inferences drawn from the paper have significant implications on community level behavioral change interventions that aim at reducing open defecation.	

Parallel Session 7E: GENDER & ENERGY (WiNEED & SETI) | Chair: Subhrendu K Pattanayak

Presenter	Title	Discussant
Pattanayak Subhrendu (Duke University)	**Gendered Time-Use Benefits from Improved Cooking Solutions: A Multi-Country Impact Evaluation** Three billion people around the world still rely on solid biomass fuels such as wood, charcoal, dung, and crop residue for their daily cooking, cleaning, and heating needs (IEA et al., 2020). The use of biomass fuels has numerous negative effects on both an individual and environmental domain. Key to this study, solid biomass fuels are time and labor intensive to acquire, often requiring regular and strenuous work to collect, carry, prepare, and use. Individuals responsible for procuring these fuels from the environment may also suffer from musculoskeletal pain, dehydration, and related health impacts (Rosenthal, 2015; Smith et al. 2013; Torres-Duque et al., 2008; Njenga et al., 2021). These drudgery burdens – in time and health – fall disproportionately on women due to historical social and cultural norms in the regions where use of solid biomass fuels remains high (Gornick and Meyers, 2003). Women tend to be responsible for both the procurement and preparation of fuel, and for the bulk of fuel intensive household labor, especially cooking.	Solomon
Aboagye Solomon (University of Cape Town)	**One-off subsidies, Credit Regimes, and Households' Willingness to Pay for Improved Cookstoves** Despite the well-documented benefits of clean cookstoves and fuels, there are still about 94% of the population lacking access to any clean cooking equipment in Nigeria. Yet, there are several global, national and local improved cookstove (ICS) programmes and interventions intended to enhance household's access. However, a growing body of literature shows very low adoption of environmentally-friendly technologies such as ICS when economic agents are generally poor, habitually short on cash, face persistent credit rigidities. Thus, to achieve some form of socially efficient level of adoption of ICS, some combinations of subsidies and credit payment regimes may be necessary even if not sufficient. To this end, the study relies on a World Bank data gathered through a quasi-experimental survey that targeted only households without ICS or any clean cooking technology and for whom biomass is the primary	Pablo

	cook fuel in hypothetical randomized bidding process characterized by one-shot subsidy and credit facilities. Using a heteroscedastic-corrected probit models, the results show that allowing households to pay over time coupled with a one-off subsidy of no less than 34% significantly increases the mean WTP to the extent that households are willing to pay even more than the full market price.	
Selaya Pablo (University of Copenhagen)	**What is the Ideal Number of Women in Politics? Distributive Preferences, Inequality, and Meritocracy** We study the low number of women in politics as a question of distributive justice, and examine empir-ically what would constitute an ideal number. Based on Harsanyi's (1977) theory of moral judgements concerning societal outcomes, we design an online survey in which we ask respondents to (a) esti-mate the current number of women in politics; and (b) express their preferences for an ideal number of women in politics under a "lottery of nature" that helps respondents to abstract from their personal characteristics and social position, and thereby helps us to interpret their preferences as impersonal, individual, and genuine moral value judgements concerning societal welfare (Harsanyi, 1953, 1977; Rawls, 1971). Our respondents reveal an ideal number of women in politics equivalent to 39%. These preferences are not confounded by personal characteristics, are stable over time, and remain systemati-cally below the 50% threshold of equality. These results uncover a noticeable degree of preference for inequality in the distribution of political power between men and women. We probe two mechanisms to explain this finding. First, we analyze whether female politicians' work, or prefer to work, in specific policy areas. If these areas are underfunded or undervalued in society, that may discourage women to embark on political careers to begin with, and thereby explain preferences for a lower ideal number of women in politics. We find a low degree of actual specialization in specific policy areas; and low preferences for female specialization in politics. Second, we examine whether respondents believe that having more meritocratic attributes is more important for female than for male political candidates to become successful politicians, by running three experiments to elicit whether respondents believe that (i) effort, (ii) experience, and (iii) education (university degree) are relatively more important for female political candidates. Female respondents consider that having a university degree is less important for any political candidate, unless the candidate in question is female, in which case having a university degree becomes more important. We also calculate that actual educational attainment is higher among women than men within the parliament and across the national population. These results suggest that meritocratic values may be used to justify inequality in the distribution of political power between men and women and, therefore, importantly, they call for a discussion of the origins of meritocratic values in society. Our research contributes to understanding the mechanisms that sustain a lower participation of women in politics.	Subhrendu

Parallel Session 8A: ENERGY AND WELFARE (SETI) | Chair: Lise Masselus

Presenter	Title	Discussant
Kevin Mutayebwa Rugaimukamu (Mwalimu Nyerere Memorial Academy)	**The Impact of Household Energy Transition on Household Welfare in Tanzania** Household energy transitions are expected to improve household welfare indicators such as health and schooling. This paper looks at the impact of households' use of modern cooking fuels for cooking and electricity for lighting on health and schooling outcomes in Tanzania. The study employs propensity score matching techniques on two survey datasets. The results show a reduction in the incidence of respiratory diseases among children for households using modern cooking fuels, while the use of electricity for lighting was associated with improved evening study hours, examination scores and educational attainment. Moreover, electrification was found to affect household time use (encouraging more non-agricultural activities in rural areas) and reduce fertility (probably due to information access). The study provides the rationale for policies geared towards improving access to modern energy for cooking and lighting and easing the constraints towards full energy transitions by households to achieve several sustainable development goals.	Sydney
Sydney Kabango Chishimba (University of Cape Town)	**Electrification Technology and Its Effect on Household Socio-Economic Welfare in Zambia** Literature shows that household and community access to electricity services in developing countries contributes to users' ability to improve their livelihood. It enables users engage in income generating activities such as running grocery shops, hair salons, barbershops and sewing (Khandker et al., 2009; Bensch et al., 2011; Daso and Fernades, 2015) once connected. It further reduces exposure to indoor pollution as reliance on traditional fuels for lighting and cooking (Khandker et al., 2012; Bonan et al., 2016) reduces and is further linked to increased time and years children spend studying (Litzow et al., 2019; Julio and Aguirre, 2014). Furthermore, electricity access improves household access to information as individuals acquire mobile phones and appliances such as radios, and TV (Bensch, et al., 2011) that use electricity.	Lise
Lise Masselus (Leibniz Institute for Economic Research)	**10 Years After: Long Term Adoption of Electricity in Rural Rwanda** Universal access to energy has emerged as a major policy goal. Yet, in many areas served by the grid, uptake and electricity consumption remain low, at least in the short and medium run. This paper combines survey and utility data to document long-term connection rates and consumption patterns in rural Rwanda. Our analysis is based on a panel of 41 communities that were	Kevin

	electrified up to 10 years ago. We find that connection rates for household living close the grid are high, though not high enough to achieve the universal access goal. At the community level, connection rates are low. Furthermore, among connected households, consumption levels and appliance usage are low, and do not grow much over time. This challenges the cost-effectiveness and economic sustainability of grid extension efforts.	

Parallel Session 8B: WATER (NatCap) | Chair: Eduardo Pacay

Presenter	Title	Discussant
Marc Jeuland (Duke University)	**Irrigation Management Systems and Technologies and Their Environmental Consequences: Empirical Evidence from Ethiopia** The main objective of this study is to understand the potential impacts and determinants of changes in environmental conditions in various irrigation systems, focusing on the role of water management systems and technologies. Descriptive, econometric and remote sensing techniques were applied in the analysis. The econometric results show that compared to open-access plots equipped with pump irrigation, other irrigated configurations have greater vegetation cover and show less susceptibility to water logging, soil salinity and erosion externalities. The result of the impact of different combinations of irrigation management system and technologies changes on vegetation biomass using DiD and treatment effect depicts that though average NDVI in all types of irrigation systems is positive and statistically significant, we found positive NDVI impact in the plots and surrounding areas that are in privately managed pump systems and withdraw water from groundwater.	Innocent
Innocent Ifelunini (University of Nigeria))	**Household Strategies to Cope with Water Scarcity in Enugu State, Nigeria** The study examines the strategies employed by household to cope with water scarcity from the point of view of source of water supply; and management of water shortage in the household. It also analyzes the factors that influence household choice of coping strategies. The study used data from 600 households selected through a multistage random sampling technique from two urban cities; Nsukka and Enugu, in Enugu State, Nigeria. we employed descriptive statistics and multivariate probit regression to examine the strategies employed and the factors that influence such strategies. Majority (55.96%) minimize water usage; 46.80% store water in the big container; 35.23% purchase water from vendors selling in tankers; and 34.72% harvesting rain water to cope with water scarcity via source of water supply. In terms of coping via managing water shortage in the household, majority (61.52%) have to postpone clothes washing, 59.22%) reduce the number of times house is	Eduardo

	cleaned 50.53% have to reduce bathing times because of water shortages. The multivariate probit regression result suggests that the number of years in school, hours spent fetching water, and total amount of money paid for water during the past 30 days preceding the survey, increase the likelihood of the household harvesting rain water as coping strategy. The household's choice of storing water in big container as a coping strategy increases with the number of minutes it takes to walk to source of water and the total number of hours it takes to fetch water in seven days but decreases with the household feeling water insecure. Moreover, that fetching water on credit are positively significantly associated with harvesting rain water. Besides, households who walk long distance to get water will also harvest rain water as coping strategy, household who store water in big container will also adopt group bathing as coping strategy.	
Eduardo Pacay (CATIE)	**Volumetric Pricing in Rural Areas** Ensuring access to safe drinking water is vital for human welfare and a priority for sustainable development. Yet, despite the global advances toward universal and equitable access to safe and affordable drinking water, geographical disparities and challenges persist. Two billion additional people need access to safely managed water (WHO et al., 2022; Everard, 2019; Fukuda et al., 2019). While inequalities between rural and urban areas have been reduced over recent years, rural areas typically suffer major problems with individual components of safely managed drinking water, such as accessibility, availability, and quality (WHO et al., 2022). In remote rural areas of developing countries, community-based water organizations (CWOs) frequently manage and provide drinking water. These collectively run local groups are crucial to maintaining and improving water access. However, while some successful examples exist, most face challenges associated with governance, performance, and their capacity to cope with climate change (Madrigal et al., 2011; Hutchings et al., 2015; UNESCO, UN-Water, 2020).	Marc

Parallel Session 8C: FOREST RESTORATION AND POLICY INSTRUMENTS (FOREST) | Chair: Chizoba Obianuju Oranu

Presenter	Title	Discussant
Aloyce Hepelwa (University of Dar Es Salaam)	**Public Acceptance of Policy Instruments to Reduce Forest Loss: Exploring Cross-National Variation in East Africa** Forest loss by deforestation and forest degradation is an important environmental problem worldwide. Policymakers that attempt to reduce forest loss in their policy have often regulative (such as ban cutting trees and charcoal) and price-based (such as tax on cutting trees and charcoal) instruments at their disposal. However, policies focusing	Chizoba

	on forest loss cannot be successful unless a majority of various groups of people support, or at least accept, the designed policy instruments. This paper presents the results of descriptive and regression analysis from an empirical survey conducted on 5000 respondents in five East African countries - Kenya, Ethiopia, Uganda, Tanzania and Rwanda, focusing on citizens' perceptions on forest loss-reducing policy instruments along with the role of socio-economic factors on these perceptions. The result indicated that while about 68% of the citizens are supportive of a ban and tax on cutting trees, only 45% of the citizens accept a ban and tax on selling and using charcoal. Citizens' trust in government, peoples' concern on forest loss problem, experiences in selling and using charcoal have positive and statistically significant associations with the regulative and price policy instruments on forest loss. The result suggests that successful implementation of policy instruments requires efforts to improve governance and build citizens' confidence in their government; and information exposure to enhance peoples' awareness about the extent of depletion of natural resources.	
Chizoba Obianuju Oranu (University of Nigeria)	**What Incentives Would Smallholder Farmers Prefer to Give Up Clearing New Forest Areas for Farming: Evidence from Nigeria's Rainforest Region** Conflicts in nature protection in developing countries are often a result of a difficult choice between tourism development and environmental conservation in communities with difficult socio-economic conditions. The management of these conflicts is paramount for the sustainable management of ecotourism. The present study investigates the preferences of resident and non-resident tourists at Kakum National Park in Ghana using the choice experiment. Although the non-resident tourists are more aware of the uniqueness of the forest habitat at Kakum National Park than resident tourists, the non-resident tourists support the conversion of portions of the park to support livelihoods in surrounding communities as compared with stricter nature protection among resident tourists. The marginal WTPs for 1% increase in biodiversity are GHS1.61 and GHS82.88 for resident tourists and international tourists respectively. Furthermore, the marginal WTPs for restoring one hectare of forest habitat is approximately GHS 0.30 for resident tourists but GHS3.55 for international tourists. Furthermore, whereas the marginal WTP for information using QR codes is (GHS4.80) and (GHS51.08) for resident tourists and international tourists respectively, the marginal WTPs for information provision using printed text are GHS1.30 and GHS21.79 for resident and international tourists. Based on these estimates, we make a number of recommendations for promotion of ecotourism and management of conflicts in nature tourism strategy development within the context of developing countries.	Monica
Monica Opoku (Colorado State University)	**Valuing Biodiversity and Forest Habitat Restoration in Kakum National Park in Ghana** Using data from 634 smallholder farmers in Cross Rivers State, Nigeria, the study employed the Heckman model and multinomial logistics to analyze farmers' willingness to accept financial incentives and non-	Aloyce

	financial incentives. The results show that factors affecting WTA financial incentives are farmers' expenditure per capita, ownership of private forest, member of forest management committee. The estimated WTA amount is 6410.25 Naira. The multinomial logit results also show that ownership of private forest, farm income, age of farmer, marital status and household size have a significant relationship with farmers' choice of non-financial incentives. Overall, most farmers (41.96 percent) prefer a combination of financial and non-financial incentives, 26.95 percent prefer only financial incentives, 10.88 percent prefer only non-financial incentives, and 17.51 percent were unwilling to accept any form of incentives to reduce deforestation. The findings of this study suggest that financial incentives are relevant in incentivizing farmers, however, a combination of financial and non-financial incentives could be an important strategy for restoring degraded forest and for sustainable management of forests.	

Parallel Session 8D: BIODIVERSITY & CONSERVATION (NatCap) | Chair: Claudia AravenaChizoba Obianuju Oranu

Presenter	Title	Discussant
Gabriel Englander (World Bank)	**Outsourcing Wildlife Conservation: A Comparative Analysis of Private and Government Management of Protected Areas in Africa** This article provides the first causal evidence comparing the effectiveness of privately and publicly managed protected areas. We leverage the transfer of protected area management from governments to African Parks (AP)—the largest private manager of protected areas in Africa—to show that private management significantly improves wildlife outcomes in protected areas via reduced elephant poaching and increased bird populations. Our results also suggest that AP's management augments tourism, while the effect on local economic development is inconclusive. However, AP's management increases the risk of armed groups targeting civilians, which could be associated with AP's improved monitoring and enforcement systems. These findings highlight the intricate interplay between conservation, tourism, economic development, and security under private protected area management in Africa.	Albers
H. Jo Albers (University of Wyoming)	**The Economics of the Birds and the Bees: Private Habitat Conservation with Market Access Costs and Multiple Ecosystem Services** Conservation science and economics research determine that wild species provide various valuable ecosystem services (ES) to agricultural production. Whether those services provide a strong incentive to farmers to allocate some land to habitat for those species depends on the characteristics of the land and ES, with Simpson (2019) finding a modest incentive for farmers to conserve habitat. This paper examines how the farmer's incentive for habitat	Claudia

	conservation relates to market access costs for inputs that substitute for ES and varies across settings that provide more than one ES. We find that common market settings in low-income countries and common multiple ES settings can increase the farmer's optimal private habitat conservation. This analysis examines Sustainable Development Goals regarding poverty (SDG 1), food production (SDG 2) and terrestrial habitat conservation (SDG 15). We also explore the response of private habitat conservation to policies that improve farmer information, reduce market access costs, make payments for ecosystem services, and conserve public land for habitat.	
Claudia Aravena (Heriot-Watt University)	**Monetary and Non-Monetary Valuation of Elements of Biodiversity in the Titicaca National Reserve** Biodiversity conservation is one of the main policy targets in Peru, where the natural ecosystems sustain the life of communities and the local economy. This paper studies whether there are significant differences in the valuation of elements of biodiversity in the Titicaca's National Reserve, Peru, using a monetary and non-monetary approach in different population groups (urban and rural). We used choice experiments to estimate the implicit prices associated with each of the biodiversity's attributes. Our results show that the values for biodiversity's elements obtained in the non-monetary approach are significantly higher in both populations compared with those obtained in the monetary approach. The preferred attribute in both preferred approaches was the transparency of the water, while the least preferred attribute was the repopulation of vulnerable species (fish and amphibians).	Gabriel

Parallel Session 8E: RESEARCH PROPOSALS | Chair: Franklin Amuakwa-Mensah

Land rush in sub-Saharan Africa and its implications on human livelihoods: a scoping review

Edward Mwavu (Makerere University)

Alternative water use in promoting the empowerment of women in rural areas

Jane Chah (University of Nigeria)

Socio-Economic Effects, Social Equity and Gender Dimensions in multilateral funded Nature-based Solutions in Southern and East Africa

Martine Visser (University of Cape Town)

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1. Aboagye, Solomon, PhD, University Of Cape Town
2. Amuakwa-Mensah, Salome, PhD, Luleå University of Technology
3. Bassongui, Nassibou, Researcher, University of Abomey-Calavi
4. Bensch, Gunther, Researcher, RWI – Leibniz Institute for Economic Research
5. Beyene, Abebe, PhD, Policy Studies Institute
6. Dang, Le Hoa, Researcher, Faculty of Economics, Nong Lam University
7. Dasgupta, Aparajita Dasgupta, PhD, Ashoka University
8. Gallé, Johannes, PhD, MCC Berlin
9. Gebreegziabher, Zenebe, Researcher, Mekelle University
10. Gräns, Carl Michael, Ambassador, Swedish Embassy, ECOWAS
11. Li, Zhi, Researcher, Xiamen University
12. Ntiyakunze, Matilda, Researcher, Ardhi University
13. Pattanayak, Subhrendu, Professor, Duke University
14. Abebe, Meseret Birhane , PhD, Addis Ababa University
15. Abubakari, Sulemana Watara , Researcher, Kintampo Health Research Centre
16. Achike, Anthonia ifeyinwa , Professor, University Of Nigeria Nsukka
17. Adjei-Mantey, Kwame , PhD, University Of Environment And Sustainable Development
18. Aggarwal, Raavi , Researcher, Indian Statistical Institute, Delhi
19. Ahmed, Farouk, Chief Executive Officer, The Nigerian Midstream and Downstream Petroleum Regulatory Authority
20. Akpalu, Wisdom, Center Director, GIMPA
21. Albers, Heidi, Professor, University of Wyoming, Laramie
22. Alem, Yonas , Associate professor, University of Gothenburg/EfD GH
23. Alpizar, Francisco , Professor, Wagenigen University and Research Center
24. Amoah, Anthony , Professor, University of Environment and Sustainable Development
25. Amuakwa-Mensah, Franklin, Economist, University of Gothenburg & Luleå Technical University
26. Appiah Amfo, Nana Aba , Vice Chancellor, University of Ghana
27. Aravena-Novielli, Claudia, Researcher, Heriot Watt University
28. Arthur, Lilian , Researcher, Ghana Communication Technology University
29. Aseete, Paul , Researcher, Makerere University
30. Babyenda, Peter , Researcher, EfD-Mak Centre, Uganda
31. Barua, Rashmi, Assistant professor, jawahalal nehru university
32. Bharadwaj, Bishal , Researcher, Curtin University
33. Bonilla, Jorge, Assistant Professor, University of Los Andes
34. Chegere, Martin J. , PhD, University of Dar es Salaam
35. Chen, Xing , Researcher, Fudan University
36. Chikumbi, Lydia , Researcher, UCT

37. Chishimba, Sydney Kabango , PhD, University of Cape Town
38. Chukwuone, Nnaemeka , Professor, University Of Nigeria Nsukka
39. Chávez, Carlos , Professor, Universidad de Talca and NENRE-EfD-Chile
40. Das, Saudamini , Researcher, Institute of Economic Growth
41. Englander, Gabriel , Researcher, World Bank
42. Estay Montecinos, Manuel Enrique , Researcher, Universidad de Concepción
43. Evia, Pablo , Researcher, Tropical Agricultural Research and Higher Education Center (CATIE)
44. Fischer, Carolyn , Researcher, World Bank
45. Fuente, David, Professor, University of South Carolina
46. G. Kebede, Selamawit , Researcher, PSI
47. Ganhane, José , Researcher, Luleå Technology University
48. García, Jorge, Professor, Los Andes University
49. Gbolonyo, Emmanuel , PhD, University of Cape Town
50. Gupta, Ridhima, Researcher, South Asian University
51. Gupta, Tanu, Researcher, CECFEE, Indian Statistical Institute
52. Hanerman, Michael, Associate professor, Luke
53. Harstad, Bård, Professor, Stanford University
54. Hepelwa, Aloyce , Researcher, University of Dar es Salaam
55. IFELUNINI, INNOCENT , Researcher, RESOURCE & ENVIRONMENTAL POLICY RESEARCH CENTRE, UNIVERSITY OF NIGERIA
56. ILEKA, CHIKAOSOLU , Researcher, UNIVERSITY OF NIGERIA NSUKKA
57. Jagger , Pamela , Associate professor, University of Michgan
58. Jaime, Marcela , Researcher, Universidad de Concepcion
59. Jalan, Jyotsna , Professor, Centre for Studies in Social Sciences, Calcutta
60. Jane Mbolle, Chah , Professor, University of Nigeria Nsukka
61. Jeuland, Marc , Professor, Duke University and SETI
62. Juhar, Nuredin , Researcher, PSI
63. Kacker, Kanishka , Researcher, Indian Statistical Institute
64. Karimu, Amin , Professor, University of Cape Town
65. Kigundu, Kenneth , Professor, Chuka University
66. Klug, Thomas , PhD, MCC Berlin / PIK
67. Köhlin, Gunnar , Director, Environment for Development
68. Lambon-Quayefio, Monica , Researcher, University of Ghana
69. Lang, Megan , Researcher, World Bank
70. Loeser, John , Researcher, World Bank
71. Lopez-Feldman, Alejandro, Researcher, Environment for Development
72. Lwiza, Florence , Researcher, Makerere University
73. Maldonado, Jorge, Researcher, Universidad de los Andes

74. Marco, Jorge, Post doctoral researcher, Universidad de los Andes
75. Masselus, Lise, Researcher, RWI - Leibniz Institute for Economic Research
76. Mercado, Leida , Researcher, EFD-CATIE
77. Montero Mestre, Jorge Luis, PhD, Universidad de los Andes Universidad de los Andes
78. Montoya , Maria Alejandra , PhD, Universidad de los Andes
79. Muchapondwa, Edwin, Professor, University of Cape Town (UCT) - EPRU
80. Mukanjari, Samson, Researcher, Lund University
81. MULWA, CHALMERS , PhD, International Potato Center (CIP)
82. Mwavu, Edward , Professor, Makerere University
83. Nanyiti, Aisha , Researcher, School of Economics, Makerere University
84. Ndhlovu, Obrian, Postdoctoral Research Fellow, Environmental-Economics Policy Research Unit, School of Economics, University of Cape Town
85. Njoki Wango, Virginiah , PhD, University of Nairobi
86. Nnaji, Amaka , Researcher, Resource and Environmental Policy Research Centre, EfD Nigeria
87. Norden, Anna, Assistant Professor, Jönköping University
88. Nunoo, Isaac, Researcher, University of Cape Town
89. Nzeadibe, Chidi , Professor, University of Nigeria
90. Onyenekwe, Chinasa Sylvia , Researcher, University of Nigeria
91. Onyia, Chukwuemeka , Researcher, University of Nigeria
92. Opoku, Monica D. , Researcher, Colorado State University
93. Oranu , Chizoba , Researcher, Research and English Policy Research Centre, University of Nigeria Nsukka
94. Oyarzo Aguilar, Mauricio , Researcher, Universidad de Concepción
95. Pacay, Eduardo, Researcher, EfD-CATIE
96. Pattanayak, Subhrendu, Professor, Duke University
97. Pham, Nam , Researcher, EfD - Vietnam
98. Riquelme, Andrés , PhD, UNIVERSIDAD DE TALCA
99. Rosas Munoz, Jua, PhD, University of Bío-Bío
100. Rugaimukamu, Kevin, Researcher, The Mwalimu Nyerere Memorial Academy
101. Ruhinduka, Remidius, Energy Expert, University of Dar es Salaam
102. Salazar, Cesar , Researcher, Universidad del Bio-Bio
103. Salazar, Leonardo , PhD, Universidad de Concepción
104. Saldarriaga, Carlos, Researcher, Universidad Nacional de Colombia
105. Sangwan, Nikita , PhD, Indian Statistical Institute
106. Sebastian Kauky, Monica , Researcher, University of Dar es Salaam
107. Selaya, Pablo , Researcher, University of Copenhagen
108. Shyamsundar, Priya , Researcher, The Nature Conservancy
109. Sills, Erin, Professor, NC State University
110. Sophia Bez, Charlotte , Researcher, Potsdam Institute for Climate Impact Research

111. Sseruyange, John , Researcher, Makerere University
112. Steckel, Jan, Head, Climate and Development Working Group, Mercator Research Institute on Global Commons and Climate Change
113. Sterner, Erik, Researcher and pedagogical developer, University of Gothenburg
114. Sterner, Thomas, Professor of Environmental Economics, EfD Environment for Development initiative, University of Gothenburg
115. Tan-Soo, Jie-Sheng, Professor, National University of Singapore
116. THONG, HO QUOC , Researcher, EfD Vietnam, University of Economics Ho Chi Minh City
117. Timilsina, Govinda R , Researcher, World Bank Group
118. Trujillo, Francisca, Researcher, University of Talca
119. UME, CHUKWUMA , Researcher, Resource and Environmental Policy Research Centre, University of Nigeria
120. Urama Chika, Kevin, Chief Economist and Vice President, African Development Bank
121. Uribe, Adolfo, Researcher, Universidad de Talca
122. Valbuena, Nicolas , PhD, Universidad de los Andes
123. Visser, Martine, Professor, University of Cape Town (UCT)
124. Vondolia, Godwin Kofi , Researcher, University of Cape Coast
125. Vásquez, Cristóbal , Researcher, NENRE EfD-Chile & The Sustainable Energy Transitions Initiative
126. Wagura Ndiritu, Simon , Researcher, Strathmore University
127. Xie, Lunyu, Energy Economics, Renmin University of China
128. Yi, Yuanyuan , Researcher, Peking University
129. Yu, Hang , Professor, Peking University
130. Zhang, Xiao-Bing, Researcher, Technical University of Denmark

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