

WORLD SUSTAINABLE DEVELOPMENT SUMMIT 2023

MAINSTREAMING SUSTAINABLE DEVELOPMENT AND CLIMATE RESILIENCE FOR COLLECTIVE ACTION

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India Habitat Centre, New Delhi



SUMMIT BULLETIN | DAY 2

#Act4Earth

PLENARY SESSION

INSTRUMENTS AND LEADERSHIP FOR INCLUSIVE GREEN GROWTH

Keynote Ministerial Address by Chief Guest

Shri Sarbananda Sonowal, Hon'ble Union Cabinet Minister, Ministry of Ports, Shipping and Waterways

Ministerial Addresses

H.E. Ms Gina Lund, Governor, Agder County, Norway

H.E. Ms Terhi Lehtonen, Deputy Minister, Ministry of Environment for Finland

Leadership Address

Ms Helen Clarkson, CEO, The Climate Group

Special Remarks

Mr Kartikeya Desai, Founder, Desai & Associates

Mr Jagjeet Singh Sareen, Principal, Dalberg Advisors

Mr Abhinav Singh, Director, Amazon India

Co-chair

Ms Kathleen McGinty, Vice President & Chief Sustainability Government and Regulatory Affairs Officer, Johnson Controls

Mr Ajay Shankar, Distinguished Fellow, TERI



Green growth involves rethinking growth strategies regarding their impact(s) on environmental sustainability and the environmental resources available to vulnerable groups. Green growth strategies should ensure that the environmental pillar of sustainable development is aligned to meeting economic and social objectives.

With this perspective, the first plenary session on Day 2 of the ongoing WSDS, focused on the instrumental role of leadership and policymaking in achieving green growth. In the Keynote Ministerial Address, Shri Sarbananda Sonowal said, "Green growth should be imperative to all policies and frameworks for India in the years to come. Deployment of renewable energy and green hydrogen will be key for the Indian shipping sector to decarbonize and reach the net zero target by 2070."


In a federal context, a predictable and secure fiscal base would also be necessary to secure local public goods for green growth. Adding to this argument, in her Ministerial Address, H.E. Ms Gina Lund said, "The key to tackle climate change is through focusing at the local level through enhanced coordination from the policy actors at the regional level. We need green growth, not a green-washed grey industry." Taking the thread

on indigenous wisdom further, H.E. Ms Terhi Lehtonen shared, "A green development pact needs to move towards the path of circular economy. A multi-stakeholder approach including indigenous people should be the key to tackle just transition."

Some measures to mainstream environment in economic decision-making by the governments include green budgeting, greening economic surveys, and greening GDP/ growth measures. Apart from this, a regulatory policy framework is needed to complement and support market-based instruments. Echoing this, in the Leadership Address, Ms Helen Clarkson said, "Sub-national policies need to be inclusive and cater to climate action at the local level through a bottom-up approach. Sub-national governments often find it difficult to justify mobilizing climate finance than the national government."

Improving governance is an essential enabler of green growth and for green growth to be effective, governments at all levels must work towards policy alignment and coherence. As shared in Special Remarks by the esteemed panelists Mr Kartikeya Desai, Mr Jagjeet Singh Sareen, and Mr Abhinav Singh, the implementation of green growth strategies is supreme. "It is absolutely possible to mobilize adaption finance through leveraging social finance and de-risking capital investments. The need for climate finance in India is surprisingly towards sustainable lands followed by energy and power," averred Mr Desai.

"G20 needs to take the initiative to change the narrow narrative of climate finance to climate-smart transition of the financial sector. There is a need to enhance the capacity of the bureaucracy across G20 for an



H.E. MS GINA LUND
Governor, Agder County, Norway

“ The key to tackle climate change is through focusing at the local level through enhanced coordination from the policy actors at the regional level. ”

effective implementation of climate action in the years to come," added Mr Sareen. Talking about the role of Amazon in envisioning a green future, Mr Singh said, "Amazon has reduced its packing wastage to 38% as part of the company's sustainable packaging vision."

As the co-chair of the session, Ms Kathleen McGinty noted how sustainability issues have come up from the 'basement of buildings to the boardrooms.' She observed, "Climate change negotiations have evolved over time with multi-stakeholder approaches as climate change has become a critical global challenge, which will require collective action to mitigate."

This stimulating session provided a platform to assimilate diverse perspectives on experiences and lessons learnt on strategies to enable green growth. 🌱



SHRI SARBANANDA SONOWAL
Hon'ble Union Cabinet Minister, Ministry of Ports, Shipping and Waterways

“ Green growth should be imperative to all policies and frameworks for India in the years to come. ”

NATURE-BASED SOLUTIONS FOR ADDRESSING CLIMATE VULNERABILITY AND ENSURING FOOD SECURITY

Ministerial Addresses

- H.E. Mr Naseer Ahamed, Minister, Ministry of Environment, Sri Lanka
- H.E. Christophe Guilhou, Directeur du développement durable - Ministère de l'Europe et des Affaires
- Ms Anne Beathe Tvinnereim, Minister of International Development, Government of Norway
- The Rt Hon Lord Goldsmith, Minister of State (Energy, Climate, and Environment), Foreign, Commonwealth and Development Office

Global Leadership Address

- Prof. Lindiwe Sibanda, Chair, CGIAR System Board

Leadership Addresses

- Prof. Anand Patwardhan, Center for Global Sustainability University of Maryland
- Dr Masahide Kimoto, President, National Institute for Environmental Studies
- Dr Vinod Mathur, Vice Chair, IPBES Bureau
- Dr Purvi Mehta, Deputy Director- Global Growth and Opportunities, Bill and Melinda Gates Foundation

Science Leadership Address

- Prof. Jan Zalasiewicz, Chair, Anthropocene Working Group, International Commission on Stratigraphy
- Prof. Mark Williams, Member, Anthropocene Working Group, International Commission on Stratigraphy

Moderator

- Dr Kiran Kumar Sharma, Senior Director, TERI



According to the International Union for Conservation of Nature (IUCN), NbS are defined as actions to protect, sustainably manage and restore natural or modified ecosystems, that is, address societal challenges (e.g., climate change, food and water security or natural disasters) effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.

Estimates by Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services suggest that nature-based solutions can provide 37% of the mitigation needed until 2030 to achieve the targets of the Paris Agreement. According to the Intergovernmental Panel on Climate Change (IPCC), while the carbon-sequestering mitigation role of increasing forest and tree cover has dominated much of the earlier

discussions, the role of NbS in promoting adaptation of natural ecosystems and human societies to climate change is being increasingly emphasised. Thus, NbS generally benefits biodiversity and supports its role in both climate mitigation and adaptation.

Nature-based solutions, if introduced with safeguards, can also contribute to adaptation and climate resilience such as reducing the incidence and impact of landslides, soil erosion and flooding. Care must be exercised on the aspect that all nature-based solutions do not automatically contribute to biodiversity and care has to be exercised when introducing species so that they do not lead to adverse biodiversity impacts. The benefits delivered by NbS vary not only across spatial and temporal scales but also among societal groups. Payment for ecosystem services to farmers for planting and protection of trees can lead to livelihood opportunities as well as ecological benefits such as enhanced water quantity and improved water quality downstream.

Climate change poses a serious challenge to the agriculture systems and food security along with threatening livelihoods leading to agrarian distress. Such vulnerability is characterized by declining growth rates in yield, depleting soil fertility, receding ground water resources, rising cultivation costs and inflation. A study published in Nature Climate Change in 2021 finds that the global average increases in farm productivity over the past 60 years have been 20 per cent lower than they would have been without climate change. IPCC finds that the overall direction of climate change impacts on food systems is negative with high confidence for general impacts, temperature, precipitation and phenology and seasons.



THE RT HON LORD GOLDSMITH
Minister of State (Energy, Climate and Environment), Foreign, Commonwealth and Development Office

“The climate and environmental crisis are fundamental drivers of food insecurity and unsustainable land use is a fundamental driver of the climate and environmental crisis. And we will only overcome these interlinked challenges and achieve sustainable development with the courage, determination and honesty from governments, businesses, investors and individuals”



MS ANNE BEATHE TVINNEREIM
Minister of International Development, Government of Norway

“It is timelier than ever that we reinforce commitments to enhance food security and climate resilience. However, commitments are not enough. They must be followed with action.”



H.E. MR NASEER AHAMED
Minister, Ministry of Environment, Sri Lanka

“To be in the green growth pathway the Nature based solutions will be the key to address many environmental issues including climate change and food security. NbS is also increasingly being recognised by governments, donors and academia as an effective approach to adaptation which also provides considerable co-benefits”

WHAT WOULD DR PACHAURI'S PRIORITIES BE FOR INDIA AND THE WORLD TODAY?

Reflections

- Mr Nitin Desai, Chairman, TERI
- H.E. Dr Ashni K Singh, Hon'ble Minister of Finance, Guyana
- Mr Janos Pasztor, Executive Director, Carnegie Climate Governance Initiative
- Dr Saroj Pachauri, Distinguished Scholar, Population Council
- Mr Rakesh Kacker, TERI Alumni Association
- Dr Vibha Dhawan, Director General, TERI

Moderator

- Dr Priyanka Kochhar, President, TERI Alumni Association

TERI's visionary Founder-Director Dr Rajendra Kumar Pachauri's leadership, vision, and hard work had made TERI the leading voice in energy and climate change that it is today. Throughout his tenure as IPCC Chairman, Dr Pachauri helped in raising awareness and building meaningful conversations on the climate change and its impacts at a global level. It was in this same vein that he instituted the World Sustainable Development Summit (WSDS), formerly known as the Delhi Sustainable Development Summit, in 2001 to bring together governments, global leaders, policymakers, businesses, civil society organizations, youth, and thought leaders to work towards the common goal of sustainable development and environmental conservation.

This WSDS, panelists and experts gathered to recall Dr Pachauri's passion for environmental conservation for a greener and sustainable future. The session titled 'In Memoriam' built on his ideals, ideas, and vision to reimagine sustainable development pathways for India and the world, given the present geo-political context. Panelists expressed their views and thoughts on what would have been Dr Pachauri's priorities for India and the world today.



DR ASHNI K SINGH
Hon'ble Minister of Finance, Guyana

“Even today, Dr Pachauri would remain firmly committed to finding lasting solutions to climate change challenges.”



MR JANOS PASZTOR,
Executive Director, Carnegie Climate Governance Initiative

“If Dr Pachauri was alive, communication regarding pandemic science could have been done in a lot better way.”

CRITICAL MINERALS AND MATERIALS: MANAGING SUPPLY CHAIN CONSTRAINTS

Introduction and Context Setting

Dr Siddharthan Balasubramania, Principal Strategist, ClimateWorks Foundation

Panel Discussion

Moderator: Mr Ajay Shankar, Distinguished Fellow, TERI

Panellists

Ms Amrita Dasgupta, Energy Analyst, International Energy Agency (IEA)
Dr Amrita Goldar, Senior Fellow, Indian Council for Research on International Economic Relations (ICRIER); Ms Swati Dsouza, Programme Head India ZEV Centre, University of California

Davis

Dr Rajesh Chadha, Senior Fellow, Centre for Social and Economic Progress (CSEP); Mr Bhuwan Purohit, Executive Director, Corporate Strategy & Planning, Rubamin Pvt. Limited



in the process. G20 can be a platform to advocate the role of circular economy and 'Remake in India' in this realm."

The supply of permanent magnet materials must increase substantially to meet the demand of a growing EV industry. In this regard, Ms Swati Dsouza said, "Electric vehicles' demand is bound to increase and hence the demand for critical minerals for battery manufacturing. India can look to form strategic alliance with Indonesia and Brazil through the platform of G20 (countries) that have better manufacturing capacity of minerals, so we do not lose our competitive advantage in the automobile sector."

Scaling up the manufacturing of the technologies, including solar panels, wind turbines, batteries and electric vehicles will result in significant demand for and dependency on the supply of a range of minerals for the foreseeable future. These 'transition-critical minerals', especially rare earth minerals, are required to manufacture the green technologies needed for the transition to a low-carbon economy. The mineral dependencies of green technologies, however, should not undermine the benefits of clean energy transitions. Dr Rajesh Chadha noted, "Assessing the criticality of minerals should be prioritized because unless we know what is least, more, and most critical, it becomes difficult to deliver fruitful policies. Resilient

access to critical minerals is required for low carbon technologies in line with COP26 commitments. There is a need to prioritize the exploration of critical mineral blocks."

Stronger laws and policies are vital to addressing the environmental and social impacts of mining and processing. India is, for instance, a member of The Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) that supports the advancement of good mining governance. About how India evidently has gaps in mining and exploration, Mr Bhuwan Purohit averred, "Power of Zero is a hydrometallurgy technology which helps recycle minerals with 'Zero Waste', which must be adopted on a large scale. It is important to bring all the recyclers together at a single platform to initiate the recycling of critical metals at a global scale."

The stimulating deliberation on the existing supply chain constraints for India, the related security issues, and how geopolitical blocks such as G20 can help stabilize the segments' volatility left the present audience feeling inspired, who felt enriched with significant takeaways. 🌍

During the 26th session of the Conference of Parties, India committed to meeting half of its electricity requirements from renewable sources by 2030 compared to a quarter today, reducing the economy's carbon intensity to less than 45% in 2030 compared to 2005 levels, and achieving the net-zero emissions target by 2070.

The first thematic track began with moderator Mr Ajay Shankar's remarks, who said, "As the world moves towards green energy, critical minerals play a critical role."

While setting the context, Mr Siddharthan Balasubramania talked about the recent risks and disruptions from supply chain, and cautioned, "we must remember it should not affect our climate goals. We need to develop a global cooperative framework. And all the excitement of new discoveries in metals and minerals cannot undermine the goal to keep people's welfare our foremost priority."

Esteemed Panellist Ms Amrita Dasgupta explained how the demand for critical minerals like cobalt and nickel is going to increase multifold in the energy sector. "There are disruptions in the supply value chain, and hence there is a need to ensure adequate and timely investment in diversified sources of supply. Scaling up recycling and promoting technological innovation can pave the way in reducing the demand of critical minerals by almost 10% by 2030."

Adding to the discussion, Dr Amrita Goldar noted, "There is a need to scale up battery recycling by working on different challenges – majorly skilling of workers in recycling space. Major recycling costs almost 40% accounts for collection of waste and transportation and hence, they need more policy support. There is a need to carry the informal sector along

NO TIME TO WASTE: HOW CIRCULAR ECONOMY PRINCIPLES CAN ADDRESS INDIA'S WASTE-RELATED EMISSIONS

Framing Presentation

Dr Manjyot Ahluwalia, Regional Lead-Asia, Global Methane Hub

Keynote Address

Ms Roopa Mishra, Ministry of Housing and Urban Affairs

Speakers: Ms Vandana Rao, Deputy Commissioner Municipal Corporation of Delhi; Mr Is'haaq Akoon, Sr Manager, Climate Change, City of Ekurhuleni, South Africa; Dr Ruchika Singh, Director, Sustainable Landscapes and Restoration, WRI-India; Mr Tom Frankiewicz, Principal, Climate-Aligned Industries RMI



Waste management in cities has improved a lot since the advent of the 'Swachh Bharat Mission'. However, most Indian cities and states still lack proper waste management practices and their infrastructure is poorly designed or non-existent. Major metropolitan cities are hotspots of legacy waste issues and have unscientific landfills, illegal dumping and burning, leading to public health risks and release of methane emissions.

With this perspective as its backbone, the thematic track on India's waste-related emissions began with the Keynote Address by Ms Roopa Mishra, who said, "India is seeing a paradigm of change with the introduction of decentralized waste management approaches, such as Material Recovery Facility (MRF), bio-methanation plants, community-based models, and so on at cities and panchayats. To keep such decentralized waste management approaches going, changes at the community level, scientific approaches, and remediation of existing dumpsites are required." While giving the Framing Presentation, Dr Manjyot Ahluwalia said, "With the rising GDP and population, waste-related emissions are expected to increase by 13 mega tonnes in the next decade."

About the newness of the zero waste colonies introduced in Delhi, Ms Vandana Rao said, "It covers several schemes such as Sahbhagita Scheme, which is an essential step for introducing sustainable waste management practice in Delhi. Bulk waste generators are also a concern in the sector of waste management and they are extensively surveyed and various alternatives are being introduced including community-based bio-methanation plant," she added.

Innovation in the waste management sector is the need of the hour. In this context, Is'haaq Akoon said, "Waste is a resource and a source of energy. However, traditional waste management practices must be innovated to better utilize the waste coming out of the cities. Some of the aspects that developing countries like South Africa and India need to comprehend are the areas where there is a lack of data and resources, such as the waste characterization data, technical in-depth analysis, and identifying best case studies that showcase sustainable waste management practices that could also be adopted to your region."

Further, despite being one of the leading food producers in the world, India suffers from massive post-harvest food loss and waste, leading to food and nutritional insecurity, and adding to waste-related methane emissions if not properly managed or segregated at source. Sharing concerns regarding this issue, Dr Ruchika Singh said, "Food loss and food waste are major concerns in the waste sector and a contributor of GHG emissions. Several aspects such as the quantity of food waste in India is

understudied. Initiatives must be introduced to reduce food loss and waste for greater food security and environmental sustainability. To decrease food loss and waste in India, we need start-up initiatives, increased research on various aspects of food wastage, such as the amount of food waste generated, increased capacity and skills, and partner-networking," she added.

About the heavy reliance on landfills for waste management, Mr Tom Frankiewicz observed, "Most countries heavily rely on landfill and dumpsites to manage waste with lower emphasis at the top of the waste management hierarchy. Hence, a two-pronged strategy is required and this strategy is underpinned by actionable data, which includes waste mapping and country deep dives. A two-pronged approach to waste methane mitigation is required which include open-source platform, decision support tools, on-the-ground support, and information sharing," he concluded. 🌍

TOWARDS PEOPLE-CENTRIC SMART CITY DEVELOPMENT

Welcome Address

Mr Sanjay Seth, Senior Director, TERI

Context Setting

Ms Rhea Srivastava, Research Associate, TERI

Panel Discussion

Chair: Ms Kamilla Kristensen Rai, Counsellor, Delegation of the European Union to India

Panellists

Mr Hitesh Vaidya, Director, National Institute of Urban Affairs; Ms Kathleen McGinty, Vice President and Chief Sustainability Government and Regulatory Affairs Officer, Johnsons Controls; Ms Vaishali Nandan, Project Head, GIZ India; Mr Panagiotis Karamanos, EU International Urban and Regional Cooperation (IURC); Ms Shruti Narayan, Regional Director, South and West Asia, C40 Cities



Cities are the fulcrum of economic, social, physical and cultural development. Rapid urbanization and globalization have led to a paradigm shift in the operation, management and governance of cities, bringing the concept of 'smart cities' to the forefront. Smart cities have become an effective way to address urban challenges and ensure service delivery to citizens — using technologies enabled by advances in information and communication technologies (ICT).

In this light, Mr Hitesh Vaidya said, "A smart city is, when I go to my city and I see good roads, I see a better working environment, I see a green box and that is with a sense of smartness. To achieve Sustainable Development Goals (SDGs), the intentions have to be converted into action, and the only way is to go back to the people. We have to start thinking and cities are going to be the prime focus of converting this intention to action. We need to look at what institutional changes are required to work on a behavioural change, which we are really targeting for."

In this thematic track, which was chaired by Ms Kamilla Kristensen Rai, the Welcome Address was delivered by Mr Sanjay Seth, followed by a brief presentation by Ms Rhea Srivastava to set the context.

Moving forward in the discussion, Ms Kathleen McGinty concentrated on the need for a blend of both technological advances and people's knowledge, and said, "Technology is the key opportunity, but people are our imperatives. (Mahatma) Gandhi said that greatness of humanity isn't being human, it's about being humane. So, for all of us, it is important

to know how we make that technology humane, so that it is enhancing the nobility of people at every step. Digital converts a building that right now is totally analogue and brings it alive which takes it from being just a burden on the grid to where the building can act as a battery," she added.

The technological dynamism that comes with smart cities often does not consider the aspects of inclusion and participation in planning and decision-making processes. Reiterating the urgent need to reach out to the common citizen in realizing environment-related objectives, Ms Vaishali Nandan remarked, "We're very complex in whatever we say in our digital world, which people struggle to understand. So, if we don't simplify it, we don't really reach the masses. We have to reach each and every citizen of the country; whatever language it is, we need to simplify."

Citizens have a central role to play in a city's development as end users of the innovative-smart technologies. It is important for cities to engage them and understand their needs to be able to address them. Dr Panagiotis Karamanos stressed, "We need to understand the needs of

the people and by understanding the needs, we should plan the project accordingly. Smartphones can be very effective in improving the quality of life and at the same time empowering people."

Ms Shruti Narayan highlighted the issue of accessibility and shared, "Access to technology plays the most important role for disaster management and resilience for the vulnerable groups living in a city. The pandemic really accelerated the urgency, and technology became the only way by which people could access just basic services, be it health or education."

Therefore, a people-centric smart city calls for a socially just, participatory approach, where people — especially the vulnerable and marginalised groups of society — are empowered to shape and co-create urban interventions in collaboration with the government, and technology acts as a vehicle to achieve the same. 🌍

TRANSITION TOWARDS CIRCULAR ECONOMY IN THE PLASTIC SECTOR

Welcome Address

Mr Souvik Bhattacharjya, Associate Director, TERI

Presentation of roadmap for the project 'India Australia Industrial and Research Collaboration on reducing plastic waste' by Dr Heinz Schandl, Senior Principal Scientist, CSIRO

Special Addresses

Dr Atul Narayan Vaidya, Director, CSIR-NEERI; Dr Ashok Khosla, Chairman, Development Alternatives

Panel Discussion

Moderator: Dr Rita Dhodapkar, Principal Technical Officer and Science Secretary, CSIR-NEERI

Speakers

Mr Mahesh Patil, Chairman, Goa State Pollution Control Board; Dr M Abul Kader, Director, CIPET, Ahmedabad; Dr Monique Retamal, Research Director, ISF-UTS; Mr Amit Lahoti, Senior Commercial Director and General Manager - Asia, Ball Beverage Packaging; Dr Prashant Gargava, (Member Secretary), CPCB; Dr Medha Tadpatrikar, Director, Rudra Environmental Solutions

Keynote Address: Ms Leena Nandan, IAS, Secretary, MoEFCC

Concluding Remarks: Dr Vibha Dhawan, Director General, TERI



One of the major innovations of the past century has been the introduction and wide adoption of plastics for several day-to-day applications that previously relied on traditional materials such as metal, glass, or cotton. Plastics have revolutionized almost all sectors for reasons like resistance to environmental degradation, affordability and accessibility, and are produced with a wide variety of material properties that allow adaptation to many different applications.

During the thematic track, in a special presentation, Dr Heinz Schandl said, "The India- Australia Industrial and Research Collaboration for Reducing Plastic Waste project's roadmap is a clear indicator for business fraternity, policymakers, and manufacturers to see what and where we stand in terms of plastic and its whereabouts. A collaborative approach is needed for roadmap implementation."

The Welcome Address was delivered by Mr Souvik Bhattacharjya after which the Keynote Address was given by Ms Leena Nandan, who highlighted the need to look at the larger narrative about production, consumption, and EOL of plastics. "Green credits can help in plastic waste management and regulation. The Ministry is going an extra mile to create efficient plastic waste management on many fronts, and not just imposing new rules," she remarked.

About the efficiency of recycling for circular economy, Dr Atul Narayan Vaidya said in a Special Address, "It has to be a technology-based solution

for plastic management. We must look into recyclability of plastics and its efficiency of how much and how many times a particular plastic is getting recycled. Circular economy cannot be feasible if we don't talk about EOL (end of life) of materials, especially plastics," he added.

Further, Dr Ashok Khosla highlighted, "Plastics are not going to get banned. We have to be creative enough to bring in innovative solutions. A synergy of plastic waste management and other sectors is needed to add high value to product." Plastic is so convenient that its unchecked application across all sectors in the economy has made it indispensable in our daily lives. However, there are reasons to worry because plastics have notable impacts on the ecology.

Dr Prashant Gargava observed, "EPR is facilitating the circular economy approach. CPCB is trying to facilitate how alternative to plastics can be eased into economy. CPCB is also accommodating the R&D support for the stakeholders." Continuing the thread on how circular economy is critical in India, moderator Dr Rita Dhodapkar said, "Management of plastics can lead to less flow of materials in the economy."

Mr Mahesh Patil too observed, "Sensitization of stakeholders should be done. EPR is helping us but it's a long road ahead."

"Doing recycling continuously is not efficient as it leads to quality reduction. Hence, new technological intervention is needed. CIPET is doing R&D for recycling technology for management of plastics," noted Dr M Abul Kader.

About the need for transparency in data collection, Dr Monique Retamal said, "Need for data collection transparency and efficiency is crucial for plastic waste management. We also must focus on reduction of plastics not just recycling."

Alternatives to plastic is the need of the hour and in that context, "Consumer awareness is needed for people associated across the plastic value chain," averred Mr Amit Lahoti.

Steering the conversation to the aspect of technology, Dr Medha Tadpatrikar stressed, "Chemical recycling is not getting popular due to cost constraints. Technology costs are high and recycling fund could be one step forward for implementation of new recycling infrastructure."

The track brought fresh insights on sustainable measures being unique solutions that must be implemented considering the identified gaps and opportunities in literature and initiatives. 🌍

CROP-BASED AGRICULTURE SYSTEMS AND CLIMATE ADAPTATIVE SOLUTIONS

Star Partner Bill and Melinda Gates Foundation

Welcome Remarks

Dr Purvi Mehta, Deputy Director, Global Growth and Opportunity, BMGF

Speaker Remarks followed by Panel Discussion

Mr Ananda Mallawatanri, Advisor to the President, Environment, Climate Change and Green Finance, Government of Sri Lanka; Dr Purvi Mehta, Deputy Director, Global Growth and Opportunity, BMGF; Dr Shahidur Rashid, Director for South Asia, IFPRI; Dr Kiran Kumar Sharma, Senior Director, Sustainable Agriculture, TERI

Moderator

Mr Siddharth Chaturvedi, Senior Program Officer, Agricultural Development, BMGF

Concluding Remarks

Dr Manish Anand, Senior Fellow, TERI



Serious commitments must be in place to mitigate climate risks, as highlighted by Dr Shahidur Rashid, who said, "You don't have to be a climate scientist to feel climate change. During the Ukraine-Russia war, India had a wheat stock that it had sought to export as a gesture of assistance. However, in March 2022, we had faced the hottest year due to which India had to revise its forecast and was bound to ban export of wheat. If we want to address climate change as a serious concern, commitments at the highest level are a must."

Technological merits must be put to use in the call for climate action. In this regard, Dr Kiran Kumar Sharma said, "There is a need to explore more on the Internet of Things (IoT) and artificial intelligence for the

maintenance of water and natural resources. We need to focus on water budgeting, specifically the rain-fed agriculture which comprises about 17%."

While deliberating on the solutions-based approaches to address climate adaptation challenges in the agriculture sector, Dr Manish Anand said, "There has been an overall consensus that we need a system-based approach across sectors including agriculture, livestock, fisheries, etc., and across scales (local, regional, national and global)." He signed off by adding, "We also need a transformative-adaptive approach, and since we are talking in the Global South context, the issue of embedding it into just transitions framework becomes important."

MONITORING, EVALUATION AND LEARNING FRAMEWORKS IN INDIA

Welcome Remarks

Dr Vibha Dhawan, Director-General, Earth Science and Climate Change Division, TERI

Global Perspectives – Initiative for Climate Action Transparency

Dr Henning Wuester, ICAT Secretariat, UNEP Copenhagen Climate Centre

Introduction to Initiative for Climate Action Transparency in Adaptation

Dr Henry Neufeldt, Project Manager, ICAT Secretariat, UNEP Copenhagen Climate Centre

Presentation of National MEL Tool on Agriculture and Project Learnings by TERI Project Team

Panel Discussion

Moderator Ms Suruchi Bhadwal, Director, Earth Science and Climate Change Division, TERI

High-Level Discussion

Dr Henning Wuester, ICAT Secretariat, UNEP Copenhagen Climate Centre; Dr Henry Neufeldt, Project Manager, ICAT Secretariat, UNEP Copenhagen Climate Centre; Dr Lindy Charlery, Advisor, Impact Assessment and Adaptation Analysis, UNEP Copenhagen Climate Centre; Mr Jagjeet Singh Sareen, Principal, Dalberg Advisors, Dalbergs' Climate Works; Ms Johanna Jagnow, Project Manager, Climate Adaptation and Finance, GIZ India; Mr Rajeev Chawla, Chief Knowledge Officer and Advisor, Agriculture Ministry, Government of India



strengthened to be able to scale up these activities. Unless and until you monitor and evaluate, you don't know where you are or what is giving you the best results, so you have to understand whether what you're doing is great or not, which will only come through M&E," she added.

"The notion of using data and matrix to drive climate actions has to be better understood. You cannot manage, if you cannot measure what you want to achieve. M&E framework is the key to mobilize the finance," said Dr Henning Wuester.

"When national governments set climate goals, they have to be implemented at local levels. Engaging with the sub-national and non-state actors is the fundamental requirement to achieving the objectives and making sure that the reporting is carried out from the local levels all the way back to the national levels where it can be analysed," observed Dr Henry Neufeldt.

"MEL are needed for both adaptation and mitigation. For India, we need the MEL framework for capacity building," said Suruchi Bhadwal, who was the moderator of the session.

"It is always challenging to bring in an MEL or monitoring system if you don't trace the incumbent system. We will need the MEL system to show us the progress which is out there," added Dr Alex Fisher.

"A lot more has been done in the mitigation sector because of clear definitions and different set of challenges. In case of India, the MEL framework has to be developed by integrating mitigation components with the adaptation components into one M&E system to get a complete picture of climate change, its impacts, and the progress being done," shared Dr Lindy Charlery.

"Government of India initiated a major project called Agri-stat, which gives data points of farmers required for the MEL framework. Data is a very crucial component of any MEL system," stated Mr Rajeev Chawla.

"Departments need indicators that are easy to monitor in MEL systems. So, the first step is to check the linkages of indicators with other schemes and programmes in various departments. The second step is to have major stakeholder consultations with those departments. The actions need to be institutionalized," said Ms Johanna Jagnow.

"We all are learning. MEL frameworks which we are building would help us focus our body of work and attention in terms of our learning curve. Let us build an organic link with farmers in India, and test whatever we know about climate change impacts and what they're trying to address with them on a regular basis," advised Mr Jagjeet Singh Sareen.



TOWARDS NET-ZERO EMISSION TARGET: ELECTRIC VEHICLES IN FREIGHT

Welcome Address

Dr Vibha Dhawan, Director General, TERI

Panel Discussion

Moderator

Dr AR Sihag, Distinguished Fellow, TERI

Panelists

Mr Sameer Pandita, Director, Bureau of Energy Efficiency, GoI; Mr N Mohan, CEO, Delhi EV Cell, Govt. of NCT of Delhi; Ms Trupti Deshpande, Senior Programme Manager, Shakti Sustainable Energy Foundation; Mr Amit Bhatt, MD (India), ICCT; Mr Umesh Revankar, CEO and MD, Shriram Transport Finance Company Ltd.

Vote of Thanks

Mr Sharif Qamar, Fellow and Area Convenor, TERI



India recently overtook China to be the most populous country in the world. With economic growth, India has witnessed a massive increase in urbanization. In this light, during the thematic track, Mr Sameer Pandita said, "Not many OEMs are making diesel hybrid vehicles or electrical vehicle trucks. Electrification of LMV is not an issue but for the major contributor of GHG emission (HDV), the technology and skilled force are still not there. Until and unless we have technology in HDV, tailor-made for Indian cities, we are not moving ahead."

There is a gap on the financial side in the trucking segment. Pilot projects can act as a solution to give the confidence to financing companies. "Financing will remain a major issue in the absence of endorsement by OEMs. The government could act as a consumer, as seen in the electric bus segment. We should look for such options in the trucking segment as well, as it will give a great push to creating demands for OEMs," said Mr N Mohan. "Also, a trial for trucking segment can be run. It will lower the burden of investment among stakeholders and challenges can be identified," added Ms Trupti Deshpande.

The European Union's new CO₂ standard for HDV mentions 90% of trucks to be zero-emission by 2040. This shows where the future industry

is heading to. "The next round of FAME with inclusion of freight vehicles would be interesting to see. India has been historically following the European automotive industry in most of its regulations. Europe, the UK, and the USA are coming up with CO₂ emission regulation for freight vehicle within the next year. This will lead to push the regulatory aspects in India as well," said Mr Amit Bhatt.

"EVs are costlier than their ICE counterparts even if after 100% interest rate subsidy, and still, the payback time would be very longer than the battery life (3-4 years). About 60-70% of the electric vehicle cost is of

battery which must be replaced frequently, making the purchase of electric vehicle financially unviable for the individual," pointed out Mr Umesh Revankar and highlighted that costs should come down for the expansive adoption of EVs. "Most of the financing are done towards 2Ws and 3Ws, since they are financially viable and make savings in the operational cost. If we move forward with more electric vehicles financing, we will be able to avail green focused funds at a cheaper cost," he added.

The session concluded with a Vote of Thanks given by Mr Sharif Qamar.

FINANCING INDIA'S NET-ZERO AMBITIONS

Opening remarks

Mr Manish Chourasia, Managing Director and CEO, TATA Cleantech Capital

Panel discussion

Moderator: Mr Manish Chourasia, Managing Director and CEO, TATA Cleantech Capital

Panelists

Mr Shalabh Tandon, Regional Head of Operations and South Asia Head of Climate Business, International Finance Corporation; Mr Manikkan Sangameswaran, Executive Director and CEO, Radiance Renewables; Mr Virender Pankaj, CEO, Aseem Infrastructure Finance Limited; Mr Peter Mwandri, Associate Data Analyst and Data modelling, Green Climate Fund (GCF)

Recent global and macroeconomic stress incidents have solidified the need for crises preparedness and resilience building. There's an urgency in cutting dependency on carbon-intensive energy and accelerating the transition to alternative sources such as renewables.

In this thematic track, in his opening remarks, Mr Manish Chourasia said, a lot of work on various fronts including policy and technology needs to be done; financing is the key. Talking about India's 'net-zero' commitment, Mr Manikkan Sangameswaran said, "There is a real revolution and movement

happening in India right now, and the developers are completely committed to this delivery."

Mr Shalabh Tandon emphasized on standardization and the need to have a template in place so that once a project is approved, money flows in automatically for certain risk parameters.

Climate change poses systemic risks to the financial systems of a country by way of climate calamities, environmental degradation, or carbon-driven pollution. Green finance is a mechanism that has the potential to mitigate risks if promoted and appropriated rightly.

Although a move towards building a sustainable financing mechanism would require a strategic and systematic infusion of policy tools, it would also open up the opportunity of redeveloping the entire climate change financial landscape from a 'green vision'. In this thematic track, the esteemed panelists deliberated on the role of private players, institutional investors and their vision, key reforms required and mechanisms that can be built into the existing policy discourse.





15TH CONVOCATION CEREMONY OF TERI SCHOOL OF ADVANCED STUDIES

TERI School of Advanced Studies aptly hosted its 15th Convocation Ceremony during 2023 edition of WSDS. The Convocation became more relevant with the presence of Dr VK Saraswat, member, NITI Aayog as the Chief Guest. Other eminent names that were present at the ceremony include Dr Shailesh Nayak, the Chancellor and Prof. Prateek Sharma, the Vice Chancellor.

In his keynote address, Prof. V K Saraswat while congratulating the students emphasized that they are graduating at the time when India is surging forward in all fields. In his words, "As transformation leaders from this quality institution you have the responsibility of balancing the 'Energy, Environment and Sustainability Trilemma' and work towards building a Knowledge economy which is built on the fundamentals of Sustainable Development."

Thanking Prof. Saraswat for his enthralled and motivating speech to the outgoing students, Prof. Prateek Sharma in his address said "It is a matter of pride that the convocation is happening at a time when India has the G20 Presidency. The mission at TERI SAS has always been to produce climate leaders who can be instrumental to enhance the global efforts to foster growth and development while pursuing strong climate ambitions. TERI SAS is committed as a research-led institution to develop a knowledge economy based on the principles of sustainability, and I am sure the outgoing students share a special responsibility in pushing the sustainability agenda, broad enough for every sector of the economy to have multiplier effect for the coming generations."

THE SCIENCE AND GOVERNANCE OF CLIMATE-ALTERING TECHNIQUES: IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT

Chair Mr Janos Pasztor, Executive Director, Carnegie Climate Governance Initiative

Keynote Address

Dr Thelma Krug (Brazil), Vice-Chair, IPCC on 'Managing climate overshoot risk: Role of CDR and SRM'

Panelists

Mr Manish K Shrivastava, Senior Fellow, Earth Science and Climate Change, TERI; Dr Ajay K Sood, Principal Scientific Adviser (PSA) to the Government of India; Ms Gabriela Ramos, Assistant Director-General for Social and Human Sciences, UNESCO; Ms Jo Tyndall, Director, Environment Directorate, OECD; H.E. Amenatave V Yauvoli, Ambassador Extraordinary and Plenipotentiary of the Republic of Fiji to the Republic of Indonesia, High Commissioner to Singapore, High Commissioner to Malaysia, Permanent Representative to UNESCAP in Bangkok



The world is not on track to meet the Paris Agreement temperature goals. According to the latest reports released by the Intergovernmental Panel on Climate Change (IPCC), even with the deepest emissions reductions and removals scenarios assessed by the IPCC, it is now more likely than not that warming will temporarily exceed 1.5°C (overshoot).

Governance challenges have a lot of uncertainty along the learning curve as the question of liability and responsibility underlies when private partnership works on these technologies. "Governance of geo-engineering technologies is to put them under a broad umbrella of loss and damage and adaptation approach, rather than on mitigation," pointed out Mr Manish K Shrivastava during the thematic track, which was chaired by Mr Janos Pasztor.

Solar Radiation Modification (SRM) and Carbon Dioxide Reduction (CDR) represent a critical aspect to address global climate crisis and global warming. Speaking on the same, Dr Ajay K Sood said, "These technologies have potential to disrupt existing structures like UNFCCC and bring a need to look at new methods like decentralized governance structures." In a similar vein, Dr Thelma Krug cautioned, "Carbon Dioxide Reduction

cannot serve as a substitute for deep emissions reduction, but can only complement reduction of anthropogenic emissions. Carbon stored in ocean and geological reservoirs have a longer time period of storage and are less vulnerable than land-based storage. Solar Radiation Modification cannot be the main policy response to climate change."

There is a need to hear what the people desire and therefore, a multidisciplinary approach is the need of the hour along with a precautionary approach. "UNESCO is developing a report on the ethics of climate change and plans to launch it during COP28," announced Ms Gabriela Ramos.

"We have a long way to go before climate altering techniques become commercially viable, as the infrastructure to govern at the national and international level are still not in place. Since we have limited resources to mitigate climate change, the investment must be prioritized and we should not over-prioritize climate altering techniques," cautioned Ms Jo Tyndall.

"The role of Global South is important when it comes to governance of climate change technologies. If the Paris Agreement is not realized, we don't know what can work to mitigate climate change," remarked H.E. Amenatave V Yauvoli.

ACHIEVING FOOD SECURITY AND CLIMATE RESILIENCE—LEARNINGS FROM SUSTAINABLE AGRICULTURE INITIATIVES

Welcome Address

Ms Martine A Bottheim, Minister Counsellor and Deputy Head of Mission at Royal Norwegian Embassy

Initial Remarks

Mr S Vijay Kumar, IAS Retd. FOLU India Lead and Distinguished Fellow, TERI

Speakers

Dr A K Nayak, Director, ICAR-National Rice Research Institute, Odisha; Dr Rengalakshmi R, Director, Ecotechnology, MSSRF, Chennai; Mr Sony R K, Manager, FOLU India; Ms Nandini Agarwal, Programme Associate, CEEW; Dr Manish Anand, Senior Fellow, TERI; Dr Ruchika Singh, Director – Sustainable Landscapes and Restoration, WRI India; Dr Jayahari KM, Country Coordinator, FOLU India; Mr H K Sahu, Professor, Odisha University of Agriculture & Technology

Vote of Thanks

The Royal Norwegian Embassy



The Indian agricultural sector is unique, with more than 50% of its population engaged in farming for their livelihoods. The agriculture sector contributed more than 17% of the Gross Value Added (GVA) during 2019–20. The sector has witnessed major paradigm shifts over the years after independence.

With this context, the thematic track on achieving food security and climate resilience ensued. Talking about the promotion of adaptation technologies based on local needs, Rengalakshmi R said, "We developed and facilitated field champions. The lead farmers who promoted adaptation technologies fine-tuned these to local needs and established community-based platforms. Plant clinics which are farm-centric advisories use ICT, early warning systems, especially climate information on both medium-range weather forecast and extreme events."

The resilience experience in Odisha was highlighted by A K Nayak, who said, "It started from national food security and is now moving towards nutritional and income security with climate resilience as a key component. We are also implementing solutions like climate-smart rice varieties, direct seeded rice, ecological specific diversification, nutrient management, etc." Continuing this sentiment, H K Sahu added, "We adopted integrated nutrient manuring, poly mulching in vegetables, etc. Our capacity building measures were driven by district-level workshops and stakeholder advisory committees where we saw maximum participation from farmers." Emphasizing the need to have the farmers' voices heard, Mr Manish Anand pointed out, "We are trying to look at it from a farmer-centric approach rather than a soil-centric one. We discovered that crop and livestock were interdependent. Livestock acted

as resilience building activity and doubled up as a source of additional income."

The current land systems are not geared up to meeting the environmental, economic, and social challenges, which is why, as pointed out by S Vijay Kumar, "There are hidden environmental, health, and poverty costs associated with the current agricultural systems. The solutions to solve this hidden poverty cost include: diversity of Indian agriculture, healthy and sustainable diets, integrated farming system, improved agrobiodiversity, and prevention of food loss."

"Farmers have started to grow tomatoes, and there is more aspiration to scale up tomato production along with groundnut. Now, given that this is an impact region, the choice of crops as well as current cropping practices both raise serious questions about what it means for the ecosystem and water resources in this region," said Ms Nandini Agarwal.

"The ecosystem services analysis allows for looking at enabling conditions, actor priorities, and cost research," said Dr Ruchika Singh about conducting surveys and consultations to identify key values in the system.

"Under the sustainable agriculture initiative, we have two flagship

programmes. These two programmes have the same principles, but follow different kinds of approaches. We are working with the government in four districts to see how a government-led transformation in a sustainable and future generative agriculture is possible," added R K Sony.

About formulating the national mission for natural farming, Dr Jayahari KM said, "We have to keep in mind that nothing should drastically change, rather we need to go slow so that progressive ways of reducing, distributing, and consuming food are found."

On climate change affecting women far more severely than men due to socially constructed roles and gender norms, Ms Martine A Bottheim raised a pertinent point and said, "We should ensure that women are consulted and allowed to participate on an equal footing with men in the planning and implementation of projects. Because of climate change, smaller farmers in India will face a big transformation in the coming years, they will have to manage a transaction to a green business as well as increased digitization."

THE RELEVANCE OF THE ENERGY EFFICIENCY FIRST PRINCIPLE IN AN INDIAN CONTEXT

Presentation on the Energy Efficiency First Principle

Mr Chirag Gajjar, Associate Director, Clean Energy and Climate, Management Consulting, PwC India

Setting the Context

Mr Edwin Koekkoek, First Counsellor, Energy and Climate Action, EU Delegation to India; Mr Ajay Shankar, Distinguished Fellow, TERI

Special Remarks

Mr Arijit Sengupta, Director, Bureau of Energy Efficiency

Panel Discussion

Co-moderators

Mr Ajay Shankar, Distinguished Fellow, TERI; Mr Edwin Koekkoek, First Counsellor, Energy and Climate Action, EU Delegation to India

Panellists

Mr Chirag Gajjar, Associate Director, Clean Energy and Climate, Management Consulting, PwC India; Ms Cornelia Schenk, Policy Specialist, IEA; Ms Namita Vikas, Founder, auctusESG LLP; Dr Winfried Damm, Head of the Energy Program, GIZ

Vote of Thanks

Mr Arupendra Nath Mullick, Vice President, TERI Council for Business Sustainability



Energy efficiency is often underestimated in existing planning and investment programmes. The principle also puts forth the 'save before you build' philosophy. The principle aims to treat energy efficiency as a source of energy in its own right in which the public and the private sector can invest ahead of other more complex or costly energy sources. This includes giving priority to demand-side solutions whenever they are more cost-effective than investments in energy infrastructure to meet policy objectives.

In his presentation, Mr Chirag Gajjar highlighted the possible strategies that could be looked at for the integration of Energy Efficiency First Principle. Making financing available for the renovation programmes that could be implemented in residential buildings is the first principle. Increasing the energy efficiency of the residential end use as well as promotion of low-carbon cooling are other principles. "Defining policy targets requires to set objectives based on results and desired impact. Identifying the barriers to the Energy Efficiency First Principle and incentivizing Energy Efficiency First Principle," are must, he added.

Moderating the session, Mr Edwin Koekkoek pointed out that there is an increasing move to renewables and that "In Europe, energy investment is often underestimated in the planning and investment programme."

"In the Indian context, I think we are fortunate and a little ahead of the curve in embracing energy efficiency as a goal pretty early on, and we have achieved more success than I thought we would. From a policy side, there is also a case where policy should nudge a forward movement so that the business case for energy efficiency stands on its own after some time, or there is enough movement down the cost curve. We are beginning to see a bit of that in the EV space," explained Mr Ajay Shankar, the co-moderator of the session.

"From a systematic lens, the lack of an agreed definition of a green or ESG in many markets serves as a hindrance, making it very difficult to exactly integrate these parameters into credit decision-making or garner investment interest. Standardization, clarity from regulators, monitoring, and accurate disclosures are keys to propelling action within regions, especially developing markets," said Ms Namita Vikas.

"I would say the issue is CO2 emission," said Winfried Damm while

pointing out the need to come up with CO2 emission trading. "We need electrification and decarbonisation as central pillars of the clean energy transition. India's energy future depends on buildings and factories that are yet to be built, and vehicles and appliances that are yet to be bought," emphasized Ms Cornelia Schenk.

For any policy and regulation to be successful, it is important to understand at what stage they are getting implemented. "At the implementation strategy, it is quite later in the life of the project that we start looking at meeting the compliances," explained Ms Shabnam Bassi.

Bringing in facts, Mr Arijit Sengupta pointed out in the special remarks that the "success of energy efficiency lies in the Energy Conservation Act, 2001. We have seen success in the appliance labelling scheme," he added, while explaining the behavioural shift in the sector. For net-zero commitment, he said 'industry decarbonization' and 'energy independence' are crucial.

FULFILLING THE PROMISE OF SOLAR IRRIGATION IN INDIA

How is KUSUM faring and what needs to change?

Mr Anas Rahman, Policy Advisor, International Institute for Sustainable Development

Speakers

Mr Anas Rahman, Policy Advisor, International Institute for Sustainable Development (IISD); Mr Nilanjan Ghose, Senior Advisor, GIZ; Ms Shweta Kulkarni, Prayas; Mr Amit Saraogi, Co-founder, Oorja Development Solutions Limited; Ms Bigsna Gill, Program Manager, Sustain Plus Energy Foundation; Mr Surajit Chakraborty, DGM and lead of Energy Programs, Switch ON Foundation; Dr Alok Sikka, Country Representative, International Water Management Institute (IWMI)



Solar irrigation has the potential to provide energy and water security to farmers, enhance productivity and incomes, and decarbonize the agricultural sector – enabling countries to achieve some of the UN's Sustainable Development Goals (SDGs).

"The high upfront cost of installing solar pumps is one of the primary problems of PM KUSUM plan, which may dissuade small and marginal farmers from adopting the technology," said Mr Anas Rahman.

The PM KUSUM plan is a significant step towards the farm sector's decarbonization, which is essential for meeting India's climate goals. "The installation of solar pumps and solar power plants under the PM KUSUM scheme would support the use of local resources and help decentralize the energy sector," said Mr Nilanjan Ghose.

In Maharashtra, the implementation of PM KUSUM scheme is lagging in overall states but the farmers' response is good. "To ensure the success of the PM KUSUM plan, all stakeholders, including farmers, state governments, financial institutions, and technology suppliers, must be involved," said Ms Shweta Kulkarni.

Although the PM KUSUM initiative has the potential to completely transform India's agriculture industry, there have been numerous problems with its implementation. "The farmers' lack of knowledge and comprehension of the PM KUSUM scheme is one of the main obstacles

to its implementation," pointed Mr Amit Saraogi.

The lives of rural communities in India have the potential to change as a result of decentralized solar plants and solar pumps. While decentralized solar plants can supply clean, dependable electricity to power homes and businesses, solar pumps can provide water for irrigation. "In order for the PM KUSUM scheme's information to reach the appropriate farmers, particularly those in rural and isolated locations, effective outreach and communication activities are crucial," said Ms Bigsna Gill.

The implementation of PM KUSUM scheme in West Bengal is lagging since bankers are not aware about schemes and technology. "In West

Bengal, they are tackling the implementation of PM KUSUM scheme challenges by conducting regular meetings with the bankers under farm sector mechanization scheme to create awareness," said Mr Surajit Chakraborty.

"The PM KUSUM programme is a ground-breaking effort in India to support solar energy and provide farmers more power. The programme will help farmers save on electricity bills by offering incentives for installing solar pumps and panels, as well as provide them with additional cash by allowing them to sell excess power back to the grid," added Dr Alok Sikka.

ENHANCING COASTAL RESILIENCE FOR A SUSTAINABLE FUTURE: MANAGING RISKS AND BUILDING A CLIMATE RESILIENT SHORELINE IN INDIA

Opening Remarks and Framing Presentation

Mr Anup Karanth, Senior Disaster Risk Management Specialist, The World Bank

Panel Discussion

Chair: Dr M V Ramana Murthy, Scientist G & Director, National Centre for Coastal Research (NCCR), Ministry of Earth Sciences

Panelists

Dr K J Ramesh, Former DG, Indian Meteorological Department, Ministry of Earth Sciences, Government of India (joined virtually); Dr Sumit Sharma, Programme Officer, United Nations Environment Programme (UNEP); Ms Riya Rahiman, Lead, Infrastructure for Resilient Island States (IRIS), Coalition for disaster Resilient Infrastructure (CDRI); Mr Anup Karanth, Senior Disaster Risk Management Specialist, The World Bank; Mr Ignacio Urrutia, Senior Disaster Risk Management Specialist, The World Bank (joined virtually)



India is highly prone to cyclones, monsoon rainfall variability associated extreme events, and other severe weather events, causing major societal impacts. The country's coastal regions, in particular, are highly vulnerable because of rapid urbanization, high population densities and related economic activities such as agriculture, aquaculture, tourism, industries, and trade.

"India is blessed with a large number of institutions [for coastal research], engaged in terrific research work. How do we bring that research into practice is always a matter of debate, but I personally believe that we put some kind of a mechanism, a knowledge management system," pointed out MV Ramana Murthy, the chair for the thematic track. The [Indian] coastline is subjected to a lot of multi-hazards and "any intervention has to be driven more in terms of what we know are the current risks, but also risks that we are not really sure [of]," he cautioned.

"Our [urban] infrastructure is not capable of taking up these extreme event(s), especially precipitations of 40 centimetres happening in 3 days' time. Priority one is understanding the disaster risks, the second is strengthening of governance, right from the federal-level to the state-level to even the NGOs, and the third is investment," said Mr Anup Karanth in his opening remarks.

Protecting the shoreline becomes important in the present context. As illustrated by an example, Dr K J Ramesh shared, "In Sagarmala, we are putting so much investment in the coastal areas and making those investments fully resilient for the future risks. Ensuring the sustainability of our lifeline infrastructure would be the high-priority of all our developmental projects. Intensities [of multi-hazards] are going to be higher and area of influence of the coastal zones are going to be much larger compared to the present scenario," he added.

Coastal areas are generating their own pressures and enhancing their environmental footprints, "but they are also conduits to the [environmental] problems transferred from upstream areas to the marine environments," noted Dr Sumit Sharma.

"It is very important to highlight how the infrastructure damage that happens [due to cyclones], especially in the Small Island Developing

States, is generally more than 20% of the GDP [of these states] which is extremely heavy. Four themes came out of [regional] consultations [with Small Island Developing States]: risk informed planning, database management systems, access to finance and mainstreaming inclusion [in creating Disaster Resilient Infrastructure]," explained Ms Riya Rahiman.

"We do have to find ways of having projects and programmes that allow for interventions that are flexible and that very quickly adapt to the results we are seeing on the ground [but] unfortunately, and this goes both for government and financing institutions like the World Bank, our current systems are not very suitable for these types of interventions. Where we see more success [with interventions] is when coastal resilience is linked to multiple benefits that really allow the community to take advantage of the space for economic activity," said Mr Ignacio Urrutia.

ACCELERATING CIRCULARITY THROUGH INTEGRATED RECYCLING INFRASTRUCTURE IN INDIA

Panelists

Dr Atul Vaidya, Director, CSIR-National Environmental Engineering Research Institute; Dr Heinz Schandl, Senior Science Leader, Commonwealth Scientific and Industrial Research Organisation (CSIRO); Dr Heinz Schandl, Senior Science Leader, Commonwealth Scientific and Industrial Research Organisation (CSIRO); Mr Amit Verma, Head – Circular Economy, NITI Aayog; Mr Mahesh Patil, Chairman, Goa State Pollution Control Board; Mr Amit Lahoti, Senior Commercial Director and General Manager-Asia, Ball Beverage Packaging; Mr Nitin Gupta, VP and Head – Sustainability Advisory, Capgemini Invent India; Mr Abhinav Ramaria, Head, Programs and Operations, Aspire Labs; Mr Yogesh Bedi, Chief Urban Mining and Steel Recycling Businesses, Tata Steel; Mr R P Sharma, General Secretary, Recycling and Environment Industries Association of India (REIA); Mr Jeevesh Kumar, Founder and CEO, Greenscape



In the last few decades, the globalised lifestyle has created the linear notion of consumption and production moving around 'take-make-use-dispose'. As per Dr Atul Vaidya, Capacity building in recycling across the value chain stream is extremely lacking and is in need for large-scale policy mobilization. This approach supported by mass production assists in faster adoption and higher economic growth. However, rising concerns around climate change have highlighted the problems associated with resources' over-utilization and inefficient application. Dr Heinz Schandl emphasized on the significance of waste industry and opined, "We need to fundamentally restructure the entire waste industry in order to capitalize upon the innovations that are currently underway within the segment."

The discussion well-established—the important pillar to break the linear approach is availability of dismantling and recycling units, to enable the smoother and formalised re-entry of extracted materials from discarded products. As per Mr Amit Verma, "Circularity as a principle can significantly help India efficiently steer its green growth efforts in the right direction. Going forward the policy evolution needs to happen with circularity as the central theme in the discourse."

The counter approach of circular economy to ensure resource efficiency in each stage of value-chains, aligning with SDG12 framework, could support in economic development and environment conversation.

Mr Amit Lahoti laid emphasis on the significance of developing

suitable policies on aluminium. In his words, "More policies on aluminium need to be galvanized by regulatory bodies given the large-scale share the metal has across commercial products."

Mr Nitin Gupta mentioned how "Building incentive structures to shift consumer habits towards recycling has proven to be a successful business model and something that can be replicated in India." Mr Abhinav Ramaria gave valuable insights on the role of informal players, such as waste pickers and small-scale processors, in waste collection and processing. As per him,

their recognition, formalization, and equitable compensation need to be part of the sector policy discourse.

Mr R P Sharma, pointed out "how lack of understanding currently in existence across the waste sector has hindered our ability to inventorize the waste that is generated efficiently."

Mr Mahesh Patil laid emphasis on relevance of reverse logistics industry. He said, "Data collection and mapping is crucial to help mobilize and formalize the reverse logistics industry."

URBAN PUBLIC TRANSPORTATION AIDING NET ZERO EMISSION TARGET

Panelists

Mr T Surya Kiran, Executive Director, Association of State Road Transport Undertakings; Mr Akash Passey, President (Bus Division and E-Mobility), Volvo Eicher Commercial Vehicles; Ms Harpreet Kaur Bajaj, Principal Transport Economist, Ramboll; Ms Nitika Krishan, Key Expert, EU Funded Project; Mr Shri Prakash, Distinguished Fellow, TERI

The thematic track deliberated and discussed actions that were essential to augment urban public transportation. In the thematic track, key issues structured around experiences, challenges, and solutions from experts in the public transport sector, role of active transportation and multi-modal integration were discussed. It also focused on multi-modal integration across all public transit modes.

During the session, Mr T Surya Kiran highlighted that without public transport it is very difficult to control the emissions. Ms Harpreet Kaur Bajaj said linking public transport with cycling and walking infrastructure should take place. She also said, "Transport and mobility are not gender neutral." Ms Nitika Krishan raised a pertinent question—"Can mobility as a service be introduced as a technological intervention where we could have choice and equal opportunity?" She felt that we need to bring the last mile service providers in the form of cooperatives or any other aspect by which they could have a seat in the system. Mr Shri Prakash discussed that large section of marginalized people is still not able to pay fees for the public transport, which is already very low. BRT system is better choice, but the number of buses is still not increasing. 🌍



PROGRESS MADE UNDER NATIONAL CLEAN AIR PROGRAM: NATIONAL AND INTERNATIONAL PERSPECTIVE

Speakers

Shri Ashish Tiwari, Secretary, Department of Environment, Forest and Climate Change, Uttar Pradesh; Dr Prashant Gargava, Member Secretary, Central Pollution Control Board; Dr Ashok Ghosh, Chairman, Bihar Pollution Control Board; Ms Jane Burston, Executive Director, Clean Air Fund; Dr Jonathan Demenge, Head of Co-operation, Swiss Agency for Development and Cooperation



Air pollution is a major problem that affects millions of people worldwide. Nine out of ten people in the world breathe polluted air which is causing about 7 million premature deaths annually globally. Rapid economic growth, population migration towards urban areas, and inadequate controls have led to degradation of ambient air quality, particularly in cities of developing countries like India.

This thematic track concentrated on the ills of air pollution and how to address the same. "Optimization of pollutant emissions through air-shed management approach can help in tackling air pollution. Enhancing public awareness and capacity building measures for inclusive public participation and for ensuring trained manpower and infrastructure on air pollution," are important, said Shri Ashish Tiwari.

Air pollution is not a localized phenomenon; coordinated efforts across the regions are required "along with trans-boundary conventions and international cooperation," pointed Dr Prashant Gargava.

Talking about the situation in Bihar, Dr Ashok Ghosh said, "The main challenge in Bihar is due to the alluvial plain on the Indo-Gangetic plain. Anthropogenic activities can severely affect the climate, mainly the air quality," and he added that the problem of "air pollution can only be resolved through community participation."

About the budgeting scenario, Ms Jane Burston enlightened the audience and said, "Though only 1% of the funding is currently going to air quality, the good news is that this is increasing. The importance of building green barriers improves the air quality of the area to a certain degree," she added.

Climate action must cover three aspects. What are those areas? Dr Jonathan Demenge answered: "Technology, Developing Capabilities, and Enforcement including public participation. Knowledge needs to be translated into policies and policies have to be implemented into action," shared Dr Demenge. 🌍

INDIA AND THE FUTURE OF ENERGY: A CONVERSATION BETWEEN IEA CHIEF ENERGY ECONOMIST TIM GOULD AND ADVISOR TO PMO TARUN KAPOOR

Welcome remarks

Dr Prodipto Ghosh, TERI

Presentation by

Mr Tim Gould, Chief Energy Economist, International Energy Agency

Discussion between Mr Tim Gould and Advisor to PMO Mr Tarun Kapoor

Vote of Thanks

IEA

The world is currently undergoing its first ever truly global energy crisis. Concerns of energy security have risen to the forefront as countries look to secure affordable energy supplies to fuel their economies. Parallely, there is greater recognition than ever before that the world must accelerate climate action by decarbonizing our economies, which involves a transformation of how the world generates and uses energy. As an emerging market, India finds itself in the midst of these forces as it charts its own energy future.

This wide-ranging conversation on the future of energy in India and the world between IEA Chief Energy Economist Mr Tim Gould and Advisor, PMO Mr Tarun Kapoor was a tour de force discussion on the future of energy in India and the world. Mr Tim Gould made a presentation on the latest IEA research, including key messages from the World Energy Outlook



2022 and the Energy Technology Perspectives 2023. Mr Gould highlighted that top 10 per cent emitters in the world account for 50 per cent of CO2 emissions and the bottom 10 percent of emitters account for 0.2 per cent of global emissions and that's why it's an important conversation to have about the role of energy in development and about ways in which we can create a new low emissions model for advancing. Mr Tarun Kapoor said, "Your essential energy requirement should be assured and it can happen if we have enough production within the country or if you have some long-term supplies where either you have invested money, which means

that you own some of the assets or have long-term tie-ups."

The discussion touched upon a wide range of topics, including:

- Has the energy crisis been a setback for clean energy transitions or a catalyst for greater action?
- How might government responses shape energy markets?
- Which energy security risks lie ahead on the path to net zero emissions?
- How can emerging new energy technologies such as green hydrogen be mainstreamed?
- How will regions reliant on fossil fuels manage the energy transition? 🌍

DECARBONISATION OF E-COMMERCE: PAVING THE WAY TO A LOW CARBON ECONOMY

Welcome Address and Special Remarks

Mr R R Rashmi, Distinguished Fellow and Programme Director, TERI

Keynote Address

Mr Naresh Pal Gangwar, Additional Secretary, Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India

Context Setting

Ms Shubra Jain, Public Policy Manager, Amazon India

Session 1 Freight Decarbonisation - Last mile and middle mile transportation

Session Chair

Dr Hanif Qureshi, Joint Secretary, Ministry of Heavy Industries (MHI), Government of India

Panel Discussion

Moderator

Mr I V Rao, Distinguished Fellow, Transport & Urban Governance, TERI

Panelists

Mr Jasmeet Khurana, Lead- Moving emerging Markets, World Economic Forum (WEF); Mr Rudrarup Maitra, Product Line Head-ILMCV, Tata Motors; Mr P Sanjeev, VP Business Planning, TVS Motors; Mr Akshay Shekhar, CEO, Kazam; Ms Chetna Nagpal, Senior Associate, RMI

Session 2: Creating a vibrant ecosystem for sustainable packaging alternatives and local packaging manufacturing

Session Chair

Mr Er S Bhardwaj, Deputy Director General, Department for Promotion of Industry, and Internal Trade (DPIIT)

Panel Discussion

Moderator: Dr Suneel Pandey, Senior Fellow & Director, Environment & Waste Management, TERI

Panelists:

Mr Ankit Gupta, General Manager Corporate Sustainability, ITC Limited; Ms Shweta Ramdas, Sustainability Leader, Amazon India Operations; Dr Anurag Kulshreshtha, Professor, Indian Institute of Technology, Roorkee, Saharanpur Campus; Dr B K Karna, Director, Packaging Clinic & Research Institute (PCRI); Mr Vaibhav Anant, Founder, Bambrew

Vote of Thanks

Mr K Umamaheswaran, Earth Science and Climate Change Division, TERI



During the two sessions of the thematic track, the panelists discussed some very germane points. Ms Chetna Nagpal highlighted the need for India's freight sector to draw lessons from global experiences. With the increase in growth of e-commerce, so will the need to address the environmental impacts both locally and globally shall increase.

Mr Sudhendu Sinha opined that it is not a one direction approach alone. It must get that kind of accelerated inspiration from the buyer's side to move towards clean mobility.

Mr P Sanjeev said, "We cannot depend on FAME. We have to bring in energy efficient vehicles and for that we have to build EV vehicles meant to be EV. So, I would not say retrofit as the A solution but it is one of the solutions for a quick adoption."

Mr Er S Bhardwaj highlighted that packaging waste from e-commerce may seem small on its own, but with the sheer volume of goods being shipped and the need to warehouse them, the environmental impact adds up quickly. It's important for us to consider the emissions from this sector and find ways to reduce our impact on the planet.

Mr Vibhore Rastogi correctly pointed out that "To create a sustainable future, we must look beyond the baseline scenario and explore new local areas that can transform waste into valuable resources. By embracing innovative solutions to reduce emissions generated from all sectors, including e-commerce, we can create a circular economy that benefits both our planet and our communities."

Ms. Shweta Ramdas said, "While the importance of sustainable packaging in e-commerce cannot be overstated, the issue of cost-effectiveness remains a significant barrier to adoption. It's crucial that we work to develop economically viable alternatives that not only benefit the environment but also make business sense. By investing in research and development, collaborating with industry partners, and leveraging the power of innovation, we can create sustainable packaging solutions that meet the needs of businesses and consumers alike. Let's make sustainability the new standard for e-commerce packaging and build a brighter future for all!"

Over the last decade, the significance of digital economy has grown substantially, both domestic and globally. It is reported that by 2030, the size of digital economy in India will be approximately, 50 per cent of the entire economy. This will be a historic transition in India's digital economy, with e-commerce playing a key role in contributing to country's tech ambitions.

In light of this, a special thematic track was organized where panelists from across fields deliberated on the use of e-commerce services, with online retail and grocery delivery emerging as critical services for Indians facing pandemic lockdowns.



WATER MANAGEMENT FOR CLIMATE RESILIENCE, BIODIVERSITY, AND FOOD SECURITY

Welcome Remarks

Dr Syamal Kumar Sarkar, Distinguished Fellow, Water Resources Division, TERI

Setting the Context

Ms Kamilla Kristensen Rai, Counsellor, Delegation of the European Union to India

Panellists

Prof. A K Gosain, Director, INRM Consultants Pvt. Ltd and Professor (Retd), IIT Delhi; Dr Jyoti Nale, Project Advisor, India-EU Water Partnership, GIZ-India; Mr Suresh Babu, Director of Rivers, Wetlands and Water Policy programme, WWF-India; Mr Kees Bons, Strategic Advisor, Deltares, The Netherlands; Dr Roshni Arora, Applied Freshwater Scientist, The Nature Conservancy, India (online)

Vote of Thanks

Ms Kamilla Kristensen Rai, Counsellor, Delegation of the European Union to India



The impact of climate change on water is predicted to be many: extended summer season causing less rainy days, late onset of monsoon season, intense precipitation, recurring occurrence of drought and flash floods, glacier melts and heavy snowfall during winters. Each of these phenomenon influences the water resources on Earth and associated biodiversity in its ecosystems and agriculture that depend on them.

"When we want to discuss the issues, we have to first resolve the complications of water interactions and come out and generate information which we can use for negotiation and that is where science has to be used. What we need for water management is convergence and integration of sectors," highlighted Prof. A.K. Gosain during this thematic track on water management.

Nature-based solutions are required "for sustainable usage of water, such as growing millets and lifestyle changes must be adopted by humans. There has to be optimal use of water for individuals for better

water management," said Dr Jyoti Nale.

For better water management, several solutions exist but it gets divided into pieces at various levels. Therefore, one needs "to articulate what is there for us in the basket of solutions and use that appropriately. Rivers and wetlands hold the key for our adaptation strategies," said Mr Suresh Babu. "If we fight nature, it will fight back so what we need is to use the strength of nature and use that for the benefit of our own kind. We need to protect the areas where nature is still at its best as these areas

are restoration areas for insects and animals and we should not encroach them any further," advised Mr Kees Bons.

Shared goals about safeguarding the ecosystem must be formulated. "Interlinkages between freshwater ecosystems, wetlands and rivers and interlinkages between different departments is what we need to solve the issues of water management," pointed out Dr Roshni Arora.

The Vote of Thanks was given by Ms Kamilla Kristensen Rai. 🙏

BREAKING THE BOUNDARIES OF HOLISTIC DEVELOPMENT: PHILANTHROPIC AND SOCIAL INITIATIVES LEAD THE WAY

Welcome Address and Setting the Context

Dr Amit Kumar Thakur, Head CSR and Associate Director, TERI

Campfire Talks: Can philanthropic and social initiatives be the link between holistic development and sustainability?

Mr Nikhil Kaushal, India Representative, IKEA Foundation; Mr Sandeep Roy Choudhary, Director, VNV Advisory; Mr C Yogesh, Managing Director, Karnataka State Textile Infrastructure Development Corporation Limited; Mr Sushil Singla, Principal Resident Commissioner, Himachal Bhavan, Delhi; Mr Gyan Prakash, Deputy General Manager, Security Printing and Minting Corporation of India Limits; Ms Pallavi Chauhan, Sr Regional Head-North KCG & EPCG, Nippon Life India Asset Management Limited

Moderator Dr Amit Kumar Thakur

Concluding Remarks Dr Mini Govindan, Senior Fellow, TERI



Social initiatives in India led by philanthropies and corporate social responsibility (CSR) have created pathways for ushering development in rural areas and engaging with underserved communities. It has evolved over the years from merely being a compliance mechanism for a policy mandate to a movement of forward thinking and pro-active endeavours that merge larger social and environmental objectives with ethical business practices aimed at 'giving back to the society'.

Dedicated to this sentiment, a special thematic track was organized as part of the ongoing WSDS on Day 2. The entire landscape of social, philanthropic and CSR regime, from 2014, has seen investments of 150 crore for 8-9 years. "It encompasses solutions in multiple sectors of renewable energy, livelihood programme, etc. CSR projects and philanthropic initiatives should be need-based and spread across India for a holistic development of a sustainable India," said Dr Amit Kumar Thakur in the Welcome Address.

Talking about the initiatives taken by IKEA foundation, Mr Nikhil Kaushal defined, it "is a strategic foundation focusing on people and planet, structuring the working in the streams of productive use of renewable energy, regenerative agriculture and green jobs, waste management and to create livelihood. MSME is the key to India's growth, and that's where the focus should be. And in all our workstream, IKEA works with MSME, as it has the biggest opportunities today and in coming years," he added.

CSR projects should be concentrated in the unprivileged background for the better health and skill development. "CSR and sustainability should be people driven and organization driven," said Mr Gyan Prakash.

"Financial domestic household savings directs into the mainstream financial assets from 9L crore in 2014 to 40L crore in 2022. An increase in financial asset holdings will thereby increase CSR and philanthropic initiatives. Charity begins at home. What we do is also followed by youngsters. All the lifestyle changes have to be developed and inculcated as habit for a sustainable lifestyle. Each effort counts," explained Ms Pallavi Chauhan.

Sustainability is the long-term value that we create. "The idea of finance in CSR is to double the farmer's value rather than double the farmer's income. When worked with smallholders, we can bring value to crop itself. CSR, philanthropy, and climate finance are tools to fill the gaps and to create the value for a sustainable future. The big picture is adaptation financed by mitigation," asserted Sandeep Roy Choudhary.

"It is easy to approach public sector organizations for CSR fund, and involve in the implementation under activities like solar lights, open air

gym, which create a lot of goodwill to society. All of us are working and will have to work for the betterment of our society and environment," said Sushil Singla.

Shifting the conversation to the textile sector, C Yogesh pointed out, "it is the largest employment provider in the nation. Garment industry is a women-oriented sector, requiring two women to operate one machine. The interventions can be in the power, livelihood, and welfare schemes, by implementing the CSR activities into solar panels, unconventional techniques to reduce the burden of the government," he added.

Digressing from a 'tick-box' approach of implementing certain activities, the scope of such CSR initiatives has moved on to engaging meaningfully with local communities, building partnerships with a variety of stakeholders across the value chain and working towards long-term impacts. 🙏

TRUE VALUE OF FOOD: A CALL TO ACTION TO SOLVE CLIMATE CHANGE AND OTHER CRISES

Keynote Address

Dr Raghav Puri, Postdoctoral Associate, Tata Cornell Institute, Cornell University (delivered the Keynote Address on behalf of Dr Prabhu Pingali, Tata Cornell Institute)

Panelists

Mr Anupam Ravi, GIST Impact, Senior Vice President; Dr Shariqua Yunus, World Food Programme India, Head of Unit & Programme Officer (Health and Nutrition) Delhi; Mr Reuben Gergan, UNEP, Biodiversity Consultant

Transforming food systems is critical to address climate change and other global crises. The convergence of the four crises of climate change, COVID-19, conflicts and associated high costs (“4 Cs”) more urgent than ever require agri-food systems to be sustainable and resilient.

In this thematic track, current approaches to assess the success or profitability of food production, processing, and consumption do not reflect the full costs of these activities on such areas as health, climate, and equity were discussed.

“The price we pay for food does not reflect its true cost. Thus, true cost accounting is one way of identifying the true value of food. There is a growing concern over the negative environmental and health impacts of intensive rice and wheat cultivation in India. Farmer’s suicide is a major issue in India and people do put a value to people’s lives,” said Dr Raghav Puri, who gave the keynote address on behalf of Dr Prabhu Pingali.

In the course of the conversation, Mr Reuben Gergan highlighted how TEEB presents a method for TCA of measuring the true value of ecosystems and benefits society. “TEEB’s main objective is mainstreaming the value of biodiversity services and the ecosystem services for decision-making. TEEB agrifood framework would be most relevant in studying policy interventions on organic farming and agroforestry. Scattered data and data unavailability are major hindrances in TEEB’s framework. Thus, in order to have an efficient TCA, there is a need in developing the capacity of institutions to strengthen the data,” added Mr Reuben Gergan.



“Unless we start measuring the invisible inputs (biodiversity services, etc.) and outputs (human health issues), we will not be able to address the challenge of performance measurement for businesses and corporations. The four capitals (natural, social, human, and reduced) approach kicks in to expand the horizon of the performance measurement beyond the benefits of shareholders to the benefits of all stakeholders. There is a need for evaluation of these four capitals to efficiently measure the

performance,” explained Mr Anupam Ravi.

Pushing for policies to start incentivizing those stakeholders who are working positively to minimize the impacts of food on health and environment is essential. “There could be emphasis on the production of pulses, millets and horticulture and developing these systems by making them available through safety nets and reimagining the entire structure,” said Dr Shariqua Yunus.

ROLE OF CARBON MARKETS IN INDIA'S DEVELOPMENTAL TRANSITION

Opening Remarks

Chair: Mr R R Rashmi, Distinguished Fellow, TERI

Framing Presentation

Ms Ritu Ahuja, Climate Change Analyst, World Bank

Keynote Address

‘Operationalizing Carbon Markets in India’ by Mr Saurabh Diddi, Director, Bureau of Energy Efficiency, Ministry of Power, Government of India

Panel Discussion

Chaired by Mr R R Rashmi, Distinguished Fellow, TERI

‘Necessary Infrastructural Requirements to Support Carbon Markets’

Dr C S Sinha, Adviser, Climate Change, World Bank

Role of Carbon Markets in India's Development Transition

Ms Mahua Acharya, MD, and CEO, CESL

Role of Markets in Scaling Renewables Beyond Solar

Mr Deepak Gupta, Senior Vice President & Head – Carbon Business, ReNew Power

Voluntary Carbon Market Perspective

Dr Lokesh Chandra Dube, Senior Standards Manager, Gold Standard, India

Landscape of Climate Finance in India and Role of Carbon Markets

Ms Neha Khanna, Manager, Climate Policy Initiative

Carbon Assets from Nature-based Solutions

Mr Vikas Kumar Singh, Executive Officer/Compliance officer, Carbon Checks (India) Pvt Ltd

Closing Remarks

Chair: Mr R R Rashmi, Distinguished Fellow, TERI



India’s continued commitment and leadership on climate action is evident in its climate ambition. With this thematic background, the discussion began with the esteemed panelists sharing insights in achieving climate goals in the form of series of presentations on a variety of topics.

“The developmental transition we are in now and that which is to come in the future is very complex. There are severe social, economic and developmental challenges that are all happening at the same time. The domestic market has the potential, if needed, to be linked on an international level. Having a national carbon registry which can be linked to an international registry would be part of a solution,” said Ms Ritu Ahuja while delivering the Framing Presentation.

An important area is MRV and who validates the credits. “In the voluntary markets of India, the credits should have more credibility, which is yet to be seen. A balance should be maintained. The cost of MRV shouldn’t be exponentially high,” cautioned Mr Saurabh Diddi. In a similar line of thought, explained Ms Mahua Acharya, “Digitization of MRV systems is a must in a country like ours. Countries are developing

their own registries and to fix the problem of double counting we can connect all the registries.”

“Metadata layer created by World Bank will capture data from registries and allow transaction between countries. Countries need to define their needs based on national requirements. Infrastructure is critical to the efficiency and functioning of the market,” stated Dr C S Sinha.

International focus on carbon markets has increased multi-fold in the last few years. “We should have some idea about how the convergence of voluntary and compliance markets would look like, including the time field it applies to, which sectors are going to play a role and attracting private investments in ongoing projects,” said Mr Deepak Gupta.

“We need to have voluntary markets that reach difficult-to-access areas, users, and citizens. Some considerations in selecting a suitable voluntary standard are activity type, credibility, co-benefits, price offered, safeguarding and user friendliness,” explained Dr Lokesh Chandra Dube.

Energy transition needs to happen in India as “this will lead to generalized pricing in domestic and international carbon markets. We need a lot more financing for domestic and international markets to proliferate and to fill the gaps,” explained Ms Neha Khanna in her presentation.

The carbon pricing for nature-based solutions has to be optimized. “Price regulation is important, otherwise there will not be adequate carbon financing and there will be a reversal of credits,” said Mr Vikas Kumar Singh.

Achieving climate goals and targets would require significant investment both from public and private sectors—domestically and globally—which can be extensively enabled by market-based mechanisms. Financing this transition to decarbonization is a critical challenge, as brought out by the renowned speakers in this stimulating thematic deliberation.

YOUNGER COLLECTIVES FOR GREENER FUTURE

Opening Remarks

Mr Sourav Roy, Chief Executive Officer, Tata Steel Foundation

Speakers

Mr Amitava Bhattacharyya, Distinguished Fellow, TERI; Ms Anjali Patra, Green Skipper, RBC Girls, Joda; Ms Smita Agrawal, Head of Education, Tata Steel Foundation; Dr Kavita Sharma, Professor, NCERT; Mr Atul Kumar Bhatnagar, General Manager, OMQ Division, Tata Steel; Mr Manish Mishra, Chief Corporate Affairs, Tata Steel; Dr Neha, Senior Fellow, TERI

Joining hands for 'Younger Collective', the panel consisted of Environment Management Committee members (one teacher & one student) from experienced schools, who shared their thoughts on how 'The Green School' learning was merged with local knowledge in collaboration with their peer group from the same school on various environmental issues to research and understand about sustainable lifestyles.

Some of the highlights are shared here:

"Climate action has to learn from, be driven by and be a conscious part of the lives of those who are likely to experience the most profound impacts—children in the remote regions of India. This has been the guiding spirit behind the Green School programme and many other efforts of Tata Steel Foundation. It is a matter of immense pride and gratitude that our children got a platform at the WSDS, and hope that their spirit resonated with those who heard them today," said Mr Sourav Roy.

"Appropriate disincentive and punishment structures along with incentives and motivation for collective actions are very much needed to make people realize the urgency of the issue," said Mr Amitava Bhattacharyya.

"Environmental actions of any type need to be local and vocal in any spatial and temporal context," noted Ms Anjali Patra.

"The Green School Initiative is not only transforming the schools but also helping in transforming communities through its activities. Children are more sensitive towards environmental values naturally than the adults and therefore, inspiring them to take actions and steps for conservation may prove to be the key driver of the positive behavioural change in the communities," said Ms Smita Agrawal.



"Environmental education is not a separate subject to be taught and graded, it is provisioned to be delivered in infused way," said Dr Kavita Sharma.

"Tata Group has pledged to achieve Net Zero by 2045 and its all industries have been aligned towards the goal. This is one example of industries paying their environmental responsibilities," said Mr Atul Kumar Bhatnagar.

"It is true increasing population and consumption are causing increased emissions; however, the relevant stakeholders are now in action mode. Various initiatives such as National Carbon Market, Emission Trading

and other initiatives may prove to be crucial in this fight against climate change," stated Mr Manish Mishra.

"The Green School Initiative has been successful in promoting environmental consciousness amongst the students. The six experienced Green Schools were able to bring 36 Panchayats for the steps for greener future, that is the power of The Green School Initiative. The partnership approach in the Green Schools is the key to transition and behavioural transformation in a collaborative way and achieving sustainability in the true sense," explained Dr Neha.

PATHWAYS FOR MEETING INDIA'S POWER SECTOR DECARBONISATION TARGETS FOR 2030

Introductory Address and Presentation

Mr A K Saxena, Senior Director, TERI

Panel Discussion: chaired by Mr Ajay Shankar, Distinguished Fellow, TERI; Former Secretary, Department of Industrial Policy & Promotion, Government of India

Speakers

Mr Tim Gould, Chief Energy Economist, IEA; Mr S R Pandey, Member, Gujarat Electricity Regulatory Commission; Mr Samir Chandra Saxena, Executive Director & Head, National Load Despatch Center (NLDC), Grid Controller of India Ltd.; Ms Ammi R Toppe, Chief Engineer (Integrated Resource Planning Division), Central Electricity Authority; Mr Y K Sehgal, Executive Director, Greenko; Ms Surbhi Goyal, Senior Energy Specialist, The World Bank

Concluding Remarks

Mr Ajay Shankar, Distinguished Fellow, TERI; Former Secretary, Department of Industrial Policy & Promotion, Government of India



India's decarbonization targets announced by the Hon'ble Prime Minister of India at COP26, Glasgow marked one of the highest increases in ambition of major economies over their Paris commitments.

"To scale up renewable capacity to meet the 2030 targets, renewable capacity addition needs to be ramped up to about 35 GW per year from the current level of 11 GW per year. The scale of renewable capacity addition is not responsive to the operating cost of coal power plant, i.e., ₹2.5-₹3.5 per unit, which needs to be economically competitive," said Mr Tim Gould.

While the country achieved a key 2015 NDC commitment of 40% non-fossil-fuel based generation capacity, the speed and scale of transition required for achieving 2030 targets calls for a well-planned roadmap and pathways. To accommodate large shares of variable renewable energy (VRE), flexibility/balancing and grid security assume significant importance.

To achieve decarbonization targets, shift of fuel from conventional to use of hydrogen, methanol, ammonia for industrial use is necessary. "The key role of regulators to enable decarbonization are promotion of RE, green hydrogen policy, long duration energy storage and electric vehicle, introduction of ancillary services and green energy markets," said Mr S R Pandey.

Carrying forward the discussion, Mr Y K Sehgal said, "High capex of PSP and cost competitiveness of RE can be integrated to provide flexibility at

a competitive price in peak hours. PSPs are environment-friendly and can be built indigenously to promote Atmanirbhar Bharat initiative."

"Similar to Greenko model, another innovative model considering bundling of hydro power with non-hydro RE in another state is under development to match the demand profile with the supply side. Digitization is extremely important for real time monitoring and data collection to maintain grid stability and flexibility," stated Ms Surbhi Goyal.

"For flexibility, newer and more efficient thermal power stations need to support two-shift operation, as is being demonstrated by Tamil Nadu

with stations at Mettur thermal station. The 'Demand Side Response' needs to be captured being the most efficient and cost-effective resource as compared to supplying the costly peak power," asserted

Mr Samir Chandra Saxena.

"Resource Adequacy mechanism is a necessity and adds to resource optimization and ensures adequate capacity in the grid. Planning should be done at the DISCOM level so that demand at every instant of time can be met reliably," advised Ms Ammi R Toppe.

NATURE-BASED SOLUTIONS (NBS) FOR SUSTAINABLE DEVELOPMENT

Panelists

Ms Ilka Hirt, Deputy Director General of International Policy, Federal Ministry for Environment, Nature Conservation and Nuclear Safety, Germany; Mr Subhash Chandra, Additional Director General, Ministry of Environment, Forest and Climate Change, Government of India; Dr Vinod B Mathur, Vice chair, IPBES Bureau and Former chairperson of National Biodiversity Authority of India; Mr Shailesh Tembhornikar, Principal Chief Conservator of Forests, Maharashtra Forest Department; Dr J V Sharma, Programme Director, Water Waste and Natural Resources, TERI; Ms. Mechthild Caspers, Head of Division on Climate Policy in the Land Sector, Federal Ministry for Environment, Nature Conservation and Nuclear Safety, Germany



in 2021, Germany put forward the discussions on further promoting the implementation of NbS.

During the session, Ms Ilka Hirt opined— “In our view, this World Sustainable Development Summit is the prime opportunity to give a renewed political momentum pushing for global implementation of the 2030 agenda to accelerate transformation towards climate-friendly, nature-positive and sustainable development.” Mr Subhash Chandra

praised India’s efforts by saying that India is among few countries which actually practices balance of development and conservation. Over the years India has diverted 11.38 lakh hectares of forest land and so far, we have been successful on 10.29 hectares of forest land. Wherever forest is diverted we are quick to compensate the loss of forest trees and biodiversity.” 🌍

HIGHLIGHTS



Dinner Reception
Address by Ms Katie McGinty, Vice President and Chief Sustainability and External Relations Officer, Johnson Controls

HIGHLIGHTS



Cultural evening performances: Kalbelia Dance and Drum Dance



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