SYMRESEARCH 2.0

Track 4

Environmental Engineering for Public Health

Co-ordinated by

Symbiosis Centre for Climate Change and Sustainability (SCCCS)

And

Symbiosis Centre for Waste Resource Management (SCWRM)

Environmental Engineering for Public Health

Plenary Speaker

Ms. Ruchika Drall

Deputy Secretary (Climate Change), Ministry of Environment, Govt.of India

Plenary Speaker

Dr. Meeta Lavania

Associate Director Environmental Biotechnology, TERI, New Delhi, India

Invited Speaker

Prof. Rajan Kumar Kotru

Head, Innovative Regional Program, ICIMOD, Nepal

Invited Speaker

Dr. P Bineesha

Executive Director, International Institute of Waste Management, Bangalore, India

Invited Speaker

Dr. Anshuman Khardenavis

Principal Scientist, National Environmental Engineering Research Institute Nehru Marg, Nagpur, India

Invited Speaker

Dr. Revati Phalkey

Director, International Institute for Global Health at the United Nations University KL, Malaysia

Invited Speaker

Dr. Roxy Mathew Koll

Climate Scientist at the Indian Institute, of Tropical Meteorology (IITM), Pune, India

Invited Speaker

Prof. Sanjay Zodpey

President, Public Health Foundation of India, New Delhi, India.

Schedule

19th September 2025

Track	4. Environmental Engineering for Public Health
Venue	SMCW Lecture Hall-4
Session Chairs	Dr. Rajan Kotru Head, Innovative Regional Program, ICIMOD, Nepal, Co-Chair: Dr.Prasoom Dwivedi, Prof., SCRI
9:00 A.M. - 9:45 A.M.	**Ms. Ruchika Drall** Deputy Secretary (Climate Change), MoEF&CC, GoI, New Delhi
9.45 A.M. – 10.30 A.M.	Oral Presentations- I Judges, Chair, Co-Chair, and Dr Abhijit Kulkarni, SCCCS
Session Chairs	Dr. Revati Phalkey, International Institute for Global Health, UN University, Malaysia, Co-Chair: Dr Pooja Singh, Assistant Prof. SCWRM
11.00 A.M. - 11.45 A.M.	**Dr. Sanjay Zodpey** President, PHFI **Topic: Deciphering the connection between climate change and global health**
11.45 A.M. – 12.15 P.M.	**Dr. Rajan Kotru** Integrated Mountain Initiative (IMI), New Delhi, India. **Topic: Building resilience of Himalayan agroecology to sustain local food systems**
12.15 P.M. - 12.45 P.M.	Oral Presentations - II Judges, Chair, Co-Chair, and Dr Anshuman Sewda, Associate Professor, SIHS
Session Chairs	Dr. Sanjay Zodpey President, PHFI, Co-Chair: Dr Manikprabhu Dhanorkar, Head, SCWRM
4.10 P.M. - 4.40 P.M.	**Dr. Revati Phalkey,** Director, International Institute for Global Health, UN University, Malaysia **Topic: Climate Resilient Health Systems, policy processes**
4:40 P.M. to 4:50 P.M.	Tea Break
4:50 P.M. - 5.20 P.M.	**Dr. P Bineesha** Executive Director, International Institute of Waste Management, Bangalore

	Topic: Effective public health through Smarter Municipal Solid Waste management
5.20 P.M. - 6:00 P.M.	Oral Presentations -III Judges -Chair, Co-Chair, and Dr.Shumailah Ishtiyaq, SCCCS

Schedule

20th September 2025

Track	**4. Environmental Engineering For Public Health**
Venue	SMCW Lecture Hall-4
Session Chairs	Dr. Anshuman Khardenavis Sr Principal Scientist, NEERI, Nagpur, Co-Chair: Dr Anshuman Sewda, Associate Prof., SIHS
9:00 A.M. - 9:45 A.M.	**Dr. Meeta Lavania** Associate Director Env. Biotechnology, TERI, New Delhi **Topic: Harnessing Sustainable Innovations at the Nexus of Environment, Science and Technology**
9.45 A.M. – 10.30 A.M.	**Oral Presentations -IV Judges - Chair, Co-Chair and Dr.Pooja Singh, Assistant Prof. SCWRM**
Session Chairs	Dr. Srinath Reddy Hon. Distinguished Professor, (PHFI), Co-Chair: Dr Prakash Rao, Head, SCCCS
11.00 A.M. - 11.30 A.M.	**Dr. Anshuman Khardenavis** Sr Principal Scientist, NEERI, Nagpur **Topic: Waste management in ensuring environmental and public health sustainability**
11.30 A.M. - 12.00 P.M.	**Dr. Roxy Mathew Koll** Climate Scientist Indian Institute of Tropical Meteorology, Pune **Topic: Building climate-smart health early warning systems for Indian cities**

12.00 P.M. - 12.45 P.M.	**Oral Presentations- V Judges - Chair, Co-Chair and Dr.Yogesh Patil, SCRI**

Speaker 1: Ms. Ruchika Drall, MoEF&CC

Dr. Ruchika Drall

Deputy Secretary, Ministry of Environment, Forest and Climate Change (MoEF&CC), GoI

- **Background & Role:** Serves as Deputy Secretary at MoEFCC, responsible for *Blue Economy Policy*, climate change diplomacy, and regional cooperation with BRICS, ASEAN, BIMSTEC, SAARC, SCO, CHOGM, and LEAD IT initiatives
- **Ongoing Focus:** Actively engaged in national and bilateral dialogues on sustainability, including green hydrogen initiatives and the Avana Sustainability Fund, promoting industry decarbonization in collaboration with Indo-German partners
- **Projects:** Notably took part in the Green Climate Fund Training of Trainers workshop (IIFM-UNDP-MoEFCC, Oct 2024), helping strengthen climate finance capacities for government and research stakeholders
- **Recognition:** Her leadership in policy and climate diplomacy underscores her influential role at MoEFCC.

At SYMRESEARCH 2.0, during the plenary talk for Track 4 – Environmental Engineering for Public Health, Ms. Ruchika Drall, Deputy Secretary (Climate Change), Ministry of Environment, Forest and Climate Change (MoEF&CC), highlighted how climate change is already shaping health outcomes in India and why adaptation must be a priority.

🔍 Key points from her talk:

- India's stance on Common but Differentiated Responsibility (CBDR) – responsibility for climate change must reflect actual contributions to emissions.

- Direct health impacts: rising heat-related illnesses, respiratory issues, vector- & waterborne diseases, and malnutrition from food insecurity.

- Indirect impacts: mental health stress, disrupted health services, and heightened inequality—especially affecting vulnerable groups like pregnant women, the elderly, and lower-income populations.

- Preventive health continues to be deprioritized over curative care in lower economic groups.

- Rural healthcare systems face digital disconnect—upgradation is not a choice but a necessity.

- India's policy framework includes National Health Mission (NHM), Ayushman Bharat, NAPCC, SAPCCs, NAPCCHH, One Health Mission, and Heat Action Plans (HAPs), with a National Adaptation Plan under preparation.

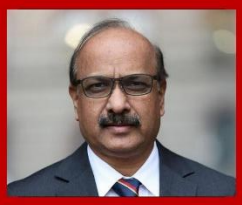
- Within the health sector, adaptation > mitigation as protecting lives must come first.

- Challenges remain: bridging the funding gap, systemic strengthening, and fostering innovation with community-level engagement.

Her talk reinforced that climate change is not a distant threat but a present reality—and that health resilience is central to building a sustainable, equitable future.

Her perspective from the Ministry was especially relevant as it set the stage for the track's theme—showing how policy, climate action, and health systems must integrate with environmental engineering to build resilience.

Speaker 2: Dr. Sanjay Zhodpey, PHFI



Dr. Sanjay Zodpey

President, Public Health Foundation of India, New Delhi

- **Background & Role** Professor Sanjay Zodpey is the President, Public Health Foundation of India. He has served as Vice President - Academics, Public Health Foundation of India, and led the Indian Institute of Public Health, Delhi as its Founding Director. He has held a joint appointment as Honorary / Adjunct Professor in five international universities. He is appointed as 'Outstanding Professor' by the Academy of Scientific and Innovative Research (AcSIR), An Institution of National Importance established by an Act of Parliament, Government of India. Before joining PHFI, he had a distinguished career as Professor at the Department of Preventive and Social Medicine, Faculty in Clinical Epidemiology Unit, and Vice Dean at Government Medical College, Nagpur, India.
- **Recognition:** Professor Zodpey is an internationally renowned epidemiologist, public health scientist, award-winning educator and a widely recognized academic leader. He was conferred 'Doctor of Science (DSc) (Honoris Causa)' by DMIMS Deemed to be University, Wardha and 'Doctor of Medicine (honoris causa) by The University of Sydney, Australia. With over 441 publications [h-index (Google Scholar): 72], he features in the top 2 percent of scientists across the world for his research contribution in Tropical Medicine for four consecutive years as part of the worldwide ranking of scientists in all science fields.
- He is a recipient of the 'Outstanding Faculty Award: Health Professions' for being the most research-proficient faculty of India in 2023, by CAREERS 360.
- He was the National President of the Indian Association of Preventive and Social Medicine for two consecutive terms.
- He is the recipient of the Public Health Education Leadership Award for significant contributions in promoting public health education in the WHO's South-East Asia Region.

"Climate change is a health crisis." - Dr. Sanjay Zodpey

At SYMRESEARCH 2.0, Dr. Sanjay Zodpey, President of the Public Health Foundation of India (PHFI), emphasized that climate change is not just an environmental issue but a moral, ethical, and social justice challenge intrinsically linked to health, food, and water security.

Key insights from his talk in Track 4: Environmental Engineering for Public Health:

- Global health cannot be achieved without addressing climate change.

- Health systems must become both climate resilient and carbon neutral to meet Paris Agreement targets.

- A ruined planet cannot sustain human lives in good health—a healthy planet and healthy people are two sides of the same coin.

With a distinguished career in public health research, education, and leadership, Dr. Zodpey and PHFI continue to play a pivotal role in shaping climate-resilient health systems for a healthier future.


FACULTY OF MEDICAL & HEALTH SCIENCES
FACULTY OF ENGINEERING
Symbiosis International (Deemed University)
SYMRESEARCH 2.0
International Conference on
Bioengineering for Global Health


SYMRESEARCH 2.0


Public Health Foundation of India (PHFI)
Working Towards A Healthier India
SYMRESEARCH 2.0

Speaker 3: Dr. Rajan Kotru, IMI

Dr. Rajan Kotru

IMI (Integrated Mountain Initiative), New Delhi

- An innovative, strategic and passionate senior international research and sustainable development expert, with a career spanning over 35 years and experience and expertise gained across South Asia, Europe, India and the USA. With a PhD from Highest Ranked Ludwig Maximilians University of Germany on Forestry Sciences, he has contributed to concepts, execution and monitoring of impact-oriented research and development projects in the German Alps and Indian Himalayan Region. He has richly contributed to national (e.g., NITI Aayog, German Alpine Foundation, J&K Climate Cell) and international Policy Think-Tanks (e.g., IUFRO, Global Landscapes Forum, FAO), cohesive multicultural teams, and governments championing climate smart, eco-friendly solutions in applied research, rural development and transnational contexts, dedicated to restoration and sustenance of mountain ecosystem services enabling poor and disadvantaged communities. As an accessible leader in his field, he has created and modelled best practices (e.g., First-ever community level PES in IHR, UNDP's selection of Changar Project). An intensively sought Youth mobilisation professional (in Himachal Pradesh and J&K, Nepal Youth Council). Has worked in over 20 countries. He has over 145 publications to his credit, apart from Newspaper articles, successful project proposals, technical manuals, German Government-supported project evaluations, and completions.
- **Programmes led by him have been Winner** of several international awards and contribution to award winning publications apart from several innovative landscape management concepts and their mainstreaming.
- **Alumni/Fellow:** Daimler-Benz Foundation Germany, Inner Wheel CLTS UK-India, ICIMOD Nepal, Member PAHAD and Advisor to several NGOs in J&K and Himachal Pradesh etc.

Valuing the Himalayas Beyond GDP ⚠

We had the privilege of hosting Dr. Rajan Kumar Kotru, an international expert in sustainable development and mountain ecosystem services, whose work spans over 37 years, encompassing South Asia, Europe, India, and the USA. He was speaking at SYMRESEARCH 2.0 in Track 4: Environmental Engineering for Public Health

Dr. Kotru first gave a broad perspective on the unique Himalayan ecology — its environment, biodiversity, cultural heritage, political context, and ecological significance — before delving into the pressing challenges the region faces.

In his insightful talk, Dr. Kotru highlighted that while Himalayan states contribute less to the nation's monetary GDP, their ecosystem services — including water regulation, soil fertility, pollination, biodiversity, and cultural heritage, such as pilgrimage sites — are priceless to India's well-being. Yet, because these services remain unmeasured, Himalayan states receive minimal support for climate resilience, despite being the most affected.

◈ According to the IPBES 2024 report, nearly 70% of Himalayan biodiversity has declined over the last century, threatening livelihoods and local economies. ICIMOD

◈ Farmers who practice traditional agroecological farming enjoy nutritious diets, and hardy native crops like black peas could play a key role in climate adaptation.

◈ Rising man-animal conflict and mounting waste management challenges further strain these ecologically sensitive regions.

◈Urgent Need: Disaster management and early warning systems for weather, precipitation, floods, and agriculture must be strengthened with the active involvement of engineering faculties for these Himalayan states.

Dr. Kotru emphasized that protecting Himalayan communities is central to safeguarding the fragile, unique ecosystem of the Himalayas — a region vital not only to local livelihoods but to the nation's food, water, and climate security.

Speaker 4: Dr. Revati Phalkey, UNU- IIGH

Dr. Revati Phalkey

UNU-IIGH (United Nations University-International Institute for Global Health), Kuala Lumpur, Malaysia

- **Background & Role:** Dr. Revati Phalkey was appointed as Director of UNU-IIGH and began her tenure in **February 2025**. UNU-IIGH serves as the UN's global health think tank, focusing on equitable and effective health governance and policy.
- **Education:** She holds a Ph.D. in Public Health (Infectious Disease Surveillance) from the University of Heidelberg, a Master's in International Health (Tropical Medicine and Disease Control) from Humboldt University, and a Master's in Humanitarian Assistance (Peace and Conflict Resolution) from the University of Bochum—reflecting a multidisciplinary background.
- **Career & Expertise:** Prior to joining UNU, she was Global Director for Health and Nutrition at Save the Children International, managing a program portfolio worth over US$350 million annually across both development and humanitarian contexts. Before that, she served as Head of Climate Change and Health at the UK Health Security Agency, co-leading the 4th assessment of health impacts of climate change and contributing to the COP26 Health Programme. She also played a key role in the Health Day at COP28 and co-chaired WHO Europe's Health in Climate Working Group (2019–22).
- **Academic Positions & Fellowships:** She holds honorary associate professorships in Global Health at both Heidelberg University (Germany) and the University of Nottingham (UK), and is a Senior Fellow of the UK Higher Education Academy—highlighting her academic mentoring and capacity-building strengths
- **Ongoing Focus Areas:** At UNU-IIGH, Dr. Phalkey spearheads research and policy work on health equity, digital health governance, workforce strengthening, climate-health emergencies, and just transitions. She emphasises addressing power and gender imbalances in global health governance and building capacity for equitable, evidence-based decision-making.
- **Research & Publications:** Her publication record spans systematic reviews, climate-health studies, infectious disease surveillance, nutritional security, and urban health topics. She is highly active in implementation research across regions—including Africa, Asia, and Europe—and continues to contribute to global health scholarship and interdisciplinary studies.

“Health is central to the climate agenda." - Dr. Revati Phalkey

We were honored to host Dr. Revati Phalkey, Director of the United Nations University - IIGH (Malaysia) and Honorary Associate Professor at Heidelberg University, Germany, who shared her insights on the urgent intersection of climate change and health. She was speaking at SYMRESEARCH 2.0 in Track 4: Environmental Engineering for Public Health

Drawing on her experience as former Global Director for Health, Nutrition & WASH at Save the Children International, Head of Climate Change & Health at the UK Health Security Agency, and as an IPCC AR6 contributing author, Dr. Phalkey reminded us that:

◈ Health systems must "Sense. Detect. Recover. Learn. Repeat." to withstand the growing climate burden.

◈ Scientists need to invest in multiple exposure–multiple outcome methods to better understand the climate crisis.

◈ Solutions exist — the challenge is scaling them up.

◈ Policy-making must be bottom-up, rooted in exposure, resources, and context.

◈ She also urged India to join the Alliance for Action on Climate Change and Health (ATACH) — a step India has yet to take.

Her presentation highlighted powerful data:

✅ 24% of global deaths are linked to modifiable environmental factors (WHO).

✅ 489,000 heat-related deaths annually (2000–2019), projected to rise to 1.6M by 2050.

✅ 8.1M deaths in 2021 due to air pollution — the second leading global risk factor.

✅ 920M children face severe water scarcity, while 2.2B people still lack safe drinking water.

✅ Climate change could push 132M people into extreme poverty by 2030, with women and children disproportionately affected.

Key takeaway

Five interventions alone (solar-powered health facilities, heat-health warning systems, WASH improvements, clean household energy, and fossil fuel reforms) could save 1.9M lives annually.

Finally, she emphasized that a Zero Regrets Strategy — building climate-resilient and sustainable health systems — is the only way forward.

A powerful reminder that the climate crisis is not only an environmental or economic issue, but fundamentally a health and human rights crisis.

Speaker 5: Dr. P. Bineesha, IIWM

P.Bineesha

International Institute of Waste Management (IIWM), Bangalore

- **Background & Role:** Environmental scientist with 23+ years of experience, currently Executive Director at IIWM (based in Bangalore)
- **Work Highlights:** Expert in urban-rural environmental management, technology evaluation, and policy advisement. She has partnered with entities such as the World Bank, UNDP, GTZ, USAID, and others
- **Responsibilities:** Serves on the Technology Development Board (TDB) since 2018, chairs its DRC, and has played key roles in AICTE, IGNOU curricula, PBD waste management panels, and smart campus initiatives
- **Recognition:** Honored as "Women Achiever for the Year (Environment)" in 2014 by Garden City Group, and has publicly highlighted critical issues like e-waste management in India
- **Current Focus:** Leading IIWM's policy-support and project implementation for sustainable waste systems, contributing to curricula design, and promoting formalization and innovation in waste and e-waste management

♻ Prevent More, Dispose Less: Smarter Waste Management for Public Health

We were privileged to co-host Dr. Bineesha Payattati, Executive Director of the International Institute of Waste Management (IIWM), Bangalore, and an environmental scientist with over 23 years of experience in rural-urban environmental management, technology evaluation, and policy-making.

With global collaborations spanning the World Bank, UNDP, USAID, and more, Dr. Bineesha has been a leading voice in shaping waste management policies, sustainable practices, and formalizing the sector in India.

In her talk, she emphasized:

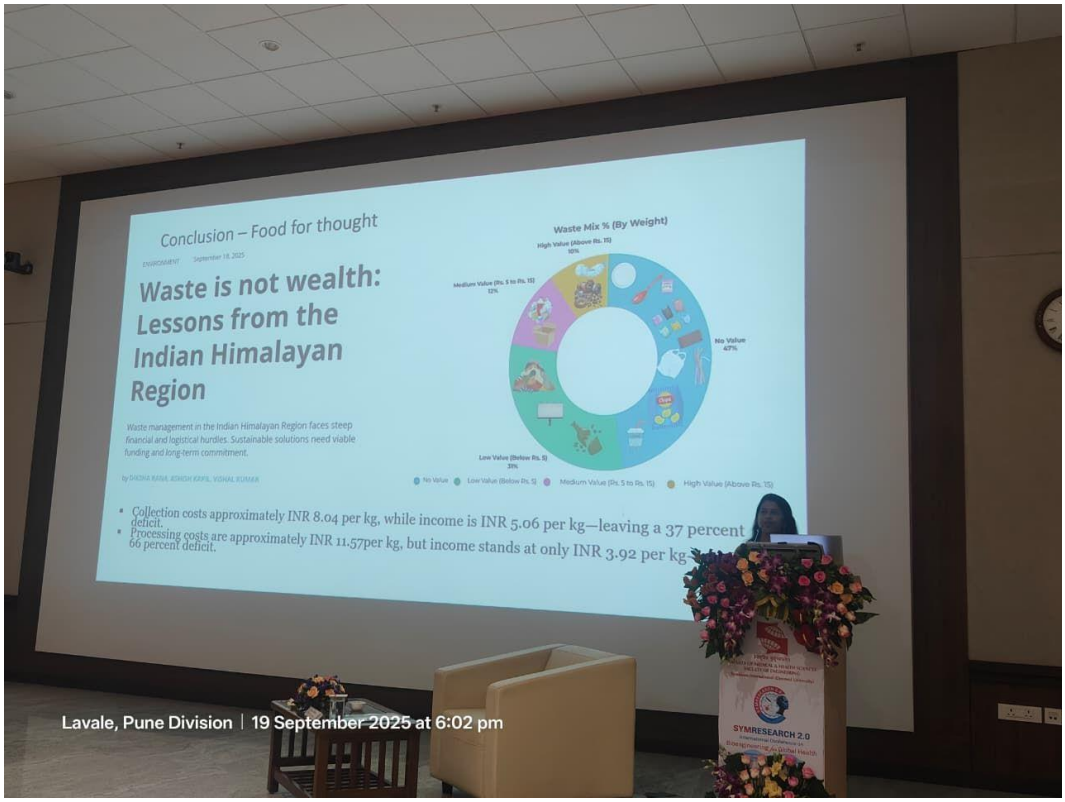
✅ Prevent more, dispose less – the golden rule of waste management.

✅ Collaboration over silos – multi-stakeholder partnerships are the only way forward.

✅ Sustainable solutions need viable funding and long-term commitment – without which projects cannot scale.

🚫 Importantly, she reminded us that "Waste is not Wealth". Without accountability, innovation, and systemic change, unmanaged waste only fuels pollution, disease, and long-term ecological harm.

Her message was clear: Waste management is not just about disposal—it is about protecting public health, preserving resources, and ensuring future sustainability.



Speaker 6: Dr. Meeta Lavania, TERI

Dr. Meeta Lavania

TERI
The Energy and Resources Institute, New Delhi

- **Background & Role:** Dr. Lavania serves as Associate Director in the Microbial Biotechnology division at TERI, focusing on environmental biotechnology applications to tackle sustainability challenges
- **Research & Projects:** She is a key contributor to TERI's development of microbial interventions aimed at the **in-situ generation and enhancement of methane from coal seams**. This work involves designing microbial consortia and evaluating techno-economic feasibility for coal-bed methane production.
- **Recognition:** TERI, along with collaborators ONGC and OEC, received the **DBT's Biotech Product, Process Development and Commercialization Award (2018)** for this innovative methane-generating microbial technology. Dr. Lavania had the honor of receiving the award on behalf of the institution.
- **Additional Contributions:** Beyond her methane research, her group has collaborated on studies exploring microbial sources from rare milk species for lactic acid bacteria (LAB) applications, aiming toward novel starter culture development.
- **Institutional Presence:** Dr. Lavania is also listed as an Adjunct Faculty for Biotechnology at the TERI School of Advanced Studies (TERI SAS), contributing to academic mentorship and coursework in the field

At SYMRESEARCH 2.0, during the plenary talk for Track 4 – Environmental Engineering for Public Health on 20th September 2025, Dr. MEETA LAVANIA, Associate Director – Industrial Biotechnology at TERI - The Energy and Resources Institute, shared cutting-edge innovations at the nexus of environment, science, and technology. Her talk highlighted how microbial and biotechnology-driven solutions can accelerate clean energy transitions while improving community wellbeing.

Key points from her talk:

- Methane enhancement from coal mines: Jointly developed with ONGC, TERI's patented microbial process stimulates indigenous microbes in coal seams to convert complex organics and CO_2 into methane, achieving a two-fold increase in production at field scale.

- Industrial Biotechnology Programme: Equipped with fermenters from 1–20,000 litres, the program works across aerobic and anaerobic organisms for #methane generation, #oil recovery, viscosity reduction, paraffin prevention, drilling fluids, metagenomics, probiotics, and large-scale bioremediation.

- Sustainable agriculture innovations: From advanced mycorrhizal biofertilizers (Uttam Superrhiza) and nano-nutrients to microbial pigments, algal farming, and micropropagation technologies, TERI is enabling resilient crops, sustainable soils, and eco-agriculture.

- Air quality & health: TERI's Environmental and Health Assessment group developed tools linking air pollution (PM2.5) levels to respiratory illnesses and supported major policy actions like crop residue burning assessments and Stage I & II Vapor Recovery Systems in fuel retail outlets.

- Public health impact: Projects such as UNICEF-backed heavy metal assessments of Yamuna water and digital surveillance systems for air pollution–related diseases underline TERI's role as a Centre of Excellence for climate-health vulnerability assessment under NAPCCHH.

- Transformative outcomes: Clean energy pathways, CO_2 sequestration into platform chemicals, and microbial oil recovery not only support decarbonization but also create livelihoods for scientists, engineers, and local communities.

Her plenary reinforced how industrial biotechnology integrates environmental engineering with climate action, net-zero goals, and global health priorities—making it deeply relevant for Track 4: Environmental Engineering for Public Health.

Speaker 7: Dr. Anshuman Khardenavis, NEERI

Dr. Anshuman Khardenavis

CSIR-NEERI National Environmental Engineering Research Institute, Nagpur

- **Background & Role:** Senior Principal Scientist at NEERI, leading the Environmental Bioprocesses division; also serves as Assistant Professor at AcSIR, New Delhi
- **Research & Contributions:** Holds a Ph.D. (Nagpur University, 2011); works on value extraction from organic waste (keratinase from feather waste, PHAs from sludge), biomethanation, microbial community dynamics in anaerobic digestion, and genome-based biodegradation
- **Awards:** Recipient of Lien Environmental Fellowship (Singapore) and CSIR-UGC Research Fellowships (JRF/SRF)
- **Current Projects:** Heads NEERI's Environmental Bioprocesses efforts, coordinating both ongoing and completed projects across biotech applications in waste valorisation and microbial genomics

♻ From "waste" to wealth – rethinking our misplaced resources

At our Track 4 session SYMRESEARCH 2.0 in Environmental Engineering for Public Health, Dr. Anshuman Khardenavis (CSIR NEERI) challenged the way we view waste: not as a burden, but as a resource waiting to be harnessed.

He reminded us that Asia generates the most wastewater globally, yet 73% remains untreated. While each individual may generate less than those in developed nations, the sheer population size makes the problem massive.

What stood out was his clear distinction between scientific landfilling and dumping, as well as the urgent need for East Asian and Pacific countries to adopt sustainable practices.

Key takeaways:

- Waste is a misplaced resource that can fuel sustainability and profitability.

Microbial systems run most degradation processes, but still remain a "black box" of untapped potential.

- Maharashtra is leading the way in municipal solid waste treatment, showcasing scalable models.

- Scientific landfilling vs. dumping — the need for East Asia & Pacific to adopt safer disposal.

- Microbial systems drive most waste degradation but remain a “black box” — with vast untapped potential in metabolic engineering.

- Government efforts like Swachh Bharat and Namami Gange are moving the needle, but more needs to be done.

- The rise of antibiotic-resistant bacteria (ARBs), worsened by untreated wastewater and pollutants, is emerging as one of the greatest health threats.

- A working example: his decentralized food waste bio-methanation digester at Go-Vigyan Anusandhan Kendra, Nagpur, where kitchen waste now powers cooking fuel and produces residue that nourishes farms.

Dr. Khardenavis's session was a powerful reminder that with the right mix of science, policy, and innovation, we can transform our waste challenges into opportunities for a healthier planet.

Speaker 8: Dr. Roxy Mathew Koll, IITM

Dr. Roxy Koll

IITM
Indian Institute of Tropical Meteorology, Pune

- **Background & Role:** Climate scientist at IITM (since 2010), adjunct Professor at AcSIR and University of Pune; Ph.D. from Hokkaido University in Ocean & Atmospheric Sciences.
- **Research & Focus:** Leading research on Indian Ocean warming, monsoon extremes, marine ecosystems, climate-health linkages, and developing climate-smart early-warning systems (AI/ML-enabled).
- **Recognition:** Awarded *Rashtriya Vigyan Puraskar* 2024, AGU Devendra Lal Medal (2022), AGU Fellowship, NAS NRC Senior Associateship (2018), IMS Young Scientist Award (2016), and R. Ramesh Endowment Award (2025).
- **Active Role:** Lead Author for IPCC reports, chaired CLIVAR Indian Ocean Panel (2018–2022), serves on CLIVAR steering groups; principal investigator for India-UK and India-France monsoon projects; leads climate-health modeling efforts and promotes "Climate-Equipped Schools" initiative in India

From heatwaves to dengue outbreaks, climate change is no longer just about melting glaciers—it is rewriting India's health story.

While speaking at SYMRESEARCH 2.0, Dr. Roxy Mathew Koll, a Climate Scientist at the Indian Institute of Tropical Meteorology (IITM) in Pune, painted a striking picture of how a warming planet is silently overwhelming our healthcare systems.

He explained how compound risks—two or more extreme weather events striking together—can multiply their impacts. Imagine a heatwave followed by heavy rains: each dangerous on its own, but together they trigger health crises far beyond what our systems can handle.

In 2023 alone, India reported nearly 2.9 lakh dengue cases. Climate projections show that if emissions continue unchecked, dengue-related deaths could more than double by the end of this century. Pune, for instance, has emerged as a climate-disease hotspot, where temperature and rainfall swings directly shape dengue outbreaks.

But there's hope. Dr. Koll and his team are developing Climate-Smart Health Early Warning Systems, utilizing supercomputers and AI/ML models to provide advanced predictions of outbreaks. This means hospitals, governments, and communities can prepare ahead of time, saving countless lives. Dr. Koll's work is a perfect blend of climate science, AI/ML, and public health—bringing together researchers across disciplines

Dr. Koll's journey reminds us that climate change is not just an environmental issue—it is a public health emergency. And with science and foresight, we can build resilience before the next crisis strikes.

Oral Presentations in Track 4

Environmental Engineering for Public Health

aPaper ID	Paper Title	Primary Contact Author Name	Oral Presentations Session	Oral Presentations Date	Oral Presentations Slot
135	Engineering $ZnFe_2O_4$ Spinel Nanoparticles for Biomedical Applications: From Lattice Structure to Magnetic Response	Rohit Shendkar	1	19/Sep	9.45 am – 10.30 am
130	Optimising Experimental Conditions: The Role of Buffered Environments in Microbial Isolation, Physiological Studies, and Taxonomic Characterization	Ujjwala Waghmare	1	19/Sep	9.45 am – 10.30 am
199	Co-production of biosurfactants and hydrolytic enzymes by Bacillus cereus using novel plant-based medium for detergent applications	Vaibhav Kadam	1	19/Sep	9.45 am – 10.30 am
111	Himalaya's best-kept secret: High-Altitude Wetlands (HAW)	Shweta kadam	2	19/Sep	12.15 pm - 12.45 pm
206	Environmental Adaptations in Orthopedic Hospitals: Integrating NABH Standards into a Cost of Quality Model to Promote Green Healthcare	Meenakshi Gijare	2	19/Sep	12.15 pm - 12.45 pm
192	Current status and review of health care waste management systems in urban and rural environments	Firdosh Roowalla	3	19/Sep	5.20 pm - 6:00 pm

84	Solid Waste Management and Quality of Life in Urban Market Environments: A Mixed-Methods Multi-Case Analysis	Surabhee Satheesh	3	19/Sep	5.20 pm - 6:00 pm
144	Bridging Legal and Engineering Gaps in Healthcare Waste Management: A Review of Rural-Urban Disparities in India	Sangramjeet Chavan	4	20/Sep	9.45 am – 10.30 am
125	GREEN INDUSTRIALIZATION VS. FARMLAND PRESERVATION: COMPARITIVE GOVERNANCE PERSPECTIVES FROM HUNGARY AND INDIA	Vivek Nemane	4	20/Sep	9.45 am – 10.30 am
128	Optimization of Cultivation Media for Hydrogenotrophic Methanogens in Biogas Upgrading	Rashmi Dhanwar	4	20/Sep	9.45 am – 10.30 am
210	Climate Change and Malaria Dynamics in the Indo-Gangetic Region: Projecting Transmission Shifts and Policy Implications Under RCP 8.5	Architha Murthy	5	20/Sep	12.00 pm - 12.45pm

Poster Presentations in Track 4

Environmental Engineering for Public Health

Paper ID	Paper Title	Primary Contact Author Name
17	Burden of Cardiovascular Diseases Attributed to Selected Climate Forcers: An Indian Perspective	Mihir Herlekar
60	Nutritional status and dietary intake of pregnant mothers attending an Antenatal Clinic in Urban Pune	Yashi Agarwal
100	Impacts of Pharmaceutical Residues in Hospital Wastewater on Soil Health, Plant Growth, and Microbial Resistance	Kshiteeja Dushing
109	Comparative evaluation of physical desorption techniques for optimizing the recovery, viability, and Culturability of matrix associated microbial cells	Vishwa Raulji
114	Prospective Evaluation of Lifestyles Behavior and Emerging Non-Communicable Diseases Risk Among Young Adults At Symbiosis, Pune .	Muskan Pandey
119	Impact of Climate Change on Vector-borne Infectious Disease and their Spread	Afshan Ahmad
122	Denitrification Pathway Diversity and Its Implications for Nitrous Oxide Emissions	Adarsh Singh
126	Actinobacteria and Climate Change in Combating Climate Stress and Sustainable Agriculture	Kriti Joshi
127	Actinobacteria and Climate Change in Combating Climate Stress and Sustainable Agriculture	Khushboo Tomar
133	Biodiversity monitoring at SIU using citizen science apps	Avishkar Munje
138	Heavy Metal Contamination in Cosmetics: Sources, Detection, Health Impacts, and Regulatory Challenges: A Review	Prajakta Magdum
140	Residual Antibiotics in Wastewater-Contaminated Sediments Drive Microbial Dysbiosis and Antimicrobial Resistance	Rupali Thakur
171	Harnessing Algal Systems for Climate Change Mitigation: Integrating Carbon Capture, Biomass Valorization and Environmental Sustainability	GAURANG SINARI

176	Environmental Engineering for Public Health Integrating Digital Technologies and Climate Adaptation for Sustainable Healthcare Systems	Viraj Tathavadekar
195	Scientometrics of Social Jet Lag	Samir Barve
198	Optimizing Food Waste In Restaurants And QSRs Through Circular Economy Strategies	Viraja Bhat
200	Unveiling the Nexus Between Emerging Contaminants and Antimicrobial Resistance in Urban Wastewater	Pooja Singh
205	Microplastics Contamination in Urban River Systems and Landfills: Status and Sources from Pune, India	Meenakshi Verma

Key developments after the conference

- Memorandum of Understanding (MoU) between Public Health Foundation of India (PHFI) represented by Dr. Sanjay Zodpey, President PHFI and Symbiosis Centre for Climate Change and Sustainability (SCCCS), represented by Prof. Dr. Prakash Rao, Head, SCCCS
- Ongoing discussion for hosting a UN Conference at SIU with Dr.Revati Phalkey, Director, United Nations University- International Institute of Global Health (UNU-IIGH), Malaysia
- Ongoing discussion with Dr. Roxy Mathew Koll, Scientist, Indian Institute of Tropical Metrology (IITM), Pune for broader collaboration between SCCCS, SSSS and IITM
- Key collaborations with TERI, New Delhi and CSIR-NEERI, Nagpur for joint research projects and student exchange
- Key collaborations with Dr.P.Bineesha, International Institute of Waste Management (IIWM), Bangalore for policy related research
- Highlighting key research initiatives at SCCCS, SCWRM and SIHS to Ms. Ruchika Drall, Deputy Secretary, Ministry of Environment, Forests and Climate Change (MoEF&CC), Government of India.
- Please highlight any more developments here