# P07 / Policy analysis for shifting development pathways towards climate change mitigation

**Topic :** ENVIRONMENT, SDGs, ENERGY

**Chair :** Kaveri Iychettira (Indian Institute of Technology, Delhi)

**Second Chair :** Diego Galego (Rutgers University)

**Third Chair :** Cesar Casiano Flores (University of Twente)

## GENERAL OBJECTIVES, RESEARCH QUESTIONS AND SCIENTIFIC RELEVANCE

=Development pathways, or the way in which countries or regions develop, drive not only outcomes such as economic growth and employment, but also outcomes related to sustainability and climate change. The IPCC Working Group III Sixth Assessment Report (AR6) argues that strengthening the capability of societies' to mitigate emissions in an accelerated manner, as well as, achieving sustainable development would require the shifting of development pathways towards sustainability (SDPS). This argument take sharp significance in the case of low-income or middle-come countries, where developmental aspirations play the more important role in driving policy decisions relative to sustainability considerations.

Existing literature demonstrates that multiple channels – such as the nature of economic activity or the economic structure, spatial patterns of development, degree of inequality, and population growth – have important direct and indirect implications for GHG emissions. Furthermore, literature also suggests that integrating mitigation considerations require non-marginal shifts in countries' developmental pathways; shifts which address interlinkages across sectors, classes, and the economy. However, there is limited empirical research on how policy levers and governance strategies can be used to exploit synergies between developmental aspects such as employment, education, mobility, housing and mitigation or sustainability outcomes in different contexts.

Finally, analytical approaches also need improvements. Models often only account for development as an exogenous input, which does not enable the exploration of interlinkages between development and sustainability considerations; when developmental factors are considered endogenously, they are usually done in a limited manner. Models and scenarios often also overlook important social scientific considerations such distributional consequences, power differentials, and aspirations of affected stakeholders, at the risk of recommending strategies which may reproduce existing injustices. There is also a need to better incorporate issues related to uncertainty, innovation, inertia and irreversibility within broad development contexts.

Accordingly, some of the key research questions that this panel seeks to address are the following. What enabling conditions related to governance make shifting development pathways possible? What lessons, applicable in other contexts, can be extracted from successful examples of SDPS? Which enablers are context-specific, and which are more broadly applicable? What analytical approaches can be used to analyse shifting of development pathways towards sustainability and mitigation through policy levers?

## CALL FOR PAPERS

The papers could make empirical contributions based on original data collection, or make contributions related to improved or novel analytical approaches; in either case, the contributions should indicate how they enrich our understanding of the interplay between development and mitigation, and the role of policy processes or levers in shifting developmental pathways towards mitigation.

Empirical contributions would include analysis based on primary data collection which identify and link policy processes or policy levers to developmental and mitigation- or sustainability-related outcomes. Contributions which take a holistic view of development are encouraged.

In terms of improved analytical approaches, we invite contributions which have the potential to address some of the methodological shortcomings -- for example, better representations of institutions and other relevant social scientific characteristics, uncertainty, inertia, feedbacks, cross-sectoral linkages -- mentioned in the description above.

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## Session 1Session 1

Thursday, July 3rd 16:00 to 18:00 (SME-F2)

### Discussants

Kaveri Iychettira (Indian Institute of Technology, Delhi)

Diego Galego (Rutgers University)

### Technology and sustainability in Southeast Asia: a survey of public perceptions about smart cities governance for energy, water, and waste in Bangkok

Kris Hartley (Arizona State University)

Subnational and urban governments are playing an increasing role in green transition, particularly as cities are immediate settings for environmental challenges and may face inaction or indifference at the national policy level. Among the realms in which urban governments are addressing cities' contribution to climate change (including the notion of 'sustainable urban development,' or SUD) is through technology – specifically 'smart cities' and enabling technologies like artificial intelligence (AI). The rapid evolution of smart city technologies has expanded their realm of application. The first generation focused on technical aspects of urban management, including traffic, energy, and data collection for administrative functions. The next generation has expanded the reach of smart cities to social and environmental arenas. One example is the concept of smart cities for sustainability, which seeks to apply urban technology to environmental management – including the negative externalities of production and the influence of environmental degradation on vulnerable communities. This study examines smart cities for sustainability from two relatively novel perspectives: (i) public perceptions of their effectiveness, and (ii) the underexplored context of Southeast Asia. Based on a survey of 1,000 respondents in Bangkok, Thailand, the empirical analysis investigates the degree to which the public embraces the notion of smart cities for sustainability – in particular, perceptions about their effectiveness in the management of energy, water, and waste. Understanding the personal perceptual dynamics of political support for smart cities is increasingly important as the smart city narrative turns from operational efficiency to political responsiveness and social equity. The Southeast Asian perspective is also relevant because policy commitment to smart cities has been growing over time as governments in the region confront the convergent dynamics of rapid urbanization, foreign investment, and population growth (all of which impact environmental quality). The empirical analysis also examines underlying factors that influence public perceptions about smart cities for sustainability, including demographic characteristics and values-based sentiments about the role of government, the appropriateness of smart city policy ambitions, and democratic participation in policymaking for smart cities. The study builds on a growing literature about SUD, the social and political dimensions of smart city development, the application of smart cities to sustainability issues, and the use of surveys to understand the above in non-Western contexts. Further, the study provides an empirical basis for further examination of policy discourses and narratives – often optimistic regarding technology development and application – in ways that operationalize the study of SUD through theoretical tools like the Narrative Policy Framework. The paper concludes with suggestions for these research pathways.

## Nature finance for climate change mitigation: Carbon rights as a critical policy lever

Micah Ingalls (Mekong Region Land Governance)
Naomi Basik Treanor (Mekong Region Land Governance)
Antoine Deligne (GRET, France)

There is no pathway to climate change mitigation without forests, which absorb up to one-third of fossil fuel-generated carbon emissions. Financial frameworks, broadly categorized as climate finance or markets for nature-based solution (NbS), have emerged including REDD+ (Reducing Emissions from Deforestation and Degradation, plus conservation, sustainable development, enhancement of forest carbon stocks) in which developing countries are compensated to reduce emissions from deforestation. REDD+ acknowledges the interplay between development and mitigation imperatives, given that many actors responsible for nature loss are often, but not always, driven by immediate profits associated with deforestation. This concept of direct compensation based on quantifiable reduction of carbon emissions, has led to remarkable growth in the voluntary carbon market (VCM).

With nearly two decades of REDD+ experience in Cambodia, Lao PDR, and Viet Nam, we can draw lessons learned on the benefits – and risks – of accessing climate finance for all stakeholders involved: governments negotiating deals to supply forest carbon credits, investors and other demand-side actors looking to purchase credits and thus offset their own emissions, and local communities who steward some of the Mekong's most carbon- and biodiversity-rich, and most threatened, landscapes - landscapes which are essential to any rural development trajectory. The governance of carbon as a marketable commodity is the ultimate result of evolving national contexts including legal frameworks, State-led policy priorities, business interests and broader economic trajectories. But who ultimately benefits from REDD+?

To succeed, climate finance must be inclusive, grounded in an enabling policy environment, and with mutual benefits for people, nature, and climate. This must include social integrity, a concept including inter alia: tenure rights of local communities (and risks of insecure tenure), the space for local communities to meaningfully engage and be consulted on decisions related to their resources and benefits from the forest carbon investment, including mechanisms of grievance redress, and Free, Prior and Informed Consent (FPIC). Yet the application of FPIC presents significant challenges due to increasing environmental pressures, complex land tenure systems, and largely inadequate social protections within legal frameworks. Many communities in the Mekong region depend on customary land tenure rights that are often not formally recognized, leaving them vulnerable to land encroachment, and displacement.

This panel will present a new analysis of the legal basis for social integrity in Cambodia, Lao PDR, and Vietnam, along four pillars: carbon rights (which entities have the right to own, transfer, and ultimately benefit from emissions reduction), FPIC, grievance mechanisms, and benefit-sharing (who is ultimately entitled to financial compensation for emissions reduction, and how can these benefits be most equitably distributed. Our session will further explore pathways towards social integrity in practice, with insights drawn from a series of multi-stakeholder dialogues that took place in 2024, involving a wide array of reform actors including government, development partners, investors and civil society. We will take a solutions-oriented approach towards integrating traditional knowledge and community-led conservation into markets for carbon and nature and the legal frameworks which underpin them, ultimately aiming to improve local stakeholders self-determination.

## Data and Advanced Data Analytics to empower SNGs in energy transition policymaking

Devin Diran (Leiden University)

To enable subnational governments (SNG) to effectively and efficiently tackle grand societal challenges such as climate change, knowledge is a powerful and necessary resource[1]. In particular local policymakers lack the necessary knowledge[2], while simultaneously, they are often overwhelmed by the pace and amount at which information is made available in the digital era by means of advanced analytics and increased data availability[3]. In order to design and implement useful and useable digital technologies for the policy process, it is imperative that scholarship and practice are aware of the impact of digital technologies on (the use of evidence in) policymaking. This paper aims to present and discuss the findings of a research project on the impact of data and data analytics on the evidence-based policy practice of local governments in the energy transition. The theoretical perspective we develop builds upon the field of evidence-based policymaking[4] and Transition Management[5], equipped to answer the following research question:

*What are the knowledge needs of SNGs for policymaking towards sustainable urban areas, and how do data and advanced data analytics contribute to these knowledge needs?*

This paper contributes to the first and third research question of the panel as it addresses: the role of SNG in the energy transition and their knowledge needs, and the utilization of advanced data analytics as policy instrument to cater to the knowledge needs.

A multi-case study among eight Dutch cities will be conducted with Utrecht, Rotterdam, Amsterdam, Groningen, Nijmegen, Haarlem, Hengelo and Den Haag. These cities are selected based on their pioneering role in energy transition policymaking and implementation and the inclusion of data in that process. Interviews are the main method for data gathering, augmented with document study of e.g. policy documents.

A semi-structured interview protocol will be derived from a literature based analytical framework encompassing the knowledge needs and the various roles data and advanced data analytics can take to establish that knowledge. The interviewees are selected based a direct and active role in energy transition policymaking or their experience with the collection and use of data.

The analysis will combine a structured and semi-structured approach, based on the analytical framework, with categorical aggregation based on the combined analytical and empirical framework.

[1]Wagner, N., Velander, S., Biber-Freudenberger, L., & Dietz, T. (2023). Effectiveness factors and impacts on policymaking of science-policy interfaces in the environmental sustainability context. Environmental Science & Policy, 140, 56-67.

[2]Durrant, H., Havers, R., Downe, J., & Martin, S. (2024). Improving evidence use: a systematic scoping review of local models of knowledge mobilisation. Evidence & Policy, 20(3), 370-392.

[3]Liu, X., & Dijk, M. (2022). How more data reinforces evidence-based transport policy in the Short and Long-Term: Evaluating a policy pilot in two Dutch cities. Transport policy, 128, 166-178.

[4]Parsons, W. (2002). From muddling through to muddling up-evidence based policy making and the modernisation of British Government. Public policy and administration, 17(3), 43-60.

[5]Rotmans, J., Kemp, R., & Van Asselt, M. (2001). More evolution than revolution: transition management in public policy. foresight, 3(1), 15-31.

## (Virtual) Scaling the developmental pathways of environmental justice institutions in France and their policy barriers towards climate change mitigation

Sophie NEMOZ (Université de Franche-Comté)

The scale of global warming is evidenced by a recurrent intensity over recent years, during which record-breaking temperatures have consistently been experienced worldwide. In all scenarios for greenhouse gas emissions produced by human activities, the sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) estimated last year that the global surface temperature will increase by 1.5°C by the early 2030s (IPCC, 2023). Through surveys of both expert and non-expert experiences of environmental justice institutions in France, our study examine what is perceived through the senses, knowledge, emotions, imaginaries and memories associated with such developemental pathways in order to try to construct collective responses towards climate change mitigation.

In terms of how we understand contemporary barriers, sociological reflexivity is focused on both the emic and etic categories employed, or imposed where they are institutionalised, including by questioning the competition, power relations and tensions at play in framing, meanings, and effects.The goal is to shed light on the policies for dealing with this major challenge for territories by addressing the many issues they raise. Who is calling for decision-making in terms of environmental justice ? How are environmental crisis thresholds and socioeconomic damage indicators determined and discussed? In which arenas does this take place and what kind of knowledge and metrics are used? How does it affect organisations, professional practices and individuals? To what extent are different options and responses compared?

Rooted in our interdisciplinary and multi-site approach, our policy analysis is aimed at developing a shared tool through scientific mediation with citizens. The intention is to go beyond simply specifying “turnkey” solutions and to think about adaptation in sustainable terms with the local groups set up by the project.

## Digital policy instruments in climate governance: A megalopolises exploratory analysis

Diego Galego (Rutgers University)

Cesar Casiano Flores (University of Twente)

Vishal Trehan (Rutgers University)

Digital technologies offer promising solutions for addressing climate change challenges in urban areas, yet their effective implementation through policy implementation and coordination has proven to be challenged and remains understudied. While subnational governments (SNGs) are increasingly recognized as crucial policy coordinators—with the OECD estimating their involvement as essential for achieving 65% of Sustainable Development Goals—the conditions driving successful coordination through digital technologies require further investigation. To address this gap, this paper examines how SNGs of four megalopolises – New York, Mexico City, Paris, and Delhi – deploy digital policy instruments to coordinate climate initiatives at the local level. The study analyzes various digital instruments, including geodata portals, mobility models, and participation platforms, develop by SNGs to facilitate climate policy coordination. Drawing on recent literature and policy document analysis, we identify key barriers to sustainable development and policy implementation in urban settings. The research reveals that while digital technologies support emissions reduction, waste management, and climate adaptation through urban and local government approaches, policy coordination success remains limited, and assessment frameworks to identify coordination challenges remain lacking. In an era of generative governance and artificial intelligence, this study contributes to both theoretical and practical understanding of digital policy instruments in climate governance. The findings emphasize the need for comprehensive assessment frameworks to advance policy coordination research and inform future climate change policies.