TRANSFORMATIVE ADAPTATION AND RESILIENCE: INTER-/TRANSDISCIPLINARY APPROACHES TO SUSTAINABLE DEVELOPMENT

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1. INTRODUCTION

Indonesia, with 142 volcanoes, makes the largest number of people affected by seismic risks (8.5 million!)—a physical event like this need multi-disciplinary planning, response, recovery and community resilience building. Like the eruption of Mt Semeru understanding sustainable development need multi-disciplines, for sustainable development we need to nurture the natural environment and community solidarity for equitable society and economy. Sustainable development golas need multi-disciplines to examine these goals and more so to implement these goals—from physicualm industrial and social sciences, the humanities and the professions of law, engineering, planning and so forth.Climate impact drivers (CIDs) such as typhoons, floods, heavy rainfall, sea level rise has radically transformed our workd. There is an imbalance between the earth's resources: extraction and consumption. At the rate we are consuming the earth's resources, we need three earths.

Investments in risk reduction and resilience, particularly, institutional-organizational, infrastructural and livelihood resilience at city, industry and community levels are crucial for urban resilience. The World Risk Index of 2016: 8 of the top15 countries are from the Asia-Pacific region but resilience investments do matter. For example, Japan, Philippines and Australia are highly exposed to disasters because these countries are in the ring of fire and exposed to the climate risks. But in the 2016 ranking, Philippines was listed no.3 while Japan was listed no. 17 and Australia, no. 117.

2. RESULTS AND DISCUSSION

Challenges to Coastal Mega Cities in The Philippines

Metro Manila's Socio-Political-Economic Profile has terrific implications for risk governance challenges—15 M population, but daytime can range from 16-18M; informality is 45-60 percent; accounts for 37 percent of GDP; and a highly decentralized governance with 17 local government units and 1 coordinating body, the MMDA.

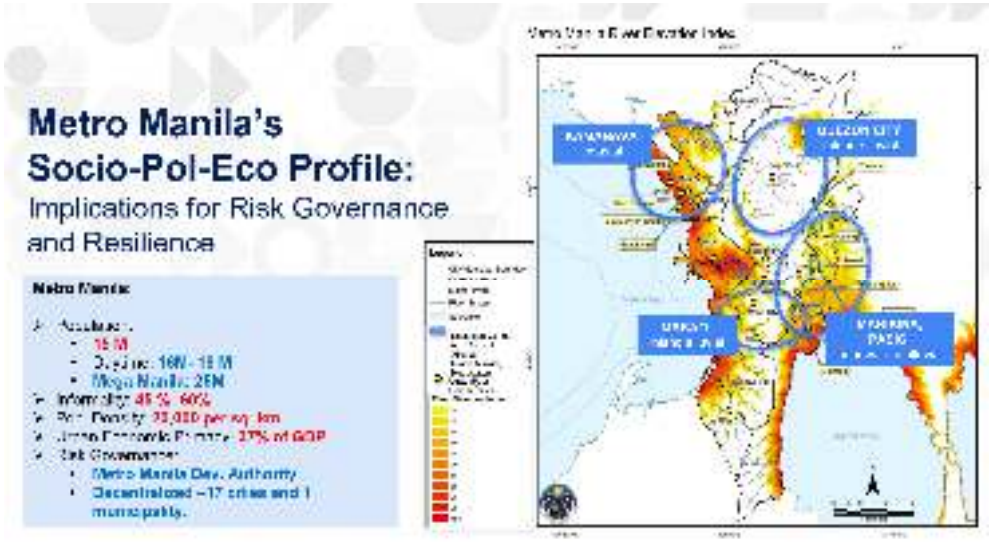

Figure 1. Metro Manilas's Socio-Pol-Eco Profile
Source: Porio, E, 2022

Risk of sea level rise is projected to affect 64 of 81 provinces, covering about 54 percent of 1, 610 municipalities in the Philippines. Metro Manila lies partly beneath sea level due because of rapid urbanization, and intense groundwater extraction.This figure illustrates the essential capacities needed for achieving resilience. The message here is that building and sustaining resilience requires all three types of capacities and clearly there are transaction costs challenges in so doing.

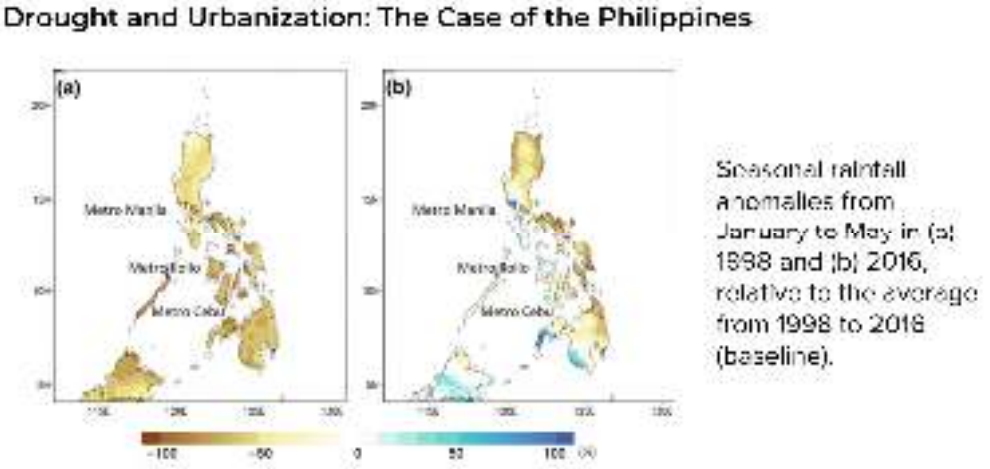

Figure 2. Drought and Urbanization of The Philiipines
Source: Porio, E., Bercilla, J. D., Narisma, G. T., Cruz, F. T., & Yulo-Loyzaga, A. (2019)

Moving Science to Climate Action

Through transdisciplinary action research, CCARPH links the climate and disaster science to policy and practice. Transdisciplinary action, research is informed by three principles: 1) co-generation of knowledge with stakeholders, 2) co-creation of capacities of resilience scientists and practitioners, and 3) co-ownership leads to co-beneficial relationships.

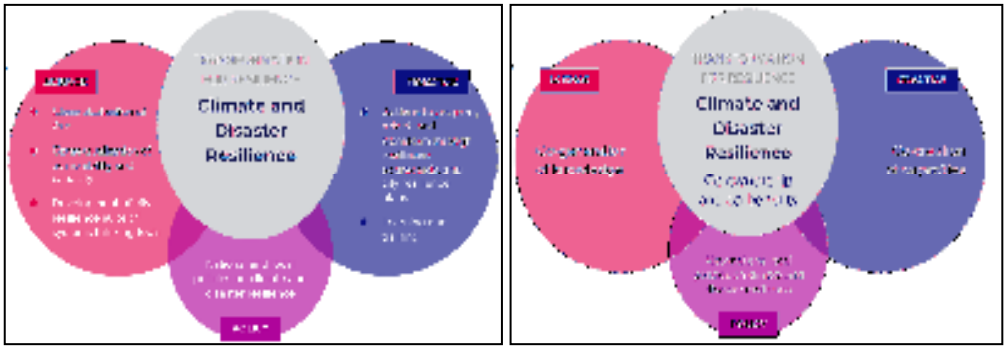

Figure 3. Linking Climate Science to Policy and Practice:Transdisciplinary Action Research
Source: Porio, E, 2022

Goal 1: Integrated Climate and Disaster Risk Assessment:
Bases for Planning and Action Towards a Resilient Local Governance and Development: Integrative, Convergent Pathways to Resilience
Investing in Climate and Disaster Risk Assessment (CDRA) for Climate Risk-informed public investment: comprehensive land-use plan, comprehensive development plan, annual investment plan, local resilience plan, local climate change action plan, local drrm plan, seal of good local governance-compliance
Goal 2: Integrated Climate and Disaster Risk Assessment:
Bases for Planning and Action Towards a Resilient Local Governance and Development : Integrative, Convergent Pathways to Resilience

Shifting Patterns of Informality and Vulnerability
In investing for climate and disaster resilience we have to be conscious of the fact– that the increasing prosperity of Metro Manila, also means increasing challenges to social equity. As you can see here in Celine's mapping of informality overtime the evolving exposure and vulnerability of different stakeholders have increasingly become more textured from 1997, 2000, 2010 & 2010!

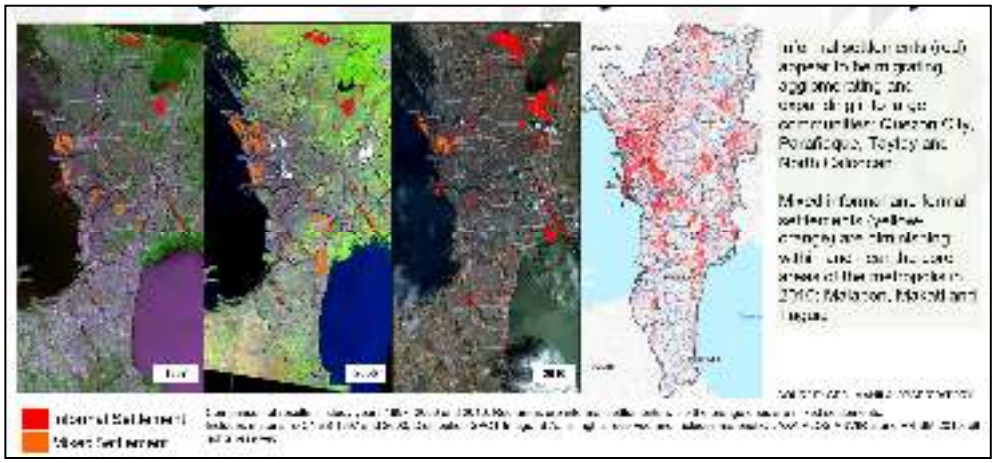

Figure 4. Shifting Patterns of Informality and Vulnerability
Source: Ged, Manila Observatory

Climate Impacts to the Formal and Informal Economy
The Economics Work Theme is developing innovations for Computable General Equilibrium (CGE) Modeling through 1) incorporating natural hazards into CGE by overlaying flooding maps and information on establishments, and identifying the link between flooding, and labor & capital productivity, 2) determining the linkages between natural hazards, health factors, labor productivity, and expenditures within

local governments, and 3) creating a microsimulation to present impacts of natural hazards on poverty and income distribution, and 4) establishing the impacts of government intervention**.**

The Economics Team has developed a model that examines the indirect costs of flooding through a dynamic multi-week model which it has been able to quantify period by period impacts of disasters on a disaggregated scale. Results from this study shall be used to inform LGUs on how they can adjust their disaster-related spending to reduce impacts of natural hazards.

Urban Ecosystem Resilience Index Model: The System Dynamics Team of CCARPH developed UERI Model, which measures the ability of a city to adapt and transform in the face of socio-economic and demographic changes, as well as long-term hazards, in order to sustain the delivery of UES to achieve sustainable development.

Systems thinking- based activities that address common resilience planning challenges, and can be adapted by stakeholders across different sectors to integrate into their respective planning processes. Our Job: Pave the road to resilient, inclusive, and sustainable development through inclusive policies, education, training, and extension programs for community resilience.

Investing in Resilience

1. Hazards may be mitigated by structural and non-structural interventions .
2. Who, what, how, when and why are exposed and vulnerable makes disaster risk complex, dynamic and contextual.
3. Adaptation and transformation require Intersectional approaches
4. Insights from Social Vulnerability indexing and risk mapping facilitate prioritization and targeting of investments
5. Resilience Beyond the Fenceline: Strategic CSR, Core Business Value Cycles and ESG

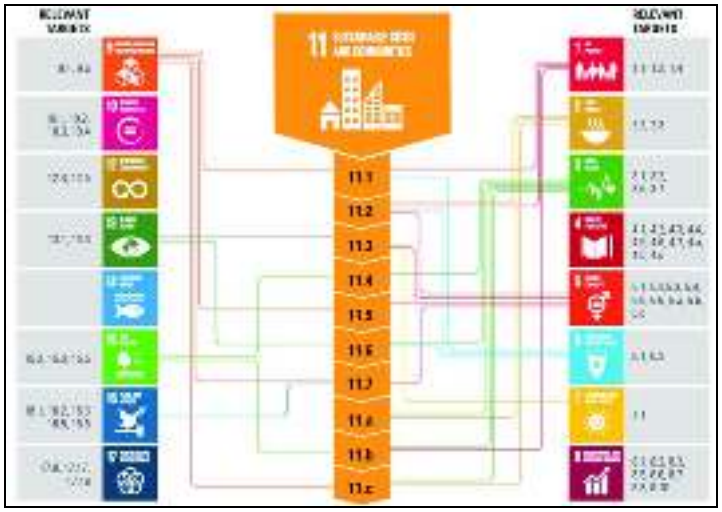

Figure 5. Interlinkages between SDG11 and other SDGs

TARGETS:

11.1: Safe and affordable housing
11.2: Affordable and sustainable transport systems
11.3: Inclusive and sustainable urbanization
11.4: Protect the world's cultural and natural heritage
11.5: Reduce the adverse effects of natural disasters

11.5: Reduce the adverse effects of natural disasters
11.6: Reduce the environmental impacts of cities
11.7: Provide access to safe and inclusive green and public spaces
11.A: Strong national and regional development planning
11.B: Implement policies for inclusion, resource efficiency and disaster risk reduction
11.C: Support least developed countries in sustainable and resilient building

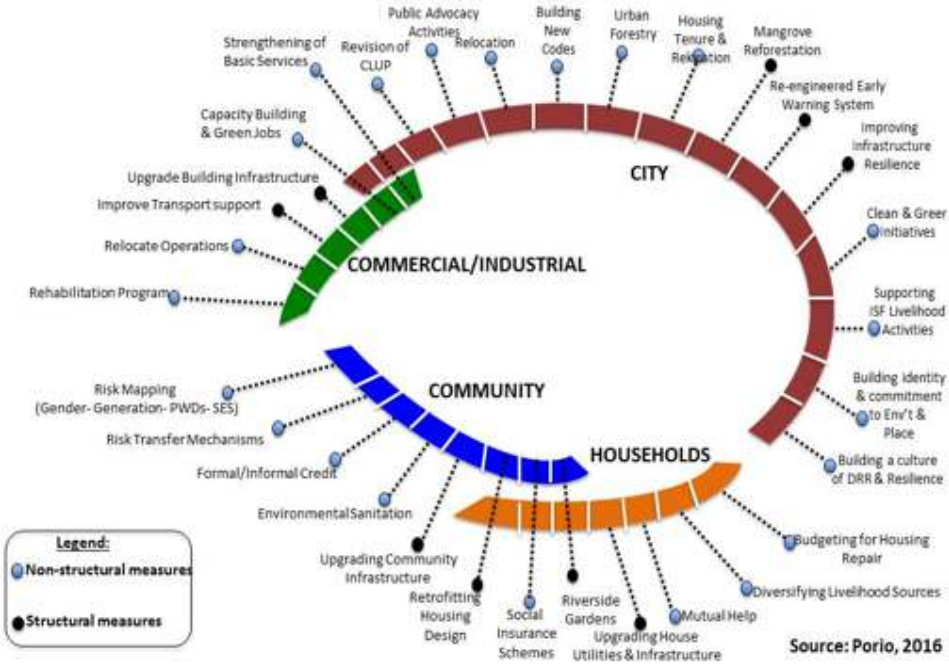

Figure 6. Adaptation-DRR Measures Across Local Governments, Commercial-Industrial and Vulnerable Communities

Advance: Integrated, multi-scalar approaches to risk governance and resilience

1. Establish coherence in the introduction of structural and non-structural measures of adaptation (Porio 2011)
2. Design resilience frameworks to address dynamic interactions between sectors (Porio 2014)
3. Contextualize gender, generation, and social geographies to reflect conditions in formal and informal sectors/economies (Porio 2016)
4. Nature-Based Solutions (NBS): In-City Relocations.