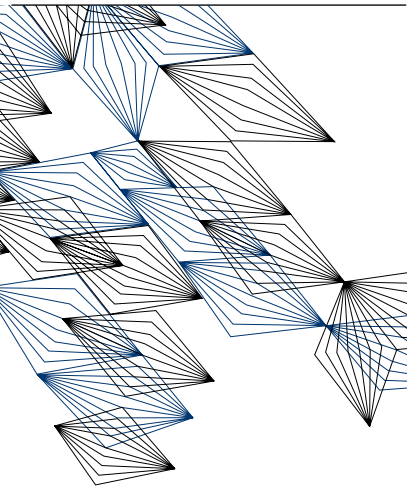
INAUGURAL LECTURE
25 APRIL, 2024



INNOVATION IN SPATIAL PLANNING FOR URBAN TRANSFORMATION AND RESILIENCE IN GLOBAL SOUTH

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Dear Rector ITC, dear Rector ISS, dear colleagues, dear family, dear students, dear distinguished guests, and friends here and all who have joined online.

I am very pleased to speak to you today on what I refer to as my second coming to ITC. 26 years later following my studies at ITC, I am standing before you with overwhelming joy coming back in this role as professorial chair. I am truly honored and at the same time humbled to join ITC as a professor spatial planning for urban resilience.

INTRODUCTION

I give this lecture at a time when humanity is facing multiple risks from climate change, heightened threat to ecosystems and biodiversity, economic disruptions, and geopolitical risks amidst increasing uncertainty. With over half of global population living in cities, the concentration of the risks, impacts and vulnerabilities are arguably more ubiquitous in urban areas. The knock-on effects of the disaster risks on health, food security, social income mobility and functionality of urban systems are well documented. Societies are responding to these risks as illustrated by a systematic stocktake on adaptation to climate change by the Global Adaptation Mapping Initiative (GAMI), Berrang-Ford et al, 2021.

Coming from Kampala, a city where I lived, studied, and worked, I have lived experience regarding failed universalistic urban development on one

hand and associated construction of risk in an effort close the urban infrastructure deficits. This drive is associated with the aspirational urban visions. I mobilize the lived experience together with my own scientific research to understand how resilient urban systems are or can be. I use the notion of 'urban systems' to illustrate the advances in discourse and policy that point to interconnectedness of city of systems.

I draw on the works of many scholars but a few who stand out that have influenced my scholarly journey. My understanding of urban systems draws from various works, Jorge Hardoy with an influential book on "the poor die young', Akin Mabogunje, whom I was privileged to meet at University of Ibadan in 2017, Jennifer Robinson whose books apply cultural lens (The urban now; theorizing beyond the new) on world cities. On the other hand, I have also immensely learned from scholars including Susan Carter, Mark Pelling, Allan Lavell, Tony Oliver Smith, Cassidy Johnson whose works have focused on conceptualization resilience providing critical views and analytical frameworks helpful in measuring urban resilience. These works continue to shape the discourse about cities in the majority world that most literature categorizes as highly vulnerable to multi-hazards. Yet these cities continue to exemplify signals of performance and functionality despite the increasing risk, compounding, and risk cascades.

Based on this background, I endeavor to delve into the why, how, and what can be done to build resilient cities. I use innovative spatial planning not as a new approach but one that recognizes performance and functionality of urban system elements.

BRIEF HISTORICAL PERSPECTIVE OF CONTEMPORARY URBAN DEVELOPMENT AS RISK CONSTRUCTION

Allow me to briefly put risk construction in urban systems into a historical perspective. Historical urban development can be arguably linked to the disasters in many places as constructed risk. Constructed risk is associated with the systemic risk of urban development processes. Hazards are natural but disasters are human constructed although in policy environments, disasters are still considered natural. There is increasing evidence of how pre-emptive risk reduction measures can help in reducing loss and damage and build more resilient cities. SDG 11 - inclusive safe resilient and

sustainable cities sets a global policy agenda in tandem with the New Urban Agenda by UN-Habitat.

Through decades, cities have been built with reinforcing processes of the 'global city' international finance and the 'planning toolbox'. As Robinson [4] observes "internationalization and transnational processes have set up the idea of the global city as a 'regulating fiction', a standard towards which other cities aspire". This urban universalism is a manifest of likeness and desire by urban managers to emulate such imaginaries that have universalist characteristic, a notion that I reflect on critically in this lecture as a driver of systemic risk. But there is a disjuncture between global urban development mechanisms and the urban realities in many geographies such as Africa. Due to the universalistic approach of urban development, there is a tendency to put much emphasis on identifying deficiencies with an aim to trigger policy, investments, and institutional arrangements to address the gap. Such deficiencies are benchmarked on standards of the universalistic global city. It is common for example to build urban infrastructure without consideration of innovative design or alternative materials because such have been validated in many places elsewhere. The result is little success in closing deficit but constructing more risk.

Glocalising urban development has influenced housing, infrastructure and operations that are centralized, networked systems and this remains a dominant agenda of urban governance. Like Maliq [5], Ernerston and Lawhon [6] observe, the urban system functioning is more than the physical artefacts (water pipes, sewer pipes, roads, transport terminals, housing projects, industrial development – the emphasis on the global city illuminates how urban governance is struggling with centralized infrastructure configurations. Urban systems functioning is the bedrock of resilience because it enables functionality but there are limitations of the centralized networked infrastructure systems when extreme disasters stretch the ability of the physical artefacts to function. When centralized infrastructure is knocked by a disaster, the cascades are sometimes far reaching. Although there is limited information regarding decentralized, splintering urban infrastructure systems, it is hypothesized that such alternatives may enhance functionality and performance during and after a disaster. Scholars such as Graham and Marvin [7] have coined terms such as splintering urbanism notions expanded by scholars from Africa Asia, and Latin American such as Parnell [8]as global south urbanism. This framework

provides analytical lens to understand the interactions between elements of glocalized centralized infrastructure and hybridized systems. What is yet to be understood is how the alternatives enhance urban resilience. Both the centralized and splintering systems are in passage to risk construction. This is due to location, design, materials used and operations of the infrastructure. Thus, two layers of risks become omnipresent. The first is the risk to the actual infrastructure systems that are damaged or knocked down when disasters are severe. The second is the double exposure of people, economic livelihoods to the risk from damaged infrastructure and the aftereffects of non-functionality of the damaged infrastructure. For example, when an extreme precipitation event knocks down bridges and culverts in cities, residents are exposed to aftereffects of disease outbreaks, inundation of houses, businesses as well as disruption in mobility. The splintering infrastructure systems may continue to function but only if they can withstand the extreme precipitation. But the splintering infrastructure also seems to have another challenge, that because they tend to be highly decentralized, the functionality has limited performance at different spatial scales.

In researching constructed risk in urban areas, the performance and functionality framework provides insights in how heterogeneous infrastructures, institutional responses, ecological resilience have enabled dialogue between public and individual community through provisioning processes. This demonstrates the materiality of urban spaces where actors identify opportunities, harness them, appropriate and control to leverage the economic, political power but also build resilience. These are the complexities of southern urbanism where resilience enhancement possibilities are less known.

RISK DRIVERS, CASCADES, COMPOUNDING AND TEMPORALITIES IN CITIES.

Urban risk is explained by several drivers. As discussed earlier, the systemic nature of risk construction inherent in development and heightened by the disparate nature of urban planning. There is limited integrated urban analysis and planning due to mechanisms through which urban development is financed, planned, or managed. These three processes are critical in understanding risk construction but at the same time the

avoidance of creating more risk in urban systems. In regard to financing, urban development is project-based on ideation, planning, design, investment and construction. The idea is that cumulatively the projects will eventually create a coherent urban development program with wide coverage. This however has not occurred due to financial shortages in many municipalities, changes in political priorities and contextual issues such as land ownership. Projects often do not cover the entire city which creates a piecemeal approach to implementing projects. While planning is usually project-based, there is effort to cover the city-wide or city-regional perspective to integrate systems and envision strategic spatial interventions. In addition, the operations and management of urban systems follows similar route of sector-based approach. There is usually limited cross-sectoral efforts because sectors are mandated by regulations and laws that often have redundant overlaps. Once again, the assumption is that if all sectors are implemented, the urban systems should function well. In conjunction with the multitude of activities done legally or illegally by the developers and households in cities, the coupling of these factors drives risk in cities.

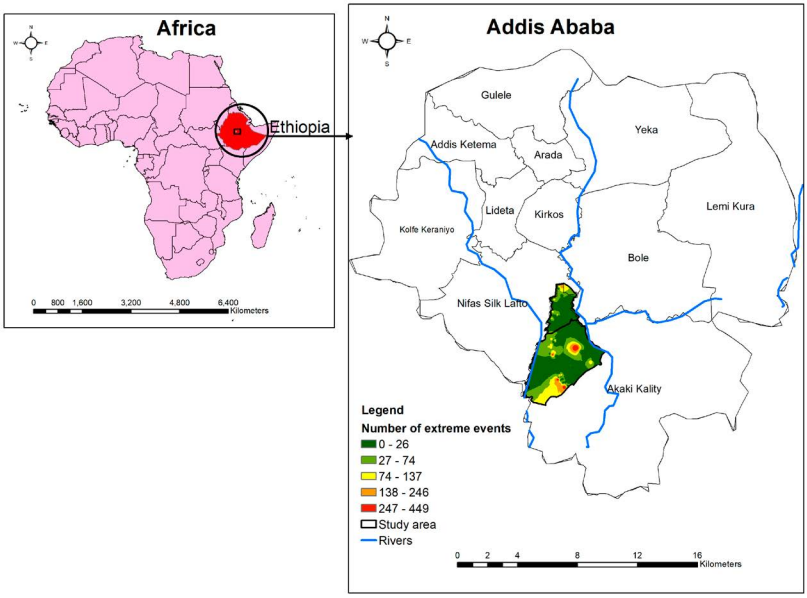

Figure 1 Multi-criteria assessment of resilience in Addis Ababa

In an ongoing urban resilience, we take a performance and functionality approach focused on some of the units – households and businesses. We define both loosely to allow diversity of profiles among businesses and households, to understand their performance, functionality and shocks experienced. This differs from the common approach where performance indicators (usually demographics) are compared to known risk and vulnerabilities estimated often as a collective rather than individual units. This approach helps to understand the differences between households and businesses and would inform resilience programming better from granular to city-regional scale. It is also evident that effects of constructed risk from urban development processes can lead cascades of risk and disasters. Cities are located within regions and some of the cities are substantive regions in themselves. Disaster risks often occur across watersheds and regions. This implies that in space and time, disasters are experienced at different scales. Extreme precipitation may occur in the upper catchment of the watershed but will affect locales where precipitation was not necessarily extreme due to spatial cascade. These cascades explain how vulnerable city-regions can be depending on their ecologies, topography, and location. Localized cascades are more omnipresent in cities that experience flashflood disasters. Once again, the design, construction of maintenance of drainage systems contributes to the cascading of flooding in any cities. With no or limited consideration of enhancing infiltration or retaining runoff, drainage systems easily and quickly transfer the risk from one location to another. In cities with wide social inequality, risk is heightened further and the most vulnerable are stretched beyond their functionality and performance levels. There is also limited incentives for businesses and households to invest in risk reducing measures in many cities. in the figure below, shocks (climate-induced, socioeconomic) their magnitude, cost impacts, recovery period interact with responses (institutional, households, businesses) in terms of financial support, early warning, humanitarian assistance with performance (building blocks – income, number of people in household, age of business) to determine their resilience index.

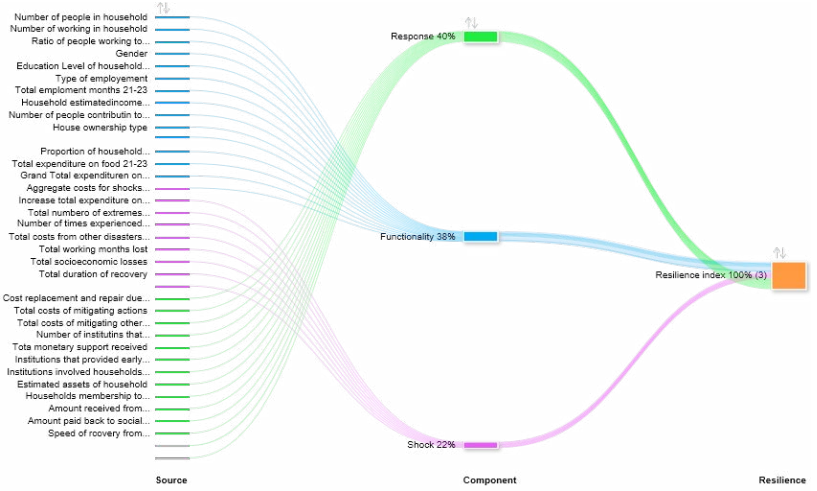

Figure 2 performance, functionality to shocks

THE COMPOUNDING EFFECT OF DISASTERS

Urban policy disjuncture is more ubiquitous when looked at in conjunction with emergencies (natural hazards as well as human-induced) that accentuate vulnerabilities. In our research about filling the urban infrastructure deficit, several processes exert pressure on urban systems for example in Africa. From refugee crises, disaster risk, pandemics and climate risks are also compounding in nature. Cities experience multi-hazards and disasters. From geo-physical, hydrometeorological, hydrological, climate induced heatwaves to floods. The compounding effect occurs when a disaster (every day or large scale) happens or is triggered by another disasters or disasters happen within a period after another before the households or businesses recover fully.

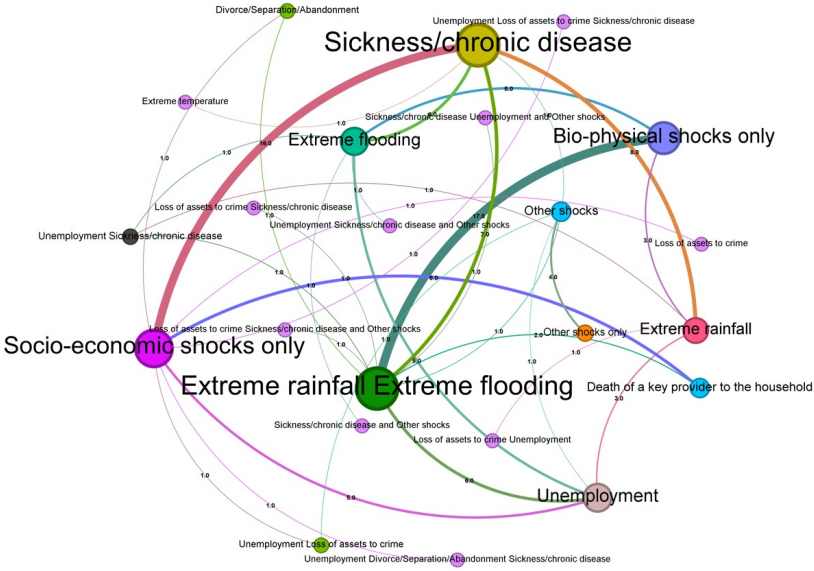

Figure 3a Compounding nature shocks

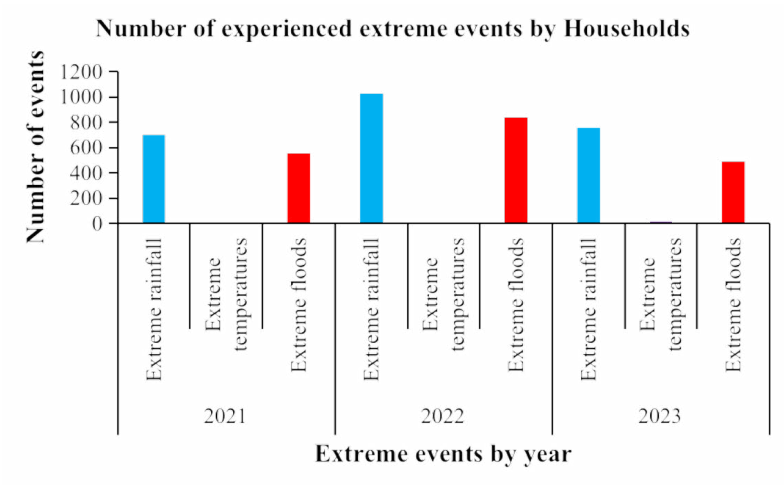

Figure 3b Compounding nature shocks

Our research at granular level reveals how different people in cities by gender, social status, income groups are affected by compounding disasters. The impacts differ whether the disasters are rapid on-sets with high impact or slow on-set with low impact but having a cumulative effect that sometimes discounts the resilience responses of multiple actors. Everyday risk expands the risk profile of many cities for example in Africa where most of our research has been undertaken[11,12]. Climate extremes such as heatwaves, extreme precipitation, flush floods, interact with livelihood systems, urban economic spaces, infrastructure deficits (sanitation, water, drainage, energy, waste management) and housing problem to compound the cumulative effect of low impact but frequent disasters. Informal settlements where much of our work has been undertaken are places of multi-hazard interactions, a profile that puts these settlements at strenuous levels for resilience building despite the multitude of micro-level interventions with potential to build resilience. The micro-level interventions offer many lessons but are often not represented in policy and international debates. One of the lessons from global south cities and largely from informal settlements is how resilient these cities can be in the wake of increasing multi-hazard interactions. How social systems interact with heterogeneous infrastructure systems to maintain a level of functionality after a disaster.

At city scale, the interactions of critical infrastructure including roads, water transport systems, bridges, drainage systems, sanitation facilities, energy grids and water distribution systems to maintain city functioning in the wake of multi-hazard risks helps to understand the resilience to compounding and cascading effects of disasters. The city infrastructure systems are vulnerable to disasters including climate extreme-driven disasters such as floods, heat waves and drought. City scale matters in determining the level at which infrastructure is vulnerable but also response to adapt and build resilience. The challenge is that most urban infrastructure systems are built on the basis of centralized and networked infrastructure model. This in our research has shown that systemic risk can impact larger sections of the infrastructure when critical nodes of the network are highly vulnerable. Due this factor, neighborhoods, economic districts, and activities dependent on mobility are negatively impacted and can go out of function for long before restoration when disasters strike. Therefore maintaining the functioning of critical infrastructure in the wake of high-impact and low frequency disasters presents a daunting task.

In questioning what makes urban systems function despite the disaster risk, our granular research delves into why people choose to stay in risk prone areas. We draw on empirical research to develop a risk assessment framework that transcends the economic valuation of risk and its impacts Lwasa, Amir and Jain. Kisembo [13] extends

this debate to challenge the notion of 'trapped' populations' who live in areas that are frequently affected by floods. From her research it emerges that people choose to stay because the economic loss from impacts is lower than the benefits of living in places that are in proximity to schools, health services and employment zones. This does not necessary mean that these people are thriving, but they are neither coping. The notion of 'build back better' is also challenged with evidence that illustrates need to build better before building back. Urban governance relies heavily on networked-centralized model of design and construction, a validated approach to urban infrastructure system. With increasing compounding of disasters there are lapses in the resilience of such infrastructure, setting in a cycle of resilience redundancies.

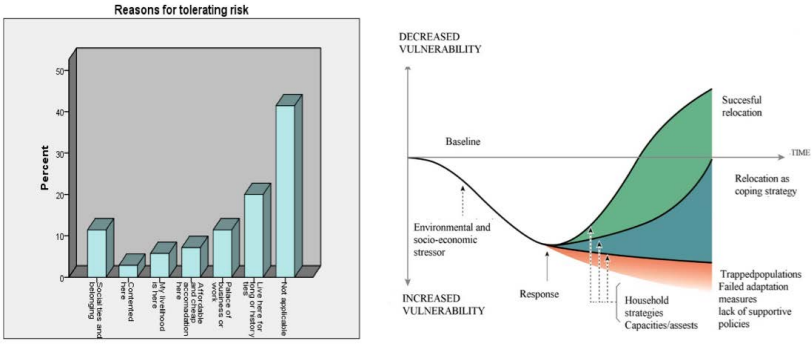

Figure 4 trapped populations

THE IMPORTANCE OF SCALE

The spatial extent of built-up areas is usually linked and dependent on networked infrastructure[14] thus urban goes beyo9nd city. City is also applied loosely but mainly to describe the jurisdictional spatial extent under which governance regime can be determined. By nature of this distinction city governance system – again well validated model of managing cities, resilience to multi-hazards tends to be understood and planned through the city lens. Whether the geophysical delimitation is applied or urban functionality, the interactions in space of 'urban' blur the city jurisdiction and so is what happens often to resilience or adaptation measures. The geographic scale framing is so critical in urban ecologies that have

upstream and downstream spatial interactions. With such interactions, systemic risk becomes more visible and has in some countries created governance tensions with the regional and provincial governments. Despite the notion of city-region being useful in helping to unpack some of the spatial interactions, it is rarely applied. The new UN-Habitat guidelines on 'territorial spatial planning' endeavor to underscore these spatial interactions and under experimentation perhaps a revitalization of 'regional planning'. With this conceptual dichotomy of 'urban' and city', it emerges that different professionals somewhat choose what to focus on when planning for urban resilience. In our research evidence is emerging on the importance of resilience planning at household business, infrastructure, institutional levels with scalable solutions to city-regional level. Micro – meso-macro spatial scales of urban offers many possibilities to optimize synergies, co-benefits, and minimization of tradeoffs.

Nature-based solutions, spatial planning and water resources management

Figure 5 WRI, city-regional interactions

SPATIAL PLANNING BOTH A RISK DRIVER AND OPPORTUNITY FOR RISK REDUCTION IN CITIES

Drawing on Mabogunje and recent works, critical urban theorists have questioned Robison's 'global city' as an exemplar for urban development. This challenges the urban planning approaches intertwined with the international development. The global city notion dominates where urban planning and the intended outcomes remains incongruent with urban realities. This is partly because planning procedures, planning standards, structures are professionally followed by the 'book' yet the urban realities as observed by Mabogunje illuminate differing trajectories of urbanizations characterized by complexities. The notion "planning by the book" provides an entry point to an engaging discourse on urbanity, urban space, and order. Innovation in spatial planning has evolved from technical approaches, sociocractic approaches and the pushing the knowledge frontiers on what planning can achieve in the midst of an intractable challenge, multi-hazards and climate challenges. Engaging with these conceptual questions stimulates Localised Urban Knowledge Arenas (LUKAs) as platforms recognizing knowledge held and applied by actors at granular level. The platforms highlight the importance of localized experimentations, innovations and creativity that are complimentary to urban science but yet to gain their locus in urban theory. The critical theory and debates challenge the a priori model of planning based on skewed knowledge generation with a posterior models in engaging with urbanity. This is helping to unlearn and relearn ongoing innovation, ingenuity whose potential is yet to be understood.

Innovation in spatial planning can be thought of in multiple ways and whether the city is; established, emerging or new

- Working at scales (micro-meso-macro) to spatially connect urban jurisdictions can drive an agenda to optimize spatially scalable opportunities.
- Leveraging resourcefulness that exist in planning areas for example ecologies for climate response and biodiversity enhancement – planning with nature
- Leveraging opportunities associated with but not limited to resourcefulness for example local to global value chains – repurposing urban infrastructure and spaces

- Flexibility is planning standards to work with existing cities in order to minimize deconstruction.

Innovation can be driven by knowledge and planning platforms such as Local Urban Knowledge Arena (LUKA) and in Kampala for example, this has evolved into Urban Labs (UAL) https://www.ual.mak.ac.ug/ or Urban Observatories that has brought different actors, community, scholars, policy actors to experiments on some of the innovations, set research priorities and test scalability of solutions. At Makerere University where I contributed establish an UAL, a learning platform is emerging as a convenor for innovation rather than being only a machine for generation of scientific knowledge that ends up only in publications. In Lagos, the Urban Lab is configured in similar manner and acting as a convenor for multi-stakeholder dialogue, planning and implementation. The platforms are putting into dialogue the three spheres and notions of urban planning, including professional principles, city dwellers and decision-making entities. Though not conclusive, the experiments so far have demonstrated that planning by the 'book' has some counter effects to urban development if not surpassed by developers determining what to do and going ahead to exercise agency to implement with or without the decision-making entities and professional expertise. The dilemma of urban planning can thus be described as either being technocratic on one end or sociocratic on the opposite end of the spectrum. The later being largely a response from actors other than planning professionals themselves. The influence of urban planning has been at best piecemeal and at worst non-responsive to urban realities. Again similar methods and mechanisms expecting different results continue to be dominant in urban development.

Some examples of spatial planning for resilience are underway and lessons emerging include allowing time for coalitions to evolve, bridging innovative financing, integrated spatial planning – planning with and for nature and people. The Edible Landcape Kampala, Kengeri campus of IIHS in Banglore, Bo City and Nbs, cape Coast and Nbs.

Figure 6 Innovative spatial planning – scalable soultions for resilience and well being

THE POTENTIAL OF NATURE-BASED SOLUTIONS IS UNKNOWN IN ADDRESSING CLIMATE RISKS

As aptly highlighted in the recent IPBES 2019 report urban ecosystems have no analogue in earth's history. This is because unlike natural biomes, they do not have an assemblage of species with a long evolutionary history, though many urban species have been evolving rapidly as they adapt to this new and rapidly changing environment. The report further observes that it is difficult to specifically refer to species as 'urban', there are some differences between same species that are found in urban and other biomes. Such differences have been reported in adapted species behavior towards food, habitat, proximity to humans, water sources, nutrient loading in the built environment for both flora and fauna species. In addition urban areas are usually naturally productive and would often have originally been rich in natural biodiversity, because people – part of nature – have many of the same requirements as the rest of nature. Cities have replaced natural forests, coastal ecosystems and desert area. Cities are of different spatial scales, demographic size and configuration that are characterized by productive urban, peri-urban agriculture and forestry areas [16]. This nature of expansion poses threats to the fragile ecosystems. But urban ecosystems offer insights into the future effects of climate change. Cities tend to have higher temperatures because of the urban heat island effect, higher CO2 levels and higher nitrogen deposition, nutrient loads but urban areas also provide habitats, which are remnants of originally-present natural

vegetation, arable cropland, meadows, waste ground and horticulturally managed areas supporting various species.

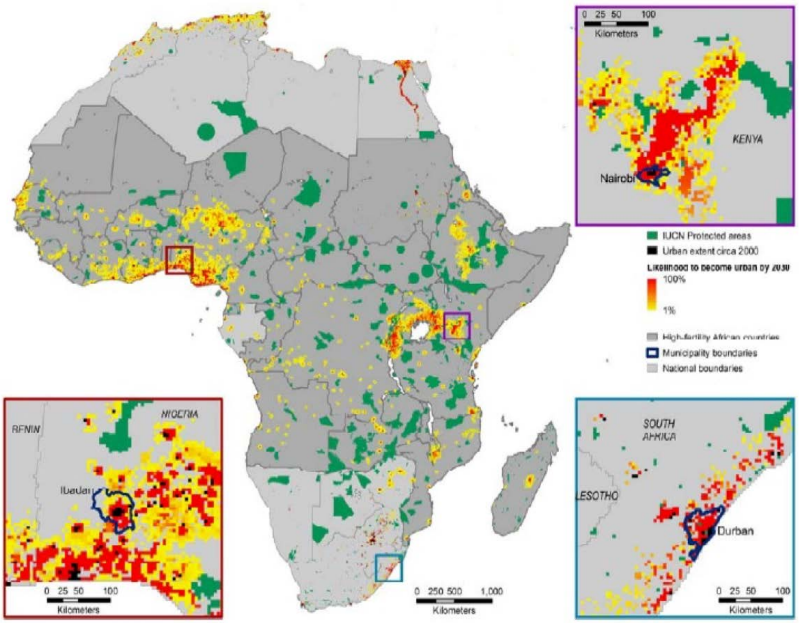

Figure 7a cropland and forest loss in Africa

Region*	Urban in PAs in 2000 (km^2)	Urban in 50km of PAs (km^2): average (std dev)			Percent Increase in Urban in 50km of PAs: average (std dev)	
		Year 2000	Year 2030			
Northern Africa	125	2,800	14,182	(2,518)	407	(190)
Mid-latitudinal Africa	300	5,425	107,110	(20,862)	1,874	(485)
Southern Africa	100	6,875	23,312	(3,194)	239	(146)
Africa	525	15,100	144,604	(25,416)	858	(68)

* Regions are based on United Nations (UN) regional categorization; Mid-latitudinal Africa is Western, Middle, and Eastern Africa regions.

Figure 7b urbanization and cropland forest loss in Africa

The global extent of urban settlements is less than 0.5% of the world's land surface but more than 54% of the world's population lives in urban areas. Urban landscapes vary greatly in structure, from heavily built-up with almost no green space to low-density development with extensive patches of vegetated lands. They also vary greatly in the degree to which green spaces are connected by potential corridors, and the degree to which key landscape features for biodiversity and ecosystem function – for example trees, invertebrates, aquatic life – are present. Nutrient loading in streams, rivers and lakes in cities is associated with urban activities, while vegetation index is lower in urban compared to rural regions, and often by less than the proportion of land that has been converted to impervious surfaces [22]. Urban units are less considered for the ecosystem functioning positives that accrue from patches with nature and how people as part of nature interact with other ecosystem elements. The ecological values of the patches tends to be underestimated and this goes from densified city centres through the peri-urban zones. Urban residents might be contributing to biodiversity conservation but the landscapes are often beyond the scope of the defined categories of landscape protection thus considered areas of less ecological interest in the context of extensive analysis. But recent efforts indicate that municipalities are recognizing and starting to value the ecosystem benefits of the patched urban landscapes [24]. Urban areas and the regions around the cities have embarked on restoration of ecosystems from species diversity to reduction in use or elimination of sewerage treatment plants by resorting to natural systems of waste treatment, filtering and purification. In some city-regions, tree-planting as a restoration drive has been embedded in social interventions of addressing poverty to create new economic opportunities while restoring and enhancing the ecosystems [26]. While linking nature with tradition, biophilia is promoted in some urban areas through awareness and public campaigns to restore native tree species in cities that local communities identify with. These examples illustrate that the futuristic character of urban ecosystem may be uncertain in context of climate change but it is also uncertain how it will most likely be shaped by deliberate programs of restoration and enhancement of the ecosystems.

Figure 8 A view of Kampala city Source: [9]

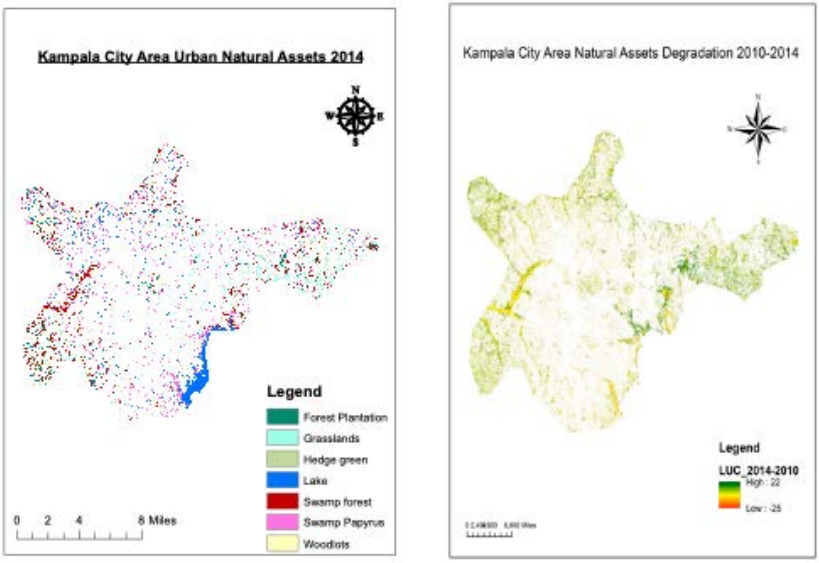

Figure 9 Urban natural assets (ecosystem patches) in Kampala

SPATIAL PLANNING FOR URBAN RESILIENCE

Resilience is complex, hard to measure leading to contestations on what it is. Resilience has traveled into other sciences and spheres from ecological science. Uncertainty complicates resilience conceptualization and measurement. A holistic approach to resilience is challenging let alone difficult to conceptualize. In the context of urban, most literature discusses resilience as a policy narrative in tandem with reference to an event or events so that the impact, recovery and bouncing back can be measured. Recent literature is starting to delve into resilience as key dimension in development process that takes into account known anticipated risk as well as uncertainty. In partnership with colleagues here from Addis, Lagos, and Kampala we are conducting a 'light touch' study that pushes the frontiers by applying an analytical framework that integrates social, institutional, and ecological resilience in order to understand how urban units are affected by shocks, their response and performance.

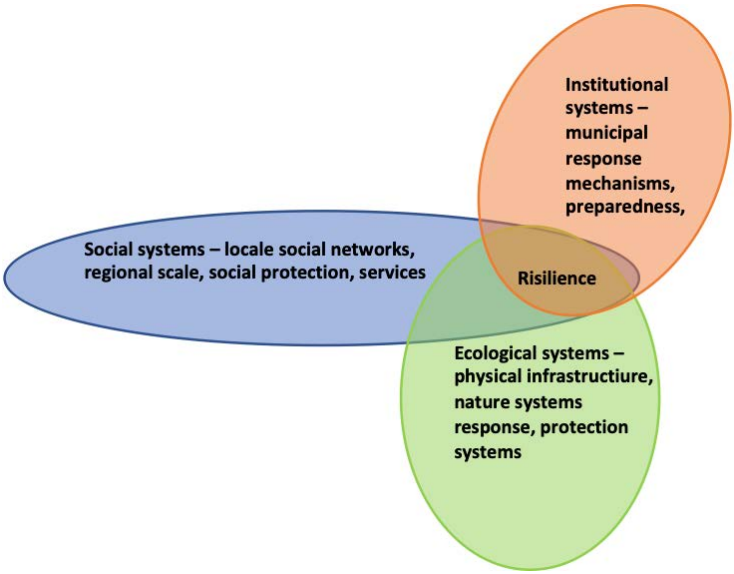

Figure 10 Performance and functionality analytical framework

THERE ARE TWO KEY QUESTIONS ABOUT URBAN RESILIENCE

- what risks are cities facing and building resilience to?
- what are the interactions of the urban system components with the multi-hazards?

The questions raised here are not simple nor straight forward. This is because of three reasons.

a) delayering risk profile of cities is helpful if there is enough understanding of the geographies, ecologies, cultural and economic systems. This is complex because the ways in which we envision cities has always and arguably remains sectoral-based.
b) there are no conceptual and theoretical frameworks developed to understand the interactions between the hazards and urban systems.
c) there is also the complexity of risks, its interpretation, communication about risk, the spatial temporalities and uncertainty especially in regard to compounding and cascading nature as the case of climate change impacts.

I endeavor to locate the discussion about urban resilience in my reflections drawing on my observation of multiple and continuous interactions between different city systems (including people) that reinforce or reduce vulnerabilities.

Despite the challenge in the questions above, as well as other fundamental challenges in resilience building, many resilience programs in the contemporary policy debates utilize frameworks that are similar to the dominant urban development processes. In our research urban resilience, we also conceptualize and discuss the centrality of 'people' and cultures together with institutions. We build on the multitude of micro studies in different cities of differing ecologies and social cultural settings to propose a framework that starts with granular level profiling of shocks, performance and functionality which is helpful in our understanding of urban resilience. Not surprising, the apparent strength of this framework seems to be rooted in the social networks, collective capital, and reform coalitions (however lose the coalitions may be) as illustrated partly by the emergence of urban Africa out of the COVID19 pandemic.

SOCIAL, INSTITUTIONAL, AND ECOLOGICAL PROCESSES OF RESILIENCE

Resilience analytical frameworks have evolved. Some of these have been applied in urban contexts. The unit and level at which resilience and vulnerability is measured is critical in not only understanding but also designing interventions. Most literature recognizes and analyses units as households, businesses, pieces of infrastructure and institutions but tend to analyse at a level of aggregation that obscures individual unit conditions, behaviour, and response. There is evidence across the world that adaptation measures have been implemented by sub national governments and households or businesses. IPCC AR6 highlights adaptation and mitigation measures that can be linked to resilience. These three graphs from AR6 report of all working groups synthesize the linkages between global warming, institutional and urban systems – including ecology.

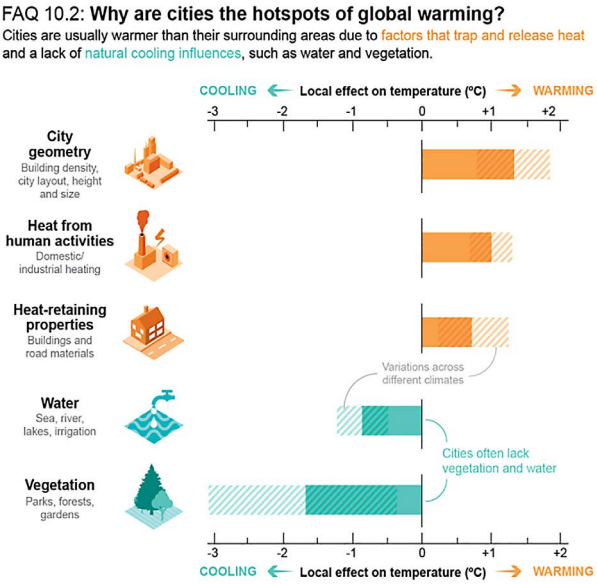

Figure 11a

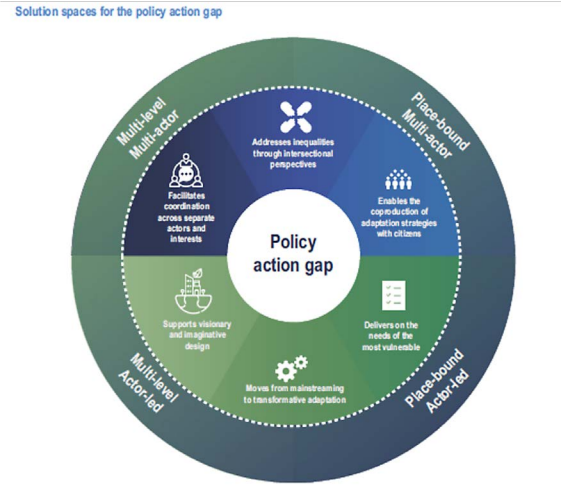

Figure 11b

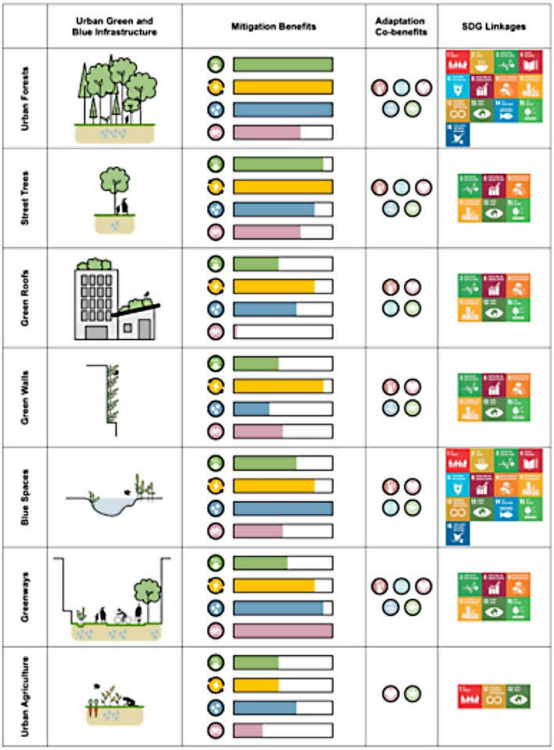

Figure 11c

From a global stocktake, vulnerabilities are experienced on every continent in varying degrees, magnitude, and impact but also in terms of response. A GAMI paper shows the interventions that have been reported in literature. Some geographies show gaps, but this does not imply there is no adaptation but sometimes this apparent gap is explained by the intricacies of global publication systems. In our planned research, we hope that colleagues can join in working on knowledge gaps drawing from grey literature and experiential knowledge to inform local to global solutions.

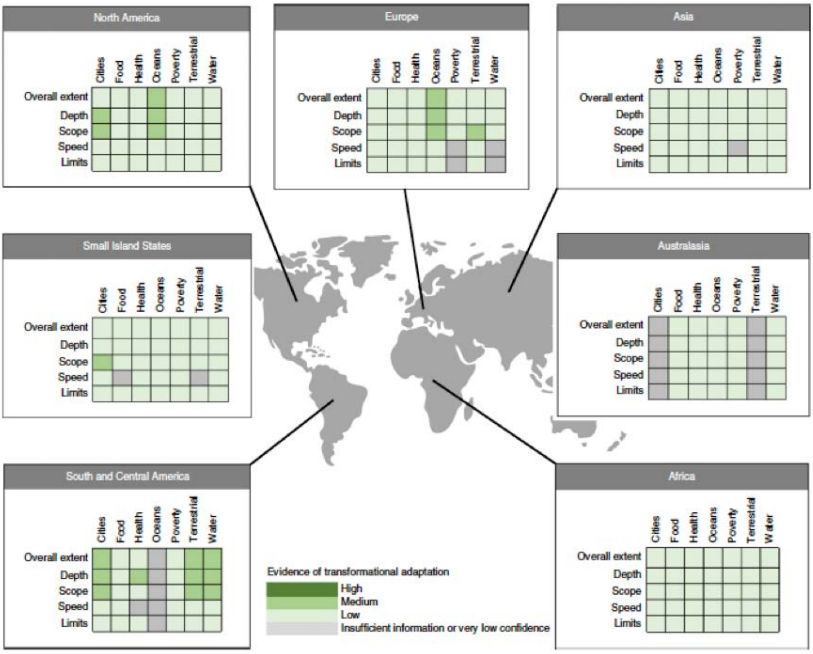

Figure 12 A systematic global stocktake of evidence on human adaptation to climate change

TRANSCENDING RISK INFORMED DEVELOPMENT

Many cities have embarked on developing strategies for resilience building. In our research on risk in urban Africa, we highlight the need for better

understanding of actors involved in reducing risks, their partnerships, capacities, and ambitions. This creates ambition for seeking positive impact in the region's emerging cities where new research can inform responsive policy agendas on resilience building as part of the framework for sustainable urban development. Risk and resilience are of concern in UN-HABITAT's New Urban Agenda, a 20-year international framework for sustainable urban development which builds on priorities identified in the Sustainable Development Goals (SDGs) and the Sendai Framework for Disaster Risk Reduction. The SDGs present the development community with an integrated approach to risk management that recognizes urban development as a driver as much as a solution for risk reduction and poverty eradication. But it is important to consider how urban risks and resilience are theorized or practiced as concepts that hold multiple meanings and intentions for different actors. Emergent resilience framings offer the potential to shift debates on and responses to the need for social justice in towns and cities, as a critical dimension of equitable and inclusive risk reduction and resilience building.

Many cities are characterized by inequalities and environmental deterioration. Whereas human exposure to disasters in cities is interwoven with the effects of state fragility in some geogrpahies. Despite the significance of large-scale disasters, the impacts of everyday hazards (such as infectious and parasitic disease linked to unsanitary conditions) and small disasters (such as localized floods and shack fires) in the region cannot be underestimated. At the city scale, understanding the linkages between development processes, underlying everyday risks and periodic disaster risk is vital if development is to reduce rather than generating risk. As observed by Pelling et al 2018 [29] methods that influence resilience and risk narratives are assumed to be consensual yet there are differences in resilience narratives when people at community scale are empowered to frame such narratives. Because of the constructed risk, urban development tends to be underpinned short-term risk reduction but evolving into residual risk in the future when uncertainty of the nature, scale, and distribution of future risks manifests.

Drawing on our recent research, possible risk- mitigating options need to be examined before deciding on the most cost- effective strategy in the short, medium, and long term. At the household level, factors including

social attachment, connectivity and access to services in cities offer an extended value registry that needs to be incorporated into frameworks for assessing decisions about risk reduction[3]. Any intervention (such as housing) results in both costs and benefits being incurred by the people. For instance, research reflects the fact that resettling people from high-risk areas diminish the costs associated with the emergency and reconstruction phase. However, certain non- monetary costs, such as the loss of livelihood opportunities, physiological and social consequences, and disruption of social cohesion are often discounted, regardless of whether the intervention is beneficial or not.

In our research, it emerges that risk is defined and experienced in different ways. Flooding risk can be defined as a cost to the city, neighborhoods, families and individuals, the environment, businesses, and livelihoods. This is the normative approach to risk in that it is seen as the potential for losses. However, we can also define risk as an opportunity, or making a trade- off for benefits. In this sense, risk- as- opportunity can be an indicator of potential for achieving greater gains than would otherwise be achievable. 'Costs' and 'risks' are related to 'value'. Here, 'value' is broader than financial measures and thus affords an opportunity to think of 'value', 'cost' and 'risk' in many different ways. Objects in the everyday environment and different configurations of location, infrastructure, flows of people, goods and resources can have different values for different people. These values can also change over time, for instance due to changing identities from a young person to an older parent. Values may also change due to changing registries of meaning: for example, land bought becomes an inheritance for children. In such a case, while the 'market value' has not gone away, the value of the land is understood within a different set of norms, expectations, obligations, and relationships and affects what can and cannot be done with the land. Household- level and project- level decisions play out within a wider regional and local dynamics of development (and not merely risk reduction). 'Value' is implicitly informed by the larger urban dynamics. At the same time, risks also need to be understood in the context of a changing climate, which may not be articulated as such at the time of 'valuing risk' due to lack of knowledge but could potentially introduce new unknown risks in the future. It is, therefore, equally important to locate decision- making within the wider context of regional and city development agendas and to use the analytical reference of

outcomes as a critical lens to examine the conditions for resilience building. We develop this framework on basis of empirical data from southern cities to push the resilience frontier by conceptualizing risk as a cost but also opportunity and that at granular scale the risk assessment by an individual or collective goes beyond the 'costs' to opportunities. Any resilience building initiative would have to engage alternative frameworks of understanding risk and vulnerabilities.

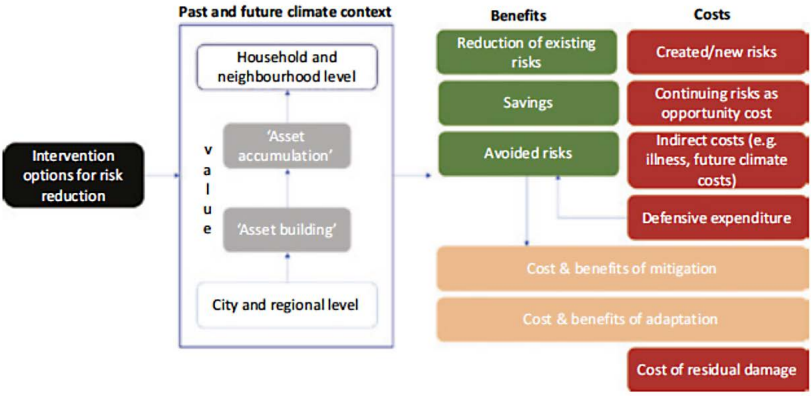

Figure 2021, A risk assessment framework for decision- making that transcends economic valuation

URBAN RESILIENCE - CONNECTING THE DOTS, A PERSONAL REFLECTION

In synthesizing the reflections on spatial planning and urban resilience I have navigated multiple fields of study that would raise the question, how did I come to engage with these topics? Perhaps the other question would be, what is my field of expertise? The answer to the first question is in the statement bellow which is rooted from my childhood days. The answer to the second question is what I outline as the ambitious plan going forward.

I have aligned my lived experience to the academic inquest in understanding how to position theory with reality in urban. Many of the

issues I have discussed resonate with the three neighborhoods where I spent my childhood days that when I read works such as by Hardoy et al "the poor die young" that resonated with my lived experiences. These works have been influential to the research I have undertaken because it provided the bedrock of my research and academic trajectory. As illustrated in this lecture the important framework I reflect on is the performance and functionality in urban areas that takes us to granular level of entities including households, businesses, infrastructure pieces. I have learned while in practice transdisciplinary methods in understanding urban resilience.

Transdisciplinary methods should help in integrating knowledge from different perspectives to create societal impact as response to the emergencies. Integrating geospatial tools, social science methods is good for heuristic analysis that can help in unearthing deep understanding of urban system dynamics. The tools also can help with linking disaggregated data with macro level systems dynamics thus enabling scalar analysis of resilience that allows profiling of different entities at risk. The integration can also help in unpacking the complex city system which would hardly be addressed by disparate sectoral approach.

We also learn from our research that in urban areas, the technical interventions that are needed are well documented, but these are dependent on institutional, social and governance systems, which tend to operate differently. Social and institutional processes are characterized by differing method of work, differing values, and cultures to be coherent in addressing the urban challenge. Arguably, disaster risk is pushing the science frontiers by making us think about bringing the broad fields of disaster risk, urban development, spatial planning in dialogue. I mobilize the previous research to explain where I am now in research pushing the frontiers of urban science in search for useful, usable, and used knowledge. Bridging the granular level with global action as we see in IPCC-UNFCCC and IPBES is critical in these times.

OUTLOOK ON URBAN RESILIENCE

PUSHING THE FRONTIERS OF URBAN SCIENCE FOR RESILIENCE

My research has generally focused on Sustainable Urban Development and recently pathways to achieve time-specific targets under SDG 11, climate targets and the New Urban Agenda. As shared with you there are number of tested possibilities that link urban deficits, social inequality, urban poverty with resilience to multi hazards. Research on possibilities is contributing to deepened theorization of Global South Urbanism and more recently contingency planning for increasing uncertainties of climate change and disasters.

Going forward, I hope to engage further in research urban systems from granular to macro-city-regional level with diverse alternative solutions and pathways to enhanced performance and functionality for resilience. Equitable access to water, sanitation and waste management and integration into the urban economy are key elements of performance. Some of the key research topics that test plurality of urban systems include green and blue infrastructure as an alternative but complimentary. These may include the role of off grid, hybrid, heterogenous infrastructure (alternative urban water and sanitation solutions); appropriate business models for MSME's to enable vulnerable low income communities to be integrated into the urban economy with possible linkage to global value chains; how informal economy can be enhanced, grown and promoted to integrate many urban dwellers whose life skills are not marketable in the formal urban labor market; the intersectionality between poverty gender and equity, and what models are appropriate to address the challenges of these intersecting processes.

In envisage a focus on cities as systems of a nested system, connected and interacting through infrastructure, flows of materials (contiguous and distal), financial resources and people by adding more light-house cities to my research network. Systems through which hazards can be understood from a systemic risk perspective. Working with current deficits in developing countries suggests rethinking spatial planning for urban development that is holistic including governance, finance, therefore

analyzing existing and alternative financing models will be a key research topic. Challenges to address decency in urban infrastructure and services coupled with how to protect the infrastructure to threats of climate change and the transferability of innovation in different geographies. There are numerous initiatives for adapting urban infrastructure to extreme climate events but cascading risk limits city-scale resilience, so how to address hazards in space (contiguous and distal) and time is key to international development as interdependencies increase. Some of the key questions include how can cities in developing countries ensure connectedness for economic vibrancy with minimal risk for loss and damage? How can adaptations be complemented and linked at multiple spatial scales to build resilience for broader urban systems in different geographical contexts? What is the potential for urban systems circular economy? What financial models, entrepreneurial skills are needed and appropriated to enable product and service development for connectedness of cities Globally?

In addition to a deep dive into city systems, future research is planned to investigate the role of urban climate policy, governance, and transformation. Urbanism brings together technical and social elements, thus institutions have to make the appropriate decisions on technological solutions and strategy for development. These can be analyzed in the context of governance, policy options, financing, and levers for transformative urban development planning. The research that expands to assess potentials, feasibility, and costs for transformative urban development for resilience in cities.

THE PLAN

The role of Chair of spatial planning for urban resilience combines well with chair of urban resilience and global development. Following my discussions with the Rectors Freek and Ruard, it is clear that this is one rather than two positions. Although it is challenging, I have initial thoughts on an ambitious plan.

Inspired by the UT-Climate Center', I would like to propose an experiment bringing to fruition the GeoTechnoSocial approach which reminds me about the book People and pixels – linking remote sensing and social science, National Research Council 1998

- With Geotechnosocio -> I plan to explore bridging ISS and ITC. Possibly PhD/s jointly supervised and applying transdisciplinary methods to deepen analysis of performance, functionality of urban resilience.

  - Possible topic/s to start with a broad topic.

  - "Fragmentation of ecosystems in urban environments, evaluating potential for adaptation and mitigation for resilient urban futures"

- The 7th IPCC assessment cycle has kicked off with a special report on cities.

  - Can we bring ITC-ISS talent, innovative methods work on a potentially impactful paper/s that can influence the IPCC AR7 trajectory on cities. key in this is highlighting 'disruptive systems' potential for climate response in established-emerging-new cities both in the global north-south, issues of equity in and seizing and harnessing opportunities.

This plan can create the space to continue engaging in granular level research while exercising decorum to have the broader view of urban systems. This is work in progress and hope to collaborate with many in this endeavor. I vouch for research-led teaching which can contribute to theorizing but more importantly societal impact on reducing risk and addressing the intractable challenge in cities.

ACKNOWLEDGEMENTS

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I would like to recognize special guests from Addis, Kampala, and Lagos. Professor Taibat, Tegegne Gebre-Egziabher Belay, Ezana Amdework Atsbeha and colleagues Dr. Paul Mukwaya, Daniel Ologe, Mr. Alex Kivumbi, Dr. Moges Tadesse Belane, Dr. Victor Onifade, Dr. Badiora Adewumi. You inspire me more to work on urban resilience. I have learned a lot already about urban resilience in these cities.

The many professors on whose shoulders I continue to stand, allow me to mention Professor Hannington Sengendo and Professor Tony Oyana, I always looked up to you for inspiration. The many learners I have worked with, who have taught me lots about urban systems, applied Geospatial tools in the search for solutions to urban challenges including resilience. The communities in several countries who have been my teachers and mentors shaping the academic and research trajectory I am speaking about today.

I take this opportunity to recognize my family here today, Jalia Luwedde, Jamein Lukyamuzi and Badru Sekyanzi and those online for the unwavering support through my academic career. Fahima and Fatumah, I know it is early morning hours in Melbourne daddy loves you very much. My family in Kampala, Mbale, Thornton, London, I know you have tuned in. A special thanks to my late Mother Hajjat Fatinah Kiwuuka Namusisi who's resolute for support and encouragement still lives on 24 years after her passing.

I would like in a special way thank Professor Richard Sliuzas, for the professional trust in all the collaborative research work we have undertaken that in many ways forms the building blocks in paving my return to ITC in this role.

FIGURE CREDITS

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Figure 2 *Lwasa S., Lawanson T., Mukwaya P., Gebre-Egziabher T., Amdework E., Onifade V., Kivumbi A., Adewumi B., Tadesse M.,et..al, 2024, urban resilience from performance and functionality perspective*

Figures 3a&b *Lwasa S., Lawanson T., Mukwaya P., Gebre-Egziabher T., Amdework E., Onifade V., Kivumbi A., Adewumi B., Tadesse M.,et..al, 2024, urban resilience from performance and functionality perspective*

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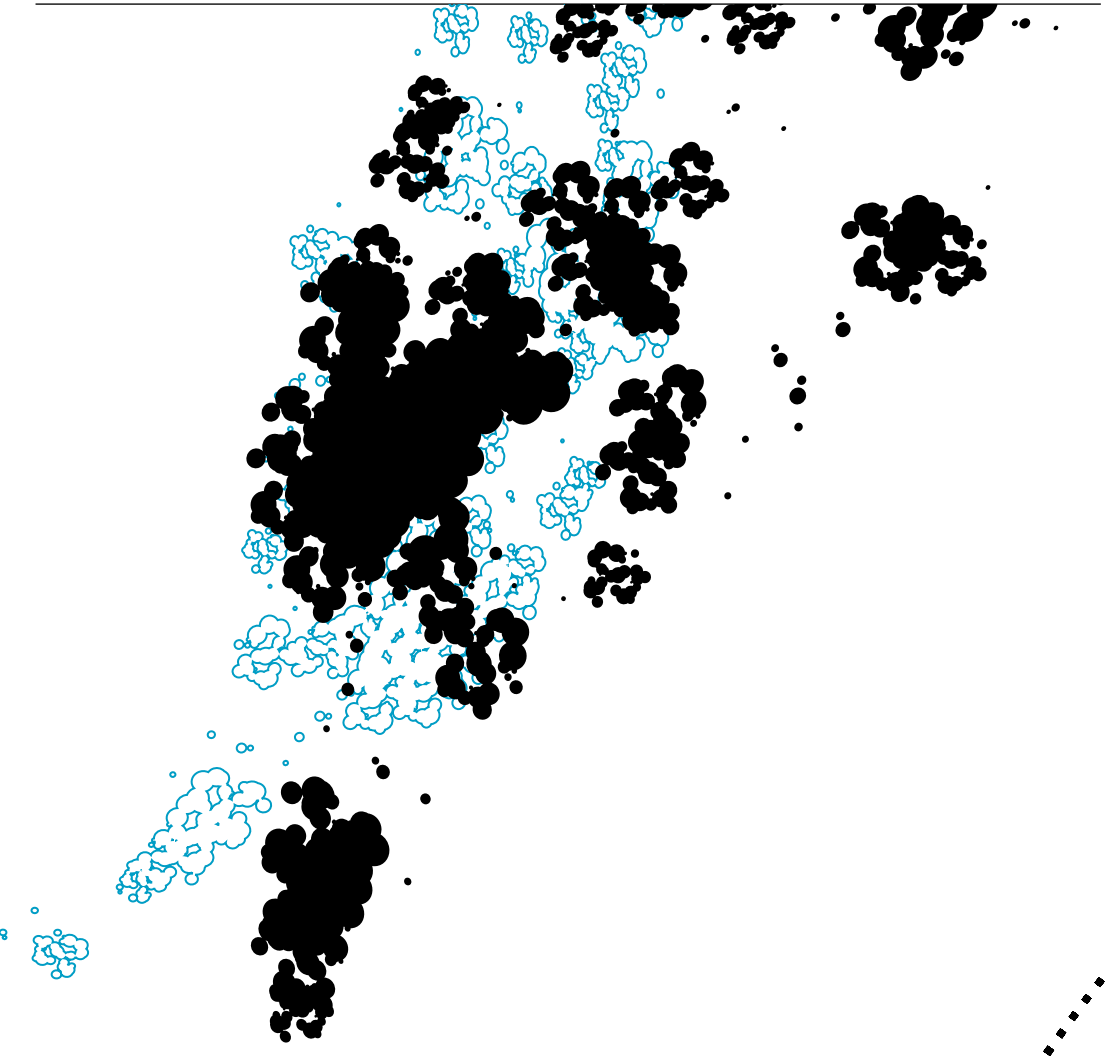

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