Summary of activities, outputs, and opportunities for the TCDSE

10th February 2021

The Nairobi Risk Hub

Summary of activities, outputs, and opportunities for the TCDSE

By Nairobi Risk Hub Team

10.02.2022

Overall Summary

By Joanes Atela

Nairobi work and impacts

The Nairobi Risk Hub (NRH) has achieved major milestones in its work over the last 2-3 years-placing city at a very strategic position to engage with the TCDSE research and impact. Social science research has focused on socialising the concept of disaster risk to the Nairobi context and co-production of risk knowledge with communities in informal settlements (Mukuru and Kibera) and the city government. At the community level, participatory assessments of risks e.g. the RVA and associated community dialogues yielded good understanding on the entry points for risk research. Further, working in Mukuru in the context of SPA implementation has yielded useful insights on considerations of disaster risks in infrastructure planning for future Nairobi. Additionally, co-produced data with communities including transect walks and FGDs has contributed to the TCDSE design and hazard (fire and flood) modelling.   At the city level, social science has focused on engaging the NCCG though sector dialogues and DRR policy analysis. Wider stakeholder engagements (e.g. with city planners, CSOs, CBO groups, UN Agencies) have also taken place at different levels. These engagements have enabled good relations with city stakeholders, created a strong identify for the hub and opened spaces for data mining and sustainable impact through the TCDSE.

The key impacts of Nairobi work this far are threefold 1) the understanding of how risks is perceived at communities and city levels and opportunities for research and impact moving forward 2) socialisation of the risk concept at community and city levels by engaging communities and city with risk science participatory risk assessments and hazard modelling 3) linking Nairobi work to the TCDSE through data.

Learnings moving forward

Some of the key learnings is that the disaster risks in Nairobi is highly socialised (including political culture, governance, livelihoods and development) in the city and any research should engage with this context to produce impact and useful learning. The SPA- in Mukuru has revealed the complexity i.e. even with clear and internationally acknowledged process, the socio-political context remains influential to the planning adoption and outcomes. Internationally driven initiatives are also subjected to this context. The UNDRR driven MCR process for example, has encountered major social barriers such as governance gaps, lack of adequate relations and capacity that has impeded its activities since its inception in Nairobi. Indeed, the UNDRR regional office has now requested the NRH to help support capacity and relations building for the MCR initiative in Nairobi.

The other learning is that building relations and trust takes time and involves a multiplicity of factors. It is not a one-off workshop but rather integrated approaches of continuous engagements, conversations in formal and informal spaces. This is because there are many initiatives at national and international level seeking attention of Nairobi stakeholders and thus, packaging the risk idea into the context will require strategic understanding and engagement with the context – something the NRH has achieved. The secondment of the hub researcher to closely work with city government has been fundamental in building city level relations while at community level, working with community leaders in Mukuru and Kibera and building on existing relations has enabled good relations with communities.

Finally, technical capacity is central to achieving impact in Nairobi. The NRH- through the ARIN network has undertaken some initial capacity assessment and found significant gaps in physical modelling since most trainings at the University are managerial in nature. Weak technical capacity at academic and city levels has 1) slowed down the hub research especially hazard modelling work 2) slowed down engagement with policy makers 3) Differing perceptions about risks among different stakeholders- an impediment for collective efforts towards current and future risk planning for the city. In order to achieve research impact under the Tomorrow's Cities – Nairobi Risk Hub and support effective disaster risk action planning at different levels, there is need to understand and strengthen technical capacity to engage with the risk concept.

Overall, the NRH experience shows that socio-technical approaches to integrating risk science could yield stronger impact at city and international levels than pure technical fixes.

Engagement with the TCDSE moving forward

Moving forward, the Nairobi hub will harness its experiences to undertake targeted research and impact activities through the TSDSE research and impact in three ways over the next year:

1. *Research- Data support and analysis and data platform for the TCDSE:* There is an opportunity to continue generating data (building on established relations) and analytical work for the TCDSE from wither Kibera and Mukuru or both. The initial plan was to link the TCDSE to the Kibera SPA planning- which has delayed something that could posit some challenges. Mukuru could provide a win-win opportunity because the SPA is already providing a good context for the TCDSE and some good relations, data and linkages built. Mukuru SPA and experience in implementing it is useful for the TSDSE in the context of national and international attention that the process has attracted- an opportunity for international impact. There is an opportunity to link to broader climate change work through the Adaptation Research Alliance. Both ARIN and KDI will implementing micro-grants adaptation projects under the ARA. There is an opportunity to save time and costs by linking the TCDSE to the strong research and impact foundation set in Mukuru. While the NRH has build relations with key city stakeholders e.g RedCross, NCCG, Kenya Met etc which has enabled access to data, the hub is working with various stakeholders to consolidate a DRR data platform. An initial workshop on data was executed to explore such opportunities.

2. *City Impact: support city DRR plan using the TCSDE-* The NRH has worked with the NCCG to undertake analysis of various sectors and identify opportunities for integrating risk in the sector plans. There is an opportunity to use the TCDSE to update the sector Standard Operating Procedures (SoPs) and the Nairobi DRR Act and plan using the TCDSE.

3. *City Impact – Capacity Building:* weak technical capacity at academic and policy levels in Nairobi remains a major impediment to the impact of tomorrows City's work in Nairobi and its associated theory of change- the TCDSE. Therefore, capacity building on risk research methodologies and approaches remains a major impact opportunity that the NRH could pursue. The TCDSE provides an opportunity to help unpack the concept of risk and its interrelation with urban planning for the purposes of technical training for Early Career Researchers, city planners and policy makers. This aligns with the long-term ambition of the NRH to turn into a Nairobi Risk Academy in collaboration with the U NDRR-MCR process and the UN-Habitat- CityRap tool and Kenyatta University.

4. *Regional Impact – regional outreach to other African cities:* through the ARIN Network, there is an opportunity to use the Nairobi experience and showcase the risk concept to other cities in Africa. Building on our experience, contextualising the risk concept requires adequate engagements and relations building. Through its functioning regional network, the ARIN could carry the experience from Nairobi to the Pan-African context. As part of workplan, the NRH will convene a pan-African workshop to assess opportunities for the TCDSE in other African cities.

City engagement and opportunities for the TCDSE

Author: Charles Tonui et al.

Risk in Nairobi is highly socialized – i.e. driven by various social parameters such as household welfare, governance, and gender and community organization among other. Reducing disasters in tomorrow's Nairobi requires active engagement of the city stakeholders with the concept of risk both in knowledge production and planning. The Nairobi Hub through the African Research and Impact Network (ARIN) has developed a forum- the Nairobi urban forum within which strategic engagements have been undertaken. The design of the Urban Disaster Risk Forum is to provide a knowledge exchange and learning platform on risks. The forum is targeting stakeholders in Nairobi city and offering lessons for other potential cities. The overall aim is to strengthen the capacity and impetus for a shift from a crisis response mechanism to reduce disaster risks in the city. Within the forum, the hub mapped DRR stakeholders, which include policymakers, community leaders, researchers, academics, and the CSOs. The forum has executed engagements at community, city, regional and global levels (https://www.youtube.com/watch?v=fE2Slg4eoZO&t=385s).   These engagements have resulted in strategic learnings and outcomes relevant for the TCDSE as outline below.

Urban Risk Forum- Nairobi

4) Nairobi city multi sector DRR consultations and policy dialogues (Virtual) led by Nairobi Risk:

Approximately, 20 city officials representing departments and sectors in NCCG, participated in three bi-weekly sector-DRR policy dialogues and consultations held on 13th June,2020 and 15th July & 28th July 2020.

Key outputs: shared capacity needs, which include:

❖ the need to understand disaster risk

❖ how best they integrate into sector SOPs and policies

5) The Visioning of a Future Resilient Nairobi Workshop (Virtual) on Friday 7th August, 2020 co-organised by Nairobi Risk Hub & Nairobi City Government:

Approximately 30 stakeholders attended: key policy actors drawn from the National and Nairobi County Government, Civil Society, UN agencies, professional societies, private sector and academy

Key output: majority of the actors desire a city with high resilience driven largely by both the private sector and state agencies

6) African Research and Impact Network (ARIN) Conference 2020 'Africa in the Post-Covid-19 World: Lessons for Research and Policy', 18th - 20th November 2020. Hub researchers presented under two main side events: Gender Lens in Disaster Risk Reduction in the context of COVID-19 and Cities and COVID-19

13) City led workshop on open DRR database for Nairobi City held on 10th December 2022 co-organised by the Hub but led by ARIN: . Approximately 35 participants attended; primary targets were city officials, and DRR data stakeholders: UN agencies (UNDRR), World Bank and relevant national and city stakeholders.

Key outputs: several data bases were identified towards enabling Nairobi city officials to access relevant data and information that will inform updating of city policies and development of DRR activities

2019

1`) Memorandum of Understanding was signed between Nairobi County Government and ACTS on 6th May 2019

2) City Engagement: Hub liaised with Deputy Director, Department of Disaster Management and Firefighting Service to mobilize city officials and retrieving of relevant policy documents and data

hundreds of stakeholders analyzed; domina **3) Mapping and analysis of DRR stakeholders in Nairobi City:** ted by humanitarian agencies; low involvement of private sector and the urban poor; complex institutional and policy landscape; lack of clarity on who is responsible for risk reduction

2020

2021

Regional and International DRR, resilience and urban policy dialogues:

7) ARIN Summer School 2021, 15th to 22nd August 2021: Hub organized 2 side events

8) ARIN Science-Policy (S-P) Convening 2021 themed 'Knowledge for Green and Sustainable Recovery from Global Intractable Challenges' November 24th – 26th 2021: Hub organised 3 side events

9) UNDRR' Private Sector Roundtable: Partnering for a More Resilient Kenya, Thursday,28 October 2021: Hub presented Nairobi Case and the role of private sector in DRR

9) Development Studies Association Conference 2021, which is an online Conference at UEA: Hub presented on 'Providing a grounded understanding of systemic risk

10) 7th Annual Gobeshona coordinated by ICCCAD, Bangladesh, 21st -24th January 2021: ARIN, Hub and partners co-hosted Cities and Resilience Event

11)   The 10th Session of the World Urban Forum (WUF), 8-14 Feb 2020, Abu Dhabi, UAE. Hubs shared lessons in various sessions; networked; build new partners

12)   UNFCCC COP26, Glasgow, UK, 9-13 November 2021: RINGO & Resilience Hub agreed to co-organise side evetns with ARIN & Nairobi Hub at COP27 in Egypt

2022

Tomorrow's Cities is the UKRI GCRF Urban Disaster Risk Hub

STRATEGIC OUTCOMES AND RELEVANCE TO THE TCDSE

Integrating risk thinking in the city planning process:

The city-led multi-sectoral DRR policy dialogues have enhanced awareness about the risk concept among the city officials and stakeholders. The city officials have started the discussion and process of integrating element of risk (hazard, exposure and vulnerability) and measures into their sector standards operating procedures (SOPs) for risk reduction. This indicate a real impact of city engagement process because most of the SOPs were anchored on development plans with little consideration of disaster risk (evidence: appreciation letter from the city: NCC/CS/JM/939/21, 12th April, 2021). The sensitization of the city sectors on the usefulness of risk-thinking provides a good foundation for engaging the city departmental planning process with the TCDSE. There is an opportunity for the TCDSE to help inform the updating of the City DRR Act (i.e. with the risk lens) and locally driven DRR action plans.

Strengthened relations between the city and local communities/ residents

The city-led multi-sector dialogues has improved relations between the hub and stakeholders and this will make it easy for the hub to bring together different stakeholders at different levels (national city and local community) to engage with the DSE. The engagement have strengthened multi-level linkage between 1) communities and city processes – by engaging the city sectors with community-level evidence drawn from dialogues and interviews and 2) connecting the city DRR office to global UNDRR platform through the Making Cities Resilient 2030 (MCR2030) initiative. The hub through ARIN network has developed a comprehensive database and stakeholder engagement plan (Datacenter: https://www.arin-africa.org/data-centre/) which can be used to contextualize the TCDSE. There is greater need to clearly understand the entry for the TCDSE whether community, city, global or all.

Data: Through the engagement, we have been able to draw data from the Nairobi city offices on hazard impact data (Database https://geodata.arin-africa.org/, policy documents and urban plans (Datacenter: https://www.arin-africa.org/data-centre / Database https://geodata.arin-africa.org/ . Bilateral engagements with key DRR stakeholders including Red-cross, UN-Habitat (https://www.arin-africa.org/2020/07/21/consultative-workshop-on-integrating-cityrap-tool-into-disaster-response-and-planning-in-nairobi/) enabled access to data on risks. During the impact year, on 10th December 2021, the HUB jointly with the city authority organized a multi-stakeholder workshop on co-developing an open data center for DRR planning where different stakeholders agreed to set up an open DRR data platform, which could help operationalize DSE during and after the project.

Activity	Description	Output	Status	Evidence
Bi-weekly sector-DRR policy dialogues (virtual) held on 13th June,2020, 15th July & 28th July 2020 respectively	Held to facilitating awareness creation of the multi-hazard project, risk thinking and facilitate understanding the level at which each sector has/or is planning to integrate risk into the sector policies and overall contribution DRR & management	• Approximately, 20 city officials representing NCCG Sectors, participate • City sectors are at different levels in integrating parameters (H*E*V) of disaster risk • City shared substantive data & information	• The dialogues are still active • At least 12 sectors have develop SOPs for DRR • Sectors requested for capacity support to understand & integrate risk	(Reports) https://geodata.arin-africa.org/documents/75

Visioning of a Future Resilient Nairobi Workshop (virtual) held on Friday 7th August, 2020	Facilitate identification of a shared vision for a future resilient Nairobi; identification of potential challenges & opportunities towards building resilience for the urban poor &; establishing the role of science in integrating risk management in urban planning &development processes.	• an approximately 30 stakeholders • established a Community of Practice (COP) around disaster risk reduction	Majority of the actors desire a city with high resilience driven largely by both the private sector and state agencies	https://www.tomorrowscities.org/visioning-future-resilient-nairobi
ARIN review (virtual): Disaster Risk Management in The Context of COVID-19 Pandemic In Africa	This was among series of webinars organized by ARIN to bring together African stakeholders to share experience & impact of COVID-19 on urban settings.	COVID19 had taken root in the majority of Africa's urban centers and had somehow embedded itself as a cascade of existing risks in the African urban setting; it exposed the detriment of these existing disasters, calling for a clear rethinking of our disaster preparedness		https://www.tomorrowscities.org/disaster-risk-management-context-covid-19-pandemic-africa
10th Session of the World Urban Forum (WUF), 8-14 Feb 2020, Abu Dhabi, UAE.	Hubs shared lessons in various sessions; networked; build new partners	Charles attended trasining on Framing Urban Resilience for African Cities facilitated by Arup International Development, UK		https://unhabitat.org/wuf10
ARIN 2020 & ARIN 2021 Conferences: Hub side events (2): Gender Lens in Disaster Risk Reduction in the context of COVID-19 and Cities and COVID-19, 18th -	Hub organize 2 main side events which brought together stakeholders to share lessons on impact of COVID19 on gender and DRR in African cities using the case of Nairobi city and thinking post-Covid-19: Lessons for Research and Policy'	Dozens of national, regional and international participants attended.		https://www.arin-africa.org/the-africa-research-and-impact-network-international-conference-on-africa-in-the-post-covid-19-world-

20th November 2020				lessons-for-research-and-policy/
ARIN Summer School 2021, 15th to 22nd August 2021: Hub organized 2 side events	The 1st side event presented policy transition in DRR in Nairobi and launch of Risk Academy	Dozens of participants attended; endorsed the risk academy to support capacity building not only in Nairobi but also across Africa.		https://www.youtube.com/watch?v=O4TiDnZl4sc
UNDRR' Private Sector Roundtable: Partnering for a More Resilient Kenya, Thursday,28 October 2021:	Hub presented Nairobi Case and the role of private sector in DRR in Nairobi	Private sector presence in DRR is low;	United Nations OCHA, UNDP, Connecting Business initiative (CBi) & UNDRR partnership ongoing	https://mcusercontent.com/d89a089eb32bd022ed2ededf6/files/74d331f0-7bca-7f73-034b-0cc43c5d7ab9/Participant_List.pdf
7th Annual Gobeshona coordinated by ICCCAD, Bangladesh, 21st -24th January 2021:	ARIN, Hub and partners co-hosted Cities and Resilience Event	At least dozens of participants attended from various continents		https://www.icccad.net/event/gobeshona-global-conference/
UNFCCC COP26, Glasgow, UK, 9-13 November 2021	Shared case of Nairobi DRR policy transition and incorporating evidence at various side events	RINGO & Resilience Hub Secretariats agreed to co-organize side events with ARIN & Nairobi Hub at COP27 in Egypt, Nov 2022		https://unfccc.int/conference/glasgow-climate-change-conference-october-november-2021
City led workshop on open DRR database for Nairobi City held on 10th December 2022	Co-organized by the Hub but led by ARIN to explore identification of relevant databases and bring together stakeholders to chart the way forward and come up with a common open data center.	• At least 35 participants • classifications of data identified •	Resolution: participants agreed to develop an open data center for Nairobi city	(Report)

KEY HIGHLIGHTS

- There is significant number of government and humanitarian agencies, with less private sector actors in DRR actions in Nairobi city. The local communities make contribution but it is not well articulated in the policy and decision making spaces due to over-reliance of CSOs as their "representatives" of their voices.
- As a delivery strategy to create a direct linkage between research (physical and social sciences) and policy discussions, the urban forum identified prevention phase in disaster management cycle as an entry point.
- Risk science is paramount in informing multi-level, multi-sector and multi-stakeholder policy consultations and dialogues.
- The dialogues and learning are anchored on evidence from ongoing Tomorrow's Cities multi hazard study and other related studies across Africa and elsewhere.
- The Forum also facilitate cross-city learning and leverage the lessons and resource support from the national and regional DRR platforms to strengthen urban forum.

Mukuru RVA in the Context of TCDSE

By: Haron Akala, et al.

INTRODUCTION

In Nairobi, impacts of disasters are felt more at the local level, especially in the informal settlements where a majority of city households and communities live. As part of upgrading living standards for the poor in Nairobi's informal settlements, the Nairobi City Government and the National Government have adopted community-driven infrastructure planning and development as a way of promoting quality service delivery, ensuring safety and resilience for informal settlements. The SPA is an infrastructure-led planning process aimed at improving residents' services and living standards. The SPA process has been held up nationally & internationally as a progressive example of community-informed, government-led slum upgrading and is a key reference point for future slum upgrading in Nairobi and further afield. Despite being an important process, the implications for risks, especially at households and community level, is not well known. There was a need to understand how households in these settings perceive risks, whether such infrastructure development approaches could help reduce risks, and what lessons can be drawn to inform more-risk informed, pro-poor urban planning in Nairobi and beyond. This was the purpose of the RVA study. Interviews (n=400) and focused group (n=2) were undertaken with the Mukuru kwa Kwa Reuben residents. This brief provides some of the key highlights and outlines linkage to the TCDSE and associated opportunities.

WHAT HAS BEEN DONE

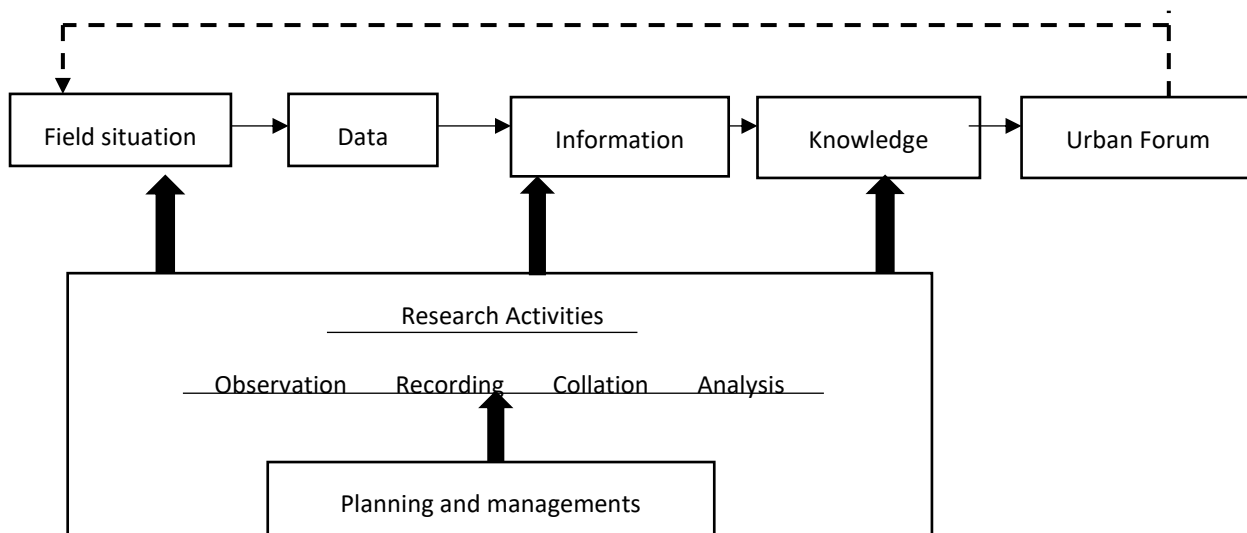| Activity	Output	Evidence	Status by the end of February
Community engagement (n=32); (The workshop allowed community members and stakeholders to interact and input into the research methodology and process for vulnerability assessment by deliberating and reaching a consensus through group activities.)	Community engagement Report	The engagement formed a better understanding of perception and contribution towards the tool, which informed the status, underlying risks, and prevailing vulnerabilities through a livelihood and ecosystem-based approach. (Available here)	Submitted for publication at Tomorrows' City website
	Community Participation on Dynamic Risk and Vulnerability Blog	Community engagement in Disaster Risk Management (DRR) should be participatory and inclusive. Developing a community engagement model needs to be adopted...... (Available here)	Submitted for publication at Tomorrows' City website
Training Research Assistants	Report	The training brought together trainees from multi-cultural contexts and disciplines with diverse hands-on field research experience. (Available here)	Submitted for publication at Tomorrows' City website
Dynamic Risk and Vulnerability Assessment at Mukuru Kwa Reuben	Dynamic Risk and Vulnerability Assessment	As shown on the key highlights below	Submitted for publication

	Report for Mukuru Kwa Reuben		
Synthesis of RVA output	Policy Brief	Info brief to support the decision-makers to make informed decision	Advance draft for sharing

KEY HIGHLIGHTS

- Demographic change defines how the community can prepare for, respond to and recover from hazards in Mukuru, with a majority of the respondent being of age group 25-45 years. This group is generally considered relatively able-bodied with the capacity to respond and provide support to the community in case of a hazardous event.
- Flood and fire are major hazards affecting the community at Mukuru kwa Reuben. All households have been exposed to these hazards differently.
- A Significant impact is loss, and damage is an outstanding property, and this perhaps exemplifies the need to pay attention to the element of loss and damage in risk management
- Enhanced drainage system even though the design of the system have not considered changing situation, and this is likely to transfer flood risk from one neighbourhood to the other
- Interestingly, the hanging wire creates new hazards in the neighbourhood.
- The road infrastructure is perceived to have enhanced access to adaptive amenities. Improved access to amenities and services is vital to improving the community's livelihood and opening the business. Diversifying activities satisfy the demand for services, products, and goods, connecting to multi-activities at the grassroots level. Issues like inadequate water impeded putting fires when they occur, thus leading to loss of life and properties. Besides, emergency services could not be feasible because of narrow roads and inadequate amenities like hospitals and access to the road.
- The involvement of the community in the development program is limited.
- Building and having new roads theoretically impacts flood and fire propagation risk but is supported by observational data on spoil dumping.
- The influence of the organizations, CBOs, community leaders, churches, and schools aligns with the Sendai Framework for DRR 2015-2030 on active stakeholder participation to support the development and implementation of DRR policies and plans standards.
- Community confidence in handling disasters varies depending on the available infrastructure and their ability to access the grassroots level of social amenities. Strengthening the social network, improved access to social amenities, and the ability to get emergency support are critical factors that can be attributed to change in the community's perception
- The massive investment breaks up an informal settlement into a more urban set-up, permitting cohesion and coherence among the residents. New social groups may emerge, and the existing ones become more assertive in implementing projects. This transformation result has led to spatial heterogeneities reducing inequality and exclusion in the informal settlement in Mukuru. Ultimately, it indicates that Mukuru kwa Reuben is transforming into a more sustainable society.
- Concerns around the following raise questions on infrastructure planning and implementation process: displacement of social amenities and transfer of current and future risks from one neighbourhood to another.

LINK TO THE DSE AND ASSOCIATED OPPORTUNITIES

Dynamic Risk and Vulnerability assessment represent a good case of transformation of data into knowledge and which support decision making as shown in the diagram below, the available information and alternative suggestion from the RVA dictate the success and failure in a holistic approach which is a great deal and important in decision making.

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- **Household-level risk data**: Flood and fire impacts on households are common and extend from damage to property to health, education, and livelihoods indicating the value of a more joined-up policy response from all lense from the DSE.
- **Experiences and reality on the infrastructural driven plan**: drawing on community perceptions, the reality in operationalizing a plan such as the SPA is a complex one requiring adequate sensitization, socialization, engagement, and buy-in. This is an important lesson for engaging the city stakeholders – especially communities with TCDSE Learning in challenges in operationalizing plans in Mukuru could be vital in informing the risk model.
- **Implication of infrastructures development and risk**: There is an increasing approach to DRR through the infrastructure lens e.g. improved roads, housing etc. However, lessons from Mukuru shows that such infratrute planning if not integrated with adequate risk considerations, are likely to exacerbate risks and create new cycles for risk accumulation for the urban poor. This provides an empirical lessons to the theriries underpinning the TCDSE - by showing how various planning trajectories might interplay disaster risks
- Impacts are reported to property, health, livelihoods, and education – demonstrating the need for City Departments, including and beyond urban planning to engage with the City Disaster Risk Management Plan. This is visible in the DSE.
- **Strengthening community capacity** on disaster risk reduction is vital, visible through the DSE.
- **Missed opportunities** and suggestions by the community are an exciting component for decision-makers and could be built further for data inputs into the TCDSE.

Community engagements in Mukuru in the Context of TCDSE

Author: Asenath Maobe et al.

INTRODUCTION

COMMUNITY-BASED ORGANIZATION ENGAGEMENTS

The Nairobi Risk Hub have been leading a series of community engagements in Mukuru SPA in collaboration with Nairobi partners. The engagements were being held virtually and physically and commenced in August 2020 to the end of 2021. The aim of the community dialogues was derived from the concept note on community engagement and was to assess the community understanding of multiple hazard & disaster risk reduction (DRR) in Community Based Organizations (CBOs) and informal settlement; identify capacity building gaps in Multi-hazard & DRR among CBOs; explore the role of gender mainstreaming and inter-sectionality on DRR in communities; facilitate horizontal knowledge sharing between the CBOs, NGOs, and the county government on DRR; and to build a network of Community Based Multi-hazard & Disaster Risk Reduction Champions in Nairobi City. Towards this end, the Nairobi Risk Hub mapped 150 community-based organizations based in the informal settlements in Nairobi, and engaged in different, diverse activities in the interest of exploring their probable understanding of risk and role in DRR. This brief provides some highlights on community dialogues and mapping undertaken in Nairobi and outlines opportunities for the TCDSE.

WHAT HAS BEEN DONE

Activity	Output	Evidence/Purpose	Status by end of February
Community dialogues and gender considerations	Report Community Dialogue Diaries	The dialogues were intended to bring together Community Based Organizations (CBO) and create DRR leadership networks with the researchers at the nairobi Hub. The leadership networks targeted the sensitization of the communities around which disasters take place, and building resilient communities, that are deeply ivolved in the risk concept. (Available here)	To be published
	Working paper	Gender Inter-sectionality and Disaster Risk Reduction - Context Analysis The working paper provided an analytical framework to spur further community engagements, with a gender lens to disaster risk reduction. The community based organizations realized the need to consider vulnerability and its differential impacts among different groups of people in the ravels of disasters. The consideration of gender as key in DRR Efforts promised	Published at Tomorrows' city website

		policies that are gender sensitive and more effective towards DR ([Available here](#))	
Community based Organization Dialogues and virtual trainings	Reports		
	Mapped Matrix of 150 CBO inventory	The purpose of mapping out these 150 community based organizations was to appreciate their different activities and place in the communities that they are operating from, but to also leverage on their existence to sensitize of disasters risk reductions and create risk champions from the communities. This was in the realization that, whenever disasters happen, it is the people in the communities that suffer the impact, and CBOs are better placed as the first responses to DRR and even preparedness.	
	Blog	COVID-19 has revealed existing gender disparities. Where COVID19 was considered as a biological disaster, its impact has been felt differentially among different groups of people and the need to design fiscal policy recovery mechanisms that capture the varied impacts would help communities build back better. https://t.co/VxwylFSHit https://accountantjournal.com/september-october/ ([Available here](#))	Published at the Institute of Certified Public Accountant in Kenya's Accountant Magazine
Gendered Impacts of COVID19	Policy Brief	The policy brief revealed existing gender disparities and substantial differences in the way men and women of all age groups face and deal with disasters,• that, gender mainstreaming is key in disaster risk management. Women and vulnerable groups are disproportionately affected on: health, unpaid care, economic livelihoods and on gender based violence There is need for Mitigation measures should employing a consultative and cross	Published at Tomorrows' city website

		borrowing approach towards building back better beyond COVID-19 https://www.tomorrowscities.org/	
Covid-19 reverses gains made on gender equality in academic research productivity	Blog	How disasters affect research and reveal gender dynamics at play in research centres and institutions of higher learning. https://tomorrowscities.org/covid-19-reverses-gains-made-gender-equality-academic-research-productivity	Published at Tomorrows' city website
Disaster Risk Governance and Gender Considerations at the Mukuru SPA	Working Paper	This study is aimed at identifying whether there were any gender intersectionality considerations in the Mukuru SPA	Ongoing to the end of 31st March
Gender and DRR	Journal Article	Addressing gender inter-sectionality and DRR	Under Review with the Publisher
The role of CBOs in DRR	Journal Article	CBOs in DRR	Under Review with the Publisher

KEY HIGHLIGHTS

- Given, CBO are directly driven by people at risk, they are quite integral in disaster risk management at the community level. Whenever there are disasters these CBOs often organise the local residents to react first before city level interventions. This signals important community leadership in DRR that can be enhanced through adequate preparedness.
- CBO as DRR engines works well when they coordinate their activities with NGOs and the local government authorities. The data collected from Nairobi's urban poor dialogues show; CBO can be good platforms for holding disaster drills to the residents on firefighting, conducting search and rescue operations.
- CBOs play an important role in bridging the gap between the populace and disaster preparedness. They provide the last mile opportunities for reaching the poor segment of the community where government services or capacity are scarce. Therefore when CBO engage with community members and get government facilitation, their output can positively impact DRR preparedness.
- The dialogues captured the level to which the different activities carried out by CBO contribute to DRR in their communities. From the responses given, most CBO are involved in different capacity

building and community empowerment activities. The activities include financial support and empowerment of members of the community, provision of water, sanitation, environmental advocacy, and human rights protection and advocacy.

- These activities were also mentioned extensively during the community dialogues in different forms and formats as adopted by respective CBO
- There is a clear need to take necessary measures to entrench DRR in these CBO. Financial support from the national and local governments to the CBO will boost their capacity to be agents of DRR activities at the community level.

IMPLICATIONS FOR RISK PLANNING AND NEXT STEPS

After the declaration of the Mukuru to SpecialPlanning Areas, it led to re-development in the informal settlement where new roads, drainage networks and sewer lines have been constructed. The new development has impacted the residents both positively and negatively, and somewhat differentially amongst the groups of people; where some of the community,had to be displaced to pave the way for the road, but for some areas, this has opened space for businesses and access to basic amenities.

The communities have been on the fore in risk assessments and risk recovery, their involvement in Mukuru meant a rich community leadership and network for DRR. Still, there have been negative implications in the process of DRR, where challenges facing the community based organizations almost threatened their very existence. Some of them included: weak linkages with the policymakers at the city level, lack of organizational capacity, operational sustainability financial handicaps, and lack of leadership and vision. If the hiccups are well addressed the CBOs remain a strong agent in DRR Process at the local level. Probable next steps would entail these;

- Source of household data: The CBO engagement has been used to get household data and shaping the research tool
- Champions identified through dialogues could be anged further in contextualizing the TCDSE
- CBO leadership provide a forum for socializing the DSE and the leadership at the local community
- Community as part of the Decision Fora: the CBO engagement is a bridge for community to be champions in DRR

BIOGRAPHY OF RELATED WORKS ON DRR, VULNERABILITY, INEQUALITY AND ORIGINS OF RISK - REFERENCE LINKS

1. https://nomadit.co.uk/conference/dsa2021/paper/61118
2. https://tomorrowscities.org/covid-19-reverses-gains-made-gender-equality-academic-research-productivity
3. https://era.ed.ac.uk/handle/1842/37726?show=full
4. https://www.tomorrowscities.org/sites/default/files/resources/2021-09/Gendered%20Impacts%20of%20COVID%2019%20Nairobi%20v2.pdf

Nairobi Fire Modelling in the Context of TCs

By: Akala Haron et al.

INTRODUCTION

The Mukuru Special Planning Area (SPA) Fire presents one of the priority risks in Nairobi currently and in the future. Fire-related disasters are most reported with high death toll or a high level of destruction in the informal settlement in Nairobi. For instance, from 2013 to 2020, at least 104 fires in the Mukuru which can be estimated to have destroyed up to almost 2,900 homes and affected up to 10,000 people. Informal settlements such as Mukuru are dominated by flammable construction materials, overgrowing and general negligence making them prone to fires. This brief highlight links to the fire modelling work undertaken so far in Mukuru and outlines the linkage to the TCDSE and opportunities for moving forward TCDSE work in Nairobi.

WHAT HAS BEEN DONE

Spatial (i.e., GIS-based) fire risk mapping in classic/formal urban environments tends to reflect that fire is not expected to spread between buildings in such places. As such, the quantitative metrics usually focus on building occupancy, fire hydrant locations, and road access. The conditions in informal settlements allow fires to propagate quickly across many buildings. Static modeling metrics provide very fast methods of quantifying fire risk based solely on the layout of a settlement. The metrics provide a much guide in terms if magnitude of risk by understanding hazard, vulnerability and exposure thus quantifying fire risks providing solution for decision making.

This is GIS mapping to quantify the fire risk in the informal settlement. The following metrics have been analysed.

- Edge density – of structure (hazard)
- Edge density within buffered area (physical exposure)
- Euclidean Nearest Neighbor – mean, standard deviations, ranges (vulnerability of the structure)

Activity	Output	Evidence	Status by end of March
Review of the existing fire models and literatures in Nairobi	Context analysis paper	The paper also outlines some of the strengths and weakness of models that have been applied in urban area to quantify fire risk and justifying the models that are applicable in Mukuru Special planning. To understand the Nairobi case, the discussion includes the analysis of impact data from Kenya Redcross and linking with weather data available here	Final Paper submitted in Journal for Publication
Static modelling and impact data output analysis	Report	The above metrics are combined to generate a structure risk score available here. Using Kernel density magnitude of a metric (risk score) within an area has been developed (Available here). The analysis entailed stages of analysis: 1. Analysis of the metrics for the Mukuru SPA and	Submitted for publication at Tomorrows City website

Novel approach to determining spatial fire spread risk in informal settlements: A Mukuru, Nairobi, case study.	Journal Article	develop a risk score; 2 Analysis of the metrics for Mukuru Kwa Reuben before and after the road intervention and develop a risk score. Pre and Post analysis provide evidence of good practice after the invention which is key in understanding the transformation in the area.	Draft paper
Kibera Transect walk: Mapping good practice and bad practice in relation to fire risk.	Slide desk and Discussion paper	The annotated images highlighted fire issues by measuring the eaves, door size, compartment dimension the window. Besides, understanding the type of wall and floor, the household composition, separation distance (Available here)	Draft paper
Synsthesis of Mukuru analysis	Policy Brief	Info brief to support the decision makers to make inform decision	Advance draft for sharing

KEY HIGHLIGHTS

- Community responses to fire in Mukuru and revealed that most of the people (91%) had experienced fire incidents. In January 2022, Kenya Redcross has responded to over 45 fire incidences in Kibera. Over 165 structures were burnt down from one of the incidences leaving over 1000 people homeless.
- The magnitude of risk in Mukuru appears to concentrate in areas with high densification e.g Case of Mukuru Kwa Reuben and Mukuru Viwandani. This suggests that these settlements have a spatial arrangement of dwellings sufficient for the spread of large fires.
- There is considerable slight change of the magnitude of risk in Mukuru Kwa Reuben after the road intervention. This is a result increase separation distance between the structures. The assumption is that probability of fire spreading over a given areas has reduced. However, this also depict there is a slight considerable chance of developing large fires.
- When addressing risk in the informal and formal settlement, it is important to consider the element of risk. It is useful to understand exposed and vulnerable assets or communities instead of concentrating around an ignition source.
- The transect walk in Kibera was to document the bad and good practices in Kibera. This can be further packaged and explored to provide evidence which is key informing strengths and weakness in reducing risk in the informal settlement by influencing change in community perceptions.

RESEARCH INFORMATION AND DSE

- **Replication of fire methodology in Kibera**; the fire model/methodology could be replicated in Kibera and this will inform DSE e,g the transect walk methodology which already providing useful information for the DSE. Fire risk at the Mukuru and Kibera can be associated with underlying factors that vary from political, economic, and social-cultural, which are interlinked with several local and national aspects. The linkage between physical modeling (static modeling) and social characteristics (RVA) is visible at the urban forum and is vital informing the DSE (As shown in Figure 1 and Figure 2).
- **New Methodological Insights** : The output provides analytical and computational techniques that combines GIS with social, economic, and human dynamics, among other factors. New methodological ideas by incorporating burnt scars will improve fire work in Kibera. With proper and advanced engineering solutions adopted during the implementation of Kibera SPA, this can help to prevent the spread of fire in buildings as an expert can easily predict the movement of the

fire in the compartment and also guiding policy implementors (urban planners) on an effective strategy they can adopt which is important for the DSE process.

- **Exemplars:** the mapping can provide a reference example that can be showcased to stakeholdersduring engagements with the TCDSE. Also provides a control opportunity for the Kibera work and lessons drawn from a well recognized planning agenda (the Mukuru SPA) with national and international interest- a good opportunity for impact-
- **Data:** Gathered in Mukuru can be used to triangulate the data in Kibera which will inform metric to measure the hazard intensity in Kibera.
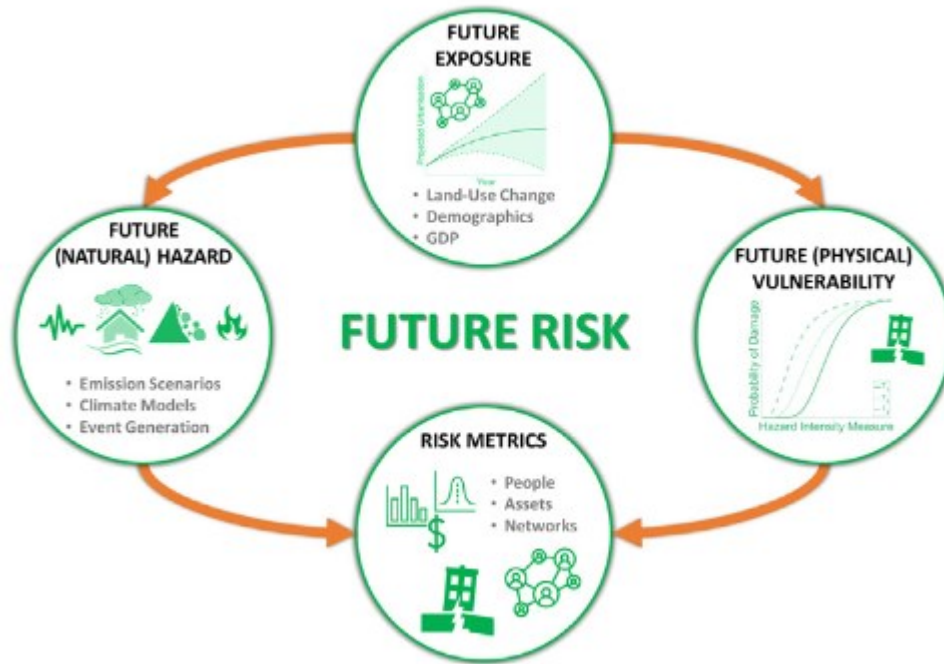
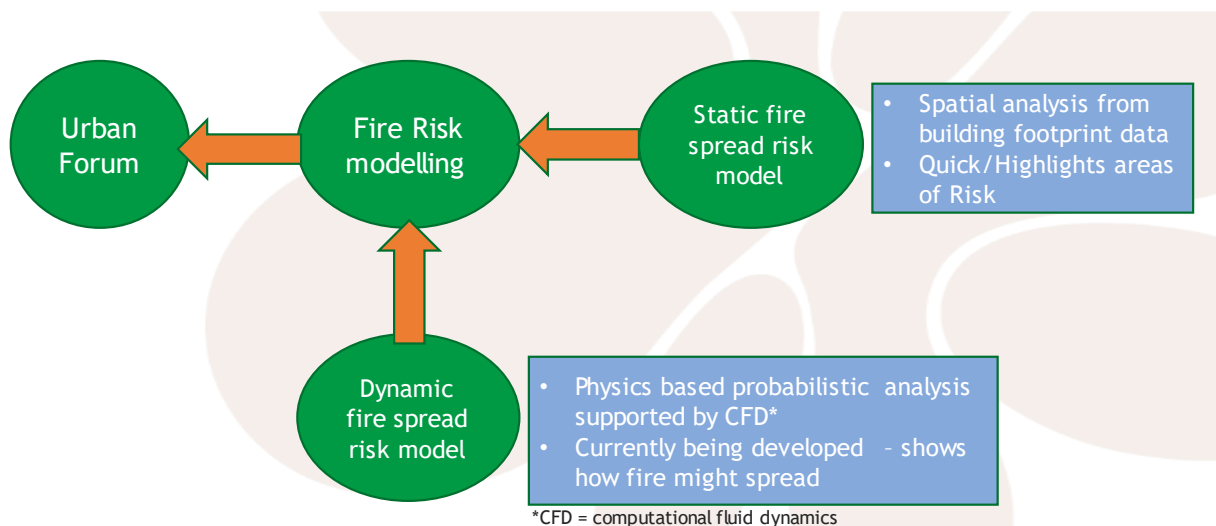*Figure 1: Modelling and quantifying tomorrow's risks from natural hazards (Gemma et al 2021)*

Figure 2: Modelling and quantifying tomorrow's fire risks and linking with Urban Forum

Summary of the Nairobi Flood Modelling in the Context of TCs

By: Tom Randa et al.

INTRODUCTION

Flooding tops the list of highly rated natural hazard that pose significant risk in Nairobi city[1], a reason for its considerations in tomorrow's Nairobi work. Flooding in Nairobi is mainly driven by surface flows and poor infrastructure planning. Flood impacts are felt across the city even though informal settlements (usually associated with poor infrastructures, services, and low income) are more vulnerable. With the climate change and rapid urbanization being experienced, the risk to flooding in Nairobi might increase and thus the need to plan the future Nairobi with this Knowledge. This brief highlights some of the flood modelling work so far undertaken in Nairobi as part of the RIP and hub impact phase and outlines potential contributions to the TCDSE   and opportunities moving forward.

WHAT HAS BEEN DONE?

Activity	Description	Output	Status	Evidence
Data gathering- historical rainfall data.				
Urban Flood Models & Modelling Approach Review: Case of Nairobi	The paper has been submitted as a journal article in the Journal of Hydrology – Regional Studies. The review gives the practical application of hydrodynamic models in understanding flood hazards in the informal settlements of a developing city such as Nairobi.	Journal Article TC Working Paper	Submitted Review Stage	The paper abstract can be found in the SharePoint through the link here.
Time series Analysis of Rainfall & Discharge Data.	This stage is critical as the flood model is as good as the inputs it's subjected to. This involves cleaning and analyzing the rainfall data (1981- 2020) and discharge data to understand the trends, cycles, correlations and thus give us general ideas of the patterns of historical flooding in Mukuru.	Section of the discussion Paper and Flooding Report	Uploaded in SharePoint in excel format as the paper is under development	Some uploaded here. More discussions to be added in the HEC RAS model paper.
The Gumbel Distribution Method Analysis	The discharge data were subjected to the Gumbel method to not only fit the data into a frequency distribution but also estimate the discharges of different flood return periods to be fed into HEC RAS as initial conditions	Section of the Discussion Paper & Report	Gumbel outputs uploaded in SharePoint as the paper and report is being developed.	The Gumbel method process and results can be accessed in the SharePoint through the link here.

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[1] Kenya Natural Disaster Profile

	and visualize the extent, depths, and velocities of possible flooding in Mukuru.			
Climate change projection for Rainfall data analysis	A time series developed to show the possible trends from 2006 to 2100 under the RCPs 4.5 and 8.5 climate change scenarios. Rainfall is the main natural driver of flooding in Nairobi. These results will be used to estimate the flood depth, velocities, and water surface levels to show the possible flood characteristics in Mukuru in the future in HEC RAS.	Section of Discussion paper	Results uploaded online but paper being developed.	Can be accessed here
HEC RAS 2D modelling for Mukuru river	The model has been set up, calibrated, and validated using the Mukuru Geometry data. The model has been run with the discharge hydrograph developed from the flow data of 1980 to 2000 as available to capture the historical cycles. The model has been run for the flood return periods of 2.33, 5, 20, 50,100 years. The results are available in Maps format and tables. This output is useful for engaging the decision-makers in understanding the possible flood cycles and their expected depths, velocities, and surface-level reach at any given time in Mukuru.	Discussion Paper	Being developed	Some of the HEC RAS outputs can be accessed here.
Ngong River Profile Analysis through Mukuru	This was a rapid analysis carried out to ascertain the actual river profile of the Ngong River passing through Mukuru (Approximately 21Km) over the years from 2003 to 2021 using google earth data coupled with a real-time drone image capture during the field visit. The river width was found to have been reducing over the years and this reduces its capacity to accommodate large and sporadic flows. The slope is generally gentle and thus water	Technical Report	Ready for Review and Publication under TC	The analysis can be accessed here.

	tends to flow easily through Mukuru posing more danger in terms of long time exposure and possibly high depths. This information is critical in the DSE to support proposed mitigation measures and inform the photo method transect walk to capture some of the best and bad practices in Mukuru with regards to flood risks.			
Transect Walk in Mukuru	Transect walk in Mukuru area to capture the best and bad practices to flood risk management to be completed by 15th February 2022. This will inform further activities e.g a documentary on flood risks exploring the vulnerabilities and capacities (Intervention efforts) in the informal settlements during the DSE phase.	Slide Deck, Blog	Planned for 10th February, 2022	To be done as planned and Prof. Krhoda is to provide a checklist to guide on this process.
Analysis of flood hazard maps & linkage to socio-economic impacts and RVA outcomes	The hazard maps from HEC Ras are to be analyzed further separately and discussed to qualitatively link to the socioeconomic data and information gathered from the impact data and the conducted RVA. This will give the exemplars for the DSE.	Discussion Paper by 20th March 2022	Ongoing and draft expected by 12th March 2022	A draft Paper to be ready by 12th March 2022.
High Level summary of flood risk in Nairobi with TC lens	Develop a High level summary brief for engaging decision makers in various forums from the TC work packaged in a brief.	Policy Brief	Planned to be delivered by end of March 2022	Draft to be ready by 20th March 2022 and finalized by 30th March 2022 after reviews.
DSE data gaps and filling	Review the DSE data gaps for flood risks in Nairobi and agree with the RWG on how to fill in the data gaps.	A technical brief of the data needs, data available, data gaps and way forward.	By end of March 2022	To be shared through the SharePoint once done

KEY HIGHLIGHTS

- While flooding in Nairobi occur during the two rainy seasons, the risks build up continually and thus require continuous, progressive flood risk management – **Calls for Preparedness and evidence based city planning and implementation.**

- Flooding occur in the entire city but the risks are more pronounced in the informal settlements where the vulnerability is high due to their positioning on flood plains, unplanned infrastructures and poor services e.g roads and drainage networks – **High flood risk in slums but solutions require city wide planning and behavioral change.**

- Flood risk Management in Nairobi requires both policy, behavioral change and community led risk reduction programs. The model outputs in form of Maps and possible flood depths and extents are critical in engaging further through the DSE – **Model outputs are tools to engage policy, decision makers, and communities for action.**

- The climate change projections of rainfall gives a clue of the possible flooding increase in the future. Developing some exemplars in terms of the possible impacts based on the historical impacts gives a clear message of the future flood risks and thus the call for action – **Future flood risks, calls for preparedness now.**

- The transect walk aimed at identifying good and bad practices with regards to flood risks at the community level will provide evidence that can be further packaged through a documentary on flood risks in Mukuru during the DSE phase – **A transect walk to inform a comprehensive flood risk documentary in Mukuru.**

IMPLICATIONS TO THE CITY RISK PLANNING AND FEEDING INTO DSE

- **Flood Characterization**: The flood risk modeling gives insights into flood hazard characteristics in Nairobi informal settlement.
  - This can inform some general learnings for the DSE work in Kibera and help understand flood characteristics in the city more generally.

- **Replicability**: The model work done can be used as a control for the Kibera to support generalization. This is because informal settlements are relatively heterogenous and the need for more samples from different informal contexts can help validate results for the DSE something that might not come out clearly if we focus on one informal settlements for the Nairobi city. Understanding the hazard heterogeneity in informal settlements will be of great benefit to the DSE process. Mukuru remains an internationally impactful case to refer to in the DSE flood work.

- **Data**: The flood risk data from Mukuru (Rainfall and river discharge) can be used to triangulate the data in Kibera for the DSE. Besides, the data acquired, processed, generated and analyzed can be used as required in the DSE.

- **Exemplars** can be drawn from the hazard maps generated from the flood modelling in engaging the stakeholders on the DSE. This is strategic given that Mukuru is the only SPA implemented and there is potential of both local and international impacts as stakeholders are keen to learn from it and associated studies.

- **Policy Brief:** Will provide a summarized evidence generated engagement tool to engage the decision makers and provoke strategic actions on the city flood risk management through the DSE process.

Summary of the Climate in the Context of TCs

By: Oscar Lino et al (Kenya RedCross)

Kenya Red Cross Society contribution to the Nairobi Risk Hub and Linkage to the TCDSE

Kenya Red Cross Society (KRCS) are currently contributing to the fire and flood modeling work. They are guiding discussions on integrating climate data to modeling the hazards, for climate parameters are known to influence the hazards' occurrence. The risk of disaster can then be exacerbated by man activities within the exposed area such as dumping of ruins along a river channel. Once relationships between the climate parameters and the hazards are understood, future climate scenarios will be used to guide modeling of future hazards and possible risk of a disaster given development trends. The TCDSE will then provide visualization of current and possible conditions of disaster risk in Kibera. In the visioning workshops, experts from Nairobi will give impressions of a future Kibera and which will feed into the TCDSE to envision a future Kibera

Summary of Kibera work and linkage to the TCDSE

By: Bosibori et al. (TBA)

INTRODUCTION

The people living in informal settlements such as Kibera face a multiplicity of challenges ranging from environmental to economic and beyond. The percentage of people residing in the informal settlements differs from city to city, in the case of Nairobi in Kenya, 6% of the land is occupied by an approximate 200 informal settlements, which accommodate 60% of the population (Kamunyori, 2019). Huchzermeyer and Obala (2019: 201-202), however, question this much-cited figure by examining Kenyan statistics; these point to a figure that is closer to 30%. Given this population and the expected increase in the number over the next few years, the urgency of the problems is worth acknowledging.

The aim of this theme - Tomorrow's Kibera Action Planning - is to produce a multi-stakeholder generated vision and action plan for a safer Kibera in 2030 and 2050. This is important because the idea of risk preparedness and planning around risks is largely insufficient at country and city level let alone at the informal settlement scale which are typically excluded from urban planning. With further embracing of Special Planning Area approaches to informal settlements in Nairobi (ongoing in Mukuru and planned for Kibera), this provides an opportunity to embed risk preparedness at the forefront of this process.

WHAT HAS BEEN DONE

The work around Kibera's action planning is subdivided into 8 parts, shown below:

	Sub-workstream	Activities Done	Output/Links	Status (By end of March)	Evidence/Links/Outputs
2.1	To confirm detailed methodological fit between modelling process and visioning process, to confirm deadlines and deliverables (work plan preparation)	Preparation of a detailed work plan with timelines	Detailed work plan design	COMPLETED	See here
2.2	To provide an assessment of current hazard, physical and social vulnerability.	Desk review of existing hazard data (within KDI and outside) from July-October 2021 Attendance of weekly RWG meeting and Social Impact Module Group Meetings to contribute to the development to the development of Tomorrowville Fire Transect walk through Kibera on 7th Dec 2021. Social Vulnerability FGDs conducted on 31st Jan & 1st Feb 2022 with KDI, ACTS, KRC as well as community members.	List of (multiple) data sources database on hazards and impacts recorded on excel sheet. Information on past projects (undertaken at KDI) shared with RWG to enhance the social impact module, including specific reference to household level data which has helped to assign identities to individuals in Tomorrowville. GIS data (2020) used for building footprints for the low-income polygon in Tomorrowville. Fire Transect walk through report and images (helped physical modelers to relate with housing typology, building materials etc.)	90% DONE, write up on Jan/Feb FGDs to be completed end of February	See here See here for the info folder and here for specific representative household data. Accompanying reference report for this data is here

			Cleaning raw data ongoing.		See here
2.3	To identify (a) plausible scenario conditions for Kibera in 2020, 2030 and 2050 for input to the Risk Concept model.	Drafting a complete methodology with input from the Nairobi and RWG members. Mobilization and curation of potential participants by KDI and KRC.	Co-produced methodology Mobilization and identification of interest groups (from Kibera Community) done.	40% DONE	See here
2.4	To verify the risk models that are appropriate for Kibera	ONGOING. Meetings in Q3 and Q4 with RWG helped to support co-development and feedback		Tied to the progress of the TCDSE.	
2.5	To work with community, private sector (Arup), NCCG and NMS stakeholders through workshop events to (1) present scenario outputs of 2.4 and compare with baseline risk analysis (2.2), (2) consider Risk Concept output in the context of wider development challenges and forces (3) agree a preferred vision and (4) identify opportunities for accessing resources, including advocacy and coalition building to achieve future ambitions by degree of possibility and responsibility for action	Ongoing discussions to collaborate with Nairobi Hub WS3 Urban Forums team, to combine activities in February and March to achieve this agenda		10% DONE	

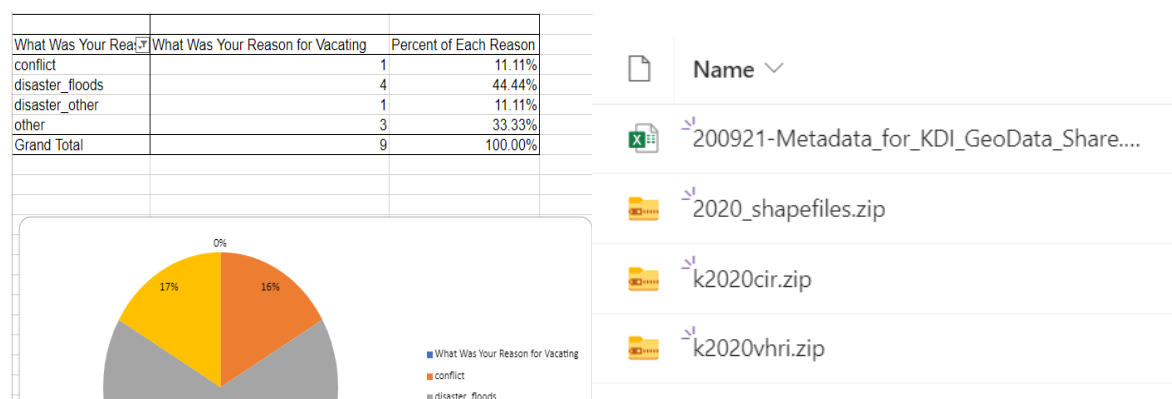| 2.6	To understand from the perspective of neighbourhood level leaders how leadership is maintained, how it intersects with research, including that of the Hub and how research practises can become owned locally and sites for power to be contested between local actors and with vertical relationships	Community leaders identified under 2.2, and available to liaise with the project team.		ONGOING	
2.7	To provide land-use planning models and decision-making models to support Kibera's SPA process	Dependent on the progress of the TCDSE		NOT STARTED	
2.8	To synthesize findings. To liaise with WS 3 on strategy and delivery of presentations	Conversations ongoing, stakeholder mapping done. Seen as a synthesis across the Nairobi Hub work Upcoming write-shop planned to coordinate this activity		NOT STARTED	

THE KEY INSIGHTS FROM THE ACTIVITIES

This section will highlight the interactive discussions with the Risk Working Group in Q3 and Q4, the social vulnerability data collection process, the upcoming future visioning sessions with Kibera residents, and contributions to COP26 discussions.
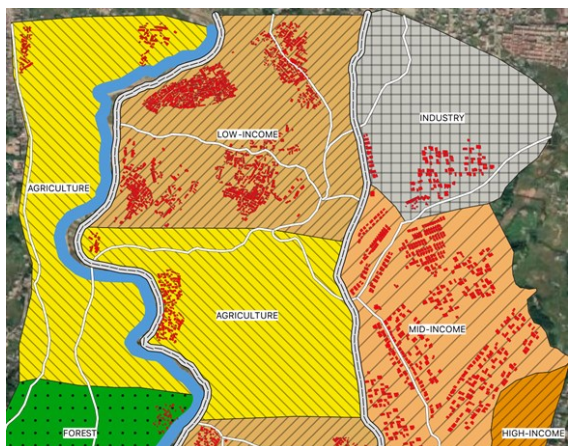
INPUT INTO THE RWG MEETINGS

Involvement in weekly meetings and collating, cleaning and sharing relevant content to support various components of the work from social and technical perspectives.

Convening meetings to enable data exchanges Nairobi urban experts e.g., IIED, SDI and others

Providing KDI collected household survey data such as housing locations, housing typologies, demographic data (no in household, % educated), household incomes, employment etc.

What Was Your Reas▼	What Was Your Reason for Vacating	Percent of Each Reason
conflict	1	11.11%
disaster_floods	4	44.44%
disaster_other	1	11.11%
other	3	33.33%
Grand Total	9	100.00%

	Name ∨
	200921-Metadata_for_KDI_GeoData_Share....
	2020_shapefiles.zip
	k2020cir.zip
	k2020vhri.zip

Examples of data shared (available on SharePoint)

Nr. Of buildings: ~600 buildings
Average Storey: 1.2
Population: 2300
Building age: ~12
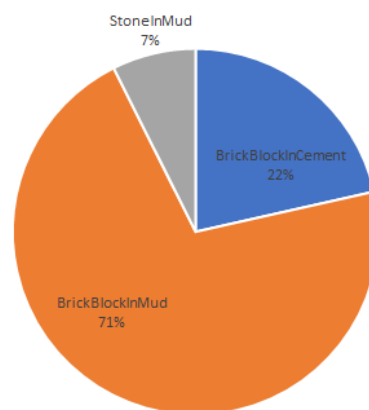
Example of how Kibera data has been used in the risk concept (from September 2021)

Document	General hazard and loss data	Specific to Physical infrastructure module	Specific to social Impact Module	Toworrowville relevant
Mulligan, J., Harper, J., Kipkemboi, P., Ngobi, B., & Collins, A. (2016, June). Community-responsive adaptation to flooding in Kibera, Kenya. In Proceedings of the Institution of Civil Engineers-Engineering Sustainability (Vol. 170, No. 5, pp. 268-280). Thomas Telford Ltd.	X			
Achungo, B. C. (2014). The social transformation of the people living in Kibera slum in Nairobi county following the Kenya slum upgrading programme (Doctoral dissertation).			X	
Shimamura, Y., Yang, J., Baffoe, G., Dodo, J., Mwakesi, I., Matsuda, H., ... & Mungai, D. (2017). Rethinking the Kibera 'Slum': The role of social networks as a mechanism for coping with the increased demand for job opportunities. J. Econ. Sustain. Dev, 8, 157-169.			X	
Division of development? Missing Link #12: A new road through kibera			X	
Building urban flood resilience https://www.kounkuey.org/projects/building_urban_flood_resilience		X		
Risk or resilience https://www.kounkuey.org/projects/risk_or_resilience		X		
https://www.kounkuey.org/projects/why_we_disagree_about_resilience_whydar				X
https://www.kounkuey.org/projects/daraja				X
https://www.kounkuey.org/about/open_data	X	X	X	
https://www.thegeographeronline.net/2-geophysical-hazard-risks.html				X
Gill, J. C., & Malamud, B. D. (2016). Hazard interactions and interaction networks (cascades) within multi-hazard methodologies. Earth System Dynamics, 7(3), 659-679.				

Hazard, vulnerability and loss database (available on SharePoint)

Insights gleaned suggest that a few modules have made use of Kibera data, and that this data could provide even further opportunities if analyzed further. e.g., the cleaned household survey data has relevant and representative socio-economic data that could be a beneficial first point of reference for the DSE risk engine.

SOCIAL VULNERABILITY FOCUS GROUP DISCUSSIONS

Beyond the physical impact and consequences of hazards, we acknowledged that social impacts are worth looking into. Three key participants were targeted: community residents, community residents involved in response actions and community leaders. They were selected to represent the key areas that the Kibera SPA covers and to encompass inclusivity of gender, age and even persons living with disability. Other than the residents of Kibera, more KDI staff, KRC and ACTS personnel were involved.

Some images from the Focus Group Discussions at KDI Office (Photo Credits:Pascal Kipkemboi)

A total of 22 residents: community risk experts, village elders, PWD representatives, older adults, etc., were able to give their views on this subject and think forward to what lessons can be incorporated in future, more specifically what can be done in terms of preparedness including for vulnerable groups. This was relevant to the risk research in Nairobi because:

- It brought a familiarity to TCP to the participants of these discussions and the idea of a "city expert group" was introduced.

- These forums enabled an understanding of some of the pressing needs in terms of safety from the two key hazards: fires and floods.

- A general understanding of social networks and the most vulnerable groups within the settlement around hazards was established.

- An insight into some of the key players (both government and non-governmental) that should be included in the urban forums was highlighted.

There may be concerns that one or two representatives may not fully bring forth the issues from their village, but time and COVID restrictions prevented having larger meetings.

Areas to be focused on in participatory future visioning (Kibera Special Planning Area)

As already indicated, a co-produced methodology has been drafted and input given from the wider hub and some groups already mobilized from identified locations that correspond with the envisioned SPA, for these conversations. The plan will be to use 2020 as a baseline in which case the outputs of 2.2 will be used to define climate risk, flood, fire hazard exposure, demographic variables, land-use and housing quality and social vulnerability.

2030 and 2050 scenarios will be generated using two variables (economy and climate change) to generate scenarios with selected stakeholders (local, academic and policy). This follows a standard methodology to generate four scenarios for 2030 and 2050 (low economy, strong mitigation; low economy, business as usual; high economy strong mitigation; high economy, business as usual).

These will then need to be populated with a few identified variables to provide more detailed input to the risk model – these can be identified in discussion and with preselection by the risk team, e.g., housing density/form; land -use; critical infrastructure. Outputs can include some qualitative expressions e.g., % of land cover with specific building types; % population with specific characteristics (income level). These will not be 'what I want Kibera to look like' scenarios, but 'what the group jointly agrees Kibera will look like given the scenario conditions.

NEXT STEPS AND FEED-INTO THE DSE

For task 2.3 - there may be an opportunity to loop into the upcoming visioning sessions with the Kibera community in late February 2022. The task aims to get residents' inputs of what 2030 and 2050 Kibera could look like. This will then be presented to the different stakeholders concerned and see if there are common points of that vision. The UK TCDSE team has had a chance to input into the FGD tool but could do a final pass given evolution of the work, to see if data needs are met. For Nairobi, engaging the "city expert group", including residents, is seen as also vital to city level decision making for disaster risk as well as feeding into the anticipated Kibera SPA.

For task 2.4 which is on risk model verification for appropriateness for Kibera, resuscitating conversations and providing a real time feedback loop is proposed.

Task 2.7 envisions providing land-use planning models and decision-making models (which is really the TCDSE) to support Kibera's SPA process. Understanding its status will enable a review of this task which is yet to begin.

Finally, for overall data support to the DSE Risk Engine, a data review of what has already been provided may be useful. e.g., the geodata, and provided household survey data, which has potentially relevant and representative socio-economic data that could be a beneficial first point of reference for the DSE risk engine.

Capacity Building Opportunities for the TCDSE

By: Kennedy Mbeva (ARIN) and Joanes Atela (ARIN/ACTS)

INTRODUCTION

Understanding the concept of risks in its totality remains a major challenge in Nairobi's efforts towards disaster risk reduction. Engagements with various stakeholders in the city reveal significant capacity gaps on disaster at multiple levels and scales. At technical research level, there is limited skills on physical hazard modelling as most of the University curriculum courses focus more on managerial and organizational elements of DRR. At the policy level, dialogues with city government sectors show relatively limited understanding of risks across sectors thus existing city plans are widely focused on development interventions with little consideration of disaster risks. Communities are more focused on livelihood security and view risks more as accidents driven by their own lifestyles and neglect from policy planning. In order to achieve research impact under the Tomorrow's Cities – Nairobi Risk Hub, and support effective disaster risk action planning at different levels, there is need to understand the current technical capacity status in the city to inform an integrated research engagements (i.e. how do various stakeholders understand risks and how can they be supported through targeted capacity building interventions). This brief highlight some of work already done – through the Africa Research and Impact Network around capacity building in Nairobi and outlines opportunities for linking with the Tomorrow's Cities Decision Support Environment.

WHAT HAS BEEN DONE

Activity	Output	Evidence	Status by the end of February
Disaster Risk Capacity building webinars (n=2) organized with stakeholders to assess capacity building needs for various stakeholders. The webinar was attended by key stakeholders who shared experiences from local, national and international levels	Community engagement Report	First webinar link here: (https://www.youtube.com/watch?v=O4TiDnZI4sc) Second webinar link here: https://www.youtube.com/watch?v=RB376NMIijU	Published on You-Tube and insights integrated into the capacity assessment report
Capacity Assessment Study – including webinars (above), Key Informant Interviews (KIs) and community and household interviews.	Report	A capacity assessment report outlining the status of capacity building initiatives in Nairobi, DRR capacity building needs. Draft report available here.	Submitted for initial reviews
Building International partnership for DRR capacity building. Partnership with UNDRR and UN-Habitat at advanced stages.	Meetings and News briefs – Capacity building concept note for	News briefs available here: Draft concept note developed and submitted for review by the UNDRR.	Submitted for initial reviews

	the Nairobi Risk Academy		

KEY HIGHLIGHTS

- **There is significant capacity gaps on disaster risk at multiple levels and scales.** At technical research level, there is limited skills around physical hazard modelling as most of the University curriculum courses as managerial and organization sense. At the policy level, dialogues with city government sectors show relatively limited understanding of risks thus existing city plans are widely focused on development interventions with little consideration of disaster risks. Communities are more focused on livelihood security and view risks more as accidents driven by their own lifestyles and neglect from policy planning.
- **Differing perceptions about risks among different stakeholders impedes collective efforts towards current and future risk planning for the city**. These perceptions are widely shaped by underlying drivers of risks including poverty- mainly at the household/community levels and wider governance and institutional politics at the city level. Ultimately, this results in urban plans that are not integrated with risk considerations and infrastructure development that yield risk accumulation.
- **Differing perceptions are very important in shaping our understanding of capacity needs** for strengthening risk considerations in tomorrow's Nairobi plans.

LINK TO THE DSE AND ASSOCIATED OPPORTUNITIES

- Overall, weak technical capacity at academic and policy levels in Nairobi remains a major impediment to the impact of tomorrows City's work in Nairobi and its associated theory of change- the DSE.
- Therefore, capacity building on risk research methodologies and approaches remains a major impact opportunity that the NRH could pursue. The TCDSE provides an opportunity to help unpack the concept of risk and its interrelation with urban planning for the purposes of technical training for city planners and policy makers at the city government and the national government. This aligns with the long-term ambition of the NRH to turn into a Nairobi Risk Academy in collaboration with the U NDRR-MCR process and the UN-Habitat- CityRap tool and Kenyatta University.

Data for DRR Planning and Operationalization of TCDSE in Nairobi City

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INTRODUCTION

The Nairobi Urban Risk Hub engaged city policy makers and city stakeholders through series of policy oriented dialogues between 2020 and 2021. One of the objective of the city and stakeholder engagement was to build and strengthen relations to facilitate sharing of relevant data and information for usage at the Hub for modelling and policy analysis. The engagement for data access is instrumental in operationalizing TCDSE because it builds better relation to access relevant data and information for local and city level use. Among the key outcome of the engagement is that relevant data and information needed at the hub is scattered and difficult to trace and to retrieve in usable format.

Some of the key findings related to data and information for DRR include,

1. The nature of the data & information relevant for urban planning for DRR in Nairobi City is scattered, not easy to find in a common place, available in formats not easy to use by various users; and significant amount of data & information is unreliable.
2. There is limited awareness, knowledge and understanding among city stakeholders about relevant data for better urban planning to reduce risk in Nairobi City.
3. There is lack of a dedicated urban planning database in Nairobi city through which it's easily accessible to the city policymakers and stakeholders for DRR.

The city officials and stakeholders emphasised on the urgency to develop an open city-led data centre that will easily be accessed by all stakeholders. The data centre is instrumental in supporting evidence based decision (support TCDSE) and policy making, planning, design and implementation of disaster reduction actions because it's not only accessed by city officials but also the local communities. Therefore, the Hub organised the workshop on developing an open data centre for Nairobi city at Sports View Hotel Kasarani in Nairobi on 10th December 2021. The workshop brought together at least 35 participants who include the Nairobi City policymakers and technical team (primary target), representatives from the national governmental agencies (such as NDM, KMD), UN agencies' (UNDRR), media, academia, civil society community leaders. The available data can be used to test TCDSE at the local and city level because delegates are open to usage of publicly available data and those that incur cost.

THE OBJECTIVES OF THE WORKSHOP INCLUDE,

1. To bring together relevant stakeholders to share available databases relevant to planning for DRR in Nairobi city
2. To facilitate identification, accessibility and usage of data and information relevant to planning for DRR in Nairobi city
3. To co-develop a framework for co-designing an open data platform centre for Nairobi city

KEY ENABLERS TO DEVELOPING AN OPENING DATA CENTER FOR PLANNING FOR DRR AND OPERATIONALIZATION OF TCDSE IN NAIROBI CITY:

1. UNDERSTANDING DATA CLASSIFICATIONS

Delegates identified the following classifications of data relevant to better urban planning (physical planning) for risk reduction in Nairobi city include: demographic, physical infrastructure, hazard, economic, land and

soil information, housing, disaster, health, meteorological, education among others. These data types composed of detail data on various socio-economic, environmental, political data. For example, the socio-economic data capture on data on population, race, income, education and employment which normally represent a specific geographic location and often associated with time.

2. SOURCES OF DATA

The above classifications sit with the national agencies simply because of the history of governance which has been centralized till 2013 when devolution governance system came into force. The sources include vital registration, surveys, records, population registers and census etc. The socio-economic related data and information is domiciled at the Kenya National Bureau of Statistic (KNBS) and National Council of Population Development. The meteorological and infrastructure data is domiciled in Kenya Meteorological Department (KMD). The infrastructure data is domiciled at the Kenya infrastructure agencies (KURA, KENHA, and KERA). Some of the related data can also be found in projects and databases owned or coordinated by the non-state actors such as the private sector, CSOs, and non-governmental organizations implementing various projects in different communities and geographical locations.

3. USAGE OF DATA

The data and information is used by governments (national and county) and various stakeholders to inform planning, future projections and decision making and development of development activities. However, delegates emphasized that most of the data available are in raw format and hosted in advance softwares hence they find it difficult to use. Data can be used for multiple purposes. For example, emergency response data can be used to estimate the number of persons and property affected during occurrence of a disaster. The same data can also be/ and has been used for modelling to estimate the extent and number of casualties and survivors and development of future. Therefore, the delegates argued that there was limited use of the available data due to the format it is in the available open databases.

4. ACCESSIBILITY OF DATA

Some of the data types identified are partially accessible and some is restricted to the general public hence attracting significant cost and time. Some data is available for free and can be downloaded by the public. However, even the free data is not necessary available to many stakeholders due to the technology advancement. At the local community level, data accessibility is limited due to low technology development and adoption. The city officials and other stakeholders who have advanced technologies like smartphones and strong internet access can easily access most of the free data but often restricted by the formats. In addition, some data is expensive and it is not reachable by the local and city officials. Cost is anticipated to restrict access to relevant data for research and better planning for DRR in Nairobi.

5. DATA INFRASTRUCTURE

6. PARTNERSHIPS TO BUILD SYNERGIES AND HARMONIZE DATA COLLECTION, STORING, ACCESSING AND USAGE

The delegates acknowledged that inclusive partnership in collection, storing, accessing and using the data types identified is important in many ways. Partnership enable stakeholders engage informally or formally to harmonize and co-develop collection tools, which then facilitate collection of relevant data to address data needs for sectors of economy and individual data needs for organizations and persons. The data for better planning for disaster risk reduction, requires strategic partnerships because no single entity can manage to do it on their own due to its cross-cutting nature. There is need to involve different partners like financial institutions, who have the ability to fund the projects and studies that are exposed and vulnerable to disaster risks.

7. MULTI-SECTORAL/STAKEHOLDER APPROACH

A multi-sectoral/stakeholder approach involving especially the 'invisible' stakeholders such as financial institutions and local communities who are also effected by disasters was touted to be among the key enablers in setting up an open data center. The government agencies (e.g. the National Disaster Management Unit, Kenya Metrological Department and National Disaster Operation Centre etc), auxiliary agencies (e.g. Kenya Red Cross Society) and other relevant institutions responsible for data collection and storage should facilitate multi-stakeholder approach to enhance partnerships for data collection, storing, accessing and usage.

KEY OPPORTUNITIES.

According to city officials, there is a great opportunity for developing an open disaster risk reduction data center that bring together different classifications of data into a centralized place or where it can easily be accessed by the city officials and stakeholders for DRR planning. There are attempts by many stakeholders such as KMD to decentralize its data and information for local use. KMD is generating weather and climate information for Nairobi city which it posts and shared on social media, print and emails. The existing willingness among the national agencies, UN agencies, regional economic blocs (RECs) and non-state actors to share data and information is a strong enabler to setting up an open data center for Nairobi city. TCDSE is instrumental in facilitating this happen as well as it provides an opportunity to operationalize TCDSE in Nairobi city.

NCCG is promoting multi-sectoral and multi-stakeholder engagement with the position to bring together local community groups, women and youths, sectors and stakeholders to share data and use it responsibly to inform better planning for not only development projects but also DRR. There is however, low awareness among the local stakeholders. Therefore, the workshop strengthens COP for Nairobi to accelerate discussion and learning about data and the urgency to co-develop an open data center for Nairobi city. The delegates who agreed to join Nairobi COP believed that open data platform is anticipated to grant access to data that will inform better planning. Therefore, TCDSE is instrumental in leveraging that to the local level and genera concrete lessons on city-community led data platform.

There is growing interests among such programmes like Making Cities Resilient 2030 (MCR2030) led by UNDRR. The Hub and ARIN have already engaged UNDRR and NCCG at the city hall to leverage and reinforce the development of an open data center for Nairobi city. UNDRR is engaging the Hub and ARIN to provide technical support towards leveraging MCR2030 but also learning towards development of a DRR database. The discussion held at the hub on 15th Dec 2021 immediately after the data workshop, concluded with the agreement to have the hub to support filling in relevant data and information from the ongoing research while ARIN was tasked with building capacity building and cross-city learning. A follow up meeting was held by the same group at the disaster management unit offices at the city hall where Deputy Director, Disaster management unit offices endorsed the discussion to be escalated to the governors for official arrangement.