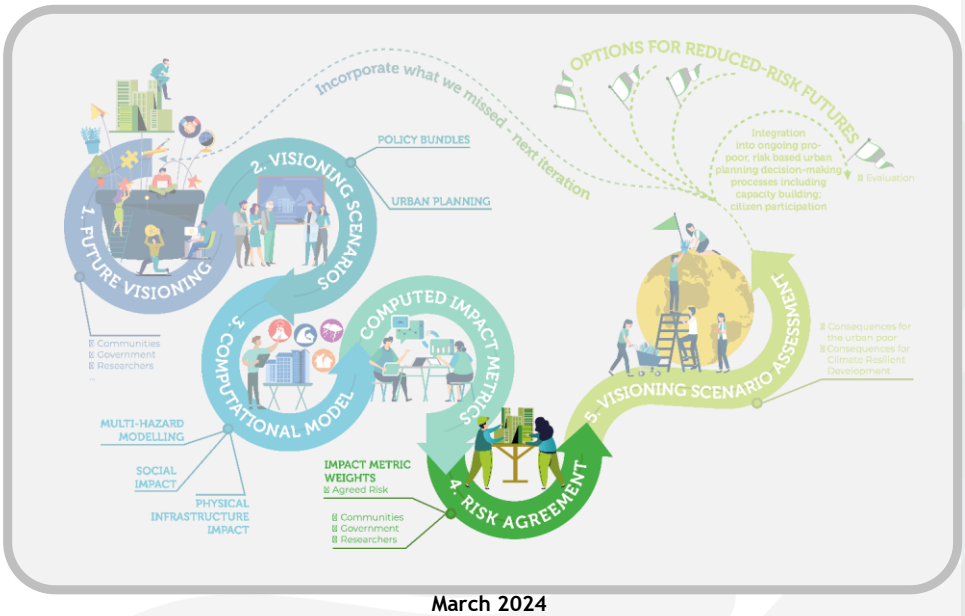
Tomorrow's CITIES
Urban Risk in Transition

Tomorrow's Cities Decision Support Environment (TCDSE) Course

Module 4: Risk Agreement

Workbook



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Module 4: Risk Agreement

Workbook

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PREFACE

This workbook on Module M4: “Risk Agreement” has been developed under the Capacity Strengthening program on Tomorrow’s Cities Decision Support Environment (TCDSE) Course of the Tomorrow’s Cities (TC) project. This course aims to enhance the capacity of professionals from the Tomorrow’s Cities and urban areas in utilizing the TCDSE and expand its reach so that the cities or urban areas can then adapt the framework based on scenarios specific to them and ultimately self-sustain.

This is module 4: "Risk Agreement" which is the fourth module of the TCDSE course and is based on the Work Package WP4 on “Risk Agreement” of TCDSE. This workbook presents the details of module 4: “Risk Agreement”. This module is aimed to aimed to enable the participants to comprehend the risk agreement methodology, as well as define the steps to deploy the related workshop.

The Risk Agreement is the fourth stage of TCDSE and is a more 'people-centred' component of the framework. The target Audience of this module are social mobilizers, urban planners, architects, GIS Experts, artists, DRR officials from Wards and Municipalities, Ministries from local, provincial, and Federal government, academics, researchers, representatives of the private sector, and Civil Society Organizations (CSOs).

This module has five sessions; “Introduction”, “Unfolding Impact”, “Hands-on TCDSE Risk Dashboard”, “Visioning Scenario Assessment”, and “Workshop Delivery and Planning”.

Each session of Module 4 course describes the process of Risk Agreement providing both theoretical knowledge and practical skill through real time in-depth exercises. The course includes the key components of the TCDSE, risk reveal and visioning scenario assessment and policy implication process, objectives, key milestones, and outputs describing how the Risk Reveal and Assessments feeds to next step of TCDSE – Action Plannings in the City. It also explains how Risk Reveal and Visioning Scenario Assessment outputs contribute to the TCDSE in its different stages.

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The module will be using various examples from TCDSE cities, including different contextualization of the methods used in different cities. This training allows to transfer the skill and knowledge which will empower participants to understand risk and assess the impacts of hazards in visioning scenarios of their cities. Whether participants are professionals seeking to deepen their understanding or a newcomer eager to explore new horizons, this module offers something valuable for everyone.

Table of Content

LIST OF FIGURES

List of Table

ABBREVIATIONS

NSET	National Society for Earthquake Technology-Nepal
TCDSE	Tomorrow's Cities Decision Support Environment
VS	Visioning Scenario
DRR	Disaster Risk Reduction
GIS	Geographic Information Systems
LRS	Load Resisting System
URL	Uniform Resource Locator

1 OVERVIEW OF THE MODULE

Authors of the Chapter: XXX, Roberto Gentile

1.1 Introduction to Tomorrow's Cities Decision Support Environment (TCDSE)

Figure 1: Summary of Tomorrow's Cities Decision Support Environment

Source: Tomorrow's city

The Capacity Strengthening program of Tomorrow's Cities Project is based on the Tomorrow's Cities Decision Support Environment (TCDSE). TCDSE is Future Visioning approach and is located within a broader framework for risk-informed urban development planning; Tomorrow's Cities Decision Support Environment. As the name suggests, this is a process that supports informed decision making rather than making or enforcing decisions. Drawing on Tomorrow's Cities primary mission to reduce disaster risk for the urban poor, the TCDSE creates equitable and interactive spaces which allow multiple stakeholders and urban groups (whether institutional actors or urban residents) to think differently about risk. This is a space for learning about: the impacts of hazards on people, nature, and the built environment; different perceptions and experiences of hazard events. In a nutshell, the TCDSE articulates technical and political spaces of decision making by engaging in a systematic methodology composed of five stages: (1) Future Visioning, (2) Visioning Scenarios, (3) Computational Modelling & Computed Impact metrics, (4) Risk Agreement and (5) Visioning Scenario Assessment. Before the kick-off of the TCDSE in a given city, there is a preparatory stage (covered by Module 0 in this course) which deals with the assessment of existing data, a critical mapping and selection of stakeholder groups (on the basis of power imbalances in planning), besides other technical and logistical arrangements that allow the TCDSE to function.

Commented [GR2]: Who wrote this?

It's very important that people take the right credit for their precious work

Commented [NS3R2]: Please suggest as we didnt have the draft writeup for most of the sessions and all these content are developed based on the ppt slides and the transcribe of the training.

Commented [RG4]: Every figure in the document should be EXPLICITLY cited in the text

Please revise the text accordingly in the entire document

Commented [GR5]: This sentence does not make sense

Commented [GR6]: Is this the terminology adopted throughout?

Commented [GR7]: What does it mean differently?

If not explained, this is nonsense

Commented [GR8]: Are you sure you want to keep this?

Commented [GR9]: Urban groups or stakeholder groups?

Consistency is an issue

Future Visioning is the official start of the framework. It is a people-centered stage in which both powerful and marginalized urban voices gather to imagine better futures that reduce disaster risk for the poor, and to think about the possible pathways and constraints to reach such futures. In the TCDSE, Future Visioning is a trajectory rather than a one-off exercise. It aims to create synergies between stakeholders, to legitimize collective positions, and to produce outputs (data, notions, expectations) that will feed other TCDSE components.

In this sense, an essential task before Future Visioning workshops (and all other TCDSE stages) take place is the critical (explicit, conscious, and justified) mapping of stakeholders that could be relevant for a risk-informed planning process in a selected area. Future Visioning is not only about imagining a good future city, but also about building relationships and questioning the injustices that shape risk. Whilst not all groups and voices could be represented in the TCDSE, having those who represent (and are able to communicate) power imbalances are a good starting point for a more democratic Decision Support Environment.

Once Future Visions are elaborated by groups, spatial and policy expectations expressed in those visions are turned into Visioning Scenarios (Stage 2), which are detailed spatial plans - containing layers of social and infrastructural datasets – coupled with DRR-oriented policies.

In Stage 3 – Computational Modelling & Computed Impact Metrics, Visioning Scenarios are exposed to multi-hazard modelling, which are simulations of hypothetical hazards. Such simulations are based on probabilistic hazard data and produce a series of objective impacts to be assessed by stakeholders.

People's evaluation of the impacts of hazards is nonetheless subjective. Risk Agreement (Stage 4) is when stakeholders gather to discuss and negotiate the impacts they prioritize, and which levels of risk are acceptable or not, helping to democratize the concept of risk. Visioning Scenarios are ranked on the basis of such collective assessment, which includes quantitative and qualitative methods.

Commented [GR10]: Not sure we do that anymore

Visioning Scenario Assessment (Stage 5) is when the results of this risk-informed urban planning process are assessed and consolidated or revised, which could mean more TCDSE iterations or the implementation of some strategies from plans and policies that reduce disaster risk. This stage is ideally when the TCDSE is institutionalized by cities, so that the process becomes ongoing and responsive to emerging urbanization.

Commented [GR11]: Is this not WP5?

I'm very confused

It is important to always keep in mind that this is a Decision Support Environment – not a Decision *Making* Environment - which means that the outputs of iterations are only informing planning discussions within cities. That is, the TCDSE offers a way to think differently about planning, in which risk is central. Although concrete solutions could be used, it is less of a prescription and more of a process of stimulating critical urban thinking.

1.2 Purpose of M4

Module 4: Risk Agreement is based on the WP4: Risk Agreement of Tomorrow's Cities Decision Support Environment TCDSE process. Module 4 is aimed to enable the participants to comprehend the risk agreement methodology, as well as define the steps to deploy the related workshop.

1.3 Objectives of M4

By the end of the module, the participants will be able to:

Commented [RP12]: Check/refine objectives if needed

- Relate and connect the different components of impact (hazard, exposure, vulnerability) to the corresponding visualizations and outputs presented in the risk dashboard, facilitating a comprehensive understanding of the impact assessment

- Navigate the risk dashboard and compare the risk modelling results on different visioning scenarios through the risk dashboard.
- Recognize the underlying factors driving impacts, directly linked to the policy decisions made (Conduct Visioning scenario assessments) and discuss strategies to adapt policies to mitigate impacts within their envisioned scenarios.
- Organize and deploy the risk agreement workshop

1.4 Target Audience of M4

Target Audience of this module are technical and social audiences working in all sectors like the government, academia, the private sector and the non-governmental sectors such as social mobilizers, urban planner, architect, GIS Expert, artist, DRR officials, Social Development Officers from wards, municipalities/cities etc.

1.5 Contents of M4

The M4 course is a 5-hour course that contains 5 sessions, combining lectures with small exercises to ease the participants in understanding these diverse topics. The sessions can be in-person or online, spread out ideally across 1 to 2 days, depending upon the need and convenience of the participants The structure of M4 is as follows:

Commented [TD13]: Introduction and workshop delivery are not technical. So best to keep it as session

1) **Introduction to risk agreement:** The Introduction session gives a brief overview of the TCDSE process with a brief description of the methodology of the Risk Agreement and Visioning Scenario Assessment process. Some of the Key concepts such as impacts, potential policy modification, policy implications are discussed in this session. This stage of the TCDSE process involves engagement with stakeholders. It focuses on understanding and mitigating disaster risk based on community decisions, hazard scenarios, and impact metrics. The stakeholders can interpret and find ways to reduce future risk.
2) **Unfolding Impact:** The session Unfolding impacts deals with the understanding the impact and how to interpret the impact results derived from computational modelling from a non-expert point of view. The computational modelling in WP3 will quantify impact of different hazards by different experts such as hazard modelers, impact modelers etc.
3) **Hands-on TCDSE risk dashboard:** The Hands-on TCDSE Risk Dashboard session is about the dashboard developed for the visualization of impact modeling results and its components. The session will deal with the different components and the use of dashboards. The session will have hands-on exercise on risk dashboard, so that everybody will be able to use and navigate the risk dashboard.
4) **Visioning scenario assessment:** The session Visioning Scenario Assessment deals with assessing the visioning scenarios for different levels of impacts and how those assessments can be used to create potential policy modifications.
5) **Workshop delivery:** The Workshop delivery session is a practical session related to planning. The session describes the methodology for preparing and deploying the risk agreement workshops.

Finally, a wrap up session allows to consolidate how the the Risk Agreement activities and results are located in the entire TCDSE.

Commented [TD14]: Can these be attached to the five sessions ? So you have the name of the five sessions + their objective

Table 1: Contents of Module 4

	Session	Duration
1	Opening Session: Introduction, Pre-test, remarks	45 min

2	Session 1: Introduction to Risk Agreement	30 min
3	Session 2: Unfolding impacts	30 min
4	Session 3: Hands-on TCDSE Risk Dashboard	60 min
5	Session 4: Visioning Scenario Assessment	45min
6	Session 5: Workshop Delivery	30 min
7	Closing Session: Way Forward and Closing	60 min

1.6 Course Evaluation

The course is evaluated at different stages to collect feedback and, in turn, update the course to foster its effectiveness for future training. The following course evaluations will be conducted in this module:

i. Pre-/ Post-Test:

The pre/post- test is an evaluation of participant's knowledge before and after the training in order to evaluate knowledge improvement.

ii. Session Evaluation:

The evaluation of each session by the participants in terms of its relevance, content, delivery and duration.

iii. Daily Feedback:

Feedback on course content and management aspects collected from participants at the end of each training day.

2 SESSION 1: INTRODUCTION TO RISK AGREEMENT

Authors of the Chapter: XXX, Roberto Gentile

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It's very important that people take the right credit for their precious work

2.1 Objectives

The aim of this session is to introduce Module 4: "Risk Agreement".

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I suggest this specific way, but I'm OK with other solutions.

The most important thing is consistency: once you decide one way, always use that

By the end of the session, the participants will be able to:

- Discuss the Tomorrow's Cities Decision Support Environment (TCDSE) and its key components
- List the Purpose, Objectives and contents of Module 4: "Risk Agreement".
- Comprehend the risk agreement methodology and the related workshops
- Describe the key concepts: disaster impacts, potential policy modifications, policy implications
- Discuss risk agreement methodology and the method to delive the related workshop.

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Whatever the rationale is, BE CONSISTENT across the document

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2.2 Structure of the Session

This introductory session will describe the following topics.

Structure

1. Purpose, Objectives, Target audience, course content and evaluation methods of Module 4: "Risk Agreement"
2. Definition of key terms
3. Introduction to Tomorrow's Cities Decision Support Environment
4. Overview of the model
5. Introduction to risk agreement
6. Overview of the Risk Agreement Methodology
7. Learning outcomes

2.3 Overview of the module

The contents of this section are extensively covered in Chapter 1.

2.4 Definitions of Key Terms

The following are not universal definitions, but contextualized explanations of what these terms mean in the context of the TCDSE and, particularly, in the context of Module 4.

Visioning scenarios Visioning scenarios comprise of a combination of city maps and policy bundles. These scenarios were generated as part of ~~Module 2~~ Work Package 2 and run through the multi-hazard computational model (~~Module~~ Work Package 3) to assess the impacts.

It consists of a specified (and detailed) representation of the future physical (natural and built) and social environment within the urban extent of interest (also accounting for any influences from relevant policies identified in Future Visioning).

The Visioning Scenario is one of the fundamental inputs to the Computational Model, which characterizes pre-defined impacts of selected multi-hazards on parts of the urban extent defined in the Visioning Scenario, accounting for its underlying physical and social fragilities, vulnerabilities, and capacities.

Policy: Within the Risk Agreement activities, a policy is an intervention that influences exposure and vulnerability. Policies can be Spatial Policies and Non-Spatial Policies:

- Spatial policies apply to specific areas of a visioning scenario, influencing land use/building patterns. For example:
  - Building patterns: residential areas
  - commercial and industrial areas
  - open space or greenspace
- Non-spatial policies, that apply to the entire visioning scenario. For example:
  - improving building codes or their implementation
  - cash relief mechanisms to improve households' wellbeing after a hazard event
  - social housing schemes

Impact Metrics: Impacts are the objective measure of the negative effect of a specific hazard event. They are quantitatively represented in numeric values. They have different measuring units based on the type of impact (see Table 2 for an example). These metrics can be associated with social impacts, economic impacts, and environmental impacts, for

Commented [GR19]: Module 2 does not generate anything

WP2 does

Consistency!!!

Commented [GR20]: Citations to tables, equations, figure, etc should be explicit (e.g., Table 2, not "table below") and they should be done using the automatic tool in MS word

Commented [GR21R20]: Please fix them all

instance. For example, in the hazard scenario in Figure 2 (1/500-year earthquake, 42.3% of the families are displaced, here the impact metrics is the Displaced household.

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Table 2: Examples of impact metrics

Impact	Measuring unit
Loss in lives	Individual
Households displaced	Household
Destroyed hospitals	Building

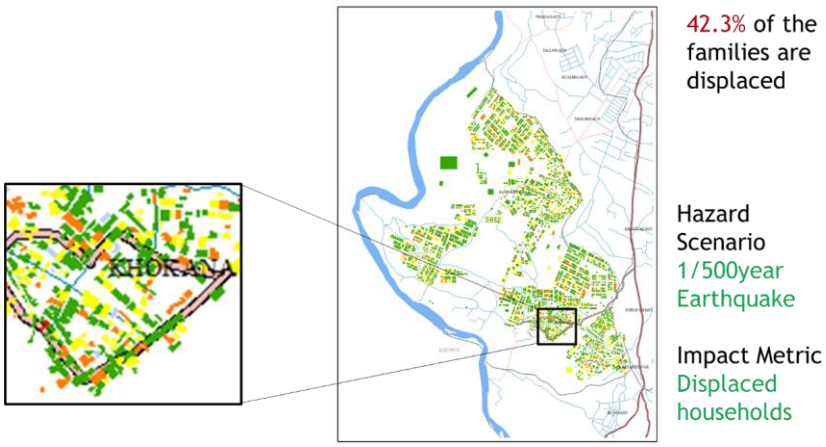

Figure 2: **Example of Impact Metrics**

Policy-impact link: this is the mechanism that regulates how impact changes as a result of a modification of an existing policy or the introduction of a new policy.

2.5 Introduction to Risk Agreement

Risk agreement refers to an exercise that creates spaces for disaggregated social groups to express their views of risk and appreciate the effect of their policy decisions in reducing impacts on their visioning scenarios. It is a "democratization" of the concept of risk, facilitating different views for the same risk from different social groups and their interaction with the risk modelling results to produce revised versions of the visioning scenarios.

The risk agreement methodology aims to facilitate evidence-based interpretation of the TCDSE framework, revealing the disaster risk associated with the visions of the future for different social groups. It allows these groups to understand the link between their decisions and the impacts on their visioning scenarios, fostering co-learning and understanding the differences in views across groups. By establishing a shared understanding of risk, the participants develop confidence in the physics-based computational risk model and the planning process facilitated through the TCDSE methodology.

In particular, the objectives of the risk agreement exercise are to:

- Enable individuals to recognize the disaster risk associated to their visions of the future

- Support individuals to recognize the effect of their policy decisions in the decision support of Tomorrow's cities
- Connect virtual evidence-based learning (learning from the risk dashboard) with the real-world challenges (what is really needed in the cities, in the communities).
- Facilitate interaction of the social groups with more evidence based scientific tools (i.e. the computational model for impacts)
- Stimulate a co-learning process (learning of different components of the community, for example, citizen, government officials, urban planners etc.) to process, change ways of thinking and acting of these key stakeholders and marginalized groups (that don't normally have the same voice in the decision-making process).
- Understanding the differences across the different social groups, in viewing and reducing risk. (To interpret what is happening and also how to interpret, what are the potential solutions to reduce risk).

2.5.1 Overarching Questions

In the TCDSE, each objective of the methodology is driven by an overarching question as represented in Figure 3.

In Risk Agreement and Visioning Scenario Assessment, six overarching questions are defined. The first question of the Risk Agreement & Visioning scenario assessment methodology is- 'Why is your (future) visioning scenario impacted or at risk?'. This question enables each disaggregated group to understand the drivers of future risk with respect to their future visioning scenarios. An understanding of the drivers of risk leads to the second question of this methodology- 'How to reduce (future) risks in your visioning scenario?'. The disaggregated groups identify measures/interventions, in the form of potential policy modification, to reduce future risk in their respective visioning scenarios.

The final question of this methodology- 'How realistic are your low-risk (future) visioning scenarios?' involves a brainstorming session on existing implementation challenges and possible solutions to address such challenges and the responsible agency for doing that. This discussion on present day issues is driven by disaggregated groups and facilitated by local urban planners and local level government officials.

- Why is your Visioning Scenario impacted?
- How to potentially reduce the impacts to VSs?
- How realistic are the potential policy modifications?
- Are there any implementation challenges?
- What are the possible solutions to such challenges?
- Who will be the responsible agency?

Figure 3: Overarching Questions

Commented [GR23]: Remove questions related to other WPs. They should be defined by other people, not by us in WP4

2.5.2 Prerequisites

To deploy the Risk Agreement workshop, several prerequisites are required, which involve inputs in terms of workshop participants, exposure datasets, risk modelling results, and visualization tools.

The starting point for the Risk Agreement methodology is the definition of the disaggregated social groups. City representatives should have already mapped powerful and marginalized voices/groups that could or should participate in the TCDSE during the initial stage, WP1/WP2. Here in this stage, those are the same groups that have participated to the future visioning and the visioning scenario workshops and hence should be automatically ready at the time of the WP4 Risk Agreement Workshop.

Visioning scenarios comprise a combination of city maps and policy bundles. Visioning Scenarios are developed during the WP2 stage. Each disaggregated social group must have a visioning scenario.

Each visioning scenario must go through the risk modeling or impact modeling process so that there are results for each visioning scenario with different hazard scenarios. For example, the Gorkha earthquake or a scenario resembling the Gorkha earthquake, or a flood resembling a common flood happening every two years in the community. For each of those hazards impacting the visioning scenarios, there must be computed impact metrics for each visioning scenario and hazard scenario.

Interactive risk dashboard is the visualization tool, where all those results of the risk modelling process are integrated. It is a tool to visualize the hazard impacts on the Visioning Scenarios. The Tomorrow's Cities risk dashboard developed is very interactive and very simple to understand.

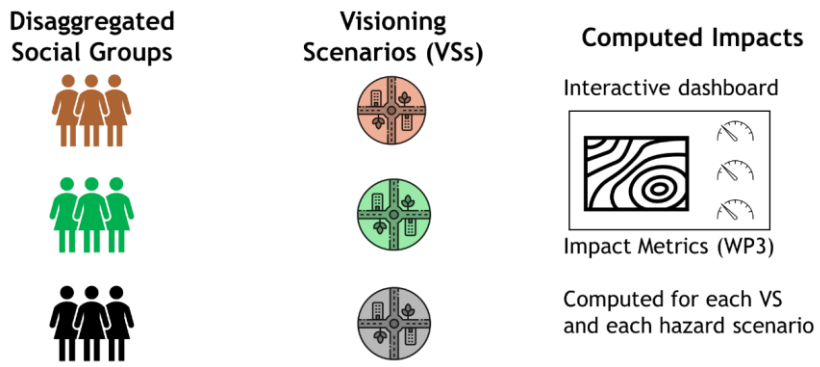

Figure 4: Prerequisites to deploy the Risk Agreement workshop

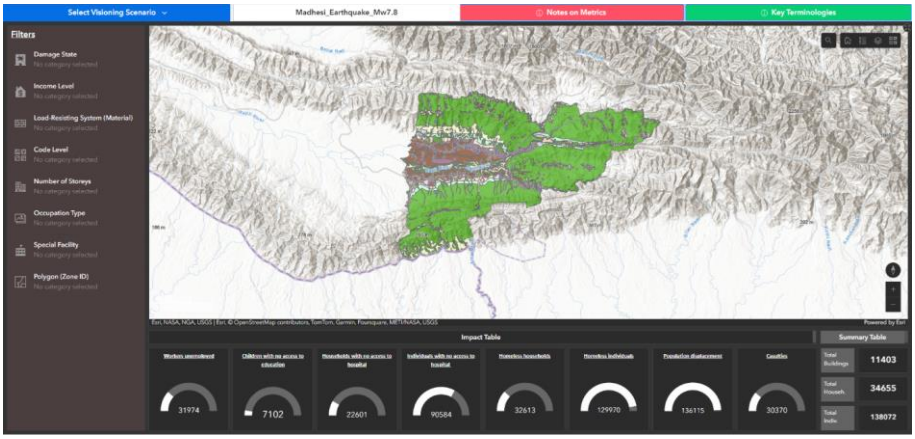

Figure 5: Interactive risk dashboard

2.6 The Risk Agreement Methodology

The Risk Agreement methodology allows a community to assess different urban layouts subjected to several refined future multi-hazard scenarios and co-develop revisions of such layouts leading to reduced disaster impacts. Within a workshop, selected community groups are first introduced to an interactive dashboard that simplifies the communication of multi-hazard impacts (e.g., human displacement, casualties, loss of education capacity), calculated with state-of-the art modelling techniques. A set of activities is designed to allow the community groups to identify and discuss different hazard, exposure, and vulnerability features of the considered urban layouts that may be responsible for different shares of the modelled impact. Such evidence-based discussions, facilitated from the social and technical points of view, lead to a set of revisions of the considered urban plans. In a final group discussion, the selected revisions are assessed against the social, political, and governmental challenges that may hinder implementation and/or effectiveness. Such reality check allows to: 1) go beyond the assumptions of the adopted risk model; 2) identify strategies to overcome such challenges and key actors responsible to implement them.

The workshop is divided into three key parts: a tutorial on the interactive risk dashboard, the Risk Reveal (allowing to identify potential policy modifications), and the Policy Implications discussion (allowing for a reality check).

Commented [TD24]: Do you mean marginalised community? What about urban planners and local govt. representatives?

The WP4 methodology has been designed to engage with all three groups- marginalised community members, urban planners and local govt. officials.

Commented [RG25R24]: I mean a community. Whatever one wants it to be

Commented [GR26]: That's my final proposal for the name
Not policy, not action, but revision

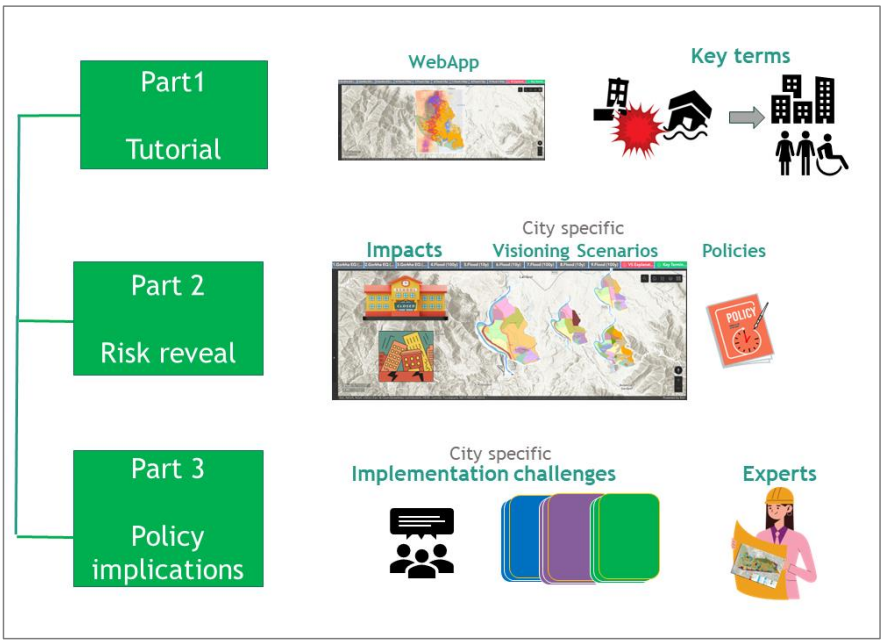

Figure 6: **Components of the Risk Agreement Workshop**

2.6.1 Part 1: Tutorial on the interactive risk dashboard

This is the first element of the Risk Agreement process. This is designed to introduce the risk dashboard and introduce key terminologies used to interpret the computational modelling results and visualise them using the risk dashboard. With this step they will be ready to understand the impacts on their visioning scenarios. The key terms introduced in the tutorial include hazard, exposure, vulnerability, hazard scenarios, impact metrics, and equitable impacts. These key terms are explained through definitions and context-specific examples followed by an activity using the risk dashboard. The Risk Dashboard helps visualize and analyze how future hazard risks interact with respective future urban plans. Ideally, this methodology should be deployed using a virtual, learning scenario (e.g., Tomorrowville) to avoid biasing the workshop participants. However, in the interest of time the community-designed visioning scenarios can be used for this part. The 'technical' learnings from part 1 are fundamental for the second part of the visioning scenario assessment methodology. The activities in this part are extensively described in Chapter 4.

2.6.2 Part 2: Risk Reveal

Commented [TD27]: Use diagrams for Part 2 and 3 like you did for Part 1 and reduce text. There needs to be consistency in the explanations.

In this step, city specific visioning scenarios and the risk dashboard will be used. The community members are shown the impacts on their own visioning scenarios and discuss the specific policies that are introduced in those visioning scenarios that were defined by the community groups in the future visioning and visioning scenario activities. Once the drivers of impact are understood, the main goal of this part is to provide some potential ways to change these visual scenarios to reduce the risk (i.e., potential policy modifications). The activities in this part are extensively described in Chapter 5.

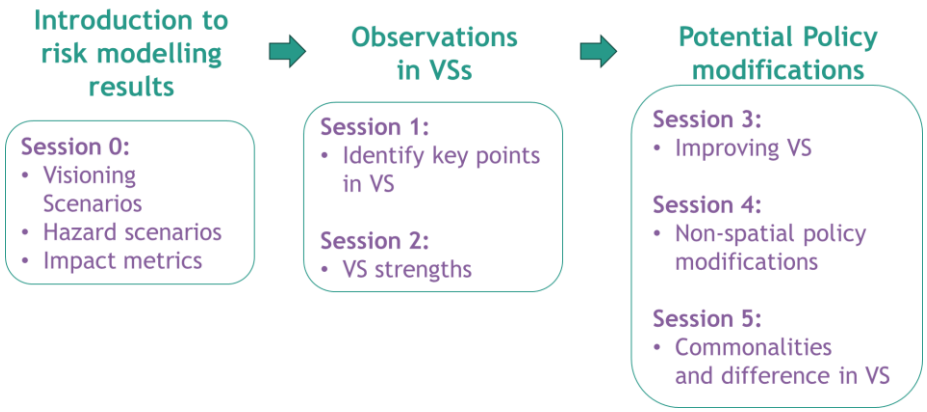

Figure 7: **Activities of the Risk Reveal**

2.6.3 Part 3: Policy Implication:

The third part of the visioning scenario assessment methodology involves a discussion about present-day realities of urban planning practices and disaster risk decision-making processes. This part allows to surface implementation challenges that may arise in a realistic implementation of the potential policy modifications. This step also helps to gain the insights into relationship between policy choices, impacts and the potential for improvement through targeted modifications. Identifying implementation challenges helps identifying possible strategies to address them. Each group collectively identifies strategies in the form of solutions, responsible agencies and timelines to overcome them. The activities in this part are extensively described in Chapter 5.

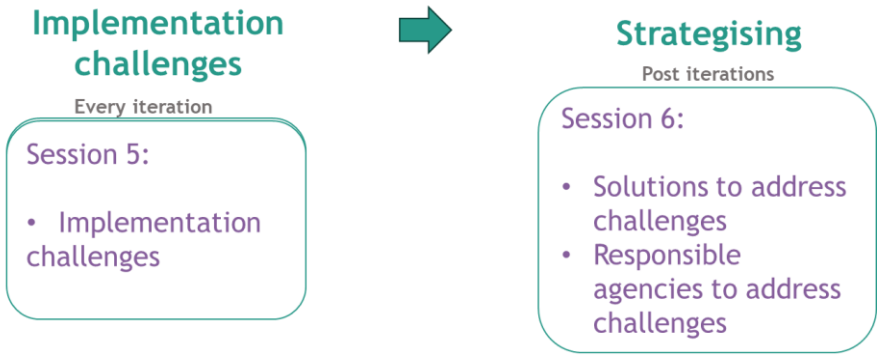

Figure 8: **Policy Implications**

2.7 Learning outcomes

The Risk Agreement methodology aims to deliver both tangible and intangible outcomes. Tangible outcomes will include potential policy modifications that will be discussed during the TCDSE methodology iterations. The objective is to achieve lower-impact visioning scenarios and develop a list of strategies to make these scenario implementable.

Intangible outcomes are equally crucial. Participants in the workshops are expected to develop a shared understanding of risk. They will also gain confidence in the physics-based computational risk model used in the process. Furthermore, participants are anticipated to build confidence in the planning process facilitated by the TCDSE methodology.

3 SESSION 2: UNFOLDING IMPACT

Authors of the Chapter: Erdem Ozer, Roberto Gentile

3.1 Objectives

By the end of the session, participants will be able to:

- Quantify the different components of impact -namely hazard, exposure, and vulnerability- and understand their interrelationships in determining the overall impact.
- Comprehend the basic assumptions and underlying principles of the TCDSE framework.
- Discuss different impact metrics being considered, particularly in relation to issues of equity and how they are affected by varying levels of hazard, exposure, and vulnerability.
- Relate and connect the different components of impact (hazard, exposure, vulnerability) to the corresponding visualizations and outputs presented in the risk dashboard, facilitating a comprehensive understanding of the impact assessment process.

3.2 Structure of the Session

Structure
1. Exposure
2. Hazard Scenario
3. Physical Vulnerability
4. Impact Metrics

Commented [GR28]: This objective looks much more general than this session, and even more general than M4.

What's the idea behind it?

Commented [RP29]: This part not coverede

Commented [GR30]: This looks more appropriate for the session on the dashboard rather than this one

Commented [GR31]: It is not appropriate to have sections without text

3.3 Components of Impact

The impact of a future hazard is calculated based on three main factors Hazard, Exposure and Physical vulnerability.

1. **Hazard** refers to the potential natural event or condition that could cause harm. It is something that -in the majority of cases- cannot be changed or influenced by human actions, such as earthquakes, floods, or storms.
2. **Exposure** indicates what is at risk of being affected by the hazard, such as people, buildings, infrastructure, and other assets. It considers the presence and quantity of these elements in hazard-prone areas.
3. **(Physical) Vulnerability** reflects how susceptible the exposed elements are to damage or harm when the hazard occurs. It includes factors like the structural integrity of buildings, the resilience of infrastructure, and the overall ability to withstand and recover from the hazard's impact.

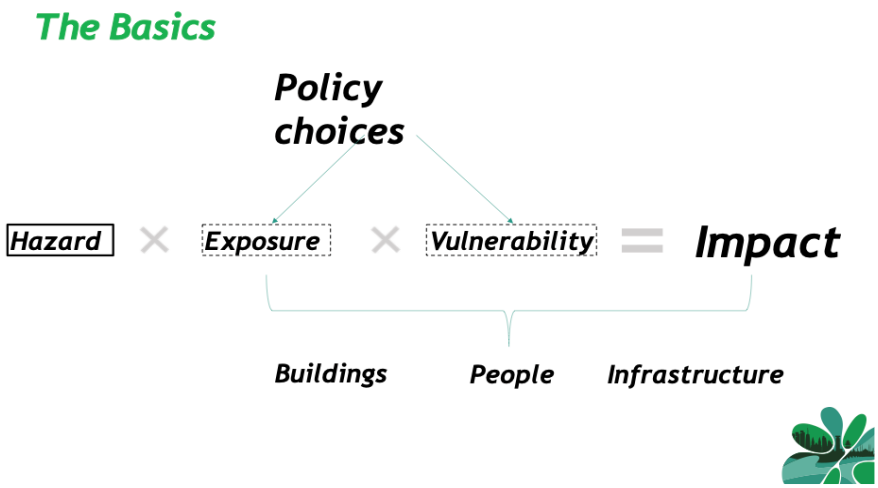

Figure 9: **Different components of impact (relation)**

XXX

Commented [GR32]: Provide more comments on this figure. Only hazard exposure vulnerability are explained

The rest is not

Mention the policy choices and the different kinds of exposure we consider for the impact (buildings people infrastructure)

3.4 Exposure

Exposure is anything that can be affected by a hazard. Exposure can be the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas. Examples of exposure may refer to the number of people in a building, the number of buildings are in an area, the typology of buildings in an area. These can be combined with the specific vulnerability and capacity of the exposed elements to any hazard to estimate the quantitative risks associated with that hazard in interest.

In the specific case of Tomorrowville, the building layout represents the physical exposure. Each polygon or area within the layout has characteristics pertaining to exposure, such as the type of buildings (e.g., residential, commercial), construction materials, structural systems, and building heights. Additionally, the exposure includes information about the population residing

Commented [GR33]: Tomorrowville is a single word. V is not capital

Check in the entire document and revise

or working within these buildings, such as their income levels, number of households, and dependence on critical facilities like hospitals or workplaces.

Figure 10: Highlighted residential part

For instance, the highlighted residential area has low-income households, with approximately 3,000 people living there. One building in this area is a five-story reinforced concrete frame structure used for residential purposes. Within this building, there are four households, and one household comprises four individuals with low incomes. Detailed information about these individuals, such as their gender, age, income level, and workplace, is also part of the exposure data.

The exposure data not only covers the physical attributes of the buildings but also the socioeconomic characteristics of the populations residing or working within them. Any damage to critical facilities like hospitals or workplaces can directly impact the well-being and livelihoods of the associated populations. Therefore, understanding the exposure is crucial for assessing the potential impacts of hazard events on the built environment and the communities within.

3.5 Hazard Scenario

A hazard scenario is a process, phenomenon, or threat with the potential to cause harm or damage. It is an event that is selected and characterized by specific parameters. It can be described quantitatively by the likely frequency of occurrence of different intensities for different areas. Examples of hazard scenarios include earthquakes, landslides, floods, or other natural hazards. In the case of an earthquake hazard scenario, it is defined by characteristics such as magnitude and frequency. Magnitude represents the strength or intensity of the earthquake, while frequency refers to the average recurrence interval of such an event. A hazard scenario does not necessarily cause damage and/or impact.

For instance, as shown in **figure 11** n earthquake scenario may have a magnitude of 7.0 and occur, on average, every 500 years. It is important to note that this frequency does not imply that earthquakes of this magnitude will occur precisely every 500 years. Rather, over a very long period, these major earthquakes can be expected to happen about once every 500 years on average.

Figure 11: Earthquake hazard scenario

When a specific hazard scenario, such as an earthquake or a flood, arises, the local intensity can be calculated at impact at a particular location. For example, it can provide an understanding of how severe the shaking from an earthquake will be in a specific area.

For earthquakes, local intensity is measured for example by the horizontal peak ground acceleration. For floods, it is represented by the water depth at a given location. The local intensity is a crucial factor when assessing potential damage and impact, as areas with higher local intensities are more likely to experience greater damage.

However, the extent of damage and impact is not solely determined by the local intensity but also depends on the vulnerability of the exposed elements, such as buildings, infrastructure, or populations. Areas with low local intensity, represented by low peak ground acceleration or water depth, may experience minimal or no damage, while areas with high local intensity are more likely to sustain significant damage, provided that the exposed elements are vulnerable to the hazard.

3.6 Physical Vulnerability

Physical vulnerability is the link between different exposure classes (such as different buildings, people, roads, bridges) and their probability of experiencing a certain level of impact under a given hazard intensity. Physical vulnerability is a way to measure how likely buildings and infrastructure are to sustain impacts (due to damage) due to hazards like earthquakes or floods. It helps to understand how different buildings or structures might be affected by these events based on their design and construction. This is important for predicting and planning the impacts of hazards on communities.

For instance, if two different buildings are in an area experiencing high peak ground acceleration (indicated by the red zone) during an earthquake, their respective physical vulnerability characteristics will determine the varying levels of damage each structure may experience. Physical vulnerability models can answer questions such as: What is the expected level of damage to a masonry building, a steel building, or a concrete building when subjected to a peak ground acceleration of 3 meters per second squared? Similarly, for flood hazards, these models can predict the damaged components of a specific hospital building when exposed to a certain flood depth at its location.

3.7 Impact Metrics

Impact metrics are the selected parameters to quantify risk for each scenario that is analysed for the city. Impacts can be different considering different hazard scenarios. Examples of impact metrics include economic losses, number of fatalities, number of students whose education is disrupted, number of orphans and unemployment level. These metrics can be disaggregated according to various social variables (e.g., age, gender and/or income level), to determine disproportionate impacts on certain social categories.

Impact metrics are clear measures of how bad a certain hazard event or situation is. In the current model, simplifying assumptions are made regarding social vulnerability, and the focus is on physical vulnerability. The impact metrics being considered include the number of workers unemployed, the number of children without access to education, households, or individuals without access to hospitals, the number of homeless households or individuals, and population displacement.

To calculate these impact metrics, the model relies on the combined effects of the hazard scenario and the physical vulnerability of the exposed elements. For a given hazard scenario, the local intensity (e.g., peak ground acceleration or flood depth) at a specific location is determined. Using fragility functions, the corresponding level of physical damage to buildings or infrastructure is estimated.

Thresholds are established to link the physical damage levels to social impacts. For instance, if a residential building sustains moderate or higher damage, it is assumed that the inhabitants are displaced. Similarly, if a workplace or hospital experiences low or higher damage, it is presumed that the associated workers are rendered unemployed, and individuals lose access to those facilities, respectively.

It is important to note that for the same visioning scenario, the impact metrics may vary depending on the hazard scenario being considered. More frequent but less severe events, such as a moderate earthquake, will yield different impact values compared to rarer but more intense events, like a major earthquake or flood.

By quantifying these impact metrics, the model provides an objective measure of the negative effects of hazard scenarios on various aspects of urban systems, including employment, access to education and healthcare facilities, and population displacement. However, the current model does not yet incorporate nuances related to differential social vulnerability within the affected populations.

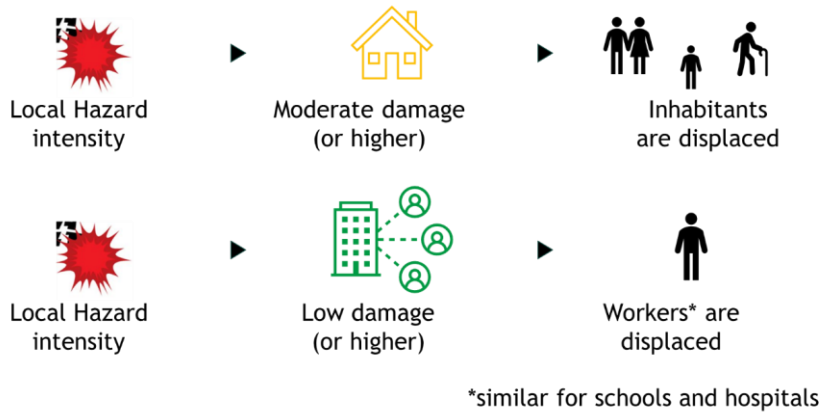

Figure 12: **From damage to impact**

Impact metrics can be agreed upon with the modelling team. Some examples of Metrics that are calculated are as follows:

- Number of workers unemployed
- Number of children with no access to education
- Number of households with no access to hospital
- Number of individuals with no access to hospital
- Number of homeless households
- Number of homeless individuals
- Population displacement
- Number of casualties

3.8 Equity

Within the pro-poor methodology of the TCDSE, the risk agreement component provides equity considerations while assessing risk. Equity means 'who gets what'. From a risk perspective, this means- the distribution of impact across communities defined by different social characteristics (e.g., different income categories). Assessing such distributions allows tackling equity-related questions such as:

- Who is most impacted due to a hazard event?
- Who has access to key services in a post-disaster situation?

4 SESSION 3: HANDS-ON TCDSE RISK DASHBOARD

Authors of the Chapter: Erdem Ozer, Roberto Gentile

4.1 Objectives

By the end of the session, the participants will be able to:

- Describe key terms such as impact, weights, ranking, and clustering, which are fundamental to the risk assessment and prioritization process.
- Represent complex impact metrics through simplified impact points, facilitating a more intuitive and accessible understanding of the potential consequences associated with different scenarios.
- Calculate the risk for each visioning scenario, considering the interplay between hazard, exposure, and vulnerability factors.
- Rank and prioritize visioning scenarios based on their respective risk levels, enabling informed decision-making and the identification of scenarios that may require more focused attention or interventions.
- Apply a serious game approach to conduct impact priority surveys, fostering stakeholder engagement, participatory decision-making, and an understanding of the trade-offs and implications associated with different policy choices or development pathways.

4.2 Structure of Session 3

Structure
1. Introduction to Dashboards
2. TCDSE Risk Dashboard
3. TCDSE Risk Dashboard Summary
4. TCDSE Risk Dashboard Tutorial

4.3 Introduction to Dashboards

A dashboard is a type of graphical user interface that provides an at-a-glance view of key performance indicators relevant to a particular object. It serves as a comprehensive visualization platform that enables users to monitor events, make decisions, inform stakeholders, and identify trends. Dashboards are designed to display multiple visualizations that work together cohesively on a single screen, offering a comprehensive view of data and providing key insights for at-a-glance decision-making.

Similar to web maps and web layers, dashboards are part of the GIS geoinformation model.

The purpose of a dashboard is to present complex data and information in a concise and easily interpretable manner, enabling users to quickly grasp the essential elements and patterns without excessive details. Dashboards serve as a centralized platform for consolidating and integrating diverse data sources, thereby allowing users to access and analyze critical information from a single interface.

Dashboards are composed of configurable elements, such as maps, lists, charts, gauges, indicators and tables. Most elements are data-driven and represent the information to present to the intended audience.

A dashboard can be created with both a desktop and mobile view, both of which can have different elements and configurations to meet the needs of the view. When the dashboard is

opened for viewing, users see the optimal view for their device. By default, a desktop view of the dashboard is created. When users need to view the dashboard on phones, a complementary mobile view can be created.

4.4 TCDSE Risk Dashboard

The TCDSE risk dashboard platform is available with both online and offline alternatives. The online dashboard refers to connecting to the platform through the internet by utilizing a URL. Regarding the specific data sets/cities, the distinct URLs are given below:

- **Rapti, Nepal:**
  https://experience.arcgis.com/experience/98194040b0e84e38bfbe9ad09b0c10b2
- **Khokana, Nepal:**
  https://experience.arcgis.com/experience/2ab57cab90534b87a58b446581479b2b
- **İstanbul, Turkiye:**
  https://experience.arcgis.com/experience/77f720d382f448c7950c95c720c8d2b6
- **Nairobi, Kenya:**
  https://experience.arcgis.com/experience/3bd8a991c2164bed9a447a26d217055b
- **Cox's Bazar, Bangladesh:**
  https://experience.arcgis.com/experience/0753ea82b9494d178090b2da9ce936e8
- **Chattogram, Bangladesh:**
  https://experience.arcgis.com/experience/7c5fae30916d4a7ea0fd77e996a858ea
- **Nablus, Palestine:**
  https://experience.arcgis.com/experience/ff0a981a3b6746b5ba1bd66f25b3850e
- **Dar es Salaam, Tanzania:**
  https://experience.arcgis.com/experience/3ffe6516555e41c791122e098cc26985

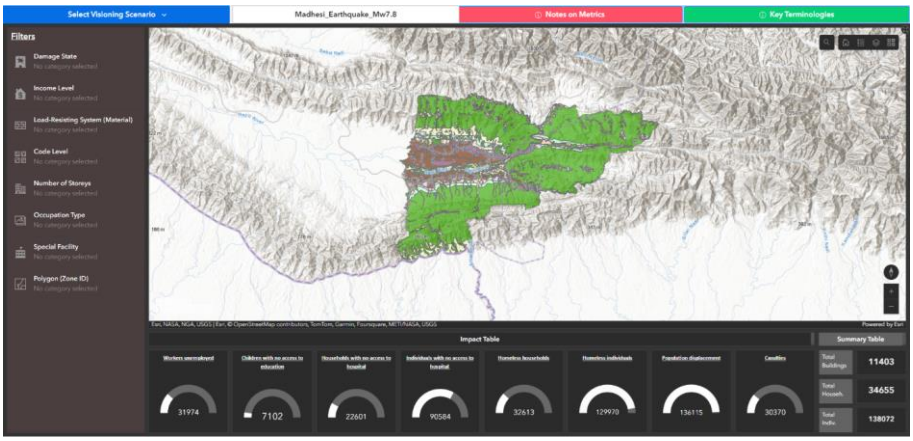

Figure 13: **TCDSE risk dashboard for Rapti**

It is worth mentioning that such dashboard is currently being incorporated into the TCDSE webapp, that also embeds the computational engine that allows the quantitative risk modelling that underpins the derivation of the data showed in the dashboard itself.

4.4.1 Tools and Functions

The TCDSE dashboard is equipped with several tools and functionalities. In the upper left corner, there is the visioning scenario selection button. It directs the user to the selected visioning scenario. The name of the selected visioning scenario is seen in the text box next to it. The "Info" button next to the title box is used for reaching any kind of detailed explanations on metrics, visioning scenarios etc. When clicked, a document becomes visible showing the mentioned information. The "Key Terminologies" button located in the upper right corner enables accessing the TCDSE glossary. When clicked, a Word document opens on a new page similar to the previous one.

Icons seen on the upper and lower right of the map area include tools such as address search, back to the home page, show legend, turn on/off layers, change base maps, reset map orientation and zoom in/out. In the lower-left corner, speedometers are seen which are extent-based dynamic. Each speedometer is assigned to an impact metric. In the lower right corner, a summary table is given showing the total number of buildings, households and individuals for the region of interest, which is also dynamic.

Lastly, the tiny arrow in the middle of the left edge is used to enable the collapsed filter panel. There are several filters inside whose details will be given in the next slides.

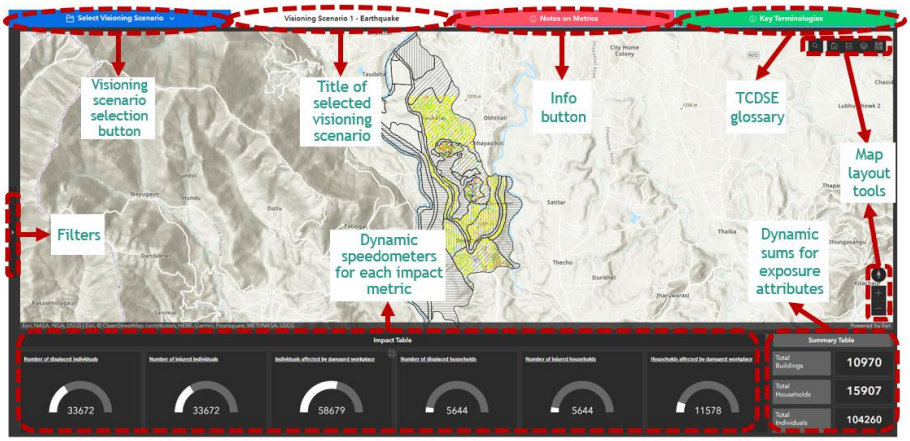

Figure 14: TCDSE risk dashboard with tools
(Source: https://experience.arcgis.com/experience/2ab57cab90534b87a58b446581479b2b)

4.4.2 Layer Symbology

One of the most important parts of the risk dashboard is layer symbology. Layer symbologies play an important role in perceiving and interpreting the results correctly. They can be reached by clicking on the "Legend" icon as shown. In order to see all layer symbologies, all layers must be turned on using the "Layers" button next to the Legend button. For each layer, there is a related symbology.

In the given example, four distinct layer symbologies are presented;

1) Hazard Heatmap: This layer visualizes earthquake intensity measures using a colour map that ranges from grey to yellow in an ascending manner. The intensity levels are represented by varying shades, with darker greys indicating lower intensities and brighter yellows signifying higher intensities.

2) Building Damage States: This symbology categorizes buildings based on their damage states, employing five distinct categories. The categories are typically represented by different colours, such as blue for no damage, red for collapsed buildings, and other colours for intermediate levels of damage.

3) Building Load Resisting Systems: This layer depicts the construction materials or load-resisting systems used in buildings. It utilises a colour scheme where different colours represent different materials or structural systems. For example, red may represent reinforced concrete (RC) buildings, while purple could indicate adobe (Adb) structures.

4) Land-use Polygons with respect to Average Income Levels: This layer represents land-use polygons or areas, with the symbology reflecting the average income levels within those regions. The income levels are symbolized using different hatching patterns, such as horizontal, diagonal, and vertical hatching. The specific hatching pattern assigned to each income level may vary but serves as a visual cue to distinguish areas based on their average income characteristics.

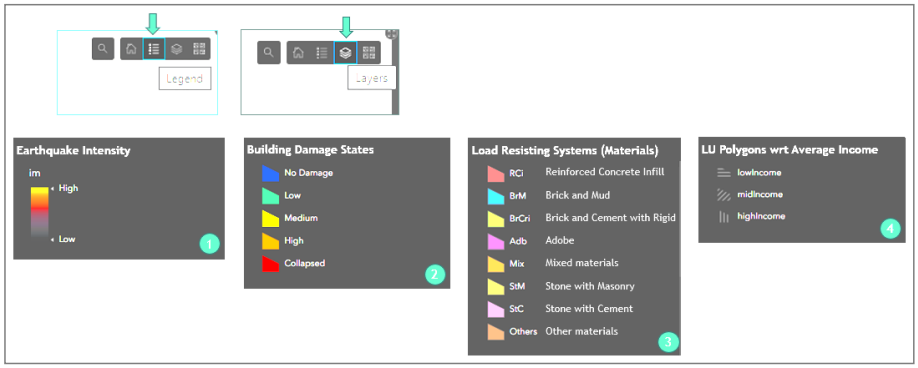

Figure 15: Layer symbology example

These layers and symbology work to provide a visual representation of various aspects of the urban environment, including hazard intensities, building characteristics (damage states and construction materials), and socioeconomic factors (average income levels). By combining these layers, users can gain insights into the interplay between hazard exposure, physical vulnerability, and socioeconomic vulnerability, enabling informed decision-making and risk assessment processes.

4.4.3 Filters

The platform offers various filtering options to examine the results in depth. These filtering options include:

1) Damage State: This filter allows users to focus on specific levels of damage sustained by buildings, such as no damage, moderate damage, or collapsed structures.

2) Income Level: This filter enables users to segment buildings based on the frequent income level of their occupants, providing insights into the socioeconomic vulnerabilities associated with different income groups.

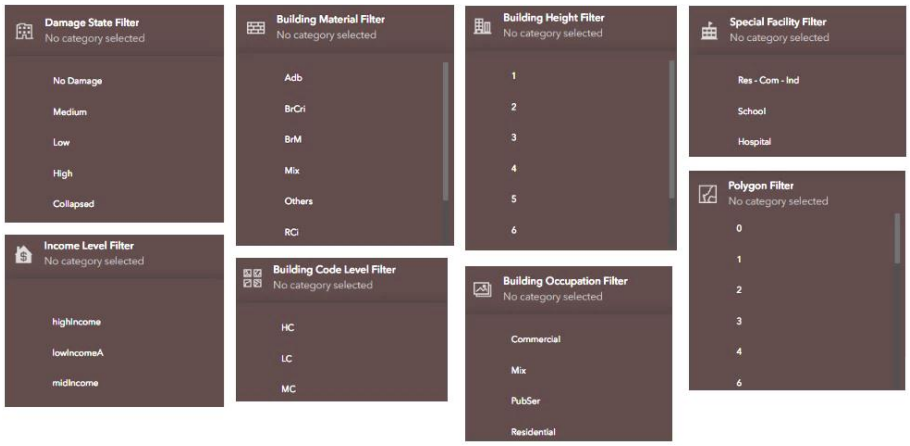

Figure 16: **Building layer filter options**

Commented [GR34]: Which filter?

Improve description

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3) **Building Material:** Users can filter buildings according to their construction materials, such as reinforced concrete, steel, or masonry, to assess the impact of different structural systems on vulnerability.

4) **Building Code Level:** This filter allows users to examine buildings based on the building code level they adhere to, which can influence their resilience to hazard events.

5) **Building Height:** Users can filter buildings based on their height, as taller structures may exhibit different vulnerability characteristics compared to shorter ones.

6) **Building Occupation:** This filter enables users to focus on specific building occupancies, such as residential, commercial, or industrial, to assess the potential impacts on different sectors.

7) **Special Facility:** This filter category includes standard facility types, allowing users to analyze the vulnerability and potential impacts on critical infrastructure, such as hospitals, schools, or emergency services.

8) **Land-use Polygon:** Users can filter based on land-use polygons, which can provide insights into the vulnerability and impacts associated with different urban zones or neighbourhoods.

The platform incorporates speedometers and summary table counters that dynamically update when filters are applied. These visual elements reflect the filtered subset of data, enabling users to quickly grasp the quantitative implications of their filtering selections. Additionally, the platform's interactivity allows users to zoom in on specific map extents after applying filters, and the counters and speedometers will adjust accordingly, ensuring that the displayed information remains relevant to the current view.

4.4.4 Case Study - Neverland

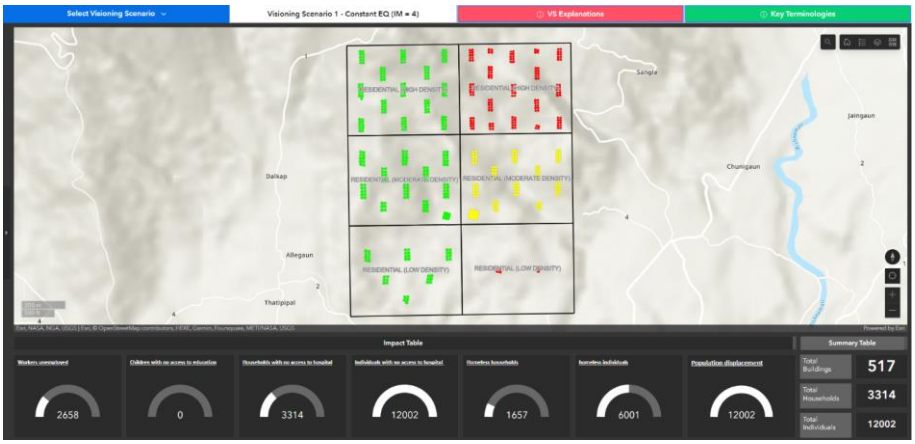

Figure 17: Risk dashboard for Neverland
(Source: https://experience.arcgis.com/experience/e1f7f1a2b205401bbce34476d7f081e8/)

The pedagogical case study "Neverland" presents a scenario where a region consists of around 500 buildings hosting approximately 3,300 households and 12,000 individuals. The region has one hospital, one school, and an average building floor of 2.7.

The region is divided into a grid system, where each square represents an identical land-use polygon covering a 20-hectare area. The three polygons on the left are considered the control group, where all buildings are made up of Reinforced Concrete Infill (RCi), are in High Code compliance (meaning they meet strict building codes) and are low-rise structures. These buildings can be considered hazard-resilient structures.

The three polygons on the right are the test polygons, where one building property is changed in each polygon to compare its effects after a hazard event:

1) Upper polygon: The building property changed is LRS (Low-Rise Structure), implying that some buildings in this polygon are not low-rise.

2) Middle polygon: The building property changed is Code Level, suggesting that some buildings in this polygon do not meet High Code compliance.

3) Lower polygon: The building property changed is Height Level, indicating that some buildings in this polygon are taller structures (high-rise or mid-rise).

The purpose of this case study appears to be to analyse the impact of different building properties, such as structure type, code compliance, and height, on the resilience of buildings and communities to hazard events (e.g., earthquakes, hurricanes, or floods). By comparing the control group (left polygons) with the test polygons (right polygons), where a single building

property is varied, the study aims to understand the effects of these properties on the vulnerability or resilience of the built environment.

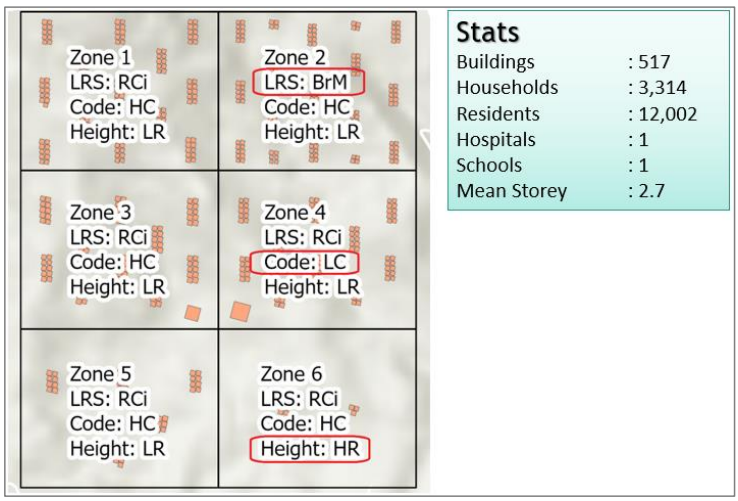

Figure 18: Scenario 1 details

In the first visioning scenario of the Neverland GUI, an earthquake event with constant intensity is assumed, meaning the hazard effect is the same for every single point across the region.

4.4.4.1 Upper Group

Focusing on the upper polygons, the only difference between them is the Load Resisting System (LRS), which refers to the building material used for construction. One polygon contains buildings made of Reinforced Concrete (RCi), while the other polygon has buildings made of Brick Masonry (BrM). By utilizing the Risk Dashboard, the impact of the earthquake event on these different building materials is revealed. The post-disaster visual clearly shows the following:

1) **RCi buildings (Reinforced Concrete)**: These buildings have sustained low damage from the earthquake event. Reinforced concrete structures are generally more resistant to seismic forces and have performed better in this scenario.
2) **BrM buildings (Brick Masonry):** These buildings have collapsed or suffered severe damage due to the earthquake event. Unreinforced masonry structures, such as those made of brick, are more vulnerable to seismic forces and have not performed well in this scenario.

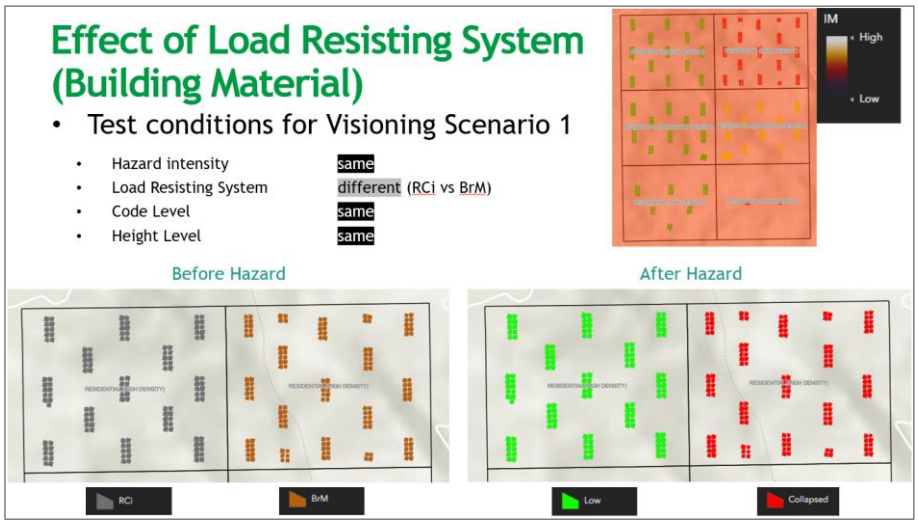

Figure 19: Scenario 1 test condition for building material

The contrast between the performance of RCi and BrM buildings in the post-disaster visual is evident and easy to interpret. The results clearly demonstrate that the choice of building material, specifically the Load Resisting System, plays a crucial role in determining the resilience of structures against earthquake hazards.

The scenario highlights the importance of using earthquake-resistant construction materials and techniques, such as reinforced concrete, in areas prone to seismic activity. It also addresses the vulnerability of unreinforced masonry structures, like brick buildings, which are more susceptible to collapse and severe damage during earthquakes.

4.4.4.2 Middle Group

The middle group of polygons in the Neverland GUI allows for the comparison of the impact of different code levels on building performance during an earthquake event. In this group, the only difference between the two polygons is the code-level compliance of the buildings. One polygon contains buildings that comply with High Code (HC) standards, while the other polygon has buildings that comply with Low Code (LC) standards.

Utilizing the Risk Dashboard and referring to the post-disaster visuals the following observations can be made:

1) HC buildings (High Code compliance): These buildings have sustained low damage from the earthquake event. Buildings that are constructed according to strict building codes and standards, which typically include seismic design provisions, have performed well in this scenario.

2) LC buildings (Low Code compliance): These buildings are in a medium damage state after the earthquake event. Buildings that do not meet high code compliance standards are more vulnerable to seismic forces and have experienced moderate levels of damage.

The result shows that buildings built according to seismic measures codes perform better during an earthquake compared to buildings that do not meet high standards. The high-code buildings sustain low damage, while the low-code buildings suffer moderate damage.

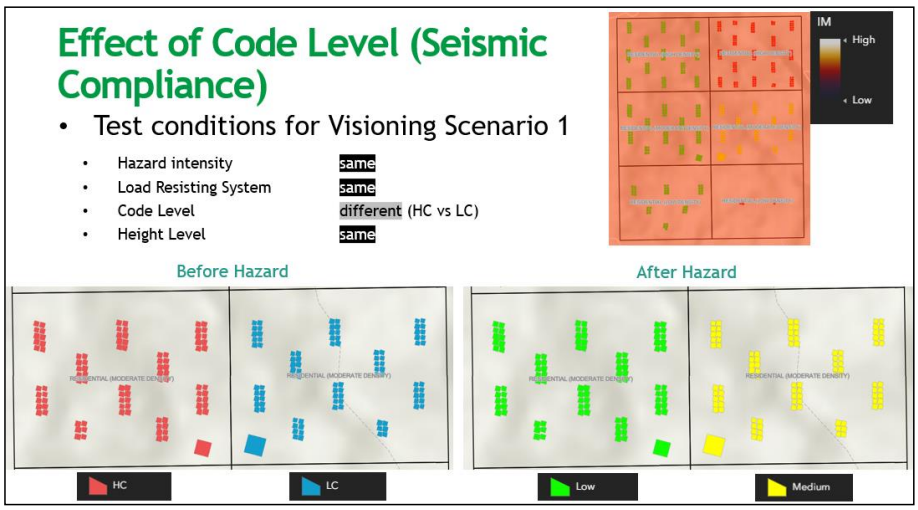

Figure 20: **Scenario 1 test condition for seismic compliance**

4.4.4.3 Lower Group

Lastly, the lower group of polygons in the visioning scenario shows a comparison of the performance of buildings with different height levels during the simulated earthquake event. In this group, the differentiating factor between the two polygons is the height of the structures. One polygon comprises low-rise (LR) buildings, while the other polygon contains high-rise (HR) buildings, with all other building characteristics remaining consistent.

The comparison between low-rise (LR) and high-rise (HR) buildings during the earthquake simulation clearly shows that LR buildings suffered minimal damage, while HR buildings collapsed completely. This highlights the vulnerability of taller structures to seismic forces. LR buildings are more resilient due to their lower height, which reduces exposure to lateral forces and concentrates mass at lower levels.

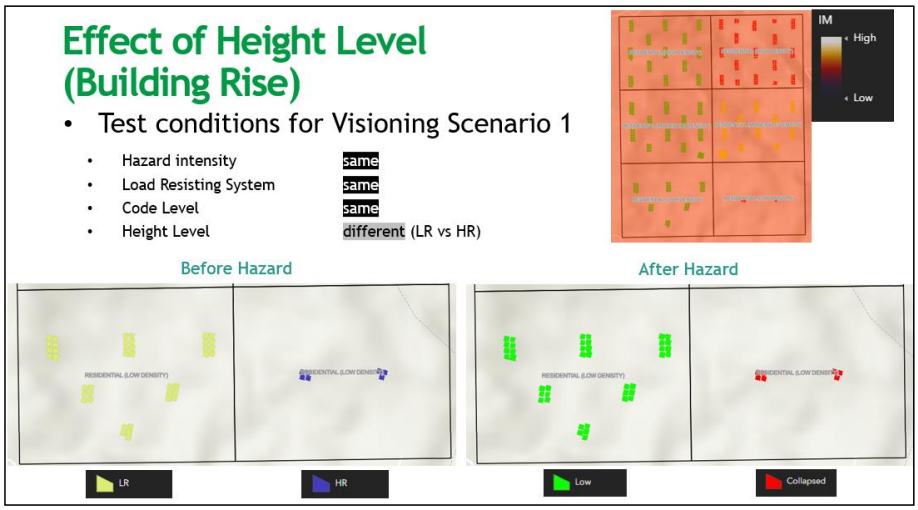

Figure 21: **Scenario 1 test condition for height level**

4.4.4.4 Combined Filtering

The Risk Dashboard allows users to analyze impact metrics by using filters. For example, users can analyze the income levels of buildings that collapsed during the earthquake simulation. In this visioning scenario, the pie chart shows the distribution of income levels among these collapsed buildings. This helps understand the socioeconomic impact of the disaster and can guide targeted mitigation strategies and resource allocation to improve resilience among different income groups.

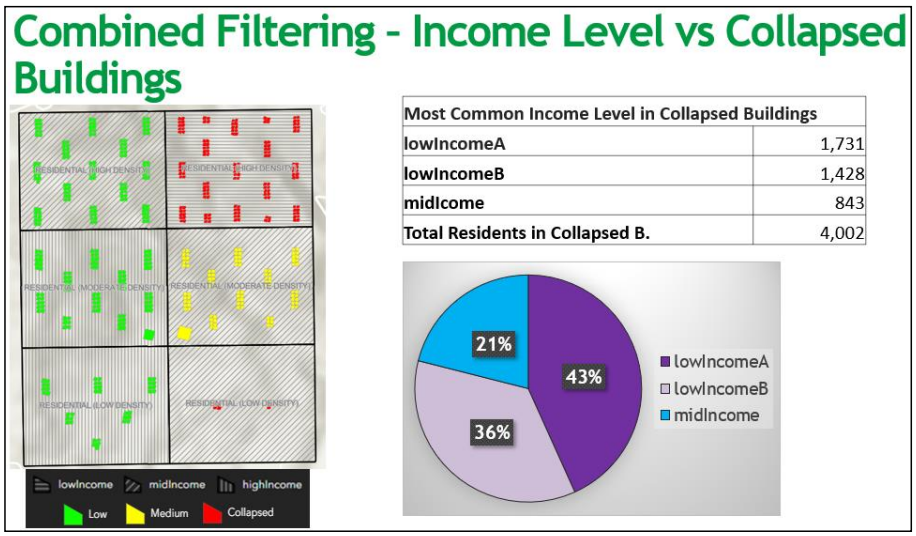

Figure 22: **Combined filtering example**

4.5 TCDSE Risk Dashboard Summary

The TCDSE Risk Dashboard helps users analyze different visioning scenarios to understand how building characteristics and hazard conditions affect disaster resilience. The Risk Dashboard enables users to address the following key questions:

1. What do layers, symbologies and speedometers/counters represent? And how should they be interpreted?
2. Can different building properties/visioning scenarios be compared? And what is the outcome of this process?
3. How can buildings with different levels of damage be compared considering different LRS, code and height levels?
4. In relation to the previous statement, what are the reasons for having different impact results under the same hazard conditions? In other words, what is the contribution of having different LRS, code & height levels?

The TCDSE Risk Dashboard provides a comprehensive visual and analytical platform for users to understand the implications of different visioning scenarios and building characteristics on disaster resilience. The risk dashboard uses various visual elements, such as layers, symbologies, and speedometers/counters, to convey information about stimulated scenarios and the extent of impact on the built environment.

One of the key abilities of the risk dashboard is to facilitate comparisons between different building properties and visioning scenarios. By analyzing the outcomes of these comparisons, users can gain valuable insights into how varying building characteristics and scenarios influence the resilience and vulnerability of structures when subjected to hazardous events. The risk dashboard's filtering tools enable users to compare buildings with different levels of damage, considering factors such as Load Resisting System (LRS), code compliance, and height levels. This comparison facilitates a comprehensive evaluation of the relative vulnerability or resilience associated with each building attribute.

4.6 TCDSE Risk Dashboard Tutorial

There is a very comprehensive tutorial about the Hands-on TCDSE Risk Dashboard session available at:

Session 3_Hands on TCDSE Risk Dashboard.

This tutorial provides a detailed walkthrough of the TCDSE risk dashboard, offering insights into its functionalities and practical applications. It covers everything from navigating the dashboard interface to utilizing its various features for risk assessment and management. Whether you're new to risk management or looking to enhance your skills with a hands-on approach, this tutorial is designed to equip you with the knowledge needed to effectively utilize the risk dashboard in real-world scenarios.

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Commented [RG38R36]: I am talking about the activities we do at the workshop. We need a section about that

5 SESSION 4: VISIONING SCENARIO ASSESSMENT

Commented [GR39]: Best chapter! Well written!

And most importantly, nicer figures

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Authors of the Chapter: Tanvi Deshpande, Roberto Gentile, Sukirti Amatya

5.1 Objectives

By the end of the session, the participants will be able to:

- Recognize the underlying factors driving impacts on aconsidered visioning scenario, directly linked to the policies included in the visioning scenario itself
- Discuss potential modifications existing policies, and/or addition of new policies, to mitigate the impacts within the considered visioning scenario
- Discuss the policy complications stemming from these proposed modifications.
- Describe the process of conducting a visioning scenario assessment, grounded in a shared comprehension of the impacts posed by various hazards.

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Explain properly what you mean

5.2 Structure of Session 4

Structure
1. Introduction to Risk Modelling results
2. Understanding drivers of Impacts in Visioning Scenarios
3. Reducing Impacts in Visioning Scenarios
4. Policy Implications

5.3 Introduction to risk modelling results

An introduction to risk modelling results involves unpacking the likely impact of future hazard events on future urban layouts (i.e., visioning scenarios) using the risk dashboard. The introduction involves explaining the requirements -visioning scenarios, hazard scenarios and impact metrics, all are outputs from previous TCDSE work-packages- for risk assessment. This introduction also explains contextuality, since the visioning scenarios, hazard scenarios and impact metrics are specific to a city. This step can be plenary led by one facilitator or in disaggregated groups facilitated by respective facilitators.

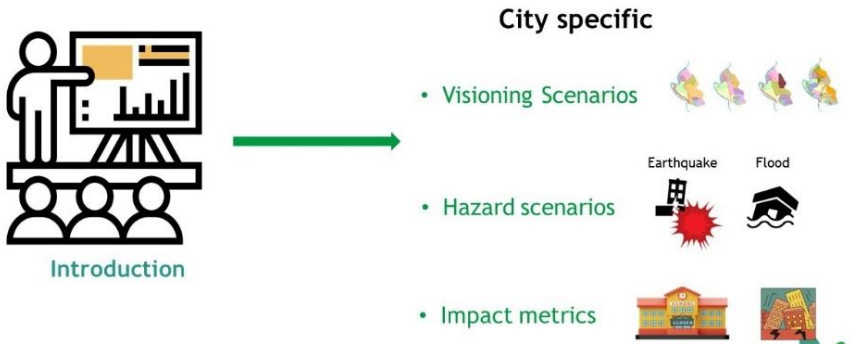

Figure 23: Risk modelling results

Risk modeling results are important to understand how future hazards(e.g. earthquakes or floods or landslides) are likely to affect a community's future urban plan. These results use computer

models to predict things like how many people might be hurt, how many buildings could be damaged, and how much it might cost to recover. The results also help identify which areas are more at risk based on things like building materials and population density. They're shown on easily understandable maps and graphs, so everyone involved can see where the risks are highest. These results help figure out why some areas are more at risk than others and suggest changes to policies and plans to reduce the risks.

Commented [TD42]: This information is too detailed for the introduction.

5.3.1 Visioning Scenarios

Commented [GR43]: I don't understand what is the purpose of this section

VSs are defined in module 2

What message you want to convey here?

Visioning Scenarios is an introduction to the visioning scenarios developed for a considered city. These scenarios are developed through a participatory process involving stakeholders from diverse backgrounds, ensuring that a wide range of perspectives and priorities are considered. Diverse background includes community members, policymakers, urban planners, and experts, to ensure a comprehensive and inclusive process.

Commented [TD44]: This should go to the definition of VS.

Figure 24: Visioning Scenarios

Analyzing future trends and drivers of change, such as population growth, economic development, climate change, and technological advancements, is also important while developing visioning scenarios. Creating multiple alternative scenarios helps represent different visions for the future of the urban area. These scenarios may explore different policy choices, land use patterns, and infrastructure investments. Visualizing the visioning scenarios can be done by using maps, 3D models, and other spatial representations to facilitate understanding and communication among stakeholders.

Commented [GR45]: Trends of what?

5.3.2 Hazard Scenarios

Commented [GR46]: Same comment as for the previous section

Hazard scenarios are an integral part of the visioning scenario assessment methodology. This involves identifying and characterizing various hazards that are relevant to the urban area under consideration. These hazards may include natural disasters such as earthquakes, floods, landslides, or human-induced hazards.

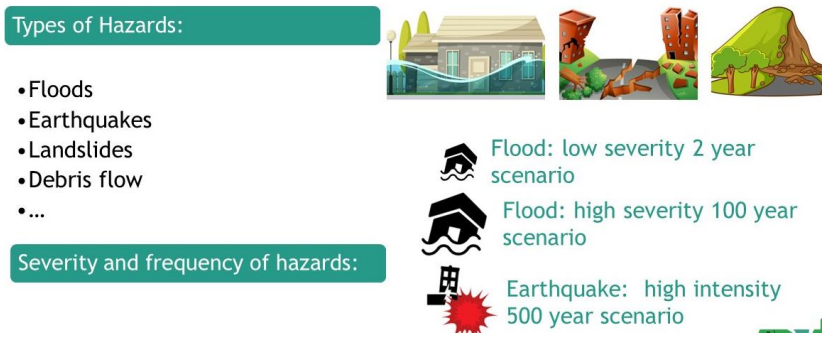

Figure 25: **Hazard Scenarios best on city specific**

For each hazard scenario, detailed information is gathered, including the probability or frequency of occurrence, the intensity of the event in every point of the visioning scenario, and the potential physical and social impacts on the urban area. This information is often derived from historical data, scientific models, and expert judgments. These scenarios provide a basis for developing policies, regulations, and strategies that aim to minimize the impacts of potential hazards and enhance the safety and well-being of communities.

5.3.3 Impact Metrics

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impact metrics are used to assess the potential consequences of different hazards on specific urban areas within the framework of visioning scenarios. They are important for understanding the magnitude and nature of the impacts. Impact metrics are quantitative, and sometimes qualitative summaries of the physical infrastructure impact and the social impact resulting from natural hazards on visioning scenarios. These metrics are generated from computational modeling results and serve as an output of the risk assessment process. Quantifying and analyzing the impact metrics will help in the development of evidence-based policies and strategies to mitigate risks.

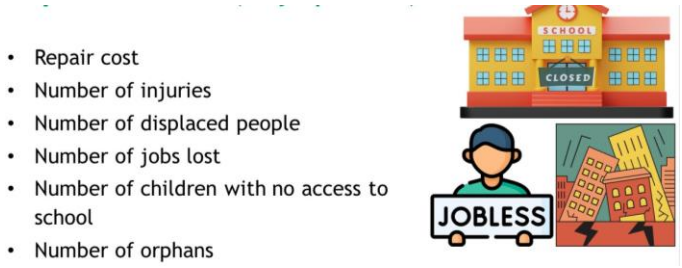

Figure 26: **Impact metrics best on city specific**

Impact metrics can include many different indicators, including:

i. Physical Infrastructure Impact:

- Number of buildings damaged or destroyed
- Transportation network disruptions
- Utility outages
- Loss of critical facilities (e.g., hospitals, schools, emergency response centers)

ii. Social Impact:

- Number of injuries or fatalities
- Displacement of people
- Loss of livelihoods
- Disruption of social services
- Mental health impacts

5.4 Understanding drivers of Impacts in visioning Scenarios

This step involves assessing the modelled impacts on every visioning scenario combined with the considered hazard scenarios, which helps understand areas that are weak (high risk) and strong (low risk). The next step is to understand 'why' certain areas are weak and/or strong. This is done by identifying the drivers of impact. This discussion is facilitated by technical facilitators and supported by social facilitators in respective disaggregated groups.

Commented [GR48]: Step of what?

You never mentioned

Commented [GR49]: You did not say anything about how to do this

Commented [GR50R49]: You should add a sentence saying that you are explaining how to do this in different subsections

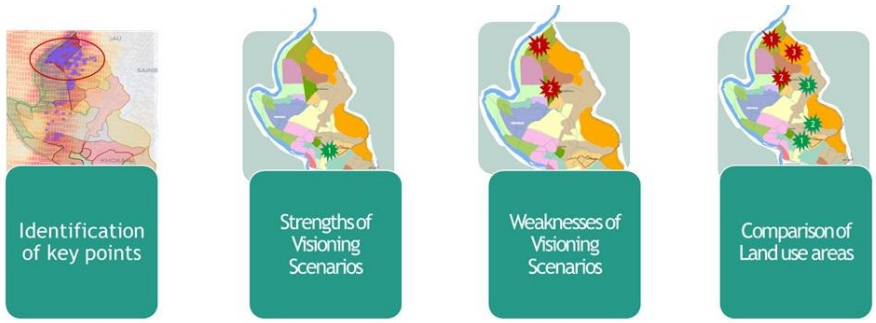

Figure 27: **The key steps in understanding the drivers of impacts**

The risk dashboard facilitates identification of a) identification of key points, followed by understanding the drivers of risk in high and low risk areas in respective visioning scenarios. Finally, there will be a comparison of the land use types within a VS to understand the difference between the low risk and high-risk areas.

5.4.1 Identification of key points

The first step in understanding the drivers of impacts is to identify key points within the visioning scenarios. This includes identifying the most populated areas, areas with the highest earthquake intensity, and areas with the highest flood intensity. These key points provide insights into the potential vulnerabilities and risks associated with different parts of the scenario.

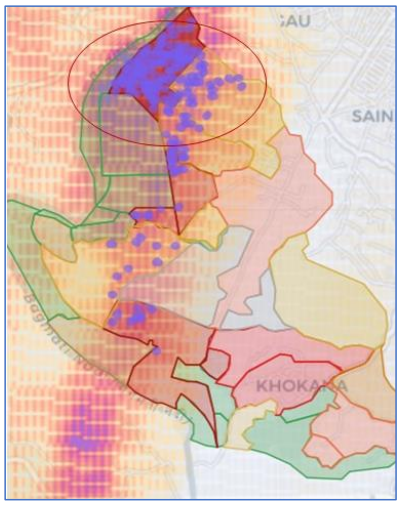

Figure 28: Identification of key points in VS

Identifying the most populated area: This step involves pinpointing where the highest concentrations of people reside within the scenario. Areas with higher populations are more vulnerable because more people and assets are at risk during disasters. This information helps to prioritize risk reduction and emergency response measures.

Locating the area with the highest hazard intensity: Identifying areas with the highest intensity (e.g., amount of ground shaking experienced during an earthquake; depth of water in a flood) helps in assessing the likelihood and potential consequences of earthquakes in different regions. Identifying areas with high hazard intensity is an essential first step for developing strategies to minimize damage and protect communities from the adverse hazard impacts.

5.4.2 Strengths of Visioning Scenarios

One key strength of visioning scenarios is the identification of low-risk areas. These areas are characterized by lower vulnerability to hazards, such as low earthquake intensity or minimal flood risk. Understanding the spatial distribution of low-risk areas can inform land use planning and zoning decisions, ensuring that future development is directed towards safer locations.

Another strength of visioning scenarios is the presence of commercial areas with low population densities. Such areas are less susceptible to hazards that disproportionately affect large populations. The lower vulnerability of commercial areas can act as a buffer zone between high-risk residential areas and hazardous zones, reducing the impact of hazards on the visioning scenario.

Commented [GR51]: Let's improve this figure

Let's use a better hazard field

Let's identify key points into it. There are none at the moment!

Commented [GR52]: This section must be rewritten completely

Commented [GR53]: This does not make any sense

Commented [GR54]: No sense at all!

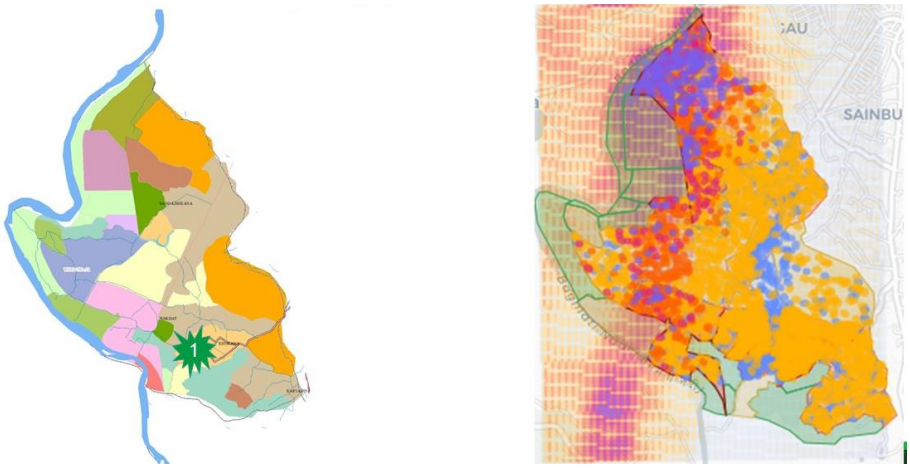

Figure 29: Low impact level in map

Visioning scenarios help to highlight areas marked as green on map as shown in figure 29, indicating low impact levels. Similarly with high impact area which helps in further land use modification process and also to analyze the scenarios.

The disaggregated social groups will review our assessments and decide whether they agree with our assessment or would they like to provide their own assessments

- Example of our assessments:
  - Low EQ hazard intensity
  - This is a commercial polygon: population is zero
  - Most buildings have a low damage state, while the rest are undamaged (due to the low EQ intensity)
  - Most buildings are made of bricks (highly vulnerable). But damage is low because hazard intensity is low
  - There is no connection between the damage level and material. This is because hazard intensity is low
  - Since population is zero, all impact metrics related to residents are zero
  - However, commercial buildings subjected to low damage are not operational, and therefore 622 people have lost their job

5.4.3 Weakness of Visioning Scenarios

The weaknesses in visioning scenarios:

1. The lack of consideration for the severity and frequency of hazards, and
2. The limited assessment of social impacts, particularly the influence of income levels on the severity of impacts.

Commented [GR55]: WHAT???

Commented [GR56]: ?

Commented [GR57]: Never mentioned nor defined

Commented [GR58]: Rewrite completely

Commented [GR59]: What????

Commented [GR60]: What is this?

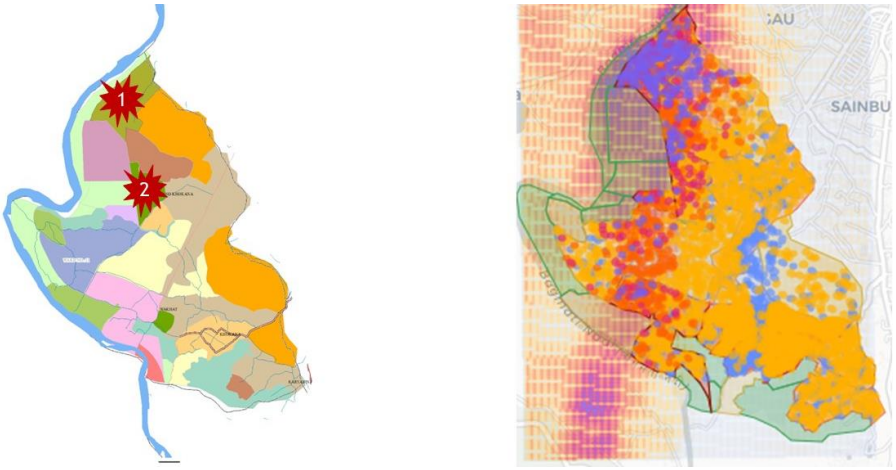

Figure 30: **Identified the high-risk area/polygons in VS**

These weaknesses can lead to an incomplete understanding of the potential risks and impacts associated with different hazards and may overlook important factors that could exacerbate or mitigate the effects of these hazards. Addressing these weaknesses would require a more comprehensive analysis of hazard scenarios, considering both severity and frequency, as well as in-depth study of the social dimensions of vulnerability and resilience.

5.4.4 Comparison of Land Use areas

Comparing different land use areas within visioning scenarios provides insights into their relative vulnerability to hazards. This comparison helps in understanding the unique characteristics of residential, commercial, and industrial areas and how they influence their exposure and susceptibility to risks.

The highlight areas marked as green and red on map as shown in figure 31 indicating low and high impact levels respectively. These impact areas help in further land use modification process.

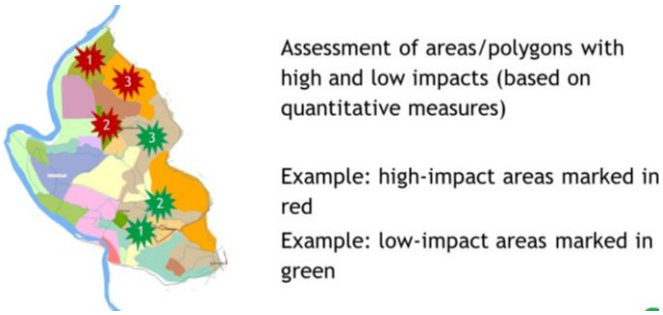

Figure 31: **Low and High impact level in map**

Residential Areas: These areas often have high population densities, making them more vulnerable to hazards that affect large populations. They may also have buildings that are more susceptible to damage from hazards.

Commercial Areas: Commercial areas typically have lower population densities compared to residential areas, making them less vulnerable to hazards that affect large populations. However, they may still be at risk from hazards that can damage buildings or disrupt business operations.

Industrial Areas: Industrial areas may have potential for pollution and environmental hazards, which can impact the surrounding environment and population. They may also be vulnerable to hazards that can disrupt operations or cause damage to infrastructure.

5.5 Reducing Impacts in Visioning Scenarios

Once the high-risk areas and drivers of risk are identified the next step is to find ways to reduce risk. This step involves identifying ways to mitigate the impacts identified in respective visioning scenarios.

This discussion is conducted in disaggregated groups and facilitated by a technical facilitator who has been provided some guidelines for potential policy modifications to reduce risk.

For better understanding it is conducted in the workshop format giving the participants practical knowledge on identifying risk, hazard, consideration of potential policy modifications and the implementation challenges in real practice.

Commented [GR61]: You did not say how to identify the drivers of risk

Commented [GR62]: Define the guidelines

Define how to derive them

Commented [GR63]: What does this mean?

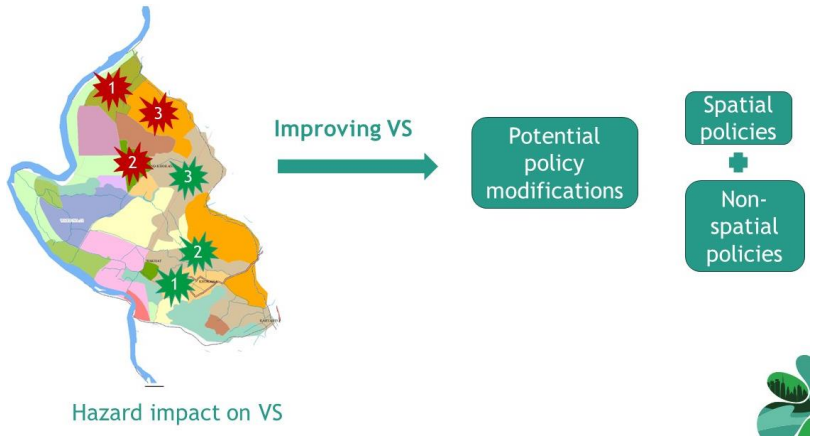

Figure 32: **Mitigate the impacts identified in visioning scenarios**

Identifying Key Points in Visioning Scenarios: Participants analyze visioning scenarios to identify areas with low impact and areas with high impact. This helps them understand the factors contributing to vulnerability and resilience in different parts of the scenario.

Identifying Low Risk Areas: Using the TCDSE risk dashboard, participants visualize the distribution of impacts and identify low-risk areas. The model provides assessments explaining why certain areas are considered low risk, based on factors such as hazard intensity, exposure, physical vulnerability, and impact metrics.

Identifying High Risk Areas: High-risk areas are identified and analyzed based on technical aspects (e.g., hazard intensity, building damage, population displacement) and social aspects (e.g., poverty, income levels). The model provides assessments considering both technical and social factors to explain why certain areas are considered high risk.

5.5.1 Potential Policy modification

To reduce the impacts of high-risk areas, the disaggregated groups can discuss hazard-specific potential policy modifications. These modifications are driven by technical and social assessments of risk. Typically, technical assessments target aspects of physical vulnerability and exposure, while social assessments target socio-economic aspects such as poverty. Potential policy modifications can be spatial in nature -as these can involve changes in specific areas- or non-spatial, when they affect the entire visioning scenario.

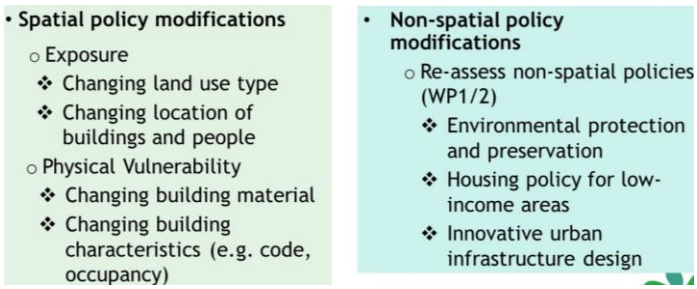

Figure 33: Examples of potential policy modifications

Spatial Policy Modifications: In terms of spatial policy modifications, changing land use types can be highly effective in reducing disaster risks. For example, converting high-risk floodplain areas into green spaces or parks serves multiple purposes. These areas can absorb excess water during floods, acting as natural buffers that reduce floodwater levels and velocity. This not only protects infrastructure and communities but also enhances biodiversity and provides recreational opportunities. Additionally, relocating settlements away from hazardous areas, such as riverbanks prone to flooding, can significantly mitigate risks. This relocation strategy reduces human and economic losses during disasters and promotes long-term community resilience

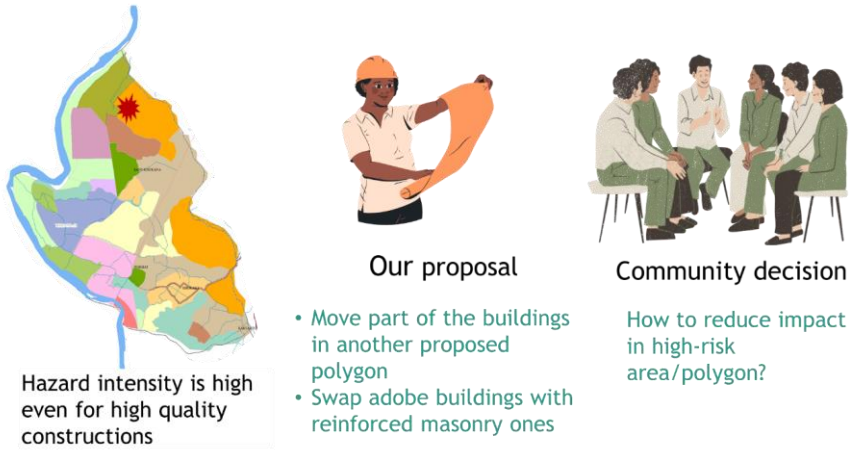

Figure 34: Spatial Policy modifications

Another critical spatial policy modification involves altering building characteristics and materials. Implementing flood-resistant building materials and designs—such as raising buildings on stilts or using materials that are less prone to water damage—can minimize structural damage during floods. Strengthening building codes to enforce these standards ensures that new constructions are resilient to flooding, reducing the need for costly rebuilding efforts after disasters.

Non- Spatial Policy Modifications: Non-spatial policy modifications play a crucial role in disaster risk reduction by focusing on environmental protection and community resilience. For instance, implementing strict regulations on deforestation and land degradation is essential. These actions help mitigate climate change impacts and reduce the risk of disasters triggered by environmental degradation. Preserving natural ecosystems, such as community forests and green belts along rivers, enhances the area's ability to withstand extreme weather events associated with climate change.

Figure 35: Non-Spatial Policies

Another vital non-spatial policy recommendation involves housing policies tailored for low-income areas. Governments can provide subsidies or incentives for low-income households to upgrade their homes, making them more resilient to disasters. Measures may include reinforcing roofs and walls to withstand strong winds or earthquakes. These initiatives not only protect vulnerable communities but also promote sustainable development by enhancing housing resilience and reducing recovery costs after disasters.

5.5.2 Prioritizing Policy modifications

Prioritizing policy modifications involves selecting the important policy modifications from a larger list to focus on discussions about implementation challenges. Prioritizating potential policy modifications can be done as follows:

Commented [GR64]: Never defined. Where does this come from?

1. **Identify Policy Modifications:** This step involves gathering a comprehensive list of potential policy modifications. This list should include both spatial (related to physical locations and structures) and non-spatial (related to regulations and management) modifications. Examples include changing land use types, relocating buildings and people, implementing housing policies, and protecting the environment.

2. **Group Discussion:** Organize group discussions with community members to review the list of policy modifications. This step is crucial for gathering input from stakeholders who will be affected by the policies. Community members can provide valuable insights into the local context and help prioritize policies that are most relevant and impactful. Initiate discussions by asking open-ended questions to encourage meaningful dialogue. Questions could include:
    - Which policy modifications do you consider most critical for addressing the identified risks and impacts?
    - What are the potential benefits and drawbacks of each modification?

3. **Voting or Ranking:** Use a voting or ranking system to gather input from group members on the relative importance of each policy modification. This can help identify which modifications are considered most urgent or beneficial by the community.

Commented [GR65]: Explain how

4. **Criteria for Prioritization:** Consider specific criteria for prioritization, such as:
    - Likely efficacy on reducing impacts and improving visioning scenarios
    - Feasibility and ease of implementation
    - Alignment with community values and preferences
    - Potential for cross-cutting benefits across different social groups

5. **Review and Finalize:** Review the results of the group discussions and voting/ranking to identify the most highly prioritized policy modifications. This step should involve careful consideration of the input gathered from the community and the criteria for prioritization.

6. **Select a Manageable Number of policy modifications:** Once a comprehensive list is compiled, it's important to narrow it down to a number that is manageable in the next methodological steps. This could be based on the resources available for implementation or the most critical needs of the community. For example, one might choose to focus on the top three to five modifications.

The Risk Agreement workshop is conducted multiple times to gather policy modifications and run calculations based on the modifications. This iterative process enables continuous refinement and improvement of the visioning scenarios.

Commented [GR66]: This is really nice!

Please prepare something like this for every other step of the methodology

Commented [GR67]: What?

We have never done it

Commented [GR68R67]: Also, it comes out of the blue now. Not really connecting with the previous text

Figure 36: **Prioritizing policy modification**

5.6 Policy Implications

The analysis of policy implications allows assessing the feasibility of implementing community driven risk sensitive future urban layouts. Respective disaggregated groups facilitated by a social facilitator discuss prevalent 'implementation challenges' their group faces.

A detailed discussion on implementation challenges helps respective disaggregated groups strategies, that is finds solutions, actors and timeline to overcome the challenges. Finally, each group shares their strategies in plenary which can facilitate cross-group learnings.

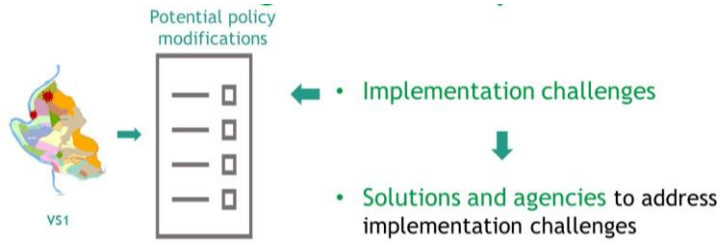

Figure 37: Potential consequences of implementing policy modifications

For example, policies related to land use planning profoundly impact a region's environment, economy, and social well-being. By designating areas for residential, commercial, or industrial development, policymakers influence the spatial distribution of land use, population density, and infrastructure development across cities or regions.

Similarly, policies related to housing can impact access to affordable housing, the quali0ty of housing, and the resilience of communities to disasters. For instance, promoting the use of sustainable building materials and construction practices can improve the resilience of buildings to extreme weather events and reduce the environmental impact of housing developments.

Environmental protection policies, such as those aimed at preserving natural habitats or reducing pollution, can have wide-ranging implications for ecosystems, biodiversity, and human health. These policies can help mitigate the impacts of climate change, protect vulnerable species, and ensure the sustainability of natural resources for future generations.

Commented [TD69]: These are great points but our exercises focused on implementation challenges and associated strategies.

5.6.1 Implementation Challenges

Implementation challenges are the barriers or difficulties that communities face today that may hinder them from pursuing such low-risk, pro-poor future urban plans. These challenges can arise due to various factors and can impact the effectiveness and efficiency of a policy.

Previously, disaggregated community groups had identified policy challenges while designing their visioning scenarios (in WP2) in a pre-disaster context. These challenges had been categorised into three broad categories: political, socio-economic and natural/infrastructural/physical. The community identified challenges are revisited during risk assessment as it is a post-disaster context. Here communities identify relevant implementation challenges applicable to their respective groups.

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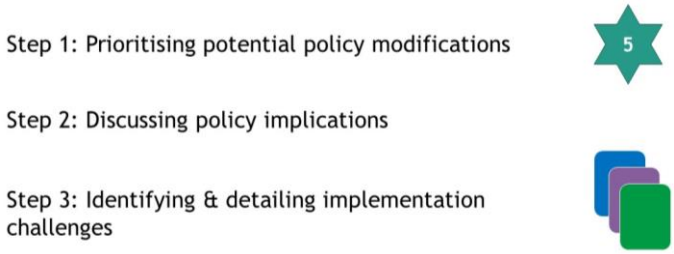

Figure 38: Implementation Challenges

One implementation challenge is political resistance or lack of support, which can arise from competing priorities, differing political agendas, or bureaucratic hurdles. Political challenges can delay or prevent the approval and enforcement of policies, making it difficult to achieve desired outcomes.

Socio-economic challenges, such as limited funding or resources, can also pose significant barriers to implementation. Insufficient financial resources can impede the implementation of policies that require investment in infrastructure, technology, or human resources. Additionally, inadequate community participation or support can undermine the success of policies that rely on community engagement and cooperation.

Natural, physical, or infrastructure-related challenges can further complicate implementation efforts. These challenges can include inadequate infrastructure to support policy objectives, such as lack of transportation networks or utilities, as well as environmental constraints that impact the feasibility of certain policies.

The discussion on implementation challenges involves three steps:

Figure 39: Step 1 implementation challenges

The starting point of the first step is the list of potential policy modifications for the considered visioning scenario. To have a structured and focused discussion on implementation challenges, each disaggregated group will prioritise the 5 most important potential policy modifications from their respective list of modifications.

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Just mention the top policy modifiations

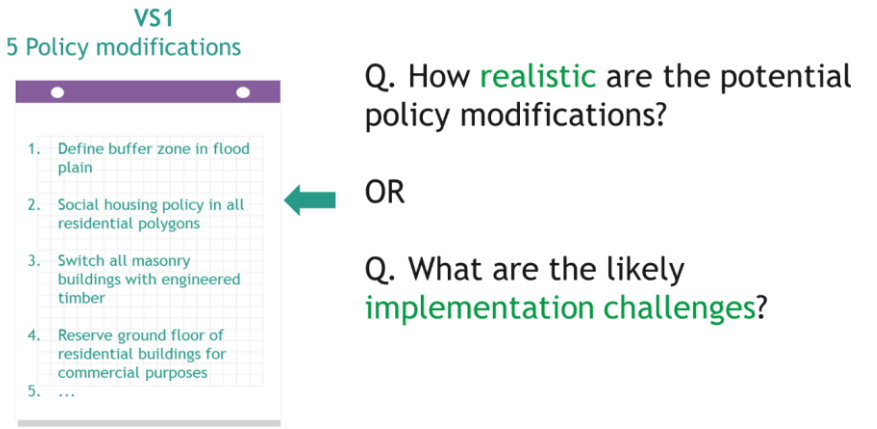

Figure 40: Step 2 implementation challenges

Commented [RG72]: Restructure the position of the figures here so that the text is not so fragmented.

Also, make the text a bullet list (since you introduced it as a bullet list)

Once the 5 most important potential policy modifications have been identified the next step is to discuss the policy implications. A good way to start a discussion is to start with a simple open-ended question: such as – read the two Qs from the slide, The disaggregated social groups should be nudged to think about the challenges they face.

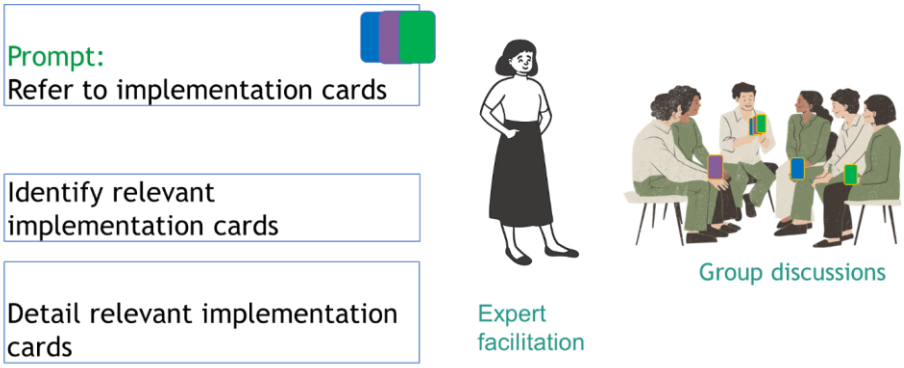

Figure 41: Step 3 implementation challenges

Commented [RG73]: Inconsistency!

You didn't explicitly mention the step numbers for the previous steps

The open-ended question might stimulate some responses; however, to keep the discussions focused on risk, 'implementation cards' will be referred to. Each disaggregated group will identify implementation cards relevant to the top five potential policy modifications. The implementation challenges need to be explained in detail by each group. The more detail provided, the better, as it will help later when discussing the solutions and actors. This discussion will be facilitated by experts such as local urban planners and local government officials with experience in urban planning, budgets, policymaking, and execution.

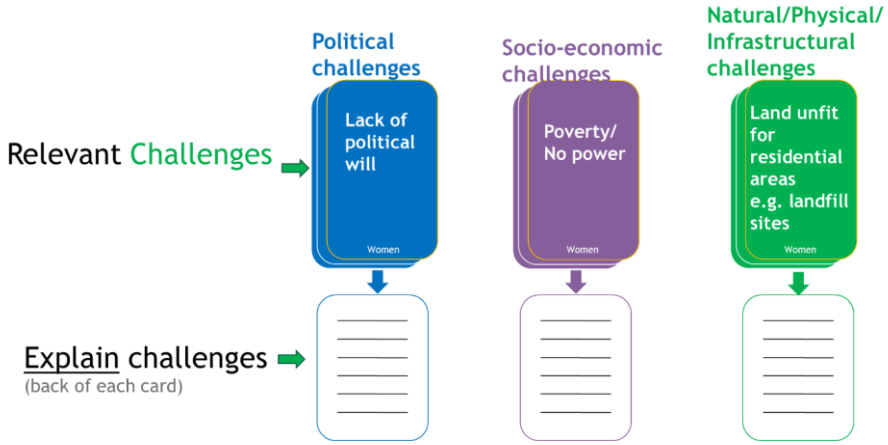

Figure 42: Detailing implementation challenges

Each disaggregated group will review their challenges and identify challenges that are relevant for all the potential policy modifications listed. Since the implementation challenges cards are developed from the discussions during the validation workshops, the challenges are generic and need to be elaborated at this stage. The back of each card will be blank for the groups to explain the challenges in detail. Blank cards will be provided to a) add new implementation challenges (not identified by any of the disaggregated groups) and/or identify overlapping challenges.

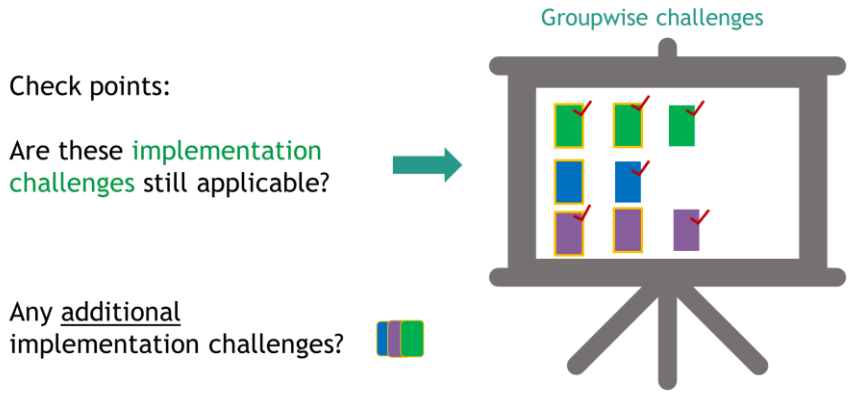

Figure 43: Implementation challenges from previous workshop (WP2 and WP3)

The discussion on implementation challenges in the subsequent risk agreement workshops will be simpler and shorter. The flipchart with the implementation challenges cards will serve as a starting point. Each disaggregated group will review their group's flipcharts and decide if the challenges are still applicable or will they like to make any changes (e.g. removing or adding an implementation card). Blank cards will be provided if groups want to make any changes.

5.6.2 Strategizing

Strategizing refers to the process of identifying solutions, actors, and timeline to address implementation challenges. his process is driven by communities in disaggregated groups. Moreovoer, relevant stakeholders such as urban planners and local government officials, can join group discussions to provide insights on the challenges they face and review the feasibility and practicality of proposed strategies. A possible set of steps of for this phase involve:

Step 1: Identifying common challenges and group specific challenges

Step 2: Identifying relevant solutions along with responsible agencies and actors

Commented [RG74]: Strategising what?

Come up with a name that is more explicit

Commented [RG75]: Actors responsible for implementing the soluytions?

How will the reader understand what you mean?

Commented [RG76]: This section does not explain anything

6 SESSION 5: WORKSHOP PLANNING AND DELIVERY

Authors of the Chapter: Nisha Shrestha, Leah Aoko, Tanvi Deshpande, Roberto Gentile

6.1 Objectives

By the end of the session, the participants will be able to:

- List out the steps of the risk agreement workshop.
- List out the key requirements of the risk agreement workshop
- Plan the requirements of the risk agreement workshop
- Organize and deploy the risk agreement workshop

6.2 Structure of Session 5

Structure
1. Introduction to Risk agreement workshop
2. Preparatory works: Before the workshop
3. Risk agreement work execution- During the workshop
4. Workshop debrief

6.3 Introduction to Risk Agreement Workshop

The risk agreement process is important to the workshop's theme, and it involves re-engaging with the community after obtaining results from computational impact metrics. The goal is to negotiate with the community to gather their views and reach a common policy decision or risk agreement aimed at reducing impact in their visioning scenarios. This process emphasizes the importance of community involvement and empowerment in decision-making regarding risk reduction measures.

The Risk Agreement Workshop serves as a platform for this negotiation process. During this session, facilitators will guide participants through the steps required to conduct the workshop effectively. This includes discussing the key considerations and preparations needed to ensure that the workshop runs smoothly and achieves its objectives.

Some of the key steps and considerations for conducting the Risk Agreement Workshop may include:

1. **Preparing the workshop agenda and materials:** This includes developing a detailed agenda that outlines the schedule and activities for the workshop, as well as preparing any materials or resources that will be used during the workshop, such as presentations, handouts, and visual aids.

2. **Organizing the logistics:** This involves arranging the venue, catering, equipment, and other logistical details to ensure that the workshop runs smoothly.

3. **Engaging with stakeholders:** It is important to identify and engage with key stakeholders, including community members, local authorities, and other relevant parties, to ensure their participation and input in the workshop.

4. **Facilitating the workshop:** Facilitators play a crucial role in guiding the workshop activities, managing discussions, and ensuring that all participants have the opportunity to contribute and express their views.

5. **Documenting the outcomes:** It is important to document the outcomes of the workshop, including any agreements reached, action points identified, and next steps to be taken.

6.4 Preparatory Works: Before the workshop

6.4.1 Formation of the team

The first thing to consider is the formation of the team, which consists of the Local Team and the International Team. For the local team, a lead facilitator and a lead planner will oversee all aspects. Group activity facilitators will be needed, depending on the number of disaggregated groups involved, as well as notetakers, ideally one per group. Ensuring there are enough group activity facilitators and notetakers for the disaggregated groups at the local level is crucial. It is also important to have a point person for logistical preparations and activities.

This list may not necessarily be exhaustive, as it will depend on the specific needs of the city undertaking the workshop. For the international team, there will be the WP Lead/International delegate, group facilitator, and MEL/Comms representative. The international team will provide support, but the processes should be led by the local facilitators as much as possible.

Figure 44: **Formation of the Team**

6.4.2 Setting things in motion

i. Step 0: Establish Date and time:

The first step is to establish the date and duration of the workshop. It is important not to schedule the workshop around auspicious days, public holidays, or religious holidays, considering the country context. Decide whether the workshop will be one day or two days and if it will be a half-day event. Determine if it will start in the afternoon to accommodate community members' availability. This will be the initial step in organizing the workshop.

ii. Step 1: Inform relevant local authority:

The first step would be to inform the local authorities, as it is very important to ensure that local authorities should know such a workshop is happening and be present in the workshop – to buy in and to build the ownership. The local authorities will need to be invited way in advance depending on the city context.

iii. Step 2: List of invitees/participants:

The second step is to create a list of invitees. Consider who should participate in the workshop, ideally including the same disaggregated groups used during the visioning workshops. For example, if the previous groups included women, men, elders, businesspeople, and youth, these

are the participants to invite again. Additionally, include local urban planners and policymakers involved in the TCSC process. Having a comprehensive list of invitees is crucial for the workshop's success.

iv. Step 3 Invite target audience:

The third step is inviting the target audience, depending again on your, on your city context, some can. Invites can go via e-mail. Some invites can go as hard copy to the offices, or some invites can be made via the telephone.

v. Step 4 Confirm target audience:

Confirmation of the target audience can be primarily done via telephone for follow-ups. This is important because certain participants, such as policymakers, often confirm initially but may cancel at the last minute or decide to participate unexpectedly. Therefore, it is crucial to confirm your target audience and finalize your list of participants ideally two days before the workshop, or as suitable based on your context.

6.4.3 Logistics

In terms of logistics, it is crucial to designate an individual who is hands-on with the planning process. This includes tasks such as securing a suitable venue that meets the event's requirements in terms of capacity, accessibility, and amenities. Additionally, ensuring the availability and readiness of necessary equipment, materials, and resources is essential for the smooth execution of activities.

i. Checklist -Workshop Venue:

Choose a venue that is secure and accessible for all the participants. Venues near to the community where community members can reach on time should be selected. For eg; In Nairobi, TC – Visioning Scenario Workshop it rained hard and the road was flooded, which made participants late to the workshop.

Figure 45: Logistics Checklist-Workshop Venue: Selection Criteria

While selecting the venue, the Security needs to be consider consider.

- Security: Is it safe for participants. Can you leave your equipment in the rooms. Does the facility have security staff?
- Space: Main Hall, Breakout room/Secretariat space. Classroom, breakouts and support room/secretariat
- Electricity: Continuous supply of electricity, Backup in case of power outage
- Internet- Continuous supply of Internet, Good Network, High Bandwidth
- Easy accessibility- Transportation, Parking space
- Food service- Considers customs of the guest/participants/ culturally acceptable food, alternatives if required (food related to culture/religions)
- Environment- Noise and atmosphere, Quiet area no commercial area

ii. Equipment/Supplies:

It is imperative to consider all potential factors that may arise on the event day when selecting the venue. Additionally, it is essential to assess the availability of audiovisual equipment. Does the chosen venue provide necessary amenities such as a Dictaphone, microphones, projector, and a functional screen? Are laptops available, and if so, will they be provided by the venue or sourced elsewhere, such as from the hotel or team members? Local team members' involvement should also be evaluated.

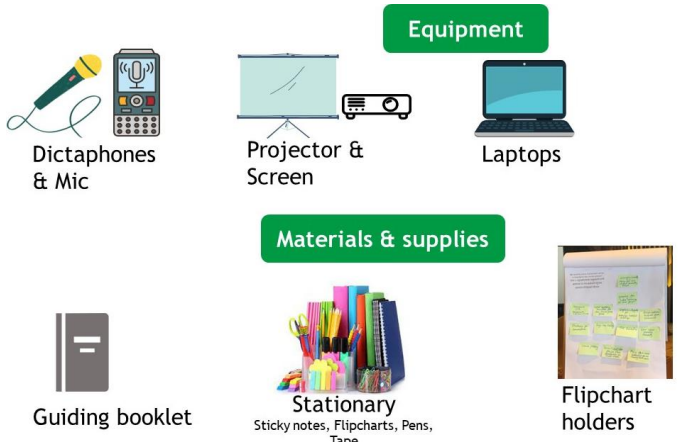

Figure 46: Logistics: Equipment/Supplies

Furthermore, regarding materials and supplies, it is important to determine the need for maps and stationary items. Essential supplies include flip charts, whiteboards, sticky notes, pens, markers, and tape. These considerations are crucial for ensuring the smooth execution of the event.

iii. Printable Materials:

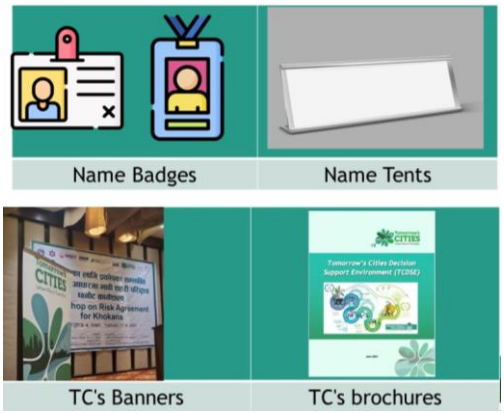

Figure 47: **Logistics: Printable**

The additional facets of logistics encompass designations and identifiers. It is imperative to exercise diligence in utilizing appropriate salutations, particularly when addressing policymakers who demonstrate a heightened sensitivity toward such formalities. Moreover, the provision of banners warrants attention, ensuring the presence of the Tomorrow Cities banner, while also formulating contingency measures. Given the inherent unpredictability in planning such logistical elements, it is essential to establish backup strategies in the event of technical malfunctions, insufficient equipment supplies, or other unforeseen circumstances. Adequate preparations should include assigning responsibility to individuals capable of addressing emergent challenges promptly.

6.4.4 Pre-Workshop preparations

i. Mock-ups & Contextualization:

There is a need for a thorough contextualization of the methodology, which involves organizing periodic meetings involving both local and international team members. These meetings aim to adapt the content provided by the international team to the specific context of the city. Local facilitators and note-takers need clear instructions regarding the desired content and observations to be recorded. Additionally, translation of materials into the native language is essential. (For eg; In the case of Nairobi, it was agreed upon using a slang or Kiswahili format, ensuring comprehension among members of informal settlement communities, In case of Rapti, Nepali language was used.)

Figure 48: **Pre-workshop: Mock-ups & Contextualization**

Furthermore, readiness of the PowerPoint slides must be ensured, and a comprehensive workshop walkthrough, akin to a simulation, should be conducted to prepare for the exercises. This simulation should take place in person a few days before the workshop, with the participation of the international team or city team (if applicable). Ideally, this walkthrough should be scheduled three to four days prior to the workshop.

ii. Pre-Workshop Check-ins

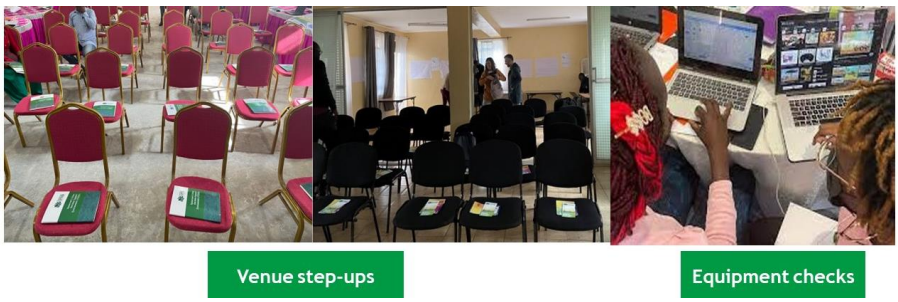

Figure 49: **Pre- Workshop Check-ins**

Pre-workshop check-ins are imperative to ensure personal visit to the venue, as unforeseen circumstances may arise. For instance, during the Nairobi workshop, the venue was unexpectedly double-booked on the second day, coinciding with the future visioning exercise. and they have to swiftly shift to an alternative tent arrangement, which was less comfortable and convenient. It underscores the necessity for thorough venue inspection and communication with the appointed personnel to review requirements, equipment needs, and logistical arrangements.

Testing and verifying the functionality of equipment such as microphones and laptops are essential steps to be undertaken before the workshop commences.

6.5 Risk Agreement Workshop Execution- During the Workshop

6.5.1 Things to Consider

This session focuses on the planning procedures for the forthcoming Risk Agreement workshop. In preparation for the workshop execution, several key considerations must be addressed. Firstly, establishing a registration desk is paramount, utilizing the standardized TCDSE registration template. Additionally, the collection of consent forms is imperative, given the sensitivity of personal identification and information. Participants must provide consent for the capture of their images and opinions.

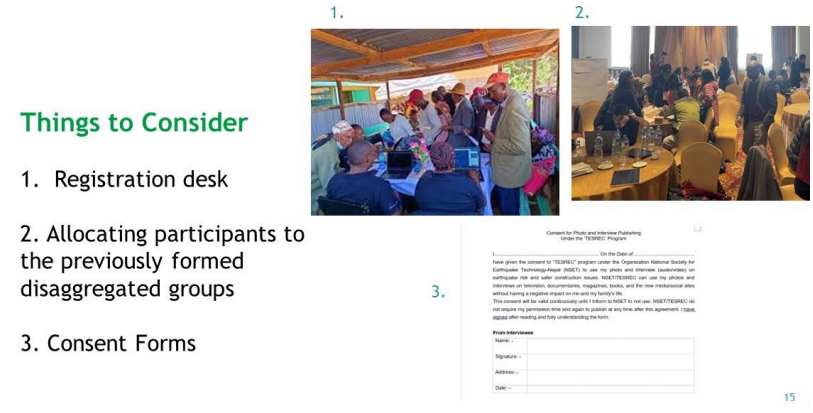

Figure 50: Gearing up for the risk agreement workshop: Things to consider

Furthermore, the allocation of participants to the pre-established, segregated groups formed during previous work packages is necessary. These groupings, initially formulated in Work Package 1 and utilized in subsequent phases, must persist throughout Work Package 4. As preparations for the workshops proceed, these aspects require thorough consideration and implementation.

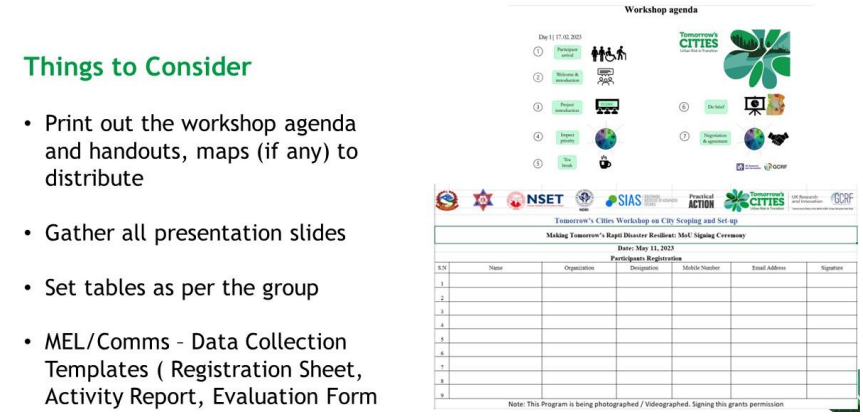

Figure 51: Gearing up for the risk agreement workshop: Things to consider

To commence the workshop seamlessly, it is essential to arrange for the printing of the workshop agenda, handouts, and maps, if applicable, ensuring that all planned distribution materials are prepared in advance. All presentation slides should be consolidated under the oversight of a designated individual who will be responsible for managing and organizing them centrally, thus ensuring their availability and coherence prior to the sessions. Moreover, the arrangement of tables according to group specifications is paramount, as each group will require a dedicated workspace for activities and discussions. Assigning responsibility for addressing any potential last-minute logistical challenges, such as shortages of tables or chairs, is crucial to mitigate such issues. Furthermore, proactive communication with venue personnel is advisable to establish contingency plans in the event of unforeseen circumstances. Alongside these preparations, it is vital to ensure the availability and readiness of various essential materials, including data collection templates, registration receipts, activity reports, and evaluation forms, which must be printed and readily accessible for utilization throughout the workshop. These meticulous considerations encompass the necessary preparations to facilitate the smooth execution of the workshop agenda.

6.5.2 Workshop Format

i. Plenary Introduction

The format includes a plenary session where introductions are facilitated by the lead facilitator. During this session, participants will listen to the introductions. Following the plenary introductions, there will be group activities. The format of the workshop is designed to be interactive and participatory, allowing participants to learn from each other and contribute to the development of the workshop outcomes.

Figure 52: Workshop Format

ii. Disaggregated groups

Then the group will be desegregated. The workshop groups will be diverse, with participants selected based on their expertise, experience, and stakeholder group. Each group will have a local facilitator who understands the local context and ensures everyone can contribute. A note-

taker in each group will record key points for the workshop report. This approach ensures local perspectives for the workshop outcomes.

iii. Part 1 - Tutorial:

This is an introductory session to familiarize participants with the key concepts and tools used in the Risk Agreement methodology. The participants will be introduced to key concepts related to hazards, exposures, and the web activities that will be used throughout the workshop. This session will be conducted in a plenary mode, where all participants will be together.

Facilitators will use simple and clear language to ensure better comprehension among participants. The focus of this part is to ensure that participants can navigate the web app effectively.

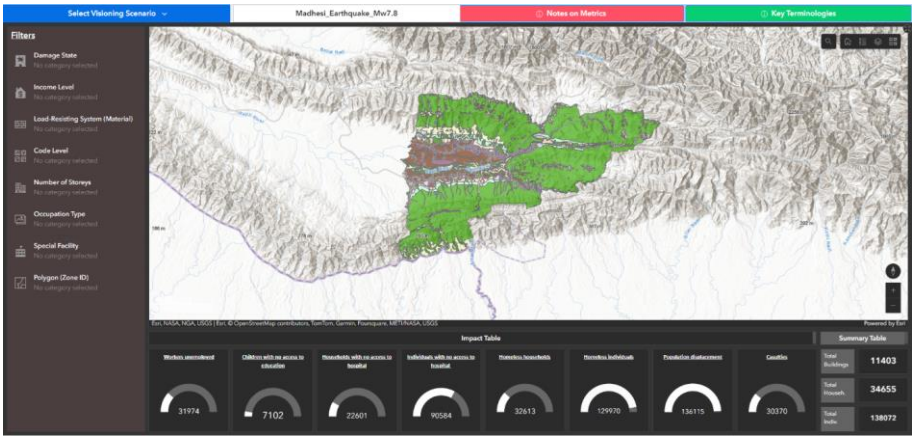

Figure 53: Risk dashboard

To facilitate this step, the web app or risk dashboard must be available and accessible to all participants. This tool will be used to demonstrate key concepts and scenarios.

An example visioning scenario, such as Khokana or Tomorrowville, will be used to illustrate how the risk dashboard can be used in practice. This scenario will help participants understand the application of the concepts they are learning.

Figure 54: Example of visioning scenario (Khokana)

A guiding booklet will be provided to participants. This booklet will serve as a key tool for recording all discussions, learnings, and reflections related to the workshop activities. It will help participants stay organized and track their progress throughout the workshop.

The outcome of this part of the tutorial is for participants to understand key concepts related to hazards and exposures, as well as to become proficient in navigating the web app. By the end of this step, participants should be able to effectively use the web app to explore different scenarios and make informed decisions based on their understanding of the concepts discussed.

iv. Part 2 - Risk Reveal:

In the Risk Reveal step of the workshop, participants will gain insights into the results of risk modeling, which are crucial for analyzing potential impacts on their visioning scenarios. This step includes both plenary sessions, where comprehensive results will be presented, and interactive group activities. During these sessions, participants will analyze specific scenarios and collaborate on identifying potential risks and discussing policy modifications.

The web app will serve as the platform for presenting detailed risk modeling outcomes and showcasing different visioning scenarios. Access to this tool is essential for participants to engage effectively. Additionally, city-specific visioning scenarios, a curated list of policies with their projected impacts, and a guiding booklet will be provided to facilitate informed discussions and activities.

Given the collaborative nature of this step, participants will be divided into smaller groups. Each group will be led by a facilitator who is proficient with the web app and knowledgeable about the visioning scenarios. The facilitator's role includes guiding discussions, interpreting data from the web app, and ensuring productive group dynamics. A designated note-taker in each group will document key insights and outcomes from discussions.

To optimize group productivity, each group will require access to one laptop and one projector. Ideally, separate breakout rooms should be provided to minimize distractions and foster focused deliberations. Alternatively, a large hall with designated tables for each group can serve as a conducive environment for collaborative work.

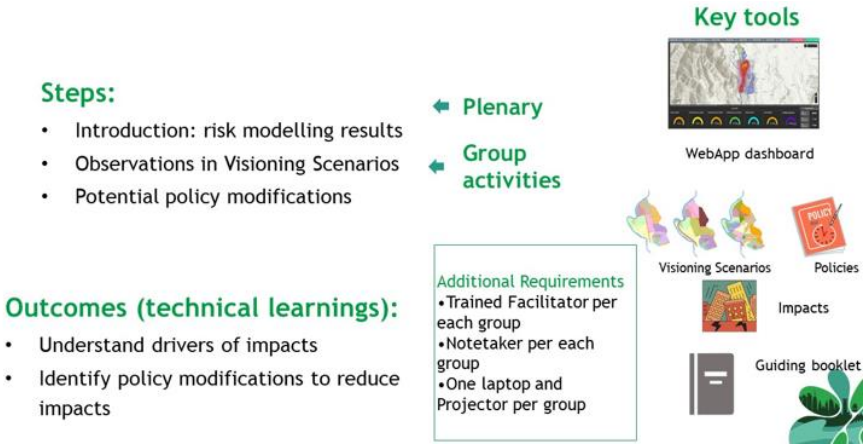

Figure 55: Steps involve in Risk Reveal

The outputs of this step are expected to be a better understanding of the drivers of impact and the identification of potential policy modifications in the visioning scenarios to reduce these impacts. By the end of this step, participants should have a clearer picture of the risks and impacts in the visioning scenarios and potential strategies for mitigation.

v. Part 3- Policy Implications

In the third step of the Risk Agreement workshop, participants will focus on the policy implications of the identified risks and impacts. This step consists of two parts: the Implementation Challenge, which is conducted in groups, and the Strategizing/Planning, which is done in plenary.

In the Implementation Challenge, participants will prioritize the identified policy modifications based on their potential impact and feasibility. They will then discuss and identify the implementation challenges associated with each policy modification. This step is crucial for understanding the practical aspects of implementing the identified policy modifications.

The second part, Strategizing/Planning, will be conducted in a plenary session. Here, participants will discuss and identify solutions to address the implementation challenges identified earlier. They will also identify the responsible agencies or stakeholders who will be responsible for implementing these solutions. This part of the workshop is aimed at developing a clear plan of action for implementing the identified policy modifications.

To facilitate these steps, several materials are required. Implementation Cards will be used for prioritizing policy modifications and identifying implementation challenges. Flip charts will be used for group discussions and recording key points. The Guiding Booklet will provide guidance and structure to discussions and activities.

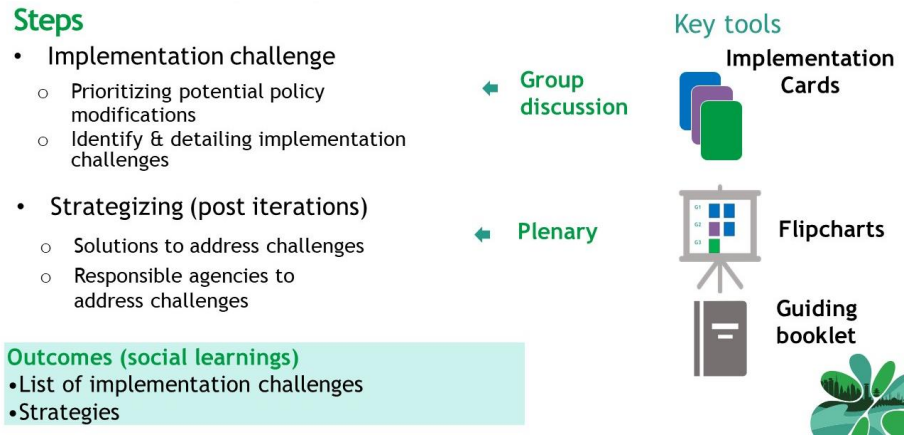

Figure 56: **Policy implications and its Steps**

Learning from this step will be a list of implementation challenges and strategies to address them. Participants will also identify the responsible agencies or stakeholders for implementing these solutions. This will provide a clear roadmap for implementing the identified policy modifications and addressing the challenges associated with them.

6.6 Workshop de-brief

The debriefing meeting is a crucial component of the workshop process, providing an opportunity for the team to reflect on the day's events, gather valuable feedback, and make necessary adjustments for future sessions. Following the conclusion of each workshop session, it is essential to convene a debriefing meeting involving both international and local teams. This meeting aims to evaluate the effectiveness of the sessions, identify areas for improvement, and ensure continued success throughout the workshop series.

Key stakeholders such as facilitators, note-takers, and relevant team members should participate in the debriefing meeting. During this session, participants should review each workshop session, discussing what aspects worked well and identifying opportunities for enhancement. Comprehensive feedback from all team members is essential to gain diverse perspectives and address any challenges that may have arisen.

An integral part of the debriefing meeting is the collection and organization of all workshop materials, including flip charts, sticky notes, meta cards, facilitators' and note-takers' notes, photographs, and videos. Proper labeling and organization of these materials facilitate easy access and future reference.

Furthermore, the debriefing meeting should focus on extracting key insights and learnings from the workshop sessions. This includes identifying emerging trends, new ideas, and innovative approaches discussed during the workshops. Discussing these insights helps inform future workshop planning and project strategies. Subsequently, the team should collect evaluation forms and feedback from participants to assess the overall effectiveness of the workshop. This feedback is critical for refining workshop planning and implementation strategies. Analyzing this data helps identify strengths and areas for improvement, guiding future workshops to achieve

their objectives effectively.

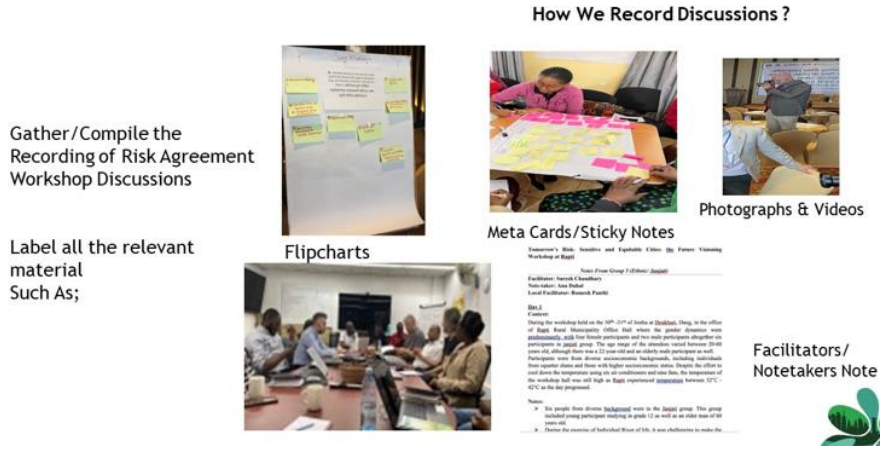

Figure 57: Notes prioritization from the workshop

After each workshop session, the debrief team should review preliminary feedback from participants, note-takers, and facilitators. This feedback can provide valuable insights into how each session was perceived and what improvements can be made for future workshops. Additionally, the group should designate who will be responsible for working on the activity report to ensure that the information generated is captured and documented effectively.

The next step after the debriefing meeting is to collect the evaluation forms and feedback from participants. These forms are used to assess the effectiveness of the workshop and gather feedback on areas for improvement. The debrief team should review this feedback to inform future workshop planning and implementation.

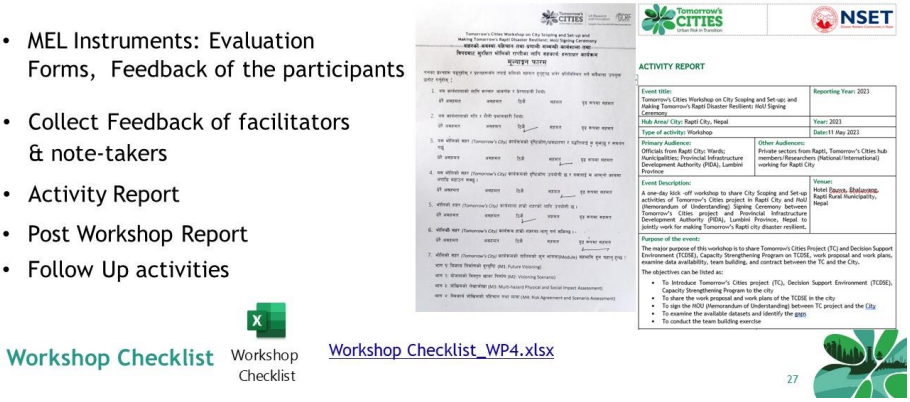

Figure 58: Reporting and follow up activities

The activity report is another important document that should be completed after each workshop. This report records the activities conducted during the workshop, the purpose of the workshop, any challenges faced, and any key learnings or insights gained. The activity report

template should be filled out and included in the post-workshop report, which provides a comprehensive overview of the workshop proceedings.

It is important to establish timelines for recording the discussions and completing the reports to ensure that this information is captured in a timely manner. Any follow-up activities that need to be planned should also be addressed during this time to ensure that the outcomes of the workshop are effectively implemented.

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