Chapter 9
COREDAR for Cities: Developing a Capacity Building Tool for Sea-Level Rise Risk Communication and Urban Community-Based Adaptation

A. Saleem Khan

Abstract Sea-level rise (SLR) is one of the greatest threats for densely populated low-lying coastal cities. Building capacities at community level to address the challenges of SLR is an important first step towards adaptation planning. However, efforts and attention for community based adaptation (CBA) in urban coastal cities are often ignored and not given much importance. Thus, building capacity through SLR risk communication and involving communities in framing urban CBA is a high priority for cities. Nevertheless, it is a difficult task for climate scientists to communicate complex SLR science and build capacity at local level. To address these challenges, this study has put forth three research questions through the lens of SLR risk communication and urban CBA, as (1) What, if any, community engagement in risk communication in addressing SLR risk occurring in urban areas; (2) What information does communities need and (3) How does it need to be communicated, in order to be better prepared and have a greater sense of agency? To answer these questions, by following the framework on SLR risk communication and urban CBA, this study has resulted in evolving "COREDAR" (COmmunicating Risk of sea-level rise and Engaging stakeholDers in framing community-based Adaptation stRategies), a capacity building tool for SLR risk communication and urban CBA. Thus, this study seeks to provide insights on communicating the risk of SLR and to evolve a robust picture of urban CBA through effective decision-making that is grounded in pressing community priorities by developing a capacity building tool for urban coastal cities.

Keywords Climate change · Sea level rise · Capacity building · Tools · Risk communication · Urban CBA

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Introduction

The scientific literature has documented the growing risks of flooding posed for coastal cities by the combination of climate change, as reflected in sea level rise (SLR) and intensified storms and storm surges, and ongoing urban growth in low-lying coastal zones (Fuchs et al. 2011). Settlements in coastal low lands are especially vulnerable to risks resulting from climate change, yet these low lands are densely settled and growing rapidly (McGranahan et al. 2007). Thus, accelerated SLR is a major long-term outcome of climate change leading to increased inundation of low-lying areas and put global cities and communities at greater risk. Particularly, urban poor communities will bear the brunt of its effects since they live in informal settlements that are more exposed to hazards like SLR. Therefore, building capacity for resilience and adapting to climate change threats like SLR are increasingly high priorities for urban coastal cities. There has been considerable focus on the potential of cities to contribute to mitigation, yet there is growing recognition of the need for urban adaptation (Romero Lankao and Dodman 2011).

Capacity building and improved knowledge management towards increasing the resilience and adaptive capacity of the coastal communities to current and future climate risks (Sales 2009) is an important dimension to view the challenges of SLR for low-lying urban coastal cities. However, community-based adaptation (CBA) experiences emphasize that it is important to understand a community's unique perception of their adaptive capacities in order to identify useful solutions and that scientific and technical information on anticipated coastal climate impacts need to be translated into a suitable language and format that allows people to be able to participate in adaptation planning (IPCC 2013). Thus, the ability to act collectively to develop and implement adaptation responses based on sound knowledge of climate science, intervention of policies and the role of societies are prime factors in building adaptive capacity (Bulkeley et al. 2009; CAP 2007; Tanner et al. 2009; Wilson 2006). Unfortunately, the planning community has had a limited role building and implementing adaptation response to climate change in urban areas (Sanchez-Rodriguez 2009). Thus, capacity building through urban CBA is a key issue for climate adaptation measures in urban areas (Hartmann and Spit 2014) and it is the urgent requirements for addressing climate risk like SLR, particularly at local level (IFRC 2009). Nevertheless, capacity building has been defined as the practice of enhancing the strengths and attributes of, and resources available to, an individual, community, society, or organization to respond to change (IPCC 2013). In other words, it is defined as an effort aimed to develop human skills or societal infrastructures within a community or organization needed to reduce the level of risk (UNISDR 2009). Importantly, capacity building through risk communication strategies would be the first step towards addressing the challenges of SLR and CBA for urban coastal cities. To meet these challenges and requirements, this study puts forth three research questions (1) What, if any, community engagement in addressing SLR is occurring in urban areas; (2) What information does communities need and (3) How does it need to be communicated, in order to be better prepared and have a greater sense of agency?

Importantly, Article 6 and Article 11 (capacity building for climate action on Paris Agreement) of the UNFCCC addresses the importance of climate change communication and engaging stakeholders in the decision-making process. It highlights the responsibility of participating countries to develop and implement educational and public awareness programmes and to ensure public access to information and to promote public participation. Nevertheless, this is one of the most difficult challenges for scientists to communicate complex climate science and to build capacity at local level (Khan et al. 2012). Similar to climate change communication, SLR risk communication presents challenges involving complex science, uncertainty, and invisibility (Covi and Kain 2015). Messages about SLR risks may fail to adequately inform audiences or persuade them to respond to consequences (Harvatt et al. 2011) because SLR information may be too general for people to relate to; scientific and technical information is too specialized; and messages are not sufficiently tested with representative audiences to gauge potential reactions (Covi and Kain 2015). Given its critical importance, public understanding of climate science (SLR) deserve the strongest possible communication science to convey the practical implications of large, complex, uncertain physical, biological and social processes (Pidgeon and Fischhoff 2011). Thus, to communicate the risk of SLR and to engage communities in urban CBA planning, capacity building tools are considered as a powerful vehicle to accomplish this task. Emphasis has been placed on participatory tools and methods for urban communities to plan strategies (Dodman and Mitlin 2013). Particularly, designing a capacity building tool for cities with the objective of developing the capacity of cities has promoted a sense of ownership over city-level resilience-building initiatives, and the evidence emphasizes that there needs to be demand from the city itself in order for a capacity building process to be successfully taken up (Archer and Dodman 2015). It is important to engage in community mobilization and awareness rising through designing activities that are tailored to local practices and establish strong relationships with the communities to enable sustainable actions to involve the key stakeholders in adaptation action and enhance capacity building (Khan 2013) particularly in the urban context. In this purview, the main aim of this article is to develop and design a capacity building tool for SLR risk communication and urban CBA for coastal cities, to communicate complex SLR science in a simple way, to better understand knowledge needs of SLR, to educate and create awareness about SLR adaptation and to emphasize the importance of community engagement in the SLR decision-making process.

Need of Capacity Building Tool for SLR Risk Communication and Urban CBA

The lack of effective communication about climate risk like SLR has contributed to improper interpretation of scientific findings pertaining to climate change and to a poor mobilization of vulnerable groups for developing appropriate response actions

(MRC 2010). Therefore, improving public awareness and developing overall communication strategies to make climate change science accessible to the average citizen and could reduce their vulnerability (UNFCCC 2007). This, in turn, will enhance capacities of various stakeholders in the community and improve sustainability at the local level. However, communicating climate risks like SLR, especially the unfamiliar, non-voluntary, scientifically complex, and politically controversial may be one of the most difficult tasks scientists, city planners, managers, and policy-makers face in dealing with adaptation to climate change and SLR (Covi and Kain 2015). Nevertheless, many scientists recognize the importance of communicating scientific findings to citizens to help them become aware of the urgent need to act and to enable them to carry out anticipatory actions. However, this is one of the most difficult and sensitive objectives of SLR communication and education (Khan 2013). Hence, effective risk communication requires more than conveying accurate information (Fischhoff 1995) it should raise awareness, increase understanding, and move audiences to action (Boholm 2009). To be effective in presenting information and moving audiences to action, communication about SLR risk must use appropriate framing, compelling visuals, and accessible language, preferably tailored to the audience for the information (Covi and Kain 2015). Furthermore, experience with adaptive learning and capacity building activities has shown that despite the existence of many of the tools, decision-makers still struggle with adaptation. Clearly, this has implications for how the approaches are applied (MRC 2010). Therefore, there is a pressing need for developing a "capacity building tool" that address and integrates SLR risk communication and urban CBA. However, the tool is defined as "a means or instrument by which a specific task is accomplished". The process of developing climate risk communication tools and methods revealed a number of key insights that can inform efforts to engage vulnerable communities, policy-makers, and other stakeholders (MRC 2010). In this context, this article advocates for urgent need of SLR risk communication and urban CBA for coastal cities. It is believed that despite of availability various other tools, the development of simple tools that holistic synthesize all perspective of SLR information is an urgent need of the hour.

Methodology

SLR and urban CBA capacity building tool have been constructed based on the rationale and guiding principle of COREDAR framework evolved by Khan et al. (2015). A broad understanding of the trends in thought on tools for adaptation planning through capacity building as a first step was considered a necessary foundation for this framework. This understanding emerged from examining scholarly discussions on the subject of SLR and urban CBA. The analysis was also guided by a set of criteria that determine an approach to adaptation planning can be considered through capacity building. However, the framework was developed following the guidelines and recommendations of IPCC Assessment Report 5,

Working Group I Report on Climate Change 2013: The Physical Science Basis; Working Group II Report on Climate Change 2014: Impacts, Adaptation and Vulnerability; Climate Change 2014: Synthesis Report is followed with an emphasize on SLR and urban CBA. The main objective of this framework is to communicate complex climate science to different stakeholders to build capacity at all levels of SLR adaptation decision-making. It provides a platform to integrate "science-policy-society" nexus of SLR and urban CBA with a systematic step-wise approach to address different dimensions of SLR risk communication and urban CBA (Fig. 9.1).

Systematic step-wise approach is constructed based on complex SLR science, such as delineation of the climate and city profile of the urban coastal city; documentation of past sea-level trend, based on tide gauge data; future SLR projection based on IPCC-AR5 dependent climate (SLR) model under different Representative Concentration Pathways (RCPs) scenarios; prediction of SLR impact based on Geographic Information System (GIS) impact assessment methods; identification of vulnerable human communities and prioritization of stakeholders based on vulnerability assessments such as stakeholder analysis; communication of SLR risk based on risk communication strategies; framing urban CBA strategies to SLR by engaging stakeholders through participatory approaches and techniques; and mainstreaming urban CBA strategies through policy intervention. Detailed descriptions of a wide range of methodologies involved in developing this tool such as analysis of tide gauge data, descriptions of climate models, impact and vulnerability assessment methods, risk communications strategies, participatory approaches and techniques etc., underlines the limitations of this paper. However, by bringing together different methods and analytical frames, the assessment sought to provide decision-makers and stakeholders in participating cities with information and tools necessary to better adapt to climate change while also recognizing the current successes and strengths of each city (Barclay et al. 2013).

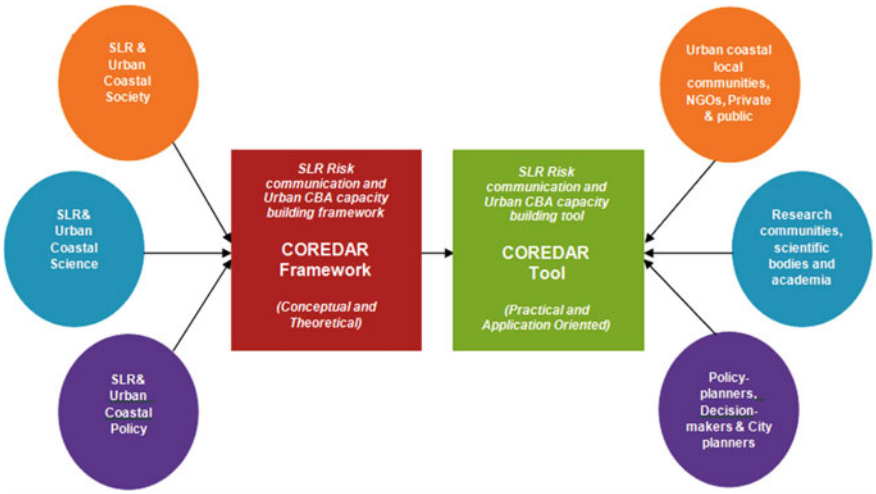

Fig. 9.1 SLR science, society and policy nexus of COREDAR framework and tool

Results

Design of the COREDAR Tool

SLR and an urban capacity building tool named COREDAR have been developed and designed based on the rationale and the guiding principle of COREDAR framework. The term COREDAR is an acronym and it stands for COmmunicating Risk of climate change and Engaging stakeholDers in framing community-based Adaptation stRategies (Khan et al. 2015; USIEF 2015; UNAI 2016; State of the planet 2016). The tool has been designed in the form "checklist" (a comprehensive list of important or relevant information and steps to be taken in a specific order) in a "check sheet" (a simple data recording sheet, custom designed to enable a user to readily interpret the results of an activity or process). In this case, this tool gathers holistic information on SLR risk communication and urban CBA in a systematic step-wise approach with information ranging from climate and the profile of the urban coastal city, past sea-level trends, future SLR projections, predicted SLR impacts and vulnerabilities, framing SLR and urban CBA strategies and mainstreaming SLR adaptation policies. Importantly, it gives a space for all stakeholders who have stake on this issue such as scientists, researchers, academicians, policy-planners, decision-makers, NGOs, the general public and anyone who is interested in the risks of SLR and how to develop adaptation strategies that are grounded in community priorities.

Structure of the COREDAR Tool

Structuring the tool with checklists may also be used as an initial step to provide an improved information basis for selecting SLR risk screening, assessment (Trærup and Olhoff 2011) and communication. Each step offers a checklist for scientific and research communities (SLR science); local communities, NGO, private partners and public (SLR and society); policy-planners and decision-makers (SLR policy) to involve and contribute to the SLR and urban CBA decision-making process. The tool consists of eight systematic step-wise approaches (Fig. 9.2) to address the challenges of SLR risk communication and urban CBA (refer "Annexure-I" for the checklist). The eight step approach includes:

SLR science dimension:

Step 1 Understanding the climate of the urban coastal city
Step 2 Documenting past observed sea-level trend
Step 3 Projecting future SLR
Step 4 Predicting SLR impact

Fig. 9.2 Outline of systematic step-wise approach of COREDAR tool

SLR society dimension:

Step 5 Identifying vulnerable communities and stakeholders
Step 6 Communicating SLR risk

SLR policy dimension:

Step 7 Framing urban CBA strategies to SLR
Step 8 Mainstreaming urban CBA strategies

Step 1 *Understanding the climate of the urban coastal city*
This step provides a checklist to fill the information related to geographical nature, climate and administrative structure of the urban coastal city. It includes geographical location, total area, and total population, administrative structure of the urban coastal city, governing body of the city such as a municipality, corporation and other relevant department involves in city governance, and importantly, overall climate pattern of the urban coastal city such as temperature, precipitation, wind

speed, humidity, elevation from mean-sea level, information on coastal disasters etc.

Step 2 *Documenting past observed sea-level trend*

Tidal datum is used as references to measure local sea levels. The estimates of twentieth century SLR are primarily based on the historical tide gauge data maintained by various services such as Permanent Service for Mean Sea Level (PSMSL) (Woodworth and Player 2003). This tool provides a checklist for documenting tide gauge station names, duration of data availability and the time span of annual mean sea-level trend of the urban coastal city. Importantly, it provides space for documenting a list of recent coastal extreme events that the urban coastal city has experienced in the recent past.

Step 3 *Projecting future SLR*

Future SLR projections, based on climate models, can provide valuable information for the robust decision-making in adaptation policy-planning. The checklist provides column for future SLR projections for different RCP scenarios of IPCC AR 5 such as RCP 2.0; RCP 4.5; RCP 6.0; RCP 8.5 (IPCC 2013) for different time scales from 2020 to 2100 with the focus on short-term and long-term projections. Importantly, to meet the uncertainties in different SLR projections, it provides opportunity for users to take effective decision-making by selecting appropriate scenario of their choice, based on the city planning objectives and goals.

Step 4 *Predicting SLR impact*

There are number of impact models using various methodologies are available to study the impact of SLR at the city level (Titus and Richman 2001). One such example is GIS based inundation models and it can be used to predict the area of inundation to rising sea level. The checklist provides space to quantify the area of inundation to a projected SLR for e.g. 0.5 m SLR and ranking vulnerable regions as high vulnerable, medium vulnerable and low vulnerable regions to SLR. In order to meet the uncertainties, it provides opportunity for users to take effective decision-making by selecting a suitable region of their interest based on short and long term planning process in the city.

Step 5 *Identifying vulnerable communities and stakeholders*

Identifying vulnerable communities to rising sea-level in the urban coastal cities are one of the most important prerequisites to plan for city adaptation strategies to rising sea-level. Importantly, prioritizing stakeholders that include local communities, city governments, NGOs, the public and others are an important first step. Stakeholder analysis is one such technique frequently used to identify and investigate any group or individuals who will be or are affected by a change and whether they are equipped to deal with it. The checklist classifies stakeholders as key stakeholders, primary stakeholders, secondary stakeholders and tertiary

stakeholders based on their exposure to risk of SLR and importance in decision-making.

Step 6 *Communicating SLR risk*
The checklist provides a platform for SLR risk communication to concerned stakeholders by two interventions through participatory approach such as (1) Convey information: one-way transmission of information to provide basic understanding of SLR science and its impacts on the study area to the concerned key stakeholders, provide data on the local SLR e.g. information campaigns, news article, exhibits, posters, brochures etc. and (2) Build understanding: a two-way transmission of information that aims to facilitate opportunities for key stakeholders to develop their own methods to understand the concept of SLR e.g. vulnerability mapping, issue investigation, focus group interviews, citizen science programs etc. (Khan et al. 2012).

Step 7 *Framing urban CBA to SLR*
CBA draws on participatory approaches and innovative participatory methods to help communities analyze the causes and effects of climate change, to integrate science and community knowledge of climate change, and to plan adaptation measures (Reid et al. 2009). Thus, identifying appropriate adaptation options should then follow, building on information about existing community capacity, knowledge and practices used to cope with climate hazards (Huq 2008). The checklist provides columns for framing short-term and long-term adaptation strategies with its descriptions, relevance, benefits and constraints.

Step 8 *Mainstreaming urban CBA strategies*
Mainstreaming means integrating climate concerns (SLR) and adaptation responses into relevant policies, plans, program and projects at the national, sub-national and local scales it includes city planning as well (USAID 2009). A more realistic approach is needed to use existing methods and strategies of coastal adaptation that inform and meet new challenges of climate change induced vulnerabilities (Cheong 2010) like SLR and particularly for urban coastal cities. This step offers a checklist to list all existing coastal, urban and national policies at one end on the other hand to list all identified SLR adaptation policies. Importantly, it provides opportunity to make an intervention to mainstream SLR adaptation strategies with existing policies.

Application of the COREDAR Tool

COREDAR tool has been designed to help users in two ways (1) *Capacity building*: it provides a systematic step-wise approach to understand the science behind SLR and risk of SLR (step 1 to step 4) and plays a valuable awareness-raising and

educational role. Communities can use this tool to build capacity to limit their exposure to hazards, save lives, limit public expenditures on armoring and emergency response, and protect valuable natural resources that provide natural flood protections and other environmental services (Grannis 2011); (2) *Decision making*: it provides a platform for all stakeholders to play a role in decision-making, ranging from researchers, policy-planners, decision-makers, local communities and public and whoever take stake on this issue of SLR and particularly it emphasizes the importance of urban CBA as an integral element of adaptation plan (step 5–step 8). This tool is designed to help policymakers manage the complexity of adoption by identifying and organizing adaptation strategies to SLR. This tool will help policymakers identify and weigh different solutions so that they can plan for and begin to adapt to SLR before impacts occur (Grannis 2011).

SWOT Analysis of the COREDAR Tool

One way to approach an evaluation of a tool like this could be through a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis. SWOT is used to encourage awareness of factors, positive and negative, that may affect planning and decision-making (Goodrich 2013). It is used to provide a descriptive assessment of tool, and provide a comparison of the factors affecting the effectiveness of the tool. There are several interesting observations that can be useful for anyone considers the application of tools or the development of new approaches, particularly when it comes to weaknesses, opportunities and threats (MRC 2010). The following are some findings of SWOT analysis of the COREDAR tool. *Strength*: (i) synthesizes different dimensions of SLR information holistically for urban coastal cities; (ii) offers a platform for SLR capacity building for different stakeholders of cities; (iii) integrates SLR science, society and policy for effective decision-making; (iv) provides simple checklist tools for easy access; (v) applicable to any coastal cities at any geographic location that are under the threat of SLR. *Weakness*: (i) difficulties in gathering too much scientific information on SLR; (ii) mistrust of climate information; (iii) challenges in transferring scientific knowledge of SLR to non-specialized audiences; (iv) lack of technical expertise of multidisciplinary perspective of SLR risk communication and urban CBA to handle the tool. *Opportunities*: (i) developing SLR risk communication and urban CBA capacity building training modules for capacity building training programs and workshops for different end users and stakeholders; (ii) developing web-based online capacity building tool for SLR risk communication and urban CBA; (iii) developing the capacity building smart phone application as a citizen science application or decision-making application for SLR risk communication and urban CBA. *Threats*: (i) threat of using wrong or incorrect SLR information; (ii) tool may be very complex for integrating wide-range of SLR information; (iii) gaps in expertise as it related to the SLR. The above mentioned are some major findings that captured

within the SWOT analysis of these tools so that they may be taken up during the future course of action for developing tool deliverables and evolving strategies and modules (NIDM 2013).

Discussion

The SLR is a significant challenge that requires a coordinated response from all members of the community particularly in the urban context. While SLR can be a sensitive topic for public engagement, research has shown that approaches with an emphasis on learning, collaboration and openness can help the City to achieve wide public support for action (Barisky 2015). Thus, the aim of (SLR) science-policy effort is to establish a capacity to improve understanding about how climate change will affect cities and to provide more detailed regional impact assessments (OECD 2008) and to facilitate effective urban adaptation decision making to changing climate.

However, building capacity for adaptation in urban areas is one of the major challenges, yet an essential requirement to address climate change, and capacity building tools are used to educate and empower stakeholders and involve them in the decision-making process. There are a number of climate change tools are available with various contexts, for various sectors, and for various locations in general. However, some specific tools focusing on CBA and SLR are Climate Vulnerability and Capacity Analysis—CVCA(CARE 2009); Climate Adaptation Knowledge Exchange–CAKE (Eco adapt 2010); Designing Climate Change Adaptation Initiatives: A Toolkit for Practitioners (UNDP 2010); Adaptation tool kit: SLR and coastal land use (Georgetown Climate Centre 2011); The Community-based Risk Screening tool: Adaptation and Livelihoods—CRiSTAL (IISD 2011); Opportunities and Risks from Climate Change and Disasters-ORCHID (IDS 2011); Regional Adaptation Collaborative Toolkit (ARCCA 2014) etc.

However, application of these tools, as a more generic or separate effort, can be an appropriate means of increasing the awareness among key stakeholders and decision-makers on climate- related risks and their potential implications for vulnerability and development. Awareness is a prerequisite for integrating climate change risks and responses into planning and decision-making at all levels, so particularly in cases where the integration of climate change adaptation into development is in very early stages, generic or separate efforts may be an important first step. In addition, the tools may be used to build capacity among key stakeholders for integrating climate change issues (Trærup and Olhoff 2011). Thus, the emphasis on participatory development of risk communication tools and methods created greater stakeholder ownership over the process and is thus more likely to trigger learning and engender capacity for action (bottom-up approach) as compared with risk communication strategies that rely on top-down approaches for information dissemination about climate change (Padgham et al. 2013). Subsequently, there is a need for user friendly climate risk screening tools and their

potentials for application that targets stakeholders. This need is amplified by the sheer volume of climate change mainstreaming guidance documents and risk screening and assessment tools available and currently under development (Trærup and Olhoff 2011)

Nevertheless, communicating the risk of SLR is one of the greatest challenges of adaptation planning because climate change associate SLR acceleration is a global concern, but SLR impacts are experienced locally (Covi and Kain 2015) and poses a serious threat particularly to densely populated low-lying coastal cities. On the other hand, SLR science is complex from observing a past SLR trend to future SLR projection, its predicted impact, identifying vulnerable communities, evolving place based urban CBA and mainstreaming adaptation in city planning.

Importantly, the practitioners and various stakeholders in the urban space not only need an understanding of climate science but also the linkages to climate impacts to city systems, such that this information could be logically applied to decision-making processes and could be inbuilt into the development paradigm (APAN 2014). Hence, there is a pressing need to develop a capacity building tool that address the challenges of communicating the risk of SLR science and methods to evolve urban CBA strategies, despite of the availability of a number of other climate change tools. The multidimensional approach of developing a new tool such as COREDAR provides promising opportunities and scope of coastal adaptation policy-planners and decision-makers, urban city planners, research and academia, urban coastal communities and other stakeholders who take a stake on this issue can better understand, prepare and adapt to rising sea-level.

Conclusion

Accelerated SLR is a major long-term outcome of climate change leading to increased inundation of low-lying areas and put global cities and urban coastal communities at greater risk. Building community resilience and adapting to SLR are increasingly a high priority for cities. Capacity building is a key issue for climate adaptation measures in urban areas (Hartmann and Spit 2014). It is one of the most urgent requirements for addressing climate risk, particularly at the local level (IFRC 2009). However, one fundamental condition of adaptation planning in urban contexts appears to be the availability of a good planning capacity, including the knowledge and participation base needed for informing decision making for the urban future (Johnson and Beril 2012). Thus, the ability to act collectively to develop and implement adaptation responses based on sound knowledge of climate science, an intervention of policies and the role of societies are prime factors in building adaptive capacity. Communicating risk of SLR and engaging stakeholders in framing CBA is one such an attempt of capacity building. However, risk communication is now a major bottleneck preventing science from playing an appropriate role in climate policy (Sterman 2008). Capacity building tools are considered as a powerful vehicle to address this challenge and effectively communicate

complex SLR science in a simple way and to educate, and engage stakeholders in the decision-making process. In this context, this article seeks to provide insights on communicating risk of SLR and to develop a robust picture of urban CBA through effective decision making that is grounded in pressing community priorities. The article introduced a capacity building tool "COREDAR" to assist users in addressing the challenges of SLR risk communication and urban CBA holistically by systematic step-wise approach that addresses the nexus of SLR science, society and policy. It provides a platform to integrate both top-down and bottom-up approaches to address the challenges and requirements of SLR and urban CBA. Thus, the main finding of this study is introducing a new capacity building tool "COREDAR" for SLR risk communication and urban CBA for coastal cities. One of the main strengths of this framework is, it is relevant to any urban coastal cities across the world and for global audiences (UNAI 2016). However, this tool requires testing and enhancement before it aid for capacity-building and decision-making. Nevertheless, the tool could be used as a foundation to systematically gather information on different perspectives of SLR and holistically synergies SLR information for potential capacity building and effective decision-making such as framing urban CBA to SLR.

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Annexure-I

Checklist outline of the COREDAR capacity building tool for SLR risk communication and urban CBA for coastal cities.

Name of the COREDAR Project	
Project Duration Period	
Institution/Organization Name	
Name of the Funding Agency	

Step 1: Understanding the climate of the urban coastal city				
(a) About the city				
Name of the coastal City	City	District/County	State/Province	Country
Geographical location	Latitude		Longitude	
Total area in ha/sq.km etc				
City Size Classification				
Population	Total population			
	Male		Female	
GNI Classification (Gross National Income)				
Human Index Classification(HDI)				
(b) Administrative structure of the city				
Governing body of the City				
Name of the Municipality/Corporation				
Other relevant department involved in the City Governance				
(c) Climate of the city				
Average Temperature				
Average Precipitation/Rainfall				
Average Wind Speed				
Average Humidity				
Elevation from Mean-sea level				

Step 2-Documenting past observed sea-level trend	
Name of the tide gauge station near to the city	
Station ID/ Reference Number	
Latitude	
Longitude	
Duration	
Time Span	
Annual mean Sea Level Trend (mm/yr or inches/yr)	
List of recent coastal extreme events that the city experienced in the recent past	1.
	2.
	3.
	4.
	5.

Step 3- Projecting future SLR				
(a) Local SLR Projections in cm/inch/ft :				
	Short-term projections		**Long-term projections**	
Year / IPCC AR5 RCPs	2020	2040	2070	2100
RCP 2.6				
RCP 4.5				
RCP 6.0				
RCP 8.5				
(or) SLR Projections in cm/inch/ft based in IPCC AR5 by 2100:				
(b) To meet the uncertainty: Select scenario of choice				
Decide RCP scenario of interest *(e.g. RCP 4.5)*				
Decide its scale for short-term and long-term projections: *(e.g 0.5m and 1m SLR)*	Scale for short-term projection		Scale for long-term projection	

Step 4-Predicting SLR impact						
(a) List and quantify regions of the city that at risk to the predicted impact of SLR:						
S.No	Name of the regions of the urban coastal city	Total area of the regions of the urban coastal city ha/sq.km	Short-term predictions		Long-term predictions	
			Total area of the region are at risk of inundation to the predicted impact of ___ m SLR	Ranking* vulnerable regions to the predicted impact of ___ m SLR	Total area of the region are at risk of inundation to the predicted impact of ___ m SLR	Ranking* vulnerable regions to the predicted impact of ___ m SLR
1.						
2.						
3.						
4.						
			* Ranking vulnerability: 1= High; 2 = Medium; 3= Low			
(b) To meet the uncertainty: Select vulnerable regions of interests and justify the reasons						
Most vulnerable region to short-term prediction of the impact of SLR						
Most vulnerable region to lone-term prediction of the impact of SLR						

Step 5- Identifying vulnerable communities and stakeholders					
Name of the chosen vulnerable region of the urban coastal city to short-term SLR impact	Identifying and prioritizing stakeholders to the predicted impact ___m SLR	Name of the stakeholders and quantity numbers	Name of the chosen vulnerable region of the urban coastal city to long-term SLR impact	Identifying and prioritizing stakeholders to the predicted impact ___m SLR	Name of the stakeholders and quantity numbers
	Key Stakeholders			*Key stakeholders*	
	Primary stakeholders			*Primary stakeholders*	
	Secondary stakeholders			*Secondary stakeholders*	
	Tertiary stakeholders			*Tertiary stakeholders*	

Step 6- Communicating SLR Risk					
Focal Point	Climate Change (SLR) Context	Purpose	Some non-formal climate change (SLR) communication, education and learning strategies (below are only examples)	Checklist of activities done	Short description about the activity
To convey information	Science of SLR and its threats	To disseminate information on SLR risk and to raise awareness	*Information campaigns*		
			News articles, posters, brochures		
			Community radios		
			Exhibits		
			Others		
To build understanding	Impacts and vulnerability of SLR and building sense of urgency	To exchange ideas and provide dialogue, to build a sense of place, to clarify and enhance understanding of information and issues and to generate concern	*Vulnerability Mapping*		
			Issue investigation		
			Focus group interviews		
			Citizen science program		
			Structured surveys		
			Others		

Step7-Framing urban CBA to SLR						
Urban CBA in the locality within the region are at risk to the predicted impact of SLR		Adaptation options to SLR	Description	Benefits	Constraints	Specific Relevance
	Short-term adaptation strategies					
	Long-term adaptation strategies					

Step 8- Mainstreaming urban CBA strategies		
List of existing national/state/city coastal policies (with an emphasize on communities)	Checklist for possible interventions	List of prioritized urban CBA strategies to SLR
1.		1.
2.		2.
3.		3.
4.		4.
5.		5.
6.		6.
7.		7.

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