CLIMATE RESPONSES OF LOCAL AUTHORITIES: A CASE OF SRI LANKAN COASTAL URBAN AREAS

P.K.S. Mahanama¹, C.Chethika. Abenayake², Amila Jayasinghe³, P.K.B.D.B. Bandara⁴

¹Dean, Faculty of Architecture, University of Moratuwa, Katubedda, Sri Lanka.
²&³Lecturer, Department of town and country planning, Faculty of Architecture, University of Moratuwa, Katubedda, Sri Lanka.
⁴Research assistant, Faculty of Architecture, University of Moratuwa, Katubedda, Sri Lanka.
mahanama_pks@yahoo.com amilabajayinghe@gmail.com dilekabandara@gmail.com

ABSTRACT

This study is mainly focused on providing an overview of the current status of awareness and practice of Sri Lankan coastal urban local authorities regarding the integrating climate change responses at local level. Not only about what is known, but also about the existing gaps in their knowledge and new directions for future works in this area has been pointed as there is a strong interaction between successful adaptation to climate change and sustainable local development.

Keywords: Climate Change, Local Authorities, Urban Planning

1. INTRODUCTION

1.1. Background of the study

Climate change has been universally recognized as a fundamental human development challenge in the 21st century which influence on social, physical, economic as well as environmental aspects of human life. Sri Lanka, as a developing country with a tropical climate pattern, has high vulnerability for the impacts of climate change including extreme weather conditions which records during unpredicted or unexpected periods of the year. Many of the urban areas in the world have already experienced the impacts of climate change. Since different parts of the world have predicted to be affected by climate change in varying degrees, many of the urban studies are focused on immediate climate change responses.

The vulnerability of individuals and communities to climate change impacts is not simply determined by the location of their settlements, but also by how those settlements are serviced, how effective and capable their local governments are and to what extent communities are able to cope with climate change impacts (Laukkonen.J et.al, 2008). The quality of government at the local level has a potentially significant impact on climate risk. Municipal governments are responsible for decisions on provision of infrastructure, disaster preparedness and disaster response, and city development planning (Huq et al., 2007). However, recent evidence suggests that many municipal governments do not have adequate provisions in order to deal with increased climate hazards (Action Aid, 2006).

In Sri Lankan context, although there are number of programs and projects have been implemented to cope with the effects of climate change, most of them are framed at the regional and national levels except a few projects funded by INGOs and multilateral organizations such as UN-HABITAT, Aus Aid. In our opinion, following a bottom – up approach, which have better ability to make improvements and alterations; as well as delegating powers and functions from central to local government tiers can give better results in climate change response.

“Climate change affects every aspect of development— agriculture, energy, infrastructure, everything we do. This means we must integrate climate-smart planning into every activity— from food security to disaster preparedness to economic growth—every dollar we invest should build climate resilience and, when possible, reduce greenhouse gas emissions” (Batten.K, 2013). Climate change is likely to impact virtually all countries and all economic development activities, from tourism to energy, agriculture,
coastal development, and infrastructure, in multiple ways. As temperature rises, communities around the world must learn to anticipate climatic variations and extreme weather conditions. Therefore, mainstreaming climate change adaptation is an iterative process of integrating considerations of climate change adaptation into policy-making, budgeting, implementation and monitoring processes at national, sectoral and sub-national levels. It is a long-term, multi-stakeholder effort grounded in the contribution of climate change adaptation to human well-being, pro-poor economic growth, and achievement of the MDGs. It entails working with a range of governmental and non-governmental actors in the development front.

With the above opinion, this study is focused on whether the Sri Lankan local authorities have contributed to the adaptation process of the causes and effects of climate change at city level. Some of the local authorities might have already initiated programs or projects –with or without explicitly addressing climate change- targeting developmental goals such as eradicating poverty and improve the living standards of the people, improving health and education of the society, city beautification and urban restoration programs. Careful observations on those programs and projects made us recognized the fact that some of them have an ability to address the causes and effects of vulnerability to climate change while improving the resilience of the urban living. For instance, if the living standards of the locals get improved with higher income and high level of services then that eventually advanced their adaptive capacity which reduces the intrinsic vulnerability to climate change. Therefore, it is worth of identifying the present status of the relevant local authorities before act on integrating climate change into urban planning.

1.2. Objective and research question

In such a background, this study attempted on identifying whether the existing practices of local authorities have contributed to the adaptation process of climate change; if they do, what the driving forces of such actions were. Accordingly, the key research questions of the study were: (a) Have the respective local authorities identified the climate change as a problem and need of integrating climate change adaptation into their development plans? (b) If yes, what were the driving forces of those actions?

1.3. Method of study

The research is based on a comprehensive literature review on integrating climate change adaptation into urban planning, perceptions and practices; including the concepts and methods of integration as well as the best practices which have been successfully integrated climate change initiatives in urban planning process. Integrating climate change adaptation with the city development plans is comparatively new process for Sri Lankan urban local authorities as commonly apparent in many parts of global south. The literature review has focused on successful methods to practice climate responsive urban planning, benefits that can be obtained by adopting this process which are yet be explored for many of the local authorities in Sri Lanka.

The study had been envisaged to be carried in selected coastal urban areas in Sri Lanka. Because most of the vulnerable industries, settlements and societies to be generally those in coastal and river flood plains, whose economies are closely linked with climate-sensitive resources such as agricultural and forest product industries, water demands and tourism (IPCC, 2007), and those in areas prone to extreme weather events, especially where rapid urbanization is occurring. “Where extreme weather events become more intense and/or more frequent, the economic and social costs of those events will increase, and these increases will be substantial in the areas most directly affected. Climate change impacts spread from directly impacted areas and sectors to other areas and sectors through extensive and complex linkages” (IPCC, 2007). Being an island country, the coastal stretch itself is an important environmental and economic resource to Sri Lanka. The coastal zone of Sri Lanka hosts around one third of the country’s population, accommodates over two third of all industrial facilities, and over 80% of tourism infrastructure (UNEP, 2001). Marine fishery plays a pivotal role in Sri Lanka’s fish supply. According to the National Aquaculture Development Authority, in 2011, around 86% of total fish supply has contributed from marine fisheries sector. 58% of the marine fish catch is obtained from coastal areas while 42% is from off-shore. The contribution of the coastal sector to the national GDP is on the rise (Nayanananda O.K., 2007). The share of coastal GDP in national GDP has increased from 35% in 1983 to 43% in 2005. Agriculture, fisheries, trade, and tourism have been playing a major role in
growing the coastal economy over the years. Moreover, two metro cities out of the six which have been proposed to be developed under the National Physical Plan of the country are located along the coast. Despite the major role in strengthening the economic, environmental as well as historic identity of the country, coastal area of Sri Lanka has been severely threatened by the ongoing changes of the global climatic conditions which have already aggravated the risk of costal settlements.

Integrating climate change adaptation methods into urban development plans is a comparatively new practice in the context of Sri Lankan local authorities, therefore, it was hard to find out the local authorities who have already integrated or planned to integrate climate change responses to their local authority’s development planning processes. Considering all, twelve (12) coastal local authorities which are located along the Western and Southern coasts of Sri Lanka - Matara Municipal Council (MC), Galle MC, Moratuwa MC, Tangalle Urban Councils (UC), Ambalangoda UC, Beruwala UC, Kalutara UC, Panadura UC, Puttlum UC, Chilaw UC, , Ja-Ela UC and Wattala UC have been selected for the detailed study.

The services delivered by Local Authorities and the role of Local Authorities have classified under three four criteria considering the powers and functions specified in local authority acts - Municipal Council Ordinance No: 16 of 1940, Urban Council Ordinance No: 61 of 1939 and Pradeshiya Sabha Act No: 15 of 1987- of Sri Lanka as follows.

Table 1. Selected criteria and respective indicators

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Indicators</th>
</tr>
</thead>
</table>
| 1. Effective utilization of Local Authority resources (physical/human/capital) in provision of services | 1 Human Resources and office Management  
2 Financial Management |
| 2. Efficient performance in respect to Local Authority responsibilities (provision of services) | 3 Public health and sanitation  
4 Management of roads and surface drainage  
5 Common amenities  
6 Welfare services  
7 Legal services |
| 3. Local Authorities acting on principles of good governance (Good Governance) | 8 Community participation  
9 Responsiveness  
10 Planning capacity |

Data collection from the identified local authorities was carried through an in-depth interview followed by a questionnaire survey directed at local authority spokesmen. Collected data have been analyzed using simple descriptive statistics and the results have revealed the existing status of local authorities in terms of integrating climate change adaptation into urban planning.

2. ANALYSIS

The summary of the results revealed through the questionnaire survey which was carried among the selected local authorities are described in the following section. The first set of the findings focuses on assessing the availability of knowledge and information, and practice of adaptation methods in order to respond climate change whereas the second set of the findings describes the criteria which have been identified as the driving forces of the existing best practices in local authorities which make them resilient to climate change exacerbated negative consequences.

2.1. Knowledge and adaptation practices to Climate change

2.1.1. Assessment of present knowledge and awareness of localities on climate change

According to the investigation on present knowledge and awareness, 91% of the selected local authorities aware or have ever discussed about the impacts of climate change on their cities. Out of that, only one local authority mentioned that they have a well comprehended awareness whereas the rest said that they have only some degree of basic understanding.

Level of awareness among local authorities has been raised through a range of learning tools including: awareness programs which have been...
conducted by various institutions and organizations, mass media campaigns, experiential knowledge settlers, discussions carried during monthly meetings of the development advisory committees, and by the complaints of general public on related matters. Among the selected local authorities, 73% mentioned that they had received some massages or information on climate change from top-level organizations whereas the rest mentioned that they had not received any.

2.1.2 Assessment of present and future impacts

Beaches and coast areas, houses, commercial properties, industries and public services are the identified resources within the local authority areas, which have been mentioned by local authority spokesmen as could be get affected due to the climate changes envisaged. According to the results, beaches have been noted as the most sensitive resource to the above mentioned challenge. Among the resources of selected locality; 32% and 39% of resources have been respectively recorded as very sensitive and sensitive to climate change.

2.1.3 Present and future adaptation methods of the local authorities

Under the adaptation methods, it has revealed that most of the local authorities (40%) have prepared vulnerability assessments to climate change exacerbated disasters but many haven’t implemented yet. Only one local authority has an adaptation strategy which has already been implemented. Quite a few are discussing about the climate change adaptation though they are yet to made plans. However, only one local authority mentioned that they have no steps regarding the climate change adaptation in their locality.

<table>
<thead>
<tr>
<th>Status</th>
<th>Number of MCs /UCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have an adaptation strategy and implemented measures</td>
<td>1</td>
</tr>
<tr>
<td>Have implemented some stand-alone adaptation measures but no integrated planning process is underway.</td>
<td>2</td>
</tr>
<tr>
<td>Have conducted a vulnerability assessment but haven’t implemented any measures</td>
<td>2</td>
</tr>
<tr>
<td>Have ongoing discussions on adaptation but no plans prepared yet</td>
<td>5</td>
</tr>
<tr>
<td>None of the above mentioned steps have been taken</td>
<td>2</td>
</tr>
<tr>
<td>No idea</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 3. Present status of the adaptation process to climate change

<table>
<thead>
<tr>
<th>Adaption method</th>
<th>Number of MCs / UCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishment of Disaster Management Unit</td>
<td>4</td>
</tr>
<tr>
<td>Participate in managing natural disasters</td>
<td>2</td>
</tr>
<tr>
<td>Practice building application approval from National Building Research Organization</td>
<td>2</td>
</tr>
<tr>
<td>Improved infrastructure in the area which can be resilient to climate change</td>
<td>1</td>
</tr>
<tr>
<td>Implement the building regulations to respond climate change and its impacts</td>
<td>2</td>
</tr>
<tr>
<td>Control the development activities in hazard prone areas through development permits</td>
<td>4</td>
</tr>
<tr>
<td>No specific actions identified</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 2. Sensitivity levels of the local resources to the climate change

<table>
<thead>
<tr>
<th></th>
<th>Very sensitive</th>
<th>Sensitive</th>
<th>somewhat sensitive</th>
<th>Not sensitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaches and coast</td>
<td>8</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Houses</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Commercial properties</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Industries</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Public services</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4. Present status of implementation of adaptation methods to climate change
When considering the present status of adaptation methods implemented by different local authorities; 20% have already implemented projects based to regulate the physical development in high-risk areas through land use plans as well as have made investments to improve infrastructure in such areas, 13% have economic instruments and financial mechanisms used, 13% have implemented revised regulations, and 17% have conducted awareness-raising campaigns to make their city resilient to climate change.

According to the analysis, some of the key barriers identified for the implementation of the climate change adaptation practices in the selected local authorities were; lack of environmental data available at local level, absence of a common framework for data collection and management (e.g. a helpdesk or a climate registry), limited opportunities for cities to exchange experiences and lessons learnt, limited availability of human and financial resources within city administration, lacking overarching multi-level governance framework for urban adaptation, malfunctioning of national compulsory legislation on dedicated initiative to trigger political commitment, and community attitudes which make them process non-prioritized.

The factors mentioned by the selected local authorities as to be implemented to promote the ‘initiatives on urban adaptation’ were; conducting awareness programmes on climate change adaptation for public and officers, provision of the relevant human and financial resources, bridging the missing link between national level institutions which are working on climate change adaptation, provision of necessary infrastructure, identify and implement action projects to strengthen climate change adaptation, and conduct researches on local level impacts of climate change.

Further, according to the responses of the selected local authorities, it was apparent that most of them are highly interested in strengthening the climate information base, vulnerability assessment process and adaptation practices with a proper guidance given at national level.

2.2. Best practices exists in local authorities to make the cities resilient

Best practices were considered under three main criterion discussed below.

2.2.1 Effective utilization of local authority resources

The present status of the selected local authorities was the Effective utilization of Local Authority resources (physical/human/capital), in providing services on Human Resources and office Management and Financial Management. The summarized results are displayed in table 5.5. The results indicate that the awareness of many of the local authorities on resource management is relatively weak.

<table>
<thead>
<tr>
<th>Sub Criteria</th>
<th>Activity</th>
<th>Already implemented</th>
<th>Implementing</th>
<th>To be implemented</th>
<th>No any idea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Resources Management</td>
<td>Appoint responsible officers (inquiries, investigations, surveys etc.)</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Ensure a close relationship between citizens and those officers</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Financial Management</td>
<td>Allocate adequate funds for climate change adaptation programs</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

2.2.2 Efficient performance in respect of local authority responsibilities (service provision)

Most of the local authorities have already implemented and continuing the major service provisions which can increase the adaptive capacity of citizens while directly or indirectly reducing the causes and effects of the climate change as well.
<table>
<thead>
<tr>
<th>Sub Criteria</th>
<th>Activity</th>
<th>Already implemented</th>
<th>Implementing</th>
<th>To be implemented</th>
<th>No any idea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Health and Sanitation</td>
<td>Identifying hazardous waste handling activities operating in the council area</td>
<td>3</td>
<td>6</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Providing an adequate number of public toilets and urinals</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Introducing programs for cleaning those toilets and urinals daily</td>
<td>5</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>daily sweeping and scavenging of streets</td>
<td>5</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public awareness programmes about solid waste collection</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regular collection and disposal of solid waste</td>
<td>6</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Educational and awareness programs on how to reduce, reuse and recycle waste</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prevention of infectious diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management of roads and storm water drainage</td>
<td>Maintaining road inventory, together with maps</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maintaining inventory of storm water drains</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Keeping the records on the maintenance of road and storm water drains</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify areas prone to climatic disasters</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preparing drainage plans with specific consideration on the variation of rainfall</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Obtaining community participation for maintenance of road and storm water drainage</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Common Amenities and Welfare Services</td>
<td>Supplying water through temporary measures at a time of necessity</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Maintaining wells, tube wells and pipe water stand posts</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Maintaining public places as pavilions, play grounds, open spaces</td>
<td>5</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal provisions</td>
<td>Direct participation and contribution of the community for activities relating to the protection of the environment</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Active participation of the community for Environmental Advisory Committee.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Holding meetings of Environmental Technical Committee and Environmental Advisory Committee at regular intervals</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Urban tree planting initiatives</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Conducting shramadana (community participatory building process) campaigns</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Collaborating with non-governmental organizations and community based organizations, in performing activities relating to the management and the protection of the environment</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Encourage home garden agriculture practices</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Environmental Protection Licenses</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
2.2.3 Local authorities acting on the principals of good governance

Most of the local authorities have already identified the importance of good governance to make their locality resilient to climate change.

Quite a few of local authorities have initiated to incorporate good governance into their service delivery process and adaptation plans positively. However, the roots of many of this attempt are not laid in the sphere of climate change adaptation rather this is an outcome of the 'good governance improvement programmers’ which had been undertaken over last few decades.

<table>
<thead>
<tr>
<th>Sub Criteria</th>
<th>Activity</th>
<th>Already implemented</th>
<th>Implementing</th>
<th>To be implemented</th>
<th>No any idea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Participation</td>
<td>Community participation in the decision making process</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Community participation in the implementation process</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Persuading public participation in the process of service provision</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Persuade of public participation in the planning process</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Provide opportunity for the people to access to information</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Conduct periodical surveys for measuring public responsiveness</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Display the annual Budget / at public places for reference</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>Reserve a public day for community to meet officers</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Planning Capacity</td>
<td>Discuss with all stakeholders including the private sector</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Identification and prioritize Strengths, weaknesses, opportunities and risks relating to the Local Authority</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Preparation of plans for identification and prioritization of the</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
3. CONCLUSION

Findings of the study have revealed that although many of the local authorities have a great deal of concern on adapting to the challenging consequences of climate change, they often experience barriers and difficulties in planning, implementing, and monitoring the climate change responses beyond a certain level. Implementing a well-integrated adaptation framework is constrained by a set of legal, institutional, technical and socio-cultural factors.

Many of the local authorities have a satisfactory level of awareness on climate change which make them capable in recognizing how even a slight variation of climate can be influenced the regular activities of community at different levels. According to the local authority spokesmen, they have a positive attitude regarding the climate change adaptation as some of the urban areas have already been exposed to the negative effects of climate change.

In this context, a well-planned climate response is needed to be emphasized and essentially be coupled with the decision making process in the local authorities. Therefore, taking the advantage of the emerging attentiveness and neediness of the local authorities regarding the climate change adaptation is vital to make the local authorities resilient to the risk and uncertainty of climate change.

4. ACKNOWLEDGMENT

This research explicitly acknowledges the financial assistance provided by University Research Grant Commission (UGC), Sri Lanka under the research titled ‘A Planning approach to integrate climate change adaptation into City Development Plans of coastal urban areas, Sri Lanka’.

5. REFERENCES