ASSESSING URBAN CLIMATE CHANGE ADAPTATION PRACTICES IN SOUTHERN COUNTRIES

A STUDY OF URBAN FLOOD ADAPTATION IN RATNAPURA, SRI LANKA

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SUMMARY

Although climate change considers as one of the significant threats faces in today's world, the impacts of climate change varying upon Global North and South. It is evident that countries in the Global North with high socio-economies are more resilient to the climatic disasters while South suffers more. Thus, with an increasing urban population and lack of resources to manage climate change leave substantial threats to the Global South leaving urban areas to suffer more significant losses in terms of fatalities and economics comparing to the rural areas. Therefore many *"of the urban studies are focused on climate change"* (Mahanama et al., 2014, P59).

Keeping that in my mind this study was an attempt to identify the aspects influencing climate change adaptation planning in Southern Countries referring to Ratnapura, Sri Lanka as the case study. The research based on the 'The Concept of Southern Planning' where it bears the characteristics such as that the global "south still shaped by their histories of colonialism, rapid urbanization, poverty &inequality, etc. which set them apart from the global North and locate them in an ongoing relationship to the global North" (Satgé and Watson, 2018, P16).

The study drew on a qualitative descriptive methodology using Key Informant Interviews, direct observations, and document analysis as the data collection methods. Six key characteristics were identified in the Southern Planning Concept and were further bundled into four sections allowing the interviews to structured and develop more logical analysis. The following sections describe the statistical and geographical background of Ratnapura and justification of its suitability as for the study and how the data gathered relates to the research scope. The Ratnapura city based in a location where confluence with Way River and Kalu River and clearly shows as a location that receives one of the highest annual rainfalls in the country. The historical data shows the flood cycles of critical floods in 50 years, high floods in every 10 years, annual moderate floods and how it has intensified in the recent past mainly believed due to climate change effects.

Chapter 5 presented how the characteristics of Southern concept influences the climate change adaptation planning in Ratnapura Sri Lanka. Findings show a strong influence of colonial governance in the current decision making and administration process in Ratnapura, Sri Lanka. The disaster response is still focusing on disaster relief than disaster risk reduction. The poverty and inequality in the area especially in the Rathnapura urban setup result in a more responsible approach than adaptation. The question arises whether this is an inherent feature of the colonial administrative system to keep a poor community within the urban setup to get done the services required by the elite of the city. It can see those societal linkages which have been made weak by colonial administrative structure remain, but observations reveal some elements were breaking through the system due to strong socio-cultural practices.

The above factors conclude that the Government should act as the facilitator and use the existing local government system to empower people and promote localized participatory decision making. Overcoming the strong colonial influence which has been there for two centuries can be complicated but sound education systems and giving exposure to government and community leaders on better management mechanisms helps the southern societies to overcome the adverse effects of Southern Planning concept. Limitations of the research are also discussed here especially the fact that was omitting the effects of rapid urbanization due to lack of data.

The researcher recommends for further research that, "The functions of participatory planning and government as a facilitator reduces the negative impacts of identified aspects influencing the climate change adaptation planning in Sri Lanka" be a high value for improving urban planning in Sri Lanka.

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ABBREVIATIONS

ADPC – Asian Disaster Preparedness Center

DMC – Disaster Management Center

DS - Divisional Secretariat/ Secretary

GN – Grama Niliadari

MET – Meteorological Department

NBRO – National Building & Research Organization

NDMC – National Disaster Management Committee

NDRC – National Disaster Relief Center

NEM- North East Monsoon

NGO – Non-Government Organizations

RMC – Ratnapura Municipal Council

SWM – South West Monsoon

UDA – Urban Development Authority

1 INTRODUCTION

1.1 Background Information

Climate change universally recognized as the most prominent global challenge in the 21st century (Feulner, 2015). Impacts of climate change have been spread all over the world, and its related impacts are expected to increase in intensity and frequency, making negative influences on socially, physically, economically and environmentally on human life and natural resources. In the long term it results in *"changes such as ecosystem degradation, reduced availability of water and food, and impacts on livelihoods, which together reduces the capacities of communities to cope with natural hazards, especially in poor developing countries"* (UN ISDR, 2009 cited in Abenayake, C. 2012). Many *"of the urban studies are focused on climate change"* (Mahanama et al., 2014, P59). Mainly because scientific evidence predicts that *"the frequency and intensity of climate-related disasters are to be increasing"* (Innocenti and Albrito, 2011, UN ISDR, 2009). Different parts of the world have been predicted to be affected by climate change in varying degrees. As a result, Abenayake, C. (2012) mentioned that this catastrophic event of increasing climate-related risks creates countries to respond to climate change disasters by either adaptation, mitigation or both.

1.2 Problem Statement

Climate Change Adaptation Planning and Global South Countries

Global South and Global North are an emerging topic in most of the urban planning studies. The two concepts emerge due to the growing inequality within countries. Global North refers to developed countries with politically stable, wealthy and technologically developing and South refers to poorer countries with problems relates to urbanization, poverty, etc. (Odeh, 2010).

As mentioned in earlier, climate change is known as a global threat, and "the impacts of climate change are global in scope and unprecedented in scale making" (Nadeau and Nadeau, 2018, P12). *"Leaving humankind at a high risk to the impacts of climate change placing sustainable urban development at risk"* (Herath, H. and Abenayake, C. 2014, P157). The effects of climate change accelerated disasters vary based on the geographic location, economic and social states of countries. The impacts of climate change are not only a threat for the Global South, but it also affects the Global North too. However, *"Developing nations with low-income levels have the lowest financial, technological and institutional capacities to pursue low-carbon, climate-resilient development pathways. Although developed nations generally have a greater relative capacity to manage the risks of climate change."* (IPCC, 2014, P117).

Climate-related disasters namely as flooding, hurricanes, landslides, sea erosion caused significant threats to the Global South countries leaving urban areas to suffer more significant losses in terms of fatalities and economics comparing to the rural areas. Today more than half of the world's population lives in cities, with an additional 2 billion urban residents expected in the next 20 years (World Bank 2009c cited in Dickson et al., 2012, P6). And *"developing countries are expected to have rapid urbanization and 1.2 billion urban residents already live in slums, and this too is expected to grow; rural-urban migration can cause low-income settlements to double in size every 5 to 7 years"* (Smith and Petley 2009 cited in Dickson et al.,2012, P6). He further added, *"Urban areas concentrate disaster risk due to the aggregation of people, infrastructure and assets, urban expansion, and inadequate management"* (Dickson et al., 2012, P6). Due to rapid urbanization and degradation of lands people in developing nations tend to settle in high-risk areas facing greater variability in climate. To overcome these various climate-related adaptation practices are required but due to lack of facilities people tend to settle in those areas. *"[…] a tension between climate change adaptation and development is seen;*

living in these areas without appropriate adaptation may be maladaptive from a climate change perspective, but this may be a risk people are willing to take, or a risk over which they have limited choice, considering their economic circumstances" (Wisner et al., 2004 cited in Handmer.J et al., 2012, P238).

Every city is different from each other where they have unique physical, socio-cultural, economic, and environmental compositions. Those compositions influence the degree of risk and vulnerability of its residents (Dickson et al., 2012). Despite the likely impacts that *"disasters have on the financial resources of city governments, and the functionality of the city, the management of disaster risk remains ex-post, with little attention to preventing or mitigating measures"* (Dickson et al., 2012, P15). Mahanama et al., (2014, P59) mentioned that 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 (urban) communities are able to cope with climate change impacts. (Laukkonen.J et al., 2009)."* This figures that the government plays a vital role in impacts on climate change. The government in a sense not only the national but both local and national level (Climate Resilient Infrastructure: Preparing for a Changing Climate, 2011). Mahanama et al., (2014, P59) further elaborate that the *"Municipal governments are responsible for decisions on quality and provision of infrastructure, disaster preparedness and disaster response, and city planning development."* Even though many studies suggested that governments responsible for taking necessary actions to adapt or mitigate climate change impacts, literature evidence suggests otherwise (Action Aid, 2006 cited in Tanner et al., 2009*). "In practice, the implementation of adaptation measures has been slow. Authorities urged to take necessary action to adapt and mitigate to varying impacts of climate-related disasters."(*Uittenbroek, 2014, P27).

1.2.1 Focus of the Research

Having the focus on Sri Lanka this research based on the Southern Planning Concept, where it bears the characteristics such as that the global south still shaped by their histories of colonialism which set them apart from the global North and locate them in an ongoing relationship to the global North (Satgé and Watson, 2018). Further, *"The south and cities of the south are marked both by a political economy of insufficient resources even on average to provide a decent life for all; and by (post) colonial disabilities."* (Mabin, 2013, P4)

"While recognizing that the specific assessment of urban risk will differ across cities based on factors such as poverty levels, the pace of urbanization, and awareness surrounding disaster risk or climate change" (Dickson et al., 2012, P13). This research is an attempt to identify different aspects of influence on climate change adaptation planning in global south countries.

In that prospect, this research focused on whether the Sri Lankan local and national level authorities contribute to the adaptation to the effects of climate change and how the local communities react to it. Therefore, it is worth identifying the present status of the relevant local planning agencies as well as how the community respond to the climate exacerbated disasters such as flooding in the Sri Lankan context. In simple terms, this study attempts to identify the different aspects influencing the climate change adaptation responses in Sri Lanka while identifying the role and functions of different stakeholders engaged in adaptation planning.

1.3 Research Objective

In global south countries with their limited capacities and resources, government authorities are increasingly facing the challenge of finding ways to include adaptation strategies in their work. *"However, as climate change adaptation is a relatively new field of activity, related knowledge and*

competence are still scarce and fragmented" (Wamsler, Brink, & Rivera, 2013, P3). But, *"the specific role, the actions, and responsibilities of the authorities remain uncertain"* (IPCC, 2007a cited in Herath, H. and Abenayake, C. 2014). Thus, this research aims to contribute to knowledge development and organizational learning for urban climate change adaptation planning practices with a focus on Sri Lanka.

The main objective of this research is to understand the aspects influencing the climate change adaptation planning in Rathnapura city in Sri Lanka through the concepts of southern planning.

1.4 Structure of the Report

This report consists of six chapters. The first chapter discussed the introduction to the research, problem statement, focus of the study and research objective. Next chapter is the "theoretical Framework" of the research and includes a literature review about the concept of Southern Planning and its characteristics as well as the conceptual framework adopted. The third chapter is about "Research Design." It describes the overall process of the research including adopted methodology, data collection methods and end of this chapter explains the reasons to select the case study. Following that next is the fourth chapter where it provides a basic introduction about Ratnapura city, Sri Lanka, it's socioeconomic factors and Ratnapura as a flood prone area. The fifth Chapter includes the results gathered from the different data collection methods namely as key informant interviews, direct observations, and Document studies. Finally, the sixth Chapter "Discussion and Conclusion," consists of answers to the main and sub research question, recommendation and conclusion of the study.

2 THEORETICAL FRAMEWORK

This chapter explains the key definitions followed, concepts adopted, and terms referred all through the study. The discussion contains a detailed description of the 'Concept of Southern Planning' and its characteristics. The conceptual framework adopted for this study explained at the end of this chapter.

2.1 The Concept of Southern Planning

As explained in the methodology, the study built, based on the concept of Southern Planning as the conceptual base to identify the essential aspects in the climate adaptation planning process, in Ratnapura, Sri Lanka.

This chapter describes the findings of urban planning in the global south and the characteristics of the global south. The content of the chapter entirely based on literature review carried out by focusing on southern planning theory, which discusses the urban planning of developing countries in the world. Findings of this chapter are profoundly influenced by the Prof.Vanessa Watson who has conducted much research about the concept of southern planning.

2.1.1 Urban Planning in Global South and its characteristics

The terms "Global North" and "Global South" are alternative terms referring to the developed and developing world countries. The term origins concerning the differences in standard of living, thus creating the inequality gap between two (Cram.com, 2012). In here the term "Global South" does not use to emphasize geographical locations of the country, it used to describe the low-income countries with developing world problems (i.e., poverty, urbanizations, slums, environmental pollution).

This section focuses given to urban planning in global south countries and its' characteristics. During the literature reviews, it noted that there is increasing scholarly about the urban planning in the global south countries (De Satge and Watson, 2018, Watson, 2009,2018, Mabin, 2013). Their main argument was that the spread of planning ideas, from the North to the Global South creates more problems in global south countries. Watson, (2009) argues that spreading happens mainly via two methods; either because of colonialism or borrowed from global north countries. 'Borrowed planning' means that the planning ideas transferred by planning consultants, politicians and scholarly to global south countries (Dougan et al., 2012). Further, they stated that both methods are problematic, as planning ideas created for a specific time and place. Such adopted planning practices from global north not appropriate for cities in the Global South where the characteristics of those cities differ from northern cities (Dougan et al., 2012).

Literature studies show that European planning laws from as early as the 1930s is still being used in many countries within Africa, South America and some parts of Asia, from the previous colonial ruling (Dougan et al., 2012). Planning methods such as master planning, zoning, and urban modernism have been used and became challenging as they fail to address current urban issues. Use of these methods caused much more problems instead of providing answers. Borrowed planning from north creates problems such as more poverty, urban to rural migration as the makes public facilities and employment opportunities concentrated in the urban center where largely inaccessible to citizens (Dougan et al., 2012, Watson 2009, Dickson et al., 2012). Looking through the above problems 'Concept of Southern Planning' criticized the 'Borrowing' of Planning theory from the North.

To do that southern practitioners have identified a unique set of characteristics that Global South makes differ from the North. Main characteristics of the global south that theorists mentioned are as follow (De Satge and Watson, 2018, P16);

- The planning system is still shaped by their histories of colonialism which set them apart from the global north,
- Rapid urbanization,
- Weak and fractured civil society,
- Poorly resource and capacitated institutions of governance,
- Largely informal urban economies
- Poverty and inequality

Each of these characteristics will further elaborate in below sections.

2.1.1.1 Planning system still shaped by their histories of colonialism

Colonialism was a feature of the spatial planning systems. Watson, (2009, P173) mentioned that *"...particularly in those parts of the world under colonial rule when planning was controlling."* She further explains that urban planning system in global south countries was frequently bound up with the 'modernizing and civilizing' mission of colonial authorities, but also with the control of urbanization processes and of the urbanizing population (Watson, 2009, P173).

In most of the global south countries, this happens under the influence of British, Dutch, Portuguese, German and French governments. During the colonial periods planning practitioner has used concepts such as master planning, zoning, building regulations and urban models that borrowed from the colonial governments of the time (i.e., Garden City) (Watson, 2009,). In that period those plans were developed with the help of renowned international planners or architects. A classic example can find in Sri Lanka. In the year 1921 during the British governing period Sir Patrick Geddes developed a plan for country's capital (at that time) naming it as the "City of Colombo: The Garden City of the East" (Townplanninginsrilanka.blogspot.com, 2013).

The problem of having these plans are they remain unchanged and functioning. Even in the case of Colombo, part of the city developed according to the plan of Sir Patrick Geddes with border roads and green and wealthy households. A matter of time before global south countries 'catch up' economically and culturally with the West, becomes the main reason behind these remaining colonial influences (Watson, 2009, P173). However, in the present, most of the countries are well above from their earlier stages but still trying to reach the northern level. This harms their natural, social and cultural environments causing environmental degradation, rapid, etc. *"Indian cities now have master plans, all displaying the problems which caused countries such as the UK to shift away from this approach,"* (Watson, 2009, P174). Above statement shows that problems exaggerate with the remaining influences of colonial governing methods.

2.1.1.2 Rapid Urbanization

A study carried out by the United Nations shows that 68% of the world's population projected to live in urban areas by 2050 (UN DESA, 2018). UNDP studies indicate that this rapid increase take place mainly in global south countries locates Africa and Asia region were both still less urbanized than other regions have the fastest urban growth rates (Palanivel, 2017). Africa's urban population is projected to jump from 40 percent today to 56 percent by 2050, and Asia's from 48 percent to 64 percent (Palanivel, 2017). However, the urban population in the Global North is comparatively lesser than to the South. Asia is home to 53% of urban populations while Europe 14% and Latin America & Caribbean 13% (United Nations, Department of Economic and Social Affairs, Population Division (2014). Rapid and unplanned urbanization come together with problems such as rapid sprawl, pollution and environmental degradation (United Nations, Department of Economic and Social Affairs, Population Division, 2014).

Most of the planning systems in global south countries incorporated the concept of urban modernism into their planning system and developed various plans based on western spatial planning practices. Urban modernism gives higher attention to the beautification, and it associates with features such as modern, aesthetic appearance, high rise buildings, better access, green belts, etc. During 19th-century western world adopted urban modernism to gain a radical change in city form and city life. However, it failed to satisfy the growing needs of a rapidly increasing population (Watson, 2009). When doing planning without considering the poor and other urbanization relate problems, such as *"wealthy tend to live in gated communities; the poor tend to be confined to marginalized homes built on unstable hillsides or floodplains"* (Freire, 2006, P4). Since the content of each problem is varying from country to country, developing world need to identify the socio-economic and cultural aspects of society like ways to manage the growing population, address income disparities, provide infrastructure, etc. before adopting solutions from the western world.

2.1.1.3 Weak and Fractured Civil Society

"Social exclusion and marginalization based on socio-economic status, gender, age, caste, ethnicity, and other categories often pose particular difficulties in gaining and securing access, rights, and opportunities in urban areas" (The World Bank, 2015, P6). Due to that "Communities have been increasingly unwilling to passively accept the decisions of politicians and technocrats that impact on their living environment." (Watson, 2009, P158). The system does not allow marginalized communities to raise their voices. However, for better society government need to "understanding the role of communities and local government and the importance of their collaboration; identification and targeting of beneficiaries; and, social mobilization in complex urban settings." (The World Bank, 2015, P26).

2.1.1.4 Poorly resource and capacitated institutions of governance

Poorly resource and capacitated governance characterize the majority of developing countries (Abed & Gupta, 2002 cited in Barasa et al., 2014). Poor governance ultimately creates different problems in developing countries (Barasa et al., 2014). Watson (2009) argues that many parts of the global South, urban administration remains highly centralized and state-led, limiting the accessibility of other stakeholders in the decision-making process. Moreover, it affects the growth of the countries too. Those countries "*exhibit a high degree of political instability, widespread corruption, weak protection of property rights and weak functioning markets"* (Barasa et al., 2014, P8).

Besides, lack of technical know-how and data scarcity are the primary outcome of the poorly resourced and capacitated institution of governance. The World Bank report about 'Inclusive Cities Approach' discussed the importance of having the proper technology. According to their paper inaccurate measurement and scarce data usually excludes remote areas that are not usually well connected (The World Bank, 2015). The people who live in those settlements are *"usually the urban poor and it's hard for authorities to address issues in their communities because they are "invisible"; they do not reflect in documents used for planning and implementing services such as the city development plan."* (The World Bank, 2015, P19).

Abenayake, C. (2012), mentioned that these constraints are especially reported in low-income countries [global south countries] as well as at lower levels of government and community levels within them. In those circumstances, there tend to be ad hoc initiatives rather than continuous practices with an insufficient transfer of skills and competency.

2.1.1.5 Largely informal urban economics

Most of the developing countries with rapid urbanization face the problem with informal economies. Rapid urbanization comes with issues such as insecurity of jobs, inadequate or low remuneration,

hazardous working conditions, lack of social security and other benefits, etc. (The World Bank, 2015, P28). As an example, studies found out that in Sri Lanka from the total employment, two-thirds or 66% were informal employment (Gunatilake, 2008). However, in most of the developing countries informal is not consider as a part of the country's total employment and the availability of data is scared. The situation is the same for Sri Lanka as well where half of the economic activities in the country seem to have been mostly unexplained (Senanayake, Premaratne and Wimalaratana, 2015).

Apart from above mention facts studies show that businesses in the informal sector, typically operating on streets and in other public places, are often consider as eye-sores and undesirable activities (Rukmana, 2007). That makes conflicts between urban authorities and informal businesses as the authorities focus more on city beautification.

To overcome that authority, try to adopt policies (i.e., zoning), rules or regulations which forcibly evict informal sector activities. Such eviction does not address the problem with the informal sector. It only relocates the problem and even exaggerates the conflicts between urban authorities and the informal sectors. Watson (2009, P176) mentioned in her study that *"the system strongly enforced and people who cannot afford to comply with the zoning requirements excluded to areas where they can evade detection—which would usually be an illegal informal settlement, probably in the peri-urban areas."* Alternatively, either they completely ignored. This makes more issues like urban sprawl, land degradation and the increase of unemployment, etc. Eradication of informal urban sectors is not a solution for urban planning. Therefore, planners need to address a strategy to incorporate and support those also to the planning system.

2.1.1.6 Poverty & inequality

In the 21st century, poverty considered as an urban issue. *"With more and more people moving to urban areas, the share of the total number of poor people who live in urban areas is expected to grow."* (The World Bank, 2015, P49). Poverty and inequality come in hand to hand. Inequality creates both spatial and social divides and shows itself within cities in many ways. Roitman, S. (n.d.)., mentioned that poverty and inequality visible in cities in terms of differences between different social group. The main reason for this gap is because marginalized population suffers from lack of access to formal labor markets (The World Bank, 2015). Factors like inadequate infrastructure facilities, lack of connectivity for urban areas, social discrimination, lack of education, poor health, etc. can also part of the gap between poor and rich (The World Bank, 2015, Nanayakkara, 2018). This gap ultimately leads to increase the informal economic activities, where more people end-up in low-cost, informal jobs.

Poverty and inequality create a high level of social discrimination among society. Roitman, (n.d.) mentioned that *"even when poor and rich groups might co-exist in the same territory they do not interact with each other, except for some formal work exchange between employer and employee, where there are strong power relations at play."* The segregation between poor and rich increases the tension and further develop into problems such as insecurity. To avoid this problem and reduce poverty and inequality the government should need to adopt proper rules, regulations and provide better access to basic needs for every person.

2.1.1.7 Conclusion

One can argue that factors such as colonial influence urban planning system, high urbanization rates, weak and fractured civil society, largely informal urban economies, poverty & inequality creates socio-economic fragmentation in the urban planning system, especially in the global south where most of the ideas and concept borrows or adopt from the western world. With those cities of the South, has a growing concentration of poor people and increase problems in the natural environment. What southern theorists argued in this concept was that each country is different from one another and

therefore, planning should be able to address and to those varying scenarios. Planning cannot be adopted as it is; it should be polished and changed according to the country's existing socio-economic systems. Planning should need to help a country to grow as an economic and socio-cultural leader protecting its environment, not as destruction to its growth.

2.2 Conceptual Framework

In previous sections, the concept of Southern Planning and its main characteristics, as well as the connection between urban planning, cities and climatic disasters, explained. This section illustrates the inter-connectivity of these elements in a conceptual diagram (figure 2.1).

In this research study the Concept of Southern Planning was reviewed to identify the factors influencing urban planning in Global South countries. Then to understand the climate change adaptation practices in the Sri Lankan context, interviews conducted with practitioners varying from national, local, NGO and community level. Ratnapura Municipal area used as the case study. The research focus to identify the, the government contribution(local and national) and community's' respond for climatic disasters such as flood in Ratnapura Municipality. Moreover, research trying to identify the relationship between different stakeholders engage in the Sri Lankan planning system that has been adopted disaster management or climate adaptation planning practices to minimize the climatic risk. Finally tries to identify the aspect involved in climate change adaptation planning in Ratnapura Sri Lanka by comparing the factors identified in the Southern Planning concept. Those factors are essential because either they work negatively or positively. This research is an attempt to explore whether those characteristics act as it says in the concept or not. (Figure 2.1)

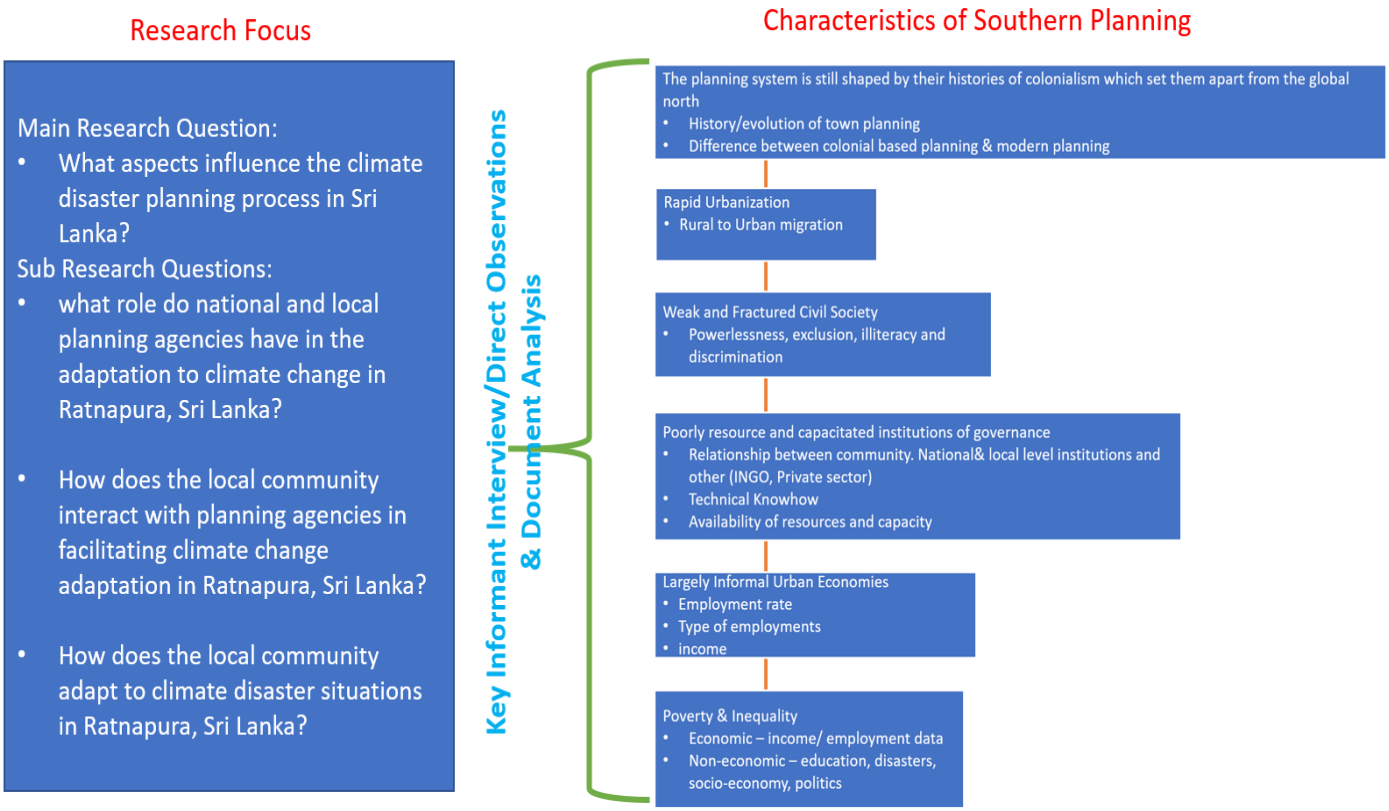


Figure 2.1 Conceptual Framework

2.3 Research Question

"With risk reduction and adaptation being a cross-cutting topic, city authorities and planners do not only have to be familiar with how risk can be reduced. They also need to know how adaptation can be integrated or mainstreamed into urban planning practice." (Wamsler, Brink, & Rivera, 2013, P5). The to reduce the risk of climate disasters community also required to respond; *"disaster preparedness at the local level is a product of knowledge types, practices and beliefs, which are mainly influenced by societal structures and processes within the local and global hazard contexts "(*Mavhura et al., 2013, P39). (Figure 2.2)

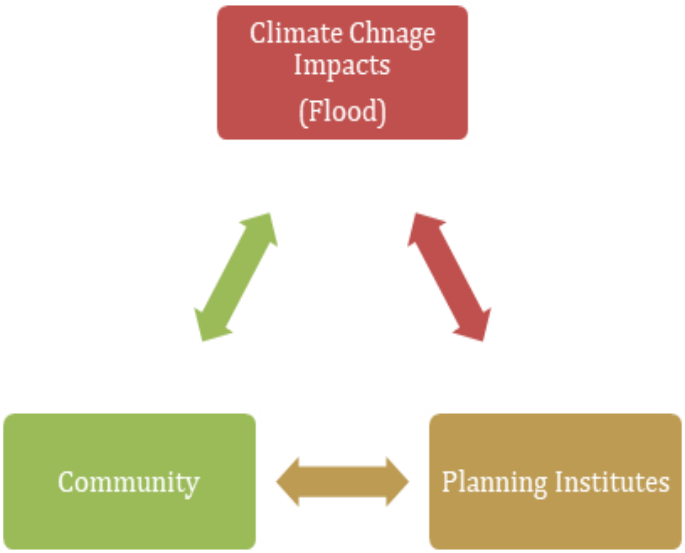


Figure 2.2Interelaion between different actors

Thus, the research attempts to find an answer for following main and sub-research questions.

Main research question;

1. What aspects influence the climate disaster planning process in Sri Lanka?

Sub research questions;

2. what role do national and local planning agencies have in the adaptation to climate change in Ratnapura, Sri Lanka?
3. How does the local community interact with planning agencies in facilitating climate change adaptation in Ratnapura, Sri Lanka?
4. How does the local community adapt to climate disaster situations in Ratnapura, Sri Lanka?

3 RESEARCH DESIGN

3.1 Introduction

This chapter mainly focused on the ways of conducting the study. As a first step, data collection methods employed in the primary survey explained. Secondly, it explains the disaster-related characteristics of the case study which selected for conducting the observations. Finally, it includes steps followed in selecting the case study area for detailed study.

3.2 Research Methodology

This study drew on a qualitative descriptive methodology to investigate the main and sub-research questions. The qualitative descriptive study used when studies are descriptive and narratological. This study drew on a qualitative descriptive methodology to investigate the main and sub-research questions. Interviews, document analysis, and observations were used to carry out this research (Figure 3.1). In investigating the aspects that influencing planning institutions and local communities in adaptation to climate change, a qualitative case study approach used to focus on Ratnapura, Sri Lanka. The concept of Southern Planning was selected as the conceptual base of the study, therefore; the concept was reviewed to identify the characteristics of the concept and how it relates to the climate change adaptation planning in the Sri Lankan urban planning system. The data collections methods and case study further explain in below sections.

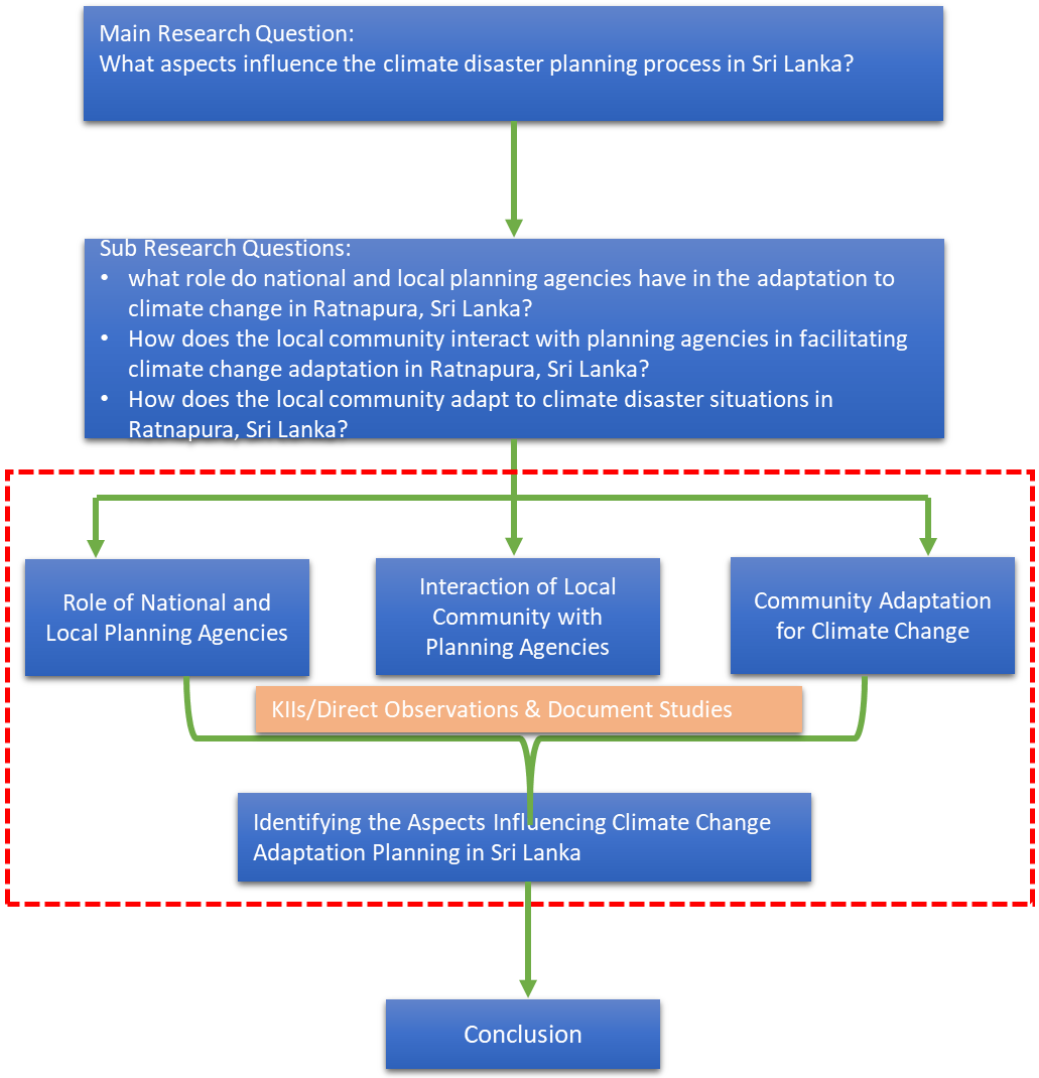


Figure 3.1 Overview of Research Methodology

3.3 Data Collection Methods

The data collection method includes,

- Key Informant Interviews (KIIs)
- Observations
- a partial *review of case-related documents*

Information is gathered from multiple sources to triangulate this for validity. Primary data gathered from the field through direct observation and key informant interviews. Secondary data gathered through the review of case-related documents consisting mainly of organization reports, relevant scientific researches, and journal articles combined with data regarding climate, weather, and current adaptation plans, of the selected case study area.

3.3.1.1 Key Informant Interviews (KIIs)

Key Informant Interviews considered as an in-depth qualitative interview of experts who are knowledgeable over a topic or an issue (Lavrakas, 2008). In this study, KIIs were conducted to identify the planned adaptation practices regarding the flooding problems in the Ratnapura, Sri Lanka and related urban planning practices for climate change adaptation. In the KIIs, a semi structured method was used to structure the interviews. A semi-structured questionnaire was preferable since it is flexible and allows new questions to be brought up during the interview in response to the interviewee. As mentioned the interviews based on an open-ended method and question guide was developed based on early literature findings (Refer Appendix A).

Interviews conducted with government officers, Non-Governmental Organizations (NGO) and Community Based Organizations (CBO) to identify the governmental (national & local) adaptation practices and community adaptation practices interviews conducted with government officers, Non-Governmental Organizations (NGO) and Community level. For planning practitioners, in total 9 interviews were held including 7 for each government layer and 2 for the non-government sector — moreover, 2 from the community level. snowball technique was used to identify the interviewees. Table 3.1 specifies the informants who participated in the study namely with their positions and representative organizations.

Stakeholder Group	Position & Organization	Area of Expertise
National Level Government Officials	Assistant Director, Climate Change Secretariat	Climate Change
	Assistant Director (Preparedness Planning), Disaster Management Centre	Disaster Risks/Risk Management/Planning
	Deputy Director, Department of Meteorology	Weather/Climate
Local Level Government Officials	Engineer, National Building & Research Organization (NBRO), Rathnapura	Disasters (Flood/Landslides) Planning
	Strategic Planner, Urban Development Authority, Rathnapura	Urban Planning, Disaster Management
	Disaster Relief Officer, Rathnapura Divisional Secretariat Office, Rathnapura	Disaster Management
	Divisional Secretary, Rathnapura Divisional Secretariat Office, Rathnapura	Disaster Management
	Administrative Officer, Rathnapura Divisional Secretariat Office, Rathnapura	Disaster Management
INGO's	UN-Habitat	Planning, Disaster management, Climate change
	ADPC (Asian Disaster Preparedness Centre),	Planning, Disaster management, Climate change
NGO's	Environment and Community Development Information Centre- Media Reporter- Ratnapura District	Disaster Management Disaster Risk

Table 3:1Detail Information of Interviewees

3.3.1.2 Direct Observations

As the primary tool for observation, direct non-participant observation method used to identify community adaptation practices for flooding. The observations recorded through photographs. Using the recoded photographs analysis was done descriptively. The observations were conducted based on an observation guide (Refer to Appendix B). Rathnapura Municipal council area selected for the direct observations. Though it was a short time, it was possible to carry out a detailed observation by building a rapport through informal talks and working for a day as an external consultant of "Plan Sri Lanka," which is one of the main INGO's in Sri Lanka, assists people in their disaster.

3.3.1.3 Document Study

Apart from the above mentioned two types of data collection methods, information collected via secondary data sources. Documents namely as;

- Ratnapura Urban Development Plan-Volume I & II (2018-2030)
- Ratnapura District Resource Profile

Were studies to gather the necessary information to support the study. Apart from these two various other documents such as research publications, journal articles, government documents, and consultancy reports were studied.

3.3.2 Methods of Analysis

Findings of the case studies documented include the types of disaster responses practice and comparison with the identified characteristics of the Southern Planning Concept. A narratological descriptive approach was applied to find the aspects influencing the climate adaptation planning and contribution of the local and national level to the adaptation to the effects of the climate change and how the local communities react to climate change impacts such as flooding. The data were analysed through the identified characteristics of the global south to achieve the results mentioned above. Namely as (De Satge, R. and Watson, V. 2018, P16);

- The planning system is still shaped by their histories of colonialism which set them apart from the global north,
- Rapid urbanization,
- Weak and fractured civil society,
- Poorly resource and capacitated institutions of governance,
- Largely informal urban economies
- Poverty and inequality

The interviews and observation were carried out between the 20th of November and 16th December 2018. However, the Interviewees were coded to protect the anonymity. (Refer Appendix C)

3.3.3 Conclusion

As mentioned earlier using the concept of Southern Planning as the structure of the study, collected data through KIIs, observations, and document studies were analysed to answer the research questions and achieve the objective of the study.

This research explores the aspects influencing the current climate change adaptation planning systems in Rathnapura city using the above-identified indicators as the theoretical basis. The final attempt is to understand the climate risk and how imported solutions based on western (colonial) experience is imposed in the local planning as opposed to adaptation of practices to incorporate local social, economic and environmental realities.

3.4 Case Study Selection

3.4.1 Climatic Disaster-Prone Areas in Sri Lanka

"'Disaster risk' refers to risk related to climatic and non-climatic hazards, while 'climate risk' only refers to risk related to climatic hazards. Climatic hazards include floods, windstorms, droughts, fires, heat and cold waves, sea level rise (water surges) and landslides" (IPCC, 2007, 2012 cited in Wamsler, Brink and Rivera, 2013, P4). Sri Lanka, as a developing country, belongs to the global south located in the middle of Indian Ocean and consists with a tropical climate features; the country itself is having a high risk for climate change impacts and extreme weather conditions on unpredicted periods of the year. The natural disaster profile of the country mainly contains five significant categories: floods, droughts, cyclones, landslides, and tsunami. According to the Post Disaster Need Assessment Report (2016), floods are a common occurrence in Sri Lanka. Moreover, *"during the period from 2000 to 2015 floods have impacted 23 out of 25 districts"* (Ministry of Disaster Management, 2016, P19). 108 Major floods are associated with the two monsoon seasons, south-west monsoon (May to September) and the north-east monsoon (October to February) (Documents.worldbank.org, 2016). Figure 3.2 indicates the number of people affected by natural disaster during the period 1974-2004 (Kumarasiri, 2016).

Sri Lanka has two monsoon seasons known as south-west and north-east monsoon. From May to September, the south-western monsoon brings rain to the south-west of Sri Lanka, while north-east monsoon brings rains between October to January to the north and eastern regions of the country. Inter-monsoonal period starts from October resulting thunderstorms across the island (Selectiveasia.com, 2017). *"These seasons are increasingly unpredictable*" (Centre for Excellence in Disaster Management & Humanitarian Assistance, 2017, P12).

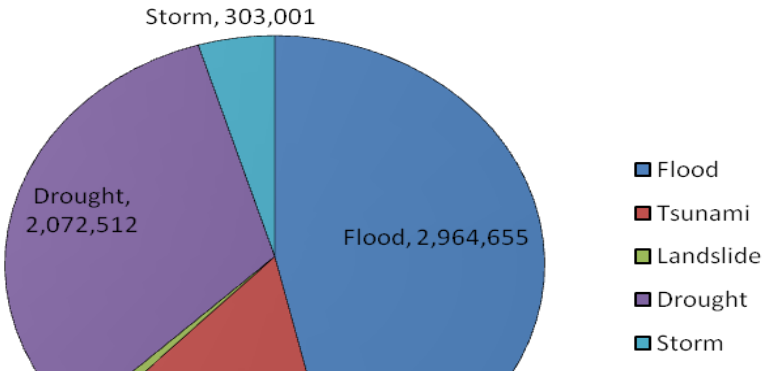


Figure 3.2Table 3:2 People affected by different disasters in Sri Lanka (1974-2004

(Source: (Kumarasiri, 2016, P209

3.4.2 Selection of the Case Study

Over the last 40 years, Ratnapura District in Sri Lanka is known floods, landslides and strong winds (world bank. org, 2016). Located in the region where the highest volume of rainfall recorded, Ratnapura District is often affected by hydro metrological disasters.

Rainfall is the leading cause for the floods and landslides in the Ratnapura district. According to studies Ratnapura recorded as one of the highest flood occurrence districts (DMC, UNDP SL, 2009). (Figure 3.3).

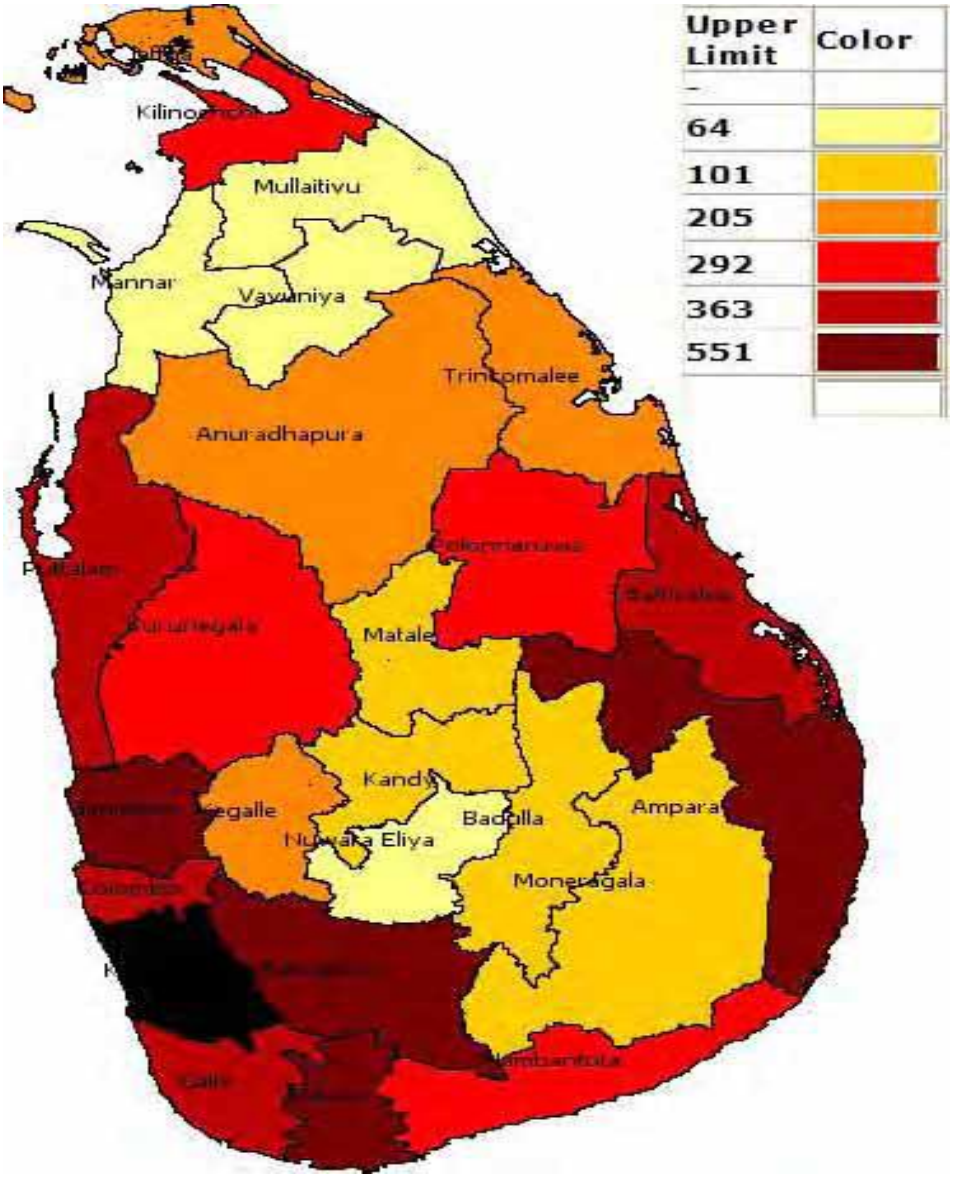


Figure 3.3patial Distribution of Flooding by District

(Source: DMC, UNDP SL, 2009)

The district receives high rainfall during the southwest monsoon (May to June) and inter-monsoon (from September to October) with average 3828mm rainfall. (Edirisooriya et al.,2018). During the southwest monsoon period, the mean annual rainfall recorded at 3000 – 4000 mm. Studies found that " *the high intensity of rainfall in upper catchment areas had caused landslides and floods during the years of 1883, 1887, 1969, 1975, 1982, 1993, 1997, and 2003, 2017 where the Ratnapura*

Municipality, Nivithigala, Elapatha DS Division, Kiri Ella and Ehaliyagoda among the worst affected" (Edirisooriya et al., 2018, P1037).

With an approximate population of 1088,007 (2012, census) Ratnapura is a district that undergone a rapid urbanization process. Approximately, *"27% of this population faces the flood and landslide problem"* Edirisooriya et al., 2018, P1037). Figure 3.4 illustrates the nature of vulnerability to floods in terms of degree, area and number of families affected. Within the Ratnapura district, Ratnapura Municipality considered as the most vulnerable where most people have been affected. Based on the above information Ratnapura Municipal council, in Sri Lanka selected as a case study.

Vulnerable Divisional Secretariat Divisions	No. of Vulnerable Grama Niladhari Divisions	Vulnerability				Vulnerable Population (No. of families)
		%	High	Medium	Low	
Ayagama	21	100	X			2,457
Balangoda	00	00				09
Ehaliyagoda	00	00				68
Elapatha*	20	100	X			8,284
Embilipitiya	00	00				160
Godakawela	00	00				415
Imbulpe	02	03			X	02
Kahawatta	00	00				954
Kalawana	33	100	X			1,950
Kiriella	17	100	X			3,674
Kolonna	00	00				211
Kuruwita	17	44		X		2,063
Nivithigala	24	100	X			4,361
Opanayaka	00	00				15
Pelmadulla	31	84		X		2,647
*Ratnapura	53	100	X			9,400

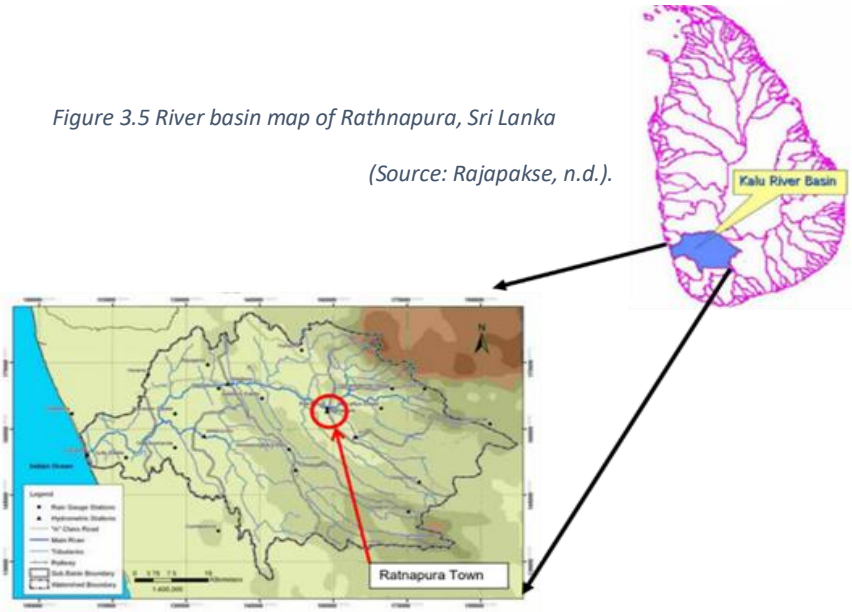
Figure 3.4Flood Vulnerability in the Ratnapura District (2003/2004)

(Source: Menike, 2013, P7)

Ratnapura is a major city in Sri Lanka which is in the Kalu Ganga River basin. *"Rathnapura city is hazard-prone, and now the risk is higher due to increased urbanization"* (Unhabitat.lk, 2014, P17). Rathnapura Municipal Council acts as the Provincial Capital of Sabaragamuwa Province which is situated 93km in an easterly direction of Colombo. It is *"a crossroads town due to the connections of the A4, A8, and A18, which come from the Western, Uva, Southern and Central Provinces in Sri Lanka"* (Unhabitat.lk, 2014, P17).

Figure 3.5 River basin map of Rathnapura, Sri Lanka

(Source: Rajapakse, n.d.).



Ratnapura mainly experiences flood due to its location in the Kalu River basin (Figure 3.5). Kalu river is in the wet zone of Sri Lanka, and due to its location Kalu river basin received the highest annual rainfall depths. Some areas in the upper Kalu River basin receive an annual rainfall of more than 5000 mm (Rajapakse, n.d.). Floods considered as an annual incident during the main monsoon seasons in the river basin. As an example, in the year 2003 due to the low-pressure weather system during the middle of the southwestern monsoon, a

large magnitude flood occurred in Rathnapura making significant disruptions to the lively hoods of people (Rajapakse, n.d.). Also, that time (2003), it was identified that estimated damage to the Ratnapura area was around 9.5Million Euros and 122 people died in the incident (Rajapakse, n.d.). However, studies figured that even the damages and severity of floods increases from time to time, there is no proper disaster risk and flood management plan for Rathnapura city and the existing current plan also not up to date (Reliefweb.int, 2017). According to the Rajapakse, (n.d) existing flood protection system is more than 50 years old and covers only the downstream of the Ratnapura town area.

Considering all the above factors Ratnapura Municipal Council area was selected as the case study. Detail description of the selected area discussed in 'Chapter 4'.

4 RATNAPURA AS A CLIMATIC DISASTER RISK AREA

4.1 Introduction

This chapter consists of two main sections. First sections provide a basic introduction to Ratnapura Municipal Council including the physical, social and economic characteristics while the second section discuss the Ratnapura as a flood prone area.

4.2 Ratnapura in Brief

Location: Ratnapura Municipal Council is a major city and acts as a provincial capital for Sabaragamuwa Province which is located 100km away from Southeast of Colombo (Urban Development Authority, 2018). The total administrative area of Ratnapura Municipal Council is 2266ha (SoSLC, 2019).

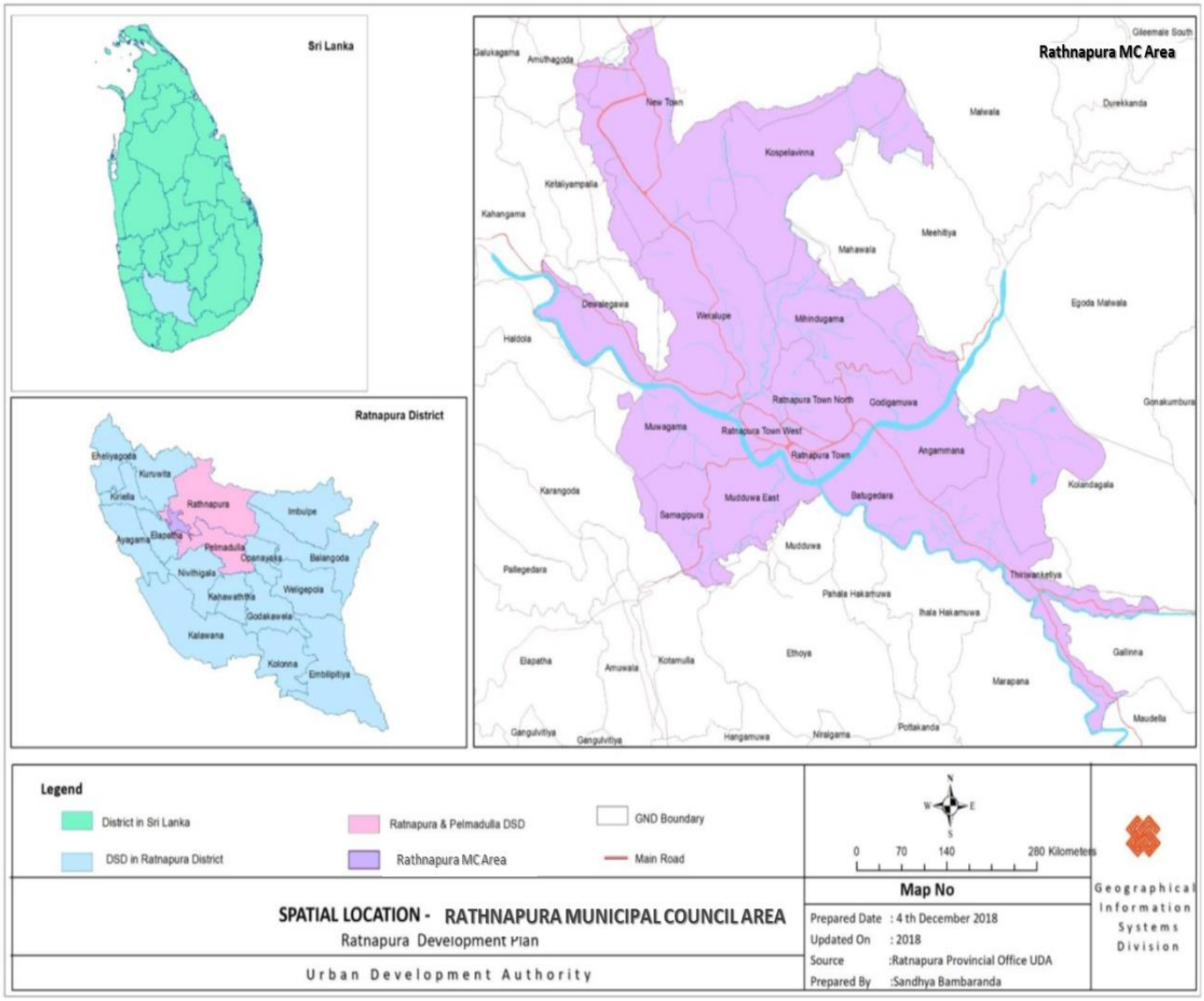


Figure 4.1 Location Map of Ratnapura Municipal Council (MC) Area

(Source: Source: Urban Development Authority - Geographical Information Systems Division, 2018)

Topography: Ratnapura Municipal Area (RMC) is placed in the upper basin of the Kalu River, the second largest river in Sri Lanka and surrounded by mountain hills, low lands, and plains (Dissanayaka and Rajapakse, 2019). The elevation varies from 18m -305m above Mean Sea Level. However, the RMC itself located above 18m from the Mean Sea Level (Urban Development Authority, 2018).

Climate: The annual rainfall is from 3000mm to 4000mm brought by the seasonal South-west monsoon and inter-monsoon rains. RMC witnesses the highest rainfall from May to June and from September to October. The average annual temperature is 29.4°C, while March records as the highest temperature rises and January as the lowest (UN-Habitat, 2015).

Population: Based on the 2012 Census & Statistics data, the total residential population of RMC is approximately 56,000 while it attracts nearly 100,000 daily commuters in addition to the residential population. The population density was approximately 54 person/ha (SoSLC, 2019). Ratnapura ethnic profile consists of a majority of 79.4% Sinhalese, followed by 12.2% Sri Lanka Moor, 7.0% Tamil, and 1.5% of Other groups.

Economy: Ratnapura is a city widely known for gem trading center since ancient times in national and international level as this area is precious of gem resources. Due to that, the city's economy mainly established around the gem industry. Tea Plantation, Paddy cultivation, dairy products, and industrial activities can be identified as other economic activities.

4.3 Ratnapura as a Flood Prone Area

Ratnapura is a city prone to many disasters, such as flood, landslides, drought, and tropical typhoon. Among those, in Ratnapura monsoon flooding is the critical and recurring problem of which the residents are acutely aware (Churchill and Hutchinson, 1984). High rainfall during the South-west monsoon and overflow of Kalu river are the leading causes of flooding in Ratnapura. According to the data obtained from the Irrigation Department, Ratnapura annually faces two significant floods, during periods of May-June and September – October. As per the historical data study, every 50 years RMC faces critical flood and every 10 years of significant floods (Table 4.1) (Abesinghe, 2017). In the year 2017 was the latest critical flood incident occurred with more than 25ft flood level which costs the life of 87 people, and 210, 617 families affected (International Organization for Migration, 2017).

Type of Flood	Return Period	Level of Flood	Recorded Years
Critical Flood	50 Year	Over 80ft MSL	1913, 1947, 1989, 2003, 2017
Major Flood	10 Year	70ft MSL – 80ft MSL	1857,1872, 1893, 1924, 1957, 1969, 1978, 1982, 1993, 2017
Minor Flood	01 Year	60ft MSL- 70ft MSL	1939, 1940, 1966, 1967, 2006, 2017

Table 4:1Disaster History of Ratnapura

(Source: Urban Development Authority, 2018)

Riverine flood is the main type of flooding occurs in Ratnapura due to its location in the upper basin of Kalu River and locates at the confluence of Wey (Ganga) River with Kalu (Ganga) River (Jayaprakash, Jayathilake and Munasinghe, 2016). Being in the wet zone of Sri Lanka and locates next to the second largest river in Sri Lanka, Ratnapura area has been receiving 3000mm average annual rainfall (Jayaprakash, Jayathilake and Munasinghe, 2016,) and some areas of upper Kalu river basin receive more than 5000mm rainfall depth. Therefore, the continues and high-intensity rainfall in the upper

catchment (hill country) is another reason for both flash and riverine flooding (Jayaprakash, Jayathilake, and Munasinghe, 2016, P43).

Studies have identified that nearly 15 Grama Niladari divisions out of 20 in Ratnapura Municipal Area have been fully or partially affected by the annual floods. Figure 4.2 gives an insight into the flood hazard in Ratnapura Municipal Area.

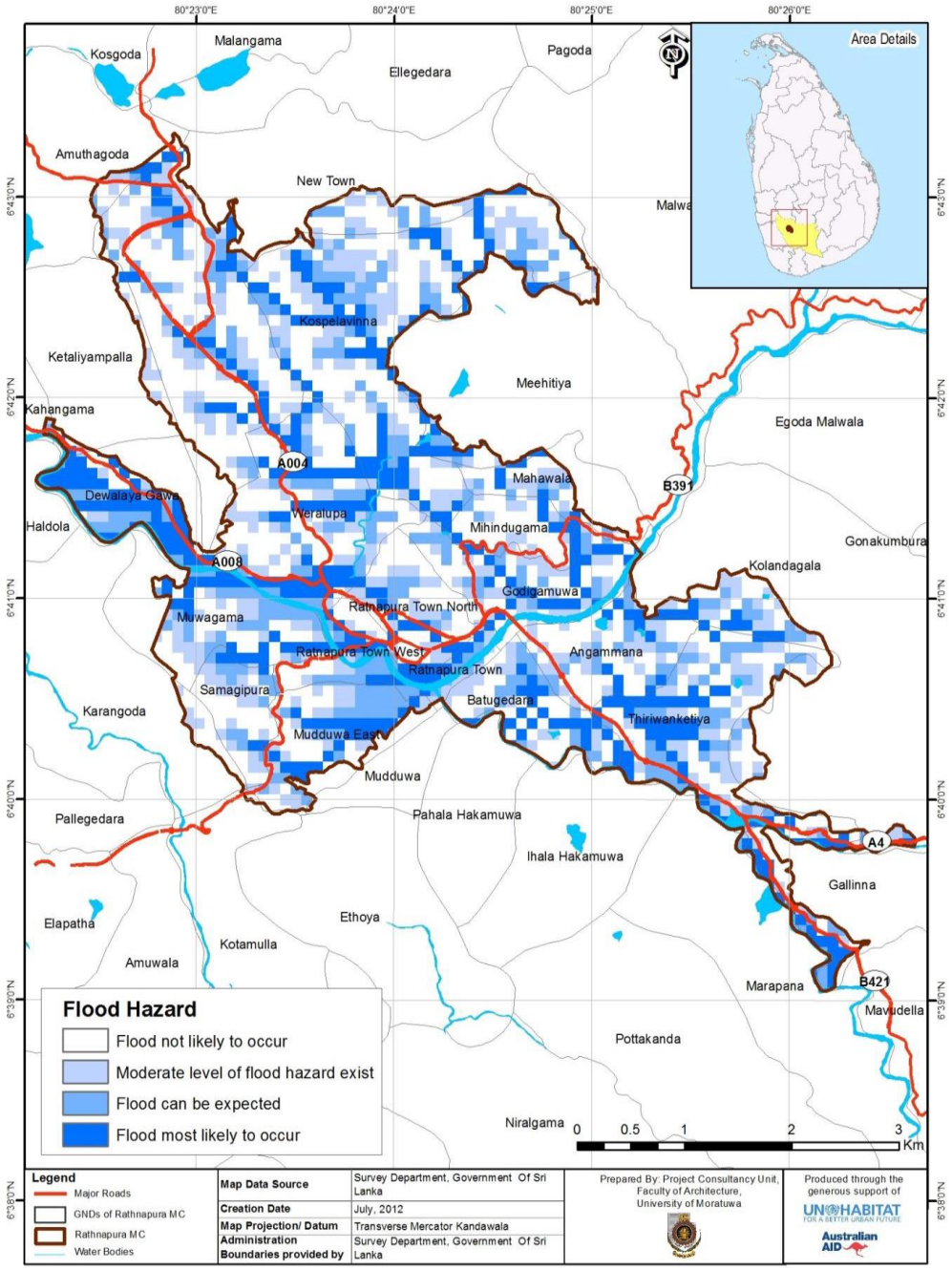


Figure 4.2 Flood Hazard Map of Ratnapura Municipal Area

(Source: Project Consultancy Unit, Faculty of Architecture, University of Moratuwa, 2012

Flood in Ratnapura city, disturbed to the National, Regional and Local level connections and smooth flows. It gives direct and indirect effects on society while damaging physical properties, giving emotional effects and long-term effects. Ratnapura is the focal point of the supply chain in the district. When considering the commercial activities in Ratnapura, both retail and wholesale activities take a major part of its commercial activities. Around 700 shops have registered in the municipal council, and over 80% of it gets affected by annual flood. Noticeably, the entire population of the planning area, which is around 70,000 depends on this focal point of supply. The flood damages to the local supply chain annually and the local authorities and other local level institutions must spend an extra cost to recover the supply chains in a cleaned environment later on.

Ratnapura is the nodal point of the west-east connection of the country (A004). Also, it is the countryside road which connects Colombo and Panadura (western region) with Hambantota (southern region) and Batticaloa (East region). Apart from that, Ratnapura is the administrative capital of the Sabaragamuwa province and Ratnapura district. The commuter population of the city is over 100,000 mainly coming to receive health and education facilities. 30% of the school population in Ratnapura district are in the schools located at the heart of the city. The provincial base hospital which is in Ratnapura also serves more than 5000 people daily, and the private and government health institutions including base hospital serve not less than 10,000 people daily. However, flood damages to all this regional connectivity and the smooth service flow of the city.

Moreover, flood in Ratnapura city disturbs the national level financial stability since the disaster situation requires government finance and other support networks to recover short term and long-term targets of recovering people and properties. It must spend an extra allocation for settling and resettling people with proper service delivery, and it requires excessive money and valuable official and non-official time of government officers annually.

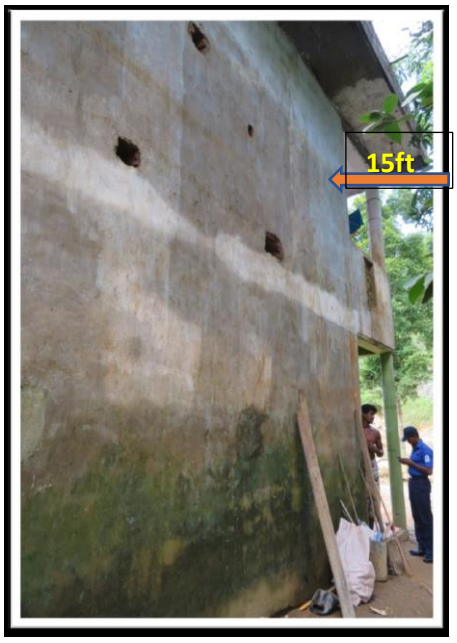


Figure 4.4 Flood Affected household in Ratnapura MC
(Source: Sri Lanka Navyy,2017)

Figure 4.3 Obstruction to Accessibility

(Source: Sri Lanka Navyy,2017

4.4 Flood as a climatic disaster in Ratnapura

The year 2017 was widely known as the most recent critical disaster occurrence in Ratnapura. The southwest monsoon has resulted in severe flooding causing 210,617 people to be affected with over 87 deaths according to the International Organization for Migration (2017). However, it observed over the years that Flood has become more frequent during the last decade according to the records of the Disaster Management Centre.

Figure 12 shows the mean monthly rainfall changes in different rainfall stations in Sri Lanka. When we observed this thoroughly, we can see that compared to the other cities, Ratnapura has a higher rainfall. During the Southwest monsoon period (May to June) and Inter-monsoon period (September to November) Ratnapura records as the wettest station.

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Mapalana	87	98	97	164	243	189	131	155	217	272	302	158
Ratnapura	131	138	202	350	499	472	331	274	397	478	434	217
Sita Eliya	151	70	72	144	167	176	157	141	164	265	280	201
Badulla	183	78	88	174	115	31	64	75	127	240	276	249
Matale	135	61	69	187	163	131	121	98	128	288	286	189
Anuradhapura	76	49	63	148	78	18	31	26	68	238	262	168
Ampara	253	134	66	72	59	28	44	41	96	185	309	385
Hambegamuwa	69	67	137	215	93	14	31	28	57	217	266	114
Ambalantota	47	37	47	72	70	58	35	50	77	137	158	99
Kirama	119	101	140	186	173	164	119	123	160	275	281	217
A Pelessa	58	55	58	104	104	68	42	49	88	152	228	104

Figure 4.5 Mean Monthly Rainfall Changes (mm)

(Source: Burt and Weerasinghe, 2014)

Following 11 years (2008-2018) annual rainfall chart (Figure 4.6) also provides evidence to prove that Ratnapura is obtaining higher rainfall over the years.

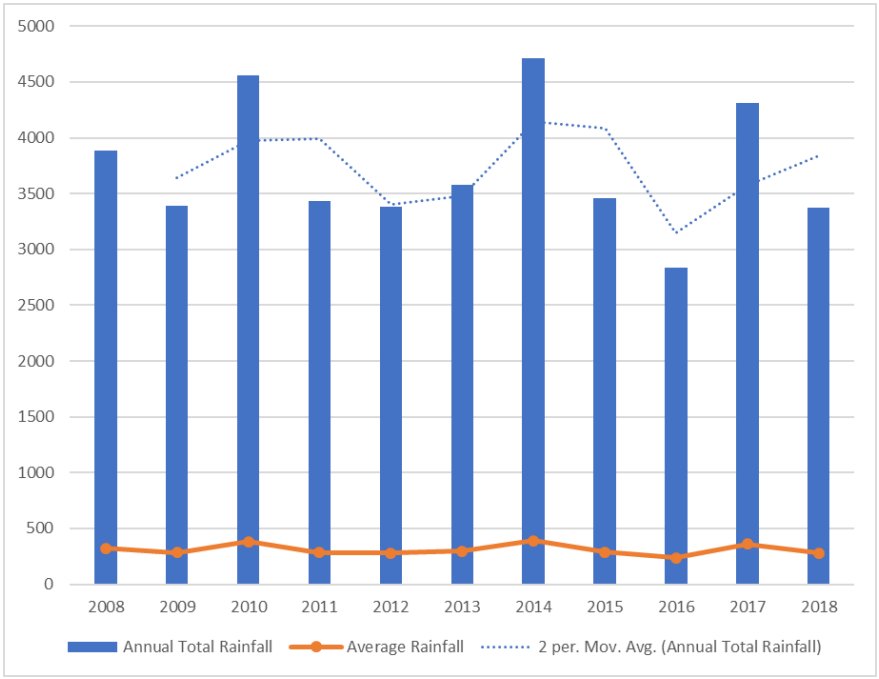


Figure 4.6: Annual Rainfall data' 'mm" (2008-2018)

Burt and Weerasinghe, (2014, P247) also says that in the wet zone, the wettest months in the North East Monsoon (NEM) are October and November and the likelihood of 10 mm rainfall in a week reaches 90%. All the above mention factors prove that Ratnapura as a classic case where vulnerability to flooding exacerbated by climate change/variation.

4.5 Conclusion

Ratnapura is a major city with 56,000 population, acts as a provincial capital for Sabaragamuwa Province which is in the wet zone of Sri Lanka.

Among different natural disasters namely, like flooding, landslides, cyclone, lightning, riverine flood is the main type of natural disaster occurring in Ratnapura due to its location in the upper basin of Kalu River and locates at the confluence of Wey River with Kalu River. Due to its location in the wet zone, the city itself getting higher rainfall. All these above mention factors prove that Ratnapura as a classic case where vulnerability to flooding exacerbated by climate change/variation.

5 RESULTS

5.1 Introduction

As explained in the methodology, KIIs, document study, and direct observations have been used to investigate the interrelation and important aspects influencing in the climate adaptation planning process in global south countries with reference to Ratnapura Sri Lanka. Six characteristics:

- The planning system is still shaped by their histories of colonialism which set them apart from the global north
- Rapid urbanization
- Weak and fractured civil society
- Poorly resource and capacitated institutions of governance
- Largely informal urban economies
- Poverty & inequality,

were identified from reviewing the concept of Southern Planning which mentioned that the above characteristics are common to planning in all global south countries. Based on the finding only, four;

- The planning system is still shaped by their histories of colonialism which set them apart from the global north
- Poverty & inequality
- Weak and fractured civil society
- Poorly resource and capacitated institutions of governance,

were critically examined during the analysis section using primary and secondary data sources to find answers to the research questions. Largely informal urban economies discussed under the fact of poverty and inequality.

This chapter details the findings of KIIs conducted, document studies and observations noted throughout the field study and compares them with the earlier mentioned four characteristics.

This chapter presents a brief note on the baseline status of each aspect and a detailed discussion on a specific focus. Accordingly, the section on “planning system” has specifically focused on the impacts of colonization on the current planning structure, section on “poverty and inequality” gives an insight to the socio-economic context of the Rathnapura city, Sri Lanka. Weak and fractured civil society section discusses the interrelationship within the community and between local communities and other government institutions, finally under “poorly resource and capacitated institutions of governance” section converse about the administrative structure and role/function of institutions when comes to disaster management and planning, availability of resources and technical know-how.

5.2 Planning system still shaped by their histories of colonialism

Sri Lanka is a country colonized for over 443 years. Sri Lanka has been under the rule of Portuguese (1505-1658), Dutch (1658-1796), British (1796-1948) governments En.vikidia.org, 2019) until regaining the independence in year1948. Then in 1833, the British government introduces wide-ranging reforms including a central new administrative system which was under the British governed colonial secretary (Lambert, 2018). By the end of 1905, the country had divided for administrative purposes into nine 'provinces.' The administrative structure consisted primarily of nine Government Agents (GAs) each representing the Colonial Secretary in each of the nine provincial capitals (Gunarathne. L. 2001, P6).

During that period, the British government introduces urban planning to the country by the restructuring of existing towns by increasing city beautification (increasing greener surrounding in towns), developing the infrastructure facilities mainly related to transport and building upscale residences (Perera, 2006). The first focus of the urban development in Sri Lanka was to manage the supply of services to the plantation industry and not as a means of uplifting the living conditions of people. Perera, (2006) argues that this process developed more chaos in Sri Lankan urban system, where marginalizing of poor and growing inequality among citizens were created. The problem created through the earlier stages remains to create more chaos in the country's urban development.

With this history of town planning, one argument derived was that Sri Lanka planning system still has considerable influence from the colonization (or from the western influencers). Based on the literature studies, Perera, 2006, mentioned that *"What town planning produced in Colombo was an exterior-Orientalist -a view which tells the story of the city to the West and the Westernized elite in a way it can and wants to understand it."* (Perera, 2006, P 70). And, in his article, he mentioned that after 1956 gaining the freedom from the British government, no one questioned the colonial planning structure and it *"still dominant in Sri Lanka and planners continue to look to the West to improve their perception and approach*" and provide less effective planning practices (Perera, 2006, P70).

Also, during the interview with IN-UNH-01, emphasizes the same. There she mentioned that,

> *"If we take our local authority ordinances, still there are ordinances which are just like a Blueprint of the United Kingdom's administrative system. If you take the HNDI (Housing and Town Improvement Ordinances), Town and country planning Ordinance, they are the blueprint of the British government. Not only the planning regulation, in simply if we look in the administrative boundaries, all most all the LA, GN and DS boundaries were developed in British ruling period. And here we are still use them without changing any."*

What derived from this is that Sri Lankan planning system is still carrying the British colonial influence. However, at present, the National Physical Planning Department is revisiting the National Physical Planning Policy and is adapting elements to match the real, local needs of Sri Lanka. With the time to come, Sri Lanka able to establish a proper planning system.

Perera, (2016) in his paper mentioned that concepts like the garden city and city beautification took away the real meaning of planning, that planning is for people. Further, he mentioned that *"this stream of intervention derailed original planning, moving it away from social causes and separating it from the specific socio-political context"* (Perera, 2016, P6). The LG-UDA-02 mentioned in her interview that Ratnapura plan introduce zoning to reduce the flood vulnerability as well as to increase city beautification, to attract more tourists to town. Therefore, she said that.

> *"in our new development plan 2018-2030 we have introduced new zones to Ratnapura MC area. Especially where the Kalu river bank is. Because Kalu river banks are inhabited by poor people. They don't have proper land permits to settle in those areas. Therefore, we are planning to remove them from these places and will resettle in some other place."*

Zoning is a planning practice that comes out from western countries, where they no longer use it. However, here in Ratnapura, the colonial practice of zoning is used as a solution to get rid of poor, marginalized communities.

The colonial administrative system requires process and hierarchy, and it was having a top-down approach (Jacobs, 2008). The respondent from LG-NBR-01 mentioned that he believed the current systems still have high influence from colonial impacts where the top-down approach has remained.

According to him, government institutions are still desiring to have the power of management and decision making into their hands. He further elaborates;

> *"…as an example, when going to building a house or any property, you need to get approval from some government institution such as UDA, local authority, if it is in the landslide-prone area then from NBRO. These rules and regulations we gained from the British. Instead of getting approval from one place person must go to every mentioned institute and it will take months to finish. They have designed this administrative system. In earlier times we didn't have any."*

Further IN-ADPC-02 also confirmed the above fact by saying;

> *"Now see immediate after a disaster happens what is happening in this country the National disaster relief center (NDRC) distribute the relief for that they need to receive. NDRC gets the list from the district agent (GA) the GA needs to receive the list from DS the DS receive the list from Grama Niladhari, this is the chain. Why can't we go beyond that , we always need to go with this letters and obtained the signature of all these people, why can't we empower the people to act during the disaster, people are now fed up with these systems now this has been happening since the '60s, 70's and now people have no empathy towards this slow system, they don't trust the DMC, NDRC anymore."*

The strong administrative characteristics of the British rule remains in the Sri Lankan administrative system, and the division of LAs based on a plantation-based economy which ignored the geography and cultural norms. Another critical point raised here was the original GN and DS divisions developed during the colonial era is still maintained, and they do not represent any economic or geographic logic for division, these have now become constraints when developing development plans and disaster management plans. The administrative divisions have not changed much since the independence (in 1948.).

5.3 Poverty & Inequality

According to the census (2012), 1.1 million people live in the Ratnapura district, and 110,925 of them are Samurdhi recipients (receiving government well fare benefit given to below poverty line people). According to the Census, (2014), 48.5% are informal sector employees. In the Ratnapura Development plan, 2018-2030, Gem industry is recognized as an informal urban economy. The city has well known for centuries for its gems and its economy established around this industry. Most of the gem exchange places are in the city center of Ratnapura MC, were frequently affected by flooding. According to the information in the development plan 70% of gem mining happening is happening in Ratnapura district, and only 25% of the gem trading is taking place in the district. (Figure 5.1).

Figure 5.1Employment of Gem Mining and Trading (Source: Ratnapura Development Plan- 2018/2030)

Next, to Gem industry, plantation or estate workers consider as the second largest income generation sources see in Ratnapura. They considered the lowest income generators among all the employees. LG-UDA-02 mentioned;

> *"Since Ratnapura located in the hill country we have both tea and rubber plantations. And the people who involved in those sectors gained even less than the minimum daily wage of Rs. 1000/= (5Euro). And they live in the highly vulnerable areas for flood and landslides. Even their houses are temporary houses."*

Also, the poverty rate in Ratnapura is 6.8. %, most of the community affected by poverty lives in a flood-prone area with unsustainable urban activities. The LNG-LC-01 further mentioned this in his interview. He mentioned that in Ratnapura;

> *"some people have given pledges (divurum prakaasha) that they will not leave even if they die. Most of these people either, low income or unemployed or doing some small day to day jobs. They don't have anywhere else to go. So, they remain in the same flood plain for years."*

The reason to take such a high risk might be because of their employment, access to urban facilities or untrustworthy attitude towards government actions. But such action creates more chaos in the system and disparity among the government and community. Poverty and inequality are significant problems in disaster management planning. *"According to Sen (2009) who focuses on social justice, development is represented in the freedom of people to live the life they value, as long as they wish, albeit within certain constraints"* (Sen, 2009 cited in Perere,2016, P6). There he further mentions, 'poverty' also a part of unfreedom, where planners should eradicate to achieve better development. However, in Ratnapura that is not the case. LG-UDA-02 mentioned that;

> *"And those unplanned settlement destroys the city's beautification and act as a barrier to natural adaptation practice. We need to save that natural beauty, so we planned to provide natural parks or river bank development with many recreational activities. What we believe is that while increasing city's aesthetic value we even can reduce the flooding."*

Authorities seem to consider Poor people or informal settlers in Ratnapura as a threat to the city's beautification and aesthetic values. The question that arises with this statement is, do the planners consider urban poor who lives in those areas or were they merely neglected? This further discussed in Chapter 06.

5.4 Weak and fractured civil society

Weak and fractured civil society discuss the interrelation between local communities and government institution when it comes to disaster management planning. In this case, Ratnapura is neither weak and fracture or either having a strong relationship between different stakeholder. The reason being although Rathnapura city in administrative terms still follows mostly colonial practices, it was still an important gem trading center even during pre-colonial period hence the social linkages remain even when the urban setup is expanding. However, during the document analysis, it was identified that to prepare, aware and relief purposes DMC have formed GN committees and local level volunteers' committees. The administrative officer from the Rathnapura LG-AO-05 mentioned that at the ground level in Rathnapura, they have local volunteer groups consist of the local community to act whenever a disaster occurred. Along with the local community government able to form several subcommittees including first aid, camp management, rescue, etc.

> *"Now we have, GN level division committees, when the Divisional secretary declares a flood situation we inform the village committee, in village level we have formed several*

subcommittees to cover the main areas such as water and sanitation, first-aid, camp, etc... in some incidents the people must be sent to camps, so we prepare all the requirements for cooking, we call a co-op and arrange the rations, the first step is the security of the people."

Further, LG-DVS-04 mentioned even they have an alternate disaster information dissemination system among local officials

"we have created a twitter group for the GN officers to be informed, but sometimes a particular officer might get caught to the flood, then other people in the committee will get together and start the relief operations."

However, with having all the positive factors, one derived negative outcome was that communities are tending to depend on government or other institutions. LG-NBR-01 mentioned that;

"They get lazy and depend on government or another NGO's. because every year there are two floods happen, one after Sinhala New Year (May), other before Christmas (November). Without doing anything they can earn money, collect necessary food rations and goods to households. New books and other educational stuff for children. I saw once people sold milk powder packets way below its original price. What do you think that means? they have stuff way more than they need for their consumptions. What I see here is our society is so corrupt, people become lazy and ignorant."

Not only the local community even national government used to the same. Instead of providing solutions and engage in preparedness activities they tend to get donor funding every year. Even IN-ADPC-02 mentioned the same;

"Countries like us every time expect donors to give money for disaster preparedness activities, we don't think of allocating our own funds for this."

This further proved by Perera, (2016) in his article stating;

"by the time the NGO left the people have become dependent, the institution created to continue the development process had collapsed, and there were no locally- developed institutions and relationships, especially social capital holds the community together." (Perera, 2016, P9).

These statements show that most people in rural communities tend to depend on the government. Even though they can take small initiatives to make changes, they do not like to take actions and wait until the government or any other responsible organizations make the difference. one derived output is that the colonial thinking of maintaining a poor and weak group of people to provide services for the elite in the city is still prevailing in Ratnapura. Moreover, this could be the reason why gem industry is considered informal despite being well established in terms of economics and time, and why the government plans do not focus systematically relocating these affected people but focus on giving compensation and keeping them in the same place.

This way of thinking could be due to the practice created in the colonial system prohibiting action from people, and/or due to the lack of proper education.

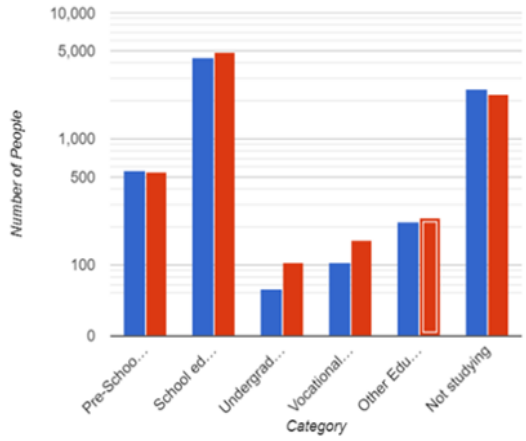


Figure 5.2 Category of Educational Attainment

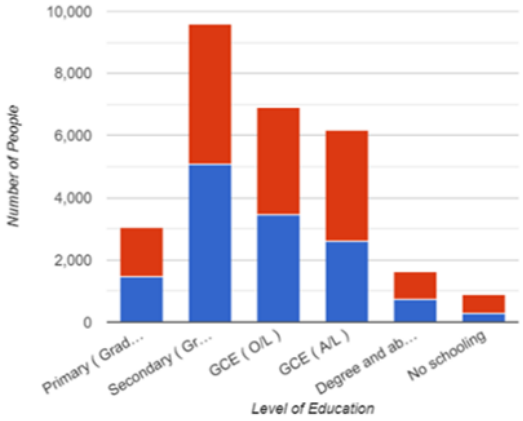


Figure 5.3 Highest Level of Education Achieved

(Source: Department of Census and Statistics,2012)

Education plays a vital role in disaster risk management. Figure 5.2 & 5.3 indicates that more people in Ratnapura attained formal education until secondary grade, which means until grade 9. Less access to education also indicates less awareness about flood vulnerability and adaptation to flood risk. During the interviews, LG-NBR-01 mentioned that;

> *"…People in flood plain do not like to evacuate or replace their households. Most of the people live in there are poor and uneducated and they consider flood as a secondary income generation for them…"*

What he emphasized was, that people have their ways of dealing with the flood. Annually Ratnapura faces two minor floods which comes in May and November. People used to consider flood as an income generation because of the distribution of aid by both private and public sources. The most widely available form of aid is dry food (i.e., milk packets, dhal, rice, water bottles, canned food) apart from that clothing and temporary housing are also donate to flood victims by the government, private institutions, NGOs, and other volunteer groups. Following a flood, the next step was assessing the damages to households and livelihoods. Based on the magnitude of damage government provides monetary compensations to those who affected by the flood. This was further proved by LG-AO-05 saying;

> *As a post disaster step we provide the statues report to the DS Office and then if necessary government provide funds (financial support) to the victimized people.*

However, in general, Ratnapura Municipal Council has implemented disaster management precautions to avoid flood damages. Even the community showed some level of awareness to flood hazard, and though there is no proper guideline for development in flood plain, government policy which exists under the NBRO has done nothing to discourage or prevent people from building and rebuilding in the most vulnerable areas.

5.5 Poorly resourced and capacitated institutions of governance

This section has a particular focus on the capacity, resources, data availability and technical know-how of the local, national level institution and community reference to the flood management.

Disaster Management Center (DMC) is the main responsible authority in Sri Lanka in terms of managing the disasters.

In theory, it mentioned that DMC was already taken necessary action to adopt and mitigation vulnerable situations, empirical data gathered during the field study shows otherwise. Following classic example is that under the institutional framework of the DMC Act, in a disaster situation DMC works with District and Divisional Secretariats (Figure 5.4). However, according to planning legislation in Sri Lanka, local Authorities are the one which has planning powers. Above fact further elaborated by IN-UNH-01, as below;

> *"disaster management has a disaster management center and disaster management ministry (National Council for Disaster Management). They both working with divisional Secretariats, district secretariats and grama niladari (Village development officer). But nobody works with the local authorities, where the planning powers are. They are the people who are having powers to have the zoning, zoning regulations, building cords, provision of all the infrastructure including the drainage, waste management, etc."*

She further explained that;

> *"the gap I am trying to say here is, Divisional secretariat does not have any kind of planning powers, they even do not have town planners, they do not have any kind of experts regarding that and they do not know what to do. Then they are working with villages without having proper zoning system, without having proper regulations. This gap needs to bridge."*

This information above emphasizes the poor capacitated of planning agencies in Sri Lanka. Where powers are not spread accordingly and integration between each party is less.

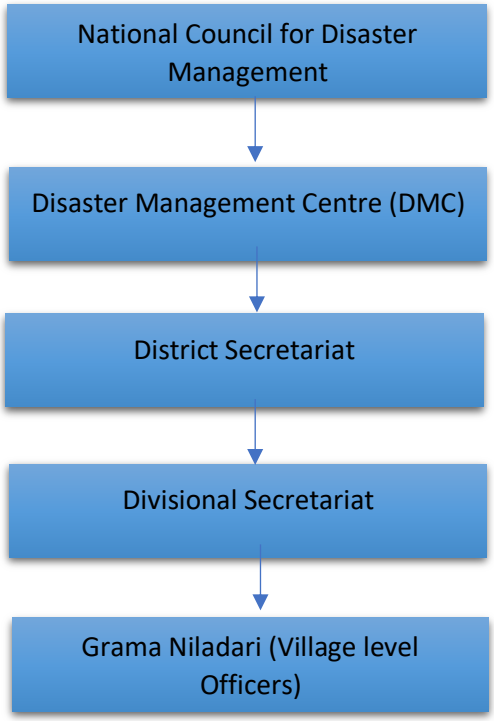


Figure 5.4 Administrative Hierarchy of DMC

The missing link between different government institutions also identified through analysis. Climate change Secretariat is the focal authority responsible and conducts all the researches and studies related to climate change adaptation, mitigation, and climate-related risk and impacts. Also, they are the ones who develop the National Climate Adaptation Plan and National Determined Contributions (NDCs). However, they are not a part of the organization structure of disaster management (Figure 5.5). When having the interview with NG-CCS-01, she mentioned that;

"We are not part of the national disaster management committee. We do all the researches about climate change, it's related impacts, etc.... as I mentioned we already prepared NAP. But up to the point, I am confused whether even they use those when they develop their disaster management strategies and plans."

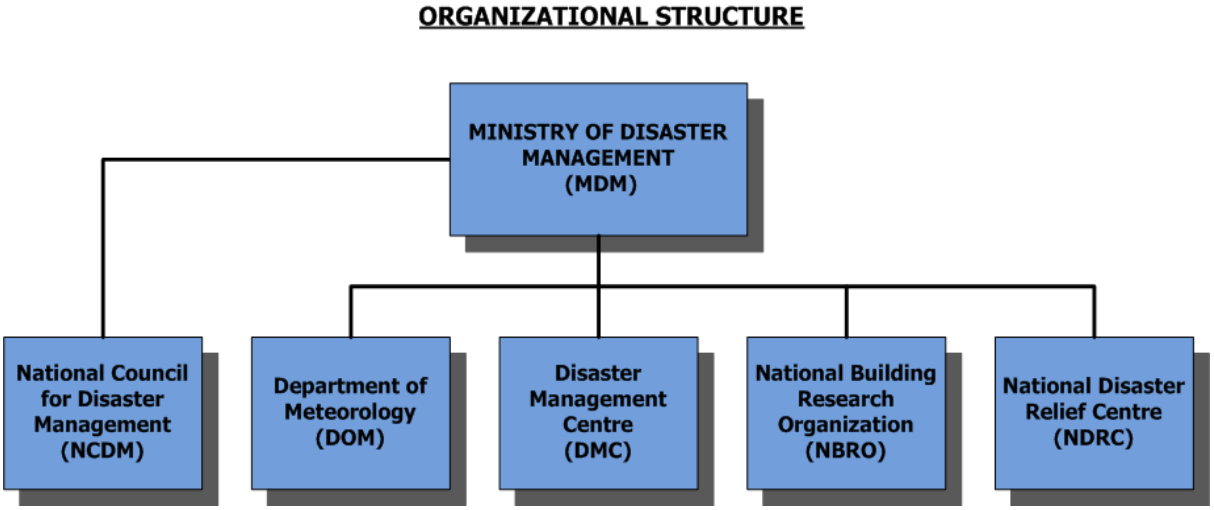


Figure 5.5: Organisational structure of DMC

(Source: Ministry of Disaster Management)

However, not only the missing links in organizational structure but also the availability of resources and technical know-how are also coming under the poorly resourced and capacitated institutions of governance.

Technical know-how is essential when adopting or mitigating disasters. Ministry of disaster management in Sri Lanka has incorporated professional expert agencies like Department of Meteorology, National Building Research Organization to improve the technical capabilities in the overall disaster management process (Figure 5.5). The government itself cannot face or reduce disaster situations. It needs help from other agencies such as regional disaster management bodies like the Asian Disaster Preparedness Centre (ADPC), and global bodies as UNDP, USAID, GIZ, and UN-HABITAT. They also take part in improving the technical capabilities of officers and other stakeholders.

Assistant director in Disaster Management Centre, participated in an interview to discuss the capacity of their officers related to disaster management and preparedness. DMC established recently after the 2004 Tsunami under the Disaster Management Act 2005. According to NG-DMC-02 most of the officers are graduates from science stream and then appointed as disaster management field officers. They have been given a comprehensive professional training at job entry level, and apart from that, the Ministry organized continuous training programs. According to him, they have updated technology and equipment. But IN-ADPC-02 mentioned otherwise. She said during their (ADPC) project they identified

"we [ADPC] realized their [DMC] coordination part is very poor in our country, when it comes to preparedness. Both capacity building and coordination parts has to improve, knowledge management is actually 'zero'."

According to the experience of ADPC, district disaster management officers were active and cooperative, but their capacities limited. However most of the government agency suffers from a lack of human resources. NG-MET-03 emphases it as below;

"Now an issue I have is that we know rain is going to increase in short spells, but how it is going to affect floods we don't have the know-how. Under the government process, it takes a long process to recruit proper people and the good ones does not stay. We took a group in 2017 and that helped to manage the HR gap but again 5 of them left for masters, so HR is actually an issue."

One surprising fact derived from the interview study was that local level communication and management is far better than the national level. According to the LG-AO-05,

"if there is 24-hour rain the DS office will inform us then we will inform the GN officers and the village committees, then the GN officers go to the field and continuously check the situation and if required people who need to go to camps will be set to camps."

This was further approved by LG-DVS-04 saying;

"We get the warning from the DMC and Irrigation then we inform our GN officer's through the twitter group and from the point we get the warning we carry out an announcement from the DS office."

Further LG-AO-05 added that they have a specific mechanism to monitor and report the flood victims in their camps.

"First, we take the list of names of affected people, if it's a camp we get details as how many men, women, children, elders, people with special needs etc. And when they leave the camps we will also record who is leaving and in what condition. To record that we have the GN officer working in the field all the time and in the camp, we will appoint a community leader to support them."

All above statements provide proof to the interconnection between local level authorities and communities on flood situation and how they capable of managing a disaster situation.

In this study, a detailed investigation of technical know-how was carried out with a specific focus on housing adaptation. In its broadest sense, to answer the research questions, 'how does the local community and planning agencies adapt to disaster situations. Housing adaptation referred here means the task of modifying houses to accommodate heavy rain, wind, and flood.

National Building and Research Organization (NBRO) has developed a comprehensive set of guidelines for housing in landslide-prone areas including best practices and techniques to retrofit but not for the flood-prone areas. LG-NBR-01 mentioned that there were no specific structural standards or regulations formulated for disaster adaptation. Furthermore, he mentioned that most of the time the community used various housing adaptation techniques based on their prior experiences with the flooding disasters.

Ratnapura is a city vulnerable to climate change impacts such as flooding. For years people who live in the flood-prone area have their local knowledge to adapt and reduce flood risk. One attention-grabbing case is where all most all the building structure is consisting of elevated structures. Elevation of the foundation is the most common adaptation noticed (Figure 5.6). Foundations made from concrete.

Figure 5.6: Elevated Structure of House

In retrofitted houses layered floors where different components with different heights area noticeable features in these houses. At the first level, compounds have been elevated by 0.5-1ft over the ground. Elevated compounds are protected by a small ground wall which is about 1.5 -2 ft in height. The second level is the entrance step which is about 1-1.5 ft from the compound, and the final layer is about 2ft from the compound with the staircase.

Apart from the elevation of foundation, raising doors and windows are another method of community adaptation observed. Most of the houses have raised their windows above the flood level to prevent flood entering the house. The red line on the figure 02 image shows the raised windows. Windows are raised more than 3ft from the ground level to protect from the entering of flood water. Apart from that all most all the building in the Rathnapura city are either two stories or more (Figure 5.7).

Figure 5.7: Two Story Buildings

From the interviews, one derived idea was that many people try to add a new story to their houses from the money they get from the government during the disaster situation. The purpose is, if a flood occurs, they can use the extra story to keep their household items and save themselves from the flood water.

However technical know-how is essential because except for very few settlers in the annual flood-prone area, nobody is willing to leave: instead everybody wants to live with the flood. What seems to be lacking is a systematic method of integrating indigenous knowledge and acquiring new knowledge from other parts of the world. Again, from the responses of people it has taken for granted that "knowledge acquisition and distribution is the role of the government" a colonial thinking pattern which continues.

5.6 Conclusion

This chapter has discussed four selected aspects which play an essential role in climate adaptation planning system namely as planning system is inherited by colonial influences, poverty and inequality, weak and fracture civil society and finally poorly resourced and capacitated institutions of governance. Each section supported by the data derived through interviews, document analysis, and field observations.

As has been positively noted, Ratnapura is having an adaptation planning mechanism for flood risk including better information dissemination system, where the local community works together with the government authorities in disaster situations. However, there is a gap between local communities and government agencies when it comes to planning and other aspects. Mostly where urban planning system focusing more on other physical factors neglecting the socio-economic aspects. As well as one striking finding is that lack of communication between each party which leads to conflicts between each other.

6 DISCUSSION AND WAY FORWARD

6.1 Approach in Brief

Developing countries in the world recognized as highly vulnerable to climate exaggerated disasters which are likely to increase in intensity and frequency of occurrence. As mentioned in the previous sections most of developing countries located in the global south, where south focused more on adaptation. Also, many scholars who conduct researches about the global south and north recognized different characteristics of the urban development in the global south, such as higher urbanization rate, insufficient resources, effects of colonialism, weak and fractured civil society, economic instability, etc. These factors identified as the main problem which results in the deviation of developing countries when it comes to planning.

With this background, this research attempted to explore the aspects of influencing climate change adoption planning in Sri Lanka. While providing answers to local and national level stakeholders contribute to the adaptation to the effects of climate change and how the local communities react to climate change impacts such as flooding. This research was support by the characteristics of the Southern Planning concept, to address and identify the prevailing bottlenecks and possible interventions in disaster management and planning.

The study was carried out on two levels, where the first level focused on a detailed literature review about the concept of Southern Planning and characteristics of it, from that six main characteristics were identified. The second level focused on local conditions explained through empirical data collected a case study conducted in Ratnapura, Sri Lanka. The study has made use of primary qualitative data that were collected using a range of methods including KIIs, direct observation and document study the information obtained was then compared with the southern planning concept characteristics and discussed as to which approaches have provided successful results.

6.2 Aspects Influencing Climate Change Adaptation Planning in Sri Lanka

This study explored a list of specific factors to identify the aspects of influencing climate adaptation planning in Sri Lanka. From the identified six characteristics, literature findings were summarized under four major topics, as planning system is still shaped by their histories of colonialism which set them apart from the global north, poverty & inequality, weak and fractured civil society, and finally poorly resource and capacitated institutions of governance.

Based on the results derived from Chapter 5, this study has identified Sri Lankan planning system has a strong influence from the previous colonial system. This aspect considered as the main reason behind the problems identified through all the field data analysis. As an example, even though Ratnapura have district level disaster management plan, that plans failed to identify the necessities of the local people. What the government (local and national) does is that they compensate people to rebuild themselves and let them be. The plan neither encourages nor discourage the vulnerable community from resettling or adopting standard risk minimizing methods. That was more of a colonial approach, where developed countries provide grants and loans for developing countries to adjust to the situation (Perera, 2016). Not only in Sri Lanka but also considering the case studies from other global south countries one undeniable fact is that colonial systems weaken the society (Watson,2009). Because in the colonial system, all most all the development works carried out under the power of local or national government including decision making leaving the community aside. That makes people weaker and more fractured. If one connection was leaked or broken, then the necessary development may not take place. IN-ADPC-02, emphasize that in her interview as;

> "Now see immediate after a disaster happens what is happening in this country the National disaster relief center (NDRC) distribute the relief for that they need to receive the list from the district agent (GA) the GA needs to receive the list from DS the DS receive the list from Grama Niladhari, this is the chain why can't we go beyond that, we always need to go with this letters and obtained the signature of all these people, why can't we empower the people to act during the disaster"

The second influential aspect was Poverty and inequality. During the analysis, it identified that poverty & inequality places a vital role in climate change adaptation planning. Where most of the people who vulnerable to settling in the flood-prone area were poor people. Where they don't have enough income opportunities to move out from those places or to retrofit their houses. Therefore, they have become dependent on the government. They consider flood as a positive outcome, where they can earn money and gathered necessary household items such as food, school items, clothes, etc. this mainly affects when comes to planning, because people may reject whatever the disaster management conditions provided by the government. As an example, LG-UDA-02 mentioned that;

> *"once we tried to introduce a dry dam to Kalu River. But people who live either sides of the bank strongly disagree with us. They even conducted a protest against us and the irrigations department."*

Further, she explained that because of that reason authorities are not much concerning about providing solutions to the flooding.

Findings show that local planners in the Ratnapura area consider the poor people who live in either side of the Kalu river as a threat to the city's beautification. Further, the respondent from UDA mentioned that they are planning to move those into some other area. However, this creates more problems than reducing problems. Before taking actions like that it's better to conduct a feasibility study and understand the reasons for people to stay in such vulnerable places and actions should be taken based on that. Merely avoiding them make more conflict such as resettlement costs more money, time-consuming, aggravate unemployment, the tension between people, etc. Because most of the people depend on informal sectors such as Gem mining, leaving from those places may create less accessible to their livelihoods. Resettling from one place to another is not a solution for poverty and inequality in Ratnapura Sri Lanka.

Weak and fractured civil society and Poorly resource and capacitated institutional governance are the other to aspect highlighted from the analysis, where different interviewed government official states differently. These two are somewhat correlated with each other. In Sri Lanka the strong social system and linkages that existed in the villages deteriorated rapidly with factors such as poverty, urbanization, unemployment and the citizens became more independent but loosely interlinked. Where citizens get the option to make their choice of governance only at an election and beyond that very little cross society interaction happen between people and the leaders in the decision-making process. So, this deterioration not happens only among the community but also between national and local level as well as different institutions.

As mentioned in the previous section, the Disaster Management Center is the main leading agency for climate-related impacts. The findings indicate that they liked to maintain their role as a leader but do not take enough necessary actions to cooperate with other institutions. IN-ADPC-02 mentioned in her interview that

> *"We feel that every time we meet for coordination meetings the DMC acts as if they are in full control with the mindset that we are government"*

In a way that is true. But to achieve the expected out comes of better planning national institutions need to play the role of a facilitator. Where it facilitates and encourage the involvement of other parties.

Most of the time institutions such as climate change secretariat, National Building, and Research Organization, etc. have fewer collaborations with DMC and each other's when it comes to disaster management and climate change adaptation planning. During an interview one derived fact was that;

> *"we prepare the legally approved policies and regulations application of those are very low"* (NG-CCS-01)

The gap between government institutions accelerated due to political, policy and information gaps having in the system. NGOs have a significant fidelity to the aspects of planning, institutional and technical assistance during their disaster response and planning. However, IN-ADPC-02 mentioned that sometimes it is hard to work with the government officials. Due to political reason officers are changing and that affect negatively to the projects carried out by other parties. Because the newly appointed person may or may not aware of the on-going projects and its states. Then they must explain it from the beginning, and it takes the necessary amount of time, ultimately affect badly in the end.

> *"As an INGO whatever project, you implement you need to get the consent of the government, in this case, it's the DMC. What happens Is most of the time the higher officials change from time to time, when this project came to date the ministry secretary has changed 4 times. In the DMC it's the second DG since the project began. This affects our activities as we have to explain the work we do every time a senior officer change."* (IN-ADPC-02)

However, with all these adverse facts there are some positive aspects too. At the community level, the most influential factors are technical know-how, finance, and availability of information. Field study observation added that factors such as indigenous knowledge and local technical know-how generated the most of community-based technical solutions in disaster resistant housing applications. However, the connection between the community and local level have shown a positive result — one such method is village level flood committees. These committees act as the connection between the local government and villages. The field survey findings showed that Sri Lanka has willingly tried different ways of disaster management and climate change adaptation planning. For example, the national government is trying to change the countries planning legislation and ordinances according to the physical situation of Sri Lanka. Also, among all the southern Asian countries Sri Lanka is the first to have a National adaptation plan. In some part of the disaster management community was highly engaged with the local government institutions. Especially when it comes to disaster information dissemination. As an example;

> *"In 2017 we had the district disaster management committee in the early part of the year there we were warned of that there will be a marginal level flood in May. The irrigation officer made us aware of the possible flood they expect it to be in the range of the flood that occurred in 2003.* (LG-DVS-04)

However, the factors mentioned in southern planning theory can be identified in Sri Lanka's planning system. However, accordingly, the factors that mentioned are not affected negatively as it mentioned in theory.

6.2.1 Role of national and local level planning agencies have in adaptation to climate change and interrelation between different actors for climate change adaptation planning

Findings of the case study have revealed that all stakeholders (national, local and community) do adaptation planning at the local level, but many of those are small interventions which do not necessarily address the national scales such as retrofitting houses, etc. To elaborate, national government institutions in Sri Lanka mostly engaged in non-structural measures followed by policy interventions and financial initiatives (i.e., monetary compensations for flood damages). During a disaster period, the government obtains money for relief and disaster management purposes especially from international bodies such as UN-HABITAT, Plan Sri Lanka, Asian Disaster Preparedness Center, etc. In year 2017 Sri Lankan government received nearly US$ 1,000,570 from UNICEF Sri Lanka to *"ensure that the communities affected by floods have access to safe water supply and adequate sanitation services together with best hygiene practices"* (UNICEF Sri Lanka, 2017, P5). However, during the interviews IN-ADPC-02 mentioned that;

> *"Most of the time National government contacted us when a disaster occurred. Other times they don't want to coordinate with us. For disaster relief situation they will invite us to have meetings and even get suggestions from us, because, they knew that we mainly work towards relief and collect funds to help the necessary."*

Lack of integration between government and other NGOs are an increasing concern. NGOs and other local institutions having much more potentials to provide solutions to problems facing by governmental institutions. Therefore, the government needs to come up with a better plan to reduce this gap between them and other stakeholders.

Second, government (local and national) provides structural initiatives which may not direct disaster management initiatives; instead, they are projects designed for some other purpose with adopted disaster management principles. For instance, recent road development projects (Urban Development Authority. (2018) have incorporated disaster adaptation features like elevated roads, stormwater drainages, such initiatives to incorporate disaster management and climate change into planning and development programs play active roles in these. However, it has simultaneously found from interviews as well as case study that there should be a national level policy revision to facilitate and increase local level partnerships. However, it has found out that NGOs and other international agencies make efforts raise public awareness and conduct preparedness campaigns.

> *"Currently we have one project going on in Rathnapura, which is called preparedness for emergency response its focused-on preparedness than on response and rehabilitation, it came on last year we got the funds from Bill & Melinda Gates foundation, we implement through partnerships. We are the implementing entity we have partners from 3 sectors government, private sector and local NGO's." (*IN-ADPC-02)

Further she explained that main purpose of the project is to build capacity of the local community as well as the project partners.

> *"We are focusing on capacity building of the so-called communities and those 3 partners. We have 3 main elements 1. Capacity building 2. strengthening coordination and 3. Knowledge Management. Among these 3 types of partners with the ultimate objective of increasing the disaster preparedness of the districts of Rathnapura"* (IN-ADPC-02)

Even UNHABITAT itself developed a disaster risk management and preparedness plan for Rathnapura. The community engages in hazard-resistant construction and retrofitting as self-initiatives. In

Ratnapura, all most all the buildings are either two stories or more. However, lack of proper rule and regulations makes development more chaotic and problematic. Even during the interviews, it was coming out the fact that most of the disaster-related awareness campaigns in Rathnapura are concerned the landslide, less awareness goes to flood. Chief Engineer of NBRO mentioned that they had developed structural guidance for houses to prevent the damages from landslides but not for the flood and he said if a person comes to approve a plan for the flood-prone area that they have to accept it due to lack of policy regulations.

Further, the LG-UDA-02 mentioned that in the new 2018-2030 urban development plan more priorities would be given to the flood risk management and especially for significant infrastructure developments to reduce the impacts of the flood.

> *"When developing this plan, we identified flood as a major threat to cities growth."* (LG-UDA-02)

Even Divisional Secretary of Rathnapura that they considered flood adaptation structures into their planning.

> *"[…] our divisional planning committee predicted the flood risk and was planning to construct a stormwater drainage management system for many years, but it never became the priority in the budget because the city always had more burning issues to be addressed in the service delivery plan."* (LG-DVS-04)

However, most of the adaptation practices are not interconnected with each other. Different stakeholders act individually. As an example, Disaster management center works with the divisional secretariat, but they are not the ones who are having planning powers. It's the local authority. So, what happens is local authorities are, they do not have financial capacities or any budget line to works towards DRR or climate adaptation planning. So even the plans developed when it comes to implementation. It's hard at ground level. Also, once interviewee from Climate Change Secretariat mentioned that they had developed all the necessary plans required from the national and global level institutions, but those plans not taken into action until today. The information reveals from that is, even adaptation to climate risk and disasters made as a result of a push from a global agenda, and those plans not localized and internalized to fit into the local reality. The top-level officials who are exposed and driven by international agenda drive the adaptation need on a level that does not match with the local reality and implementation capabilities, this again can be seen as a trace of colonial approach to administration.

Sri Lanka has the legal, social and institutional base which strongly supports disaster adaptations. Adaptation does not merely refer to the development of physical structures to prevent flood vulnerability. Sometimes, adaptation is the choice of people. In the case of Rathnapura, most of the people live in a flood-prone area and half of the lands are prone to flood (refer to Chapter 4 more details). Many of them are not willing to resettle, and moreover, there is a minimal possibility to do so. Livelihood dependency on occupations such as gem and sand mining also force many people to choose their housing in disaster-prone zones. Most of the people who lived in flood-prone are low-income people. It identified during the interview; people think flood as one of their primary sources of income, where every year once or twice they get monetary reimbursement from flood damages to their houses and livelihoods.

In conclusion, what derived was that Ratnapura is a city which has many potentials to develop a proper climate change adaptation plan to prevent from flood risk. However, due to lack of interconnection and communication between different stakeholders, such as loss of connection between national and

local level, loss of connection between government and Non-government, loss of connection between government and community develops a gap between each stakeholder and proper planning system.

6.3 Rethinking

The main objective of this study was to understand the aspects influencing to climate change adaptation responses in Rathnapura city in Sri Lanka through the concepts of southern planning with special reference to a case city of Ratnapura, Sri Lanka. Under that, the main research question was identifying the aspects influencing the climate adaptation planning process in Sri Lanka. The qualitative descriptive methodology was adopted to carry out the study, and necessary data collected via three primary methods namely as KIIs, a document study, and direct observations.

First conducted a literature study to understand the concept of Southern Planning and characteristics were identified to investigate the climatic disasters at the local level with reference to the case city of Ratnapura, Sri Lanka. Through the achieved data was identified that among the six aspects four aspects had a high influence on the climate change adaptation planning system in Ratnapura Sri Lanka. Those mainly found by the answers provided by the key informants, and derived outcome was that identified aspects create gaps between different stakeholders and the effects of climate change adaptation planning practices in Ratnapura, Sri Lanka.

The outcomes were derived based on 11 interviews, observation, and document analysis and for future, it is better to target more interviews and conduct observations during a real flooding situation, which help to provide more insight into how the government (local & national level) and community act and to adapt to flood risk.

6.4 Way forward

This section aims to provide an insight into national & local governments and community in Ratnapura, Sri Lanka to minimize the negative aspects identified through the analysis and achieved the maximum benefits in climate change adaptation planning.

First one is Adopting participatory planning and strategic planning into the system: through this Ratnapura able to heal the concerns related to weak and fractured civil society and be able to strengthen the connection between different level of stakeholders. By adopting this system community also able to contribute to decision making. Planning is for people, and the main concerns of planning are to achieve better socio and economic aspects. Therefore, the community should be the main target point in planning. They should need to get a chance to provide their opinions and suggestions on where they were going to live for the rest of their lives. They are the ones who suffer from the problem. Keeping in that mind planners should need to aware the public about the new development plans and how they can participate to raise their voice. For that more reliable and accessible ways such as social media, television, radio, newspaper, loudspeakers, etc. can used as information delivery mood. Plus, it helps to reduce the gap between government officials and the community. By giving voice to every person in society makes people together and care for each other.

Next approach is a national government and local governments as a facilitator: Facilitative approach gives room for the government to look into private investment going into these adaptative measures and maybe develop long term plans and provide financial tools to reduce the burden and make more effective one-off investments to adapt to the impacts of the flood. As an example, many successful community-based disaster adaptation practices are existing at the individual and neighborhood level which have not recognized so far. Those initiatives were not adaptable enough to mitigate or adapt. For instance, most of the people add layers to their houses with the money they got from the governments, but there are no adequate safety provisions to identify those are stable or not. So, the

government can facilitate community with workable, cost-effective, and with easily adoptable technical solutions to make things better. Being a facilitator also increase the communication between different level of stakeholders. The government can get fund or help from other non-governmental organizations and conducts researches and studies to gather the knowledge related to ways of facilitation etc.

6.5 Conclusion & Limitations

Impacts of climate change are varying from country to country, and the severity of the impacts increases for developed world countries due to its socio-economic and environmental factors. Various scholars identified that countries locate in the Global South are facing more impacts than the Global North. Therefore, the global south needs to adopt climate change adaptation practices into their planning system. This research is an attempt to identify the different aspects of influencing climate change adaptation planning in Sri Lanka. But climate change is a broader topic. Therefore, the research studied the government authorities' adaptation methods and community's' response to climate exaggerated disasters in Rathnapura city by using the global south as the conceptual basis.

The findings of this study prove that Ratnapura planning system grew with the southern planning characteristics, namely as planning system is still shaped by their histories of colonialism which set them apart from the global north, poverty & inequality, weak and fractured civil society, and finally poorly resource and capacitated institutions of governance. All most all these aspects were affected negatively to climate change adaptation planning in Ratnapura Sri Lanka. The impacts of colonial systems can be identified as the deep root for all most all the problems. Where the strong administrative characteristics of the British rule remains in the Sri Lankan administrative system and where the early division of LAs based on a plantation-based economy which ignored the geography and cultural norms. Those LAs are using as it is in today's modern administrative system.

Moreover, some rules and regulations such as "the Town & Country Planning Ordinance" use even today. Those updated rules and regulations increase the tension between society, especially where it marginalized poor people and create weak and fractured civil societies. Those societies neglect poor people; their voices never addressed in the administrative system. The British government introduced the administrative system was more of a top-down approach, where decisions taken by the top level and passed to the bottom. The impacts are remained and create more chaos in the current bureaucratic system leading gaps between different levels of stakeholders. The context in Ratnapura in Sri Lanka shows many elements of Southern planning concept and shows that these approaches have resulted in mostly due to weak and bureaucratic decision-making concerning adapting to climate risk and disaster risk reduction. The top-level policies and mechanisms are set up very quickly due to push from global agenda, but they do not trickle down to the local level effectively just because local level situations and capacities not taken into consideration. This is a trace of colonial practice; some exceptions were seen even in Rathnapura where sometimes community response and local knowledge integration was seen mainly due to strong cultural relationships and individual leadership. The three sub-research questions are as follow;

- What role do national and local planning agencies have in the adaptation to climate change in Ratnapura, Sri Lanka?
- How does the local community interact with planning agencies in facilitating climate change adaptation?
- How does the local community adapt to climate disaster situations?

These three sub-research questions discussed throughout the study and case study. The study has recommended adopting participatory planning and strategic planning and government (national & local) as facilitators to reduce the negative impacts of the identified four aspects.

6.5.1 Limitations

Although due to the time limitation, this research is only focusing on one case study area. Therefore, studies of each district are required ensuring appropriate generalization of the findings of the study. The present study highly based on qualitative data, and the availability of quality and appropriate data is crucial for this study to provide a holistic picture of the given subject. The study recommends having more interviews including all the necessary institutions as well as the community to provide a more holistic answer. In this study community adaptation captured solely based on observations. Therefor recommended to have questionnaire survey or more interactive field study interviews with the community when trying to identify the community adaptation practices. However, the data collection of this study was limited due to the political instability of Sri Lanka during the data collection period (November - December 2018 period.).

Apart from that, in the analysis chapter 'Rapid Urbanisation' was not addressed due to lack of information. Information related to socio-economic aspects were less addressed. Study unable to provide a proper elaborated theoretical explanation to the concept of southern planning since the concept is still evolving and due to the unavailability of enough literature. What steps should be taken to overcome the negative aspects of southern planning characteristics were not clearly emphasized from the study, but it can state that if leaders and bureaucrats have good education and exposure to diverse cultures and management can bring in better results.

6.5.2 Recommendation for further research

The following recommendation help further studies into this research;

- The functions of participatory planning and government as a facilitator reduces the negative impacts of identified aspects influencing the climate change adaptation planning in Sri Lanka.

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APPENDIX A

Interview Guide Assessing Climate Adaptation Practices Among Planning Agencies (National & Local Level)

1.The planning system is inherited from the previous colonial governments or have been adopted from northern countries.

1.1 what is your role/function with in the administrative planning structure in Sri Lanka?

1.2 Can you please, briefly explain about the history of town planning in Sri Lanka?

1.3 Do you think colonization affects to the involvement of current planning structure? If so, are the effects of colonization remains in the current planning structure?

2.Rapid Urbanization

2.1 What is your opinion about the urbanization rate in Rathnapura city? Have you noticed any significant changes during last 10 years?

2.2 Can You please provide data about rural to urban migration over last 10 years in Rathnapura or point out where I can find those data?

2.3 Have you ever noticed any changes (such as rapid increase or decrease) happened in the birth rate or morality rate in Rathnapura over last 40years?

3.Poverty and inequality

3.1 How about the employment sector? Are there any significant changes identified in the employment sector and GDP growth rate of Rathnapura during past 10 years?

3.2 Can you please provide data about;

- Literacy rate over last 10 years/ No of schools in the area / No of university attendees in the area

4.Weak and Fractured Civil Society

4.1 What are the causes of flood occurrence in Rathnapura city area?

4.2 Does the local municipality follow the plans/rules/regulations etc provide by the national planning agencies to prevent/ adapt floods in Rathnapura city?

4.3 Which areas in the Rathnapura city are the most significantly vulnerable for flood impacts?

4.4 Can you please provide information about following questions or Suggest where I can gain valid data for those?

- *Number of vulnerable households in areas of significant flooding in Rathnapura City?*
- *Number of properties (houses and businesses) in areas of flood risk? (highly vulnerable/ not accounting for defense)*
    - *Number of properties in river floodplain*
    - *Number of properties in areas at risk from surface water flooding (1 in 200-year event)*
- *What is the annual rate of development (houses and businesses) in areas of flood?*
    - *Rate of development in river floodplain and surface flooding*

- *Number of properties (houses and businesses) built in floodplain? (accounting for defenses)*
- *Proportion of floodplain development in areas at significant risk of river/ surface flooding*

4.5 What are the identified flood damages with in Rathnapura city:

- *Annual insured losses from flooding*
- *Number of deaths caused by flooding events*
- *per year Number of injuries caused by flooding events*

5.Poorly resource and capacitated institutions of governance

5.1 Can you please discuss the degree of cooperation between the various sectors working in climate change adaptation?

- citizens and government agencies
- government and nongovernment/private sectors
- citizens and nongovernment/private sectors

5.2 Is the quality and details of the information on adaptation to climate change relates to flood management in urban areas sufficient for your organization? Please elaborate.

5.3 Of the issues influencing your organization's capacity to address climate change adaptation, what do you consider the most important? What are the reasons behind your selections?

- Training on adaptation
- Improved information on adaptation
- Increase in funding
- Better coordination between actors

6.Resource Limitations

6.1 In which ways your organization obtained financial resources for climate adaptation practices? And How are the financial resources used/ implemented?

6.2 Within your organization, how many people received training in adaptation to climate change impacts?

6.3 Do you consider people in your organization have a good understanding of adaptation to climate change?

6.4 As per your knowledge what are the barriers/challenges faced Sri Lankan planning agencies when comes to climate adaptation?

6.5 What is your idea about technology use into climate change adaptation?

General Questions: National Level

1. What is your idea about the climate change in Sri Lanka?
2. What is your perception about the climate change adaptation practices within Sri Lanka? / Within Rathnapura City?
3. Is Sri Lanka takes adequate measure to overcome the climate change impacts? If Yes, what are those?
4. What is your opinion about the existing adaptation practices for flood prevention? (both National & Local levels?)

5. In the case of Rathnapura, what sort of adaptation measures take place to reduce the damages?
6. Are those plans/policies/ regulations/ laws works as they should be? If not please elaborate?

Local Level:

1. What is your perspective about the current flood adaptation practices in Rathnapura city? In which ways you suggest improving the existing situation?
2. What is the role of local municipality in Flood prevention and adaptation?
3. What sort of actions taken from your authority to design of new development in areas at flood risk?
4. What kind of provision taken for flood defenses? (e.g.: provision of early warning systems/ retrofitting houses etc.…)
5. What sort of actions taken so far to contribute risk awareness among local citizens?

APPENDIX B

Assessing Community Adaptation for Urban Flooding in Rathnapura City _ Observations

1 Physical Structures

- Retrofitted Housing
- Elevated housing/buildings
- Use of materials

2 Infrastructure facilities

- Drainage systems
- Permeable surfaces
- Flood walls/ Barriers
- River rehabilitation projects
- Availability of evacuation facilities (Eg: boats)

3 Early warning systems

4 Availability of sign posts

APPENDIX C

Index of Interviews

Following table can be used as a guideline to understand the key informant interviews documented in the Chapter 05 & 06

Stakeholder Group	Code of Respondent	Position & Organization	Area of Expertise
National Level Government Officials	NG-CCS-01	Assistant Director, Climate Change Secretariat	Climate Change
	NG-DMC-02	Assistant Director (Preparedness Planning), Disaster Management Centre	Disaster Risks/Risk Management/Planning
	NG-MET-03	Deputy Director, Department of Meteorology	Weather/Climate
Local Level Government Officials	LG-NBR-01	Engineer, National Building & Research Organization (NBRO), Rathnapura	Disasters (Flood/Landslides) Planning
	LG-UDA-02	Strategic Planner, Urban Development Authority, Rathnapura	Urban Planning, Disaster Management
	LG-DRO-03	Disaster Relief Officer, Rathnapura Divisional Secretariat Office, Rathnapura	Disaster Management
	LG-DVS-04	Divisional Secretary, Rathnapura Divisional Secretariat Office, Rathnapura	Disaster Management
	LG-AO-05	Administrative Officer, Rathnapura Divisional Secretariat Office, Rathnapura	Disaster Management
INGO's	IN-UNH-01	UN-Habitat	Planning, Disaster management, Climate change
	IN-ADPC-02	ADPC (Asian Disaster Preparedness Centre),	Planning, Disaster management, Climate change
NGO's	LNG-LC-01	Environment and Community Development Information Centre- Media Reporter- Ratnapura District	Disaster Management Disaster Risk

List of codes for Interviews

Concept/Theory	Code	Respondent
Concept of Southern Planning	Colonial	IN-UNH-01, LG-UDA-02, LG-NBR-01, IN-ADPC-02
	Poverty & Inequality	LG-UDA-02, LNG-LC-01
	Weak & Fractured	LG-AO-05, LG-DVS-04, IN-ADPC-02, NG-CCS-01, LG-NBR-01

	Capacitated Governments	LG-NBR-01, IN-UNH-01, NG-CCS-01, NG-DMC-02, IN-ADPC-02, NG-MET-03, LG-AO-05, LG-DVS-04

APPENDIX D

Interview Transcribed Document

1.UN-Habitat - Project Manager – Urban (Conducted in English)

History of the Urban Planning and climate change Adaptation

We are the people, we are the nation familiar with climate change adaptation. Climate change adaptation is not a newly thing for Sri Lanka. Newly thing for the whole Asian countries. Why and the first one, normally we had a very ground land use system in the country. And it is a natural landscape. That gave enough, favorable impact to mitigate adverse effects of climate change. How? Because we have the coastal area. In the coastal area you have enough nice vegetation to adopt to the different type of climate. If it is a strong, if it is a tsunami, if it is a different type of erosion. These are the some kind of adverse effects. And the Central province also like that, due to climate change, you can see different type of negative impacts like landslides, mud slides (earlier you only heard the landslides, now you can see the mud slide and you can hear the rock falling.) these are the some kind of negative effects of climate change.

We are the country having an enough rich biodiversity area and different type of landscape areas. And the biodiversity is very high in this country. If it is a high or thick heavy rainfall, we have enough area to absorb water and other thing is our climate itself is very favorable for the different type of variation of the climate. And the absorption capacity was there evaporation was there. Now both are having some problems. How? Because all the marshy lands and within this couple of years you can see the way of changing the landscape of the cities. There are no wetlands. Wetlands diminishing day by day. And all the eco base? The eco base adaptation actually we can do very nicely. If you take the Battaramulla, Battaramulla administrative capital itself is having a very nice eco system. And also, Colombo city was declared as a Ramsar site. They identified more than 15 hotspots within Colombo. That means already we have enough areas to protect not to having the negative impacts of climate change. Eco base adaptation is a very nice one. Through eco base adaptation you can do lot of things.

To do it, you have to have a comprehensive land use system with proper rule and regulations. That is must. And this one is not a newly thing for us. As an example, in earlier we didn't have any kind of tea or coffee in the central province. Nuwara Eliya, itself was a thick jungle. What has happened, when the British people, when they go there, they have cleaned that area for tea, coffee and different type of cash crops. Because of that, animals came towards the down south area of country. Those areas are the most appropriate for paddy cultivations. Other one is the coastal areas, where they convert into urban activities. Due to that, rich vegetations like "Pandanus tectorius (Wetakeiya)" suitable for the sea erosion day by day start diminishing.

Building courts. Now we don't have proper building cords. But earlier we have the different architecture suitable for different type of climate conditions in the country. As an example, southern

has the typical nice houses with verendas, Jaffana has court yards and the well is in the middle of the house. It was designed to cope with hot climate. However now due to the rapid urbanization and lack of proper planning we cannot see those things.

British Influences:

If we take our local authority ordinances, still there are ordinances which are just like a Blueprint of the United Kingdom's administrative system. If you take the HNDI (Housing and Town Improvement Ordinances), Town and country planning Ordinance, they are the blueprint of the British government. Not only the planning regulation, in simply if we look in the administrative boundaries, all most all the LA, GN and DS boundaries were developed in British ruling period. And here we are still use them without changing any.

Sometimes some kind of regulations are not suitable for our country. But now they are changing the rules and regulations according to our climate situation of the country. National Physical Planning Department now revisited the National Physical planning Policy and introduce separate area for climate change. In that they are discussing how they going to include suitable adaptation practices and disaster risk reduction etc.… however, in other countries disaster risk reduction and climate change adaption are two types of areas, but when we come to Sri Lanka, these two areas are not separated. If you have disaster risk reduction, then you can get good results for climate change adverse effects. There is no big difference in Sri Lanka regarding climate change impacts and disasters. If you reduce the disaster risk, it will be a good impact to the climate change.

If you take the UDA regulations, you can see the influences of British government. As an example, getting the sun shine, angel for the light and ventilation, when you examine that those things are not necessary for our country. There are some rules and regulations earlier actually we didn't have this kind of subdivision system. Now due to the subdivision system and the started from the site, if you take a small land fragmentation there is no place to runoff the excess water.

Gaps between different institutions:

In Sri Lanka, the Ministry of Environment is the focal point and there is a unit called climate change secretariat. They have done the climate change policy. They have done climate change adaptation policies. Apart from that they have done so much of projects and programs regarding climate change adaptation, but it didn't come to the grass root level.

The problem is in Sri Lanka we have different type of administrative systems. And the ministries will work with the Divisional Secretariats, but local authority has the all kind of planning powers. But local authorities don't have any kind of budget line or standing committee to work regarding DRR or climate change. Under the UNHabitat, what we have done was, we identified 08 cities including Rathnapura also, through our work we introduce ne of the standing committee to the local authority. Then the local authority has some kind of mandatory powers to use money for climate change or DRR related activities. Otherwise if you just read the ordinance, they have only the permission to allocate or release money only for flood and assistant or support.

Another problem is Environmental Ministry doesn't have strong linage with the disaster Management. And the disaster management has disaster management center and disaster management ministry. They also working with divisional Secretariats, district secretariats and Grama Niladari (GN) (Village development officer). But nobody works with the local authorities, where the planning powers are. They are the people who are having powers to have the zoning, zoning regulations, building cords, provision of all the infrastructure including the drainage, waste management etc.

The gap I am trying to say here is, Divisional secretariat does not have any kind of planning powers, they even do not have town planners, they do not have any kind of experts regarding that and they do not know what to do. Then they are working with villages without having proper zoning system, without having proper regulations. This gap needs to bridge. To do that we suggest having the local authority level DRR unit or climate change. When they prepare plans, they can involve the other parties such as divisional secretary, district secretary etc.

2.National Building & Research Organization (NBRO) – Rathnapura (Translated from Sinhala)

Role and Functions

The man role of the NBRO is about landslide risk reduction in Rathnapura area. For that we are using Sendai Framework (2015-2030). Apart from that we provide building guidelines and rules and regulation for housing development. People need to get our approval if they need to build a house.

But the problem is we are not considered about the flooding situations and focusing only on landslides. But we provide resilient features and type plans for housing. Those type plans are flood resilient and we provide instructions such as height of the houses, which materials to use, elevation etc. but most of the time people retrofit there houses based on their prior experiences.

History

You might know that, Rathnapura affects from three types of floods, such as Critical flood (50years), Major floods (10years) and Minor floods (01year). People in Rathnapura, knows from their lifestyles when a flood is coming. Every year,45 days (May) after the New year there is a huge flood coming. So, people get ready for that before the flood happens.

Gaps

Local Authority is the responsible organization for the implementation of national level plans. But their involvement is very low. But due to administrative structure of disaster management. The disaster management Center works with divisional secretariat not with the local authorities, but they are the ones who are having implementation and development of planning powers in local level. And also, when comes to the early warning in most of the country's warnings issued by the local level but here in Sri Lanka it was happening in national level. Sometimes when the warning issued the area was already flooded.

Another thing is we most of the time works for landslide, but the irrigation department is the one responsible for floods. But they do not provide any planning regulations for housing development and local authority only required our authorization. It would be better if there is a mechanism to get the authorization of irrigation department also.

Plus, when thinking about the colonial influence, I believe that we are still working for the rules and regulations developed by those eras. Mainly because our administrative system still a more of a top down approach, where you need to take approval from top to bottom. As an example, when going to building a house or any property, you need to get approval from some government institution such as UDA, local authority, if it is in the landslide-prone area then from NBRO. These rules and regulations we gained from the British. Instead of getting approval from one place person must go to every mentioned institute and it will take months to finish. They have designed this administrative system. In earlier times we didn't have any. I don't mean it's bad, it's a good approach for a safe community but sometimes it's too much.

Most of the people in Rathnapura are very poor and lack of education. There main income is gem mining. For them flood is like a bonus comes in every year. Since the flood occurrence is higher and they get compensations and relief from government and Non-government agencies. That also a main problem for not having an adequate and proper plan. People do not provide their support to minimize or reduce flood risk. They get lazy and depend on government or another NGO's. because every year there are two floods happens, one after Sinhala New Year (May), other before Christmas (November). Without doing anything they can earn money, collect necessary food rations and goods to households. New books and other educational stuff for children. I saw once people sold milk powder packets way below its original price. What do you think that mean? They have stuff way more than need for their consumptions. What I see here is our society is so corrupt, people become lazy and ignorant.

Simply, people in flood plain do not like to evacuate or replace their households. Most of the people live in there are poor and uneducated and they consider flood as a secondary income generation for them.

3.Climate change Secretariat – Assistant Director (Translated from Sinhala)

As the climate change secretariat, we prepared the National Adaptation plan (NAP). It was having 09 sectors. It was prepared using the data gathered from stakeholder consultations. What we noticed this stakeholder meeting was national level participation was higher than the provincial and local level. Under the national adaptation plan we have established national steering committee shared by the secretary of the environmental ministry.

Apart from the national level, we have conducted regional level workshops to aware the regional level officers and how the NAP can be adopted into their local and regional level plan.

Gap:

Even though we have conducted awareness workshops and involved the local level into the preparedness of the NAP, implementation of NAP activities is very low. Because when the people change the message of the NAP is not goes through the other administrative levels. Even if, we prepare the legally approved policies and regulations application of those are very low. Most of the time necessary officers do not know about it due to lack of awareness and communication. We are not part of the national disaster management committee. We do all the researches about climate change, it's related impacts etc.… as I mentioned we already prepared NAP. But up to the point I am confused whether even they use those when they develop their disaster management strategies and plans.

Another problem we are having is integration between other national governmental departments. As the climate change secretariat, we have mainly two committees named as adaptation expert committee and mitigation expert committee.to implementation the actions taken by those two committees we have intergovernmental agency committee for climate change. All the necessary organizations are part of this committee. We have established the necessary mechanisms to carry out a proper adaptation system. But what we felt is those agencies lacking with the proper expertise, they need to have a dedicated officer to work regarding the climate change adaptation and mitigation sectors. As an example, if we take the environmental ministry looks for different sectors such as emission, pollution but they don't have a separate cell for climate change. I believe if they have priorities climate change also as a part of their system we can implement the adaptation plans properly. It means they are having a lack of human resources and lack of responsibilities and the commitment of the necessary authorities.

We have problems related to finance also. It is easy for us to gain financial support from international than from national level. As an example, the money given for the DMC not accountable as climate change. Even if there are more resources in global level, national level officers do not know how to tap those resources. Officers need to train for those too.

Planning Process of Sri Lanka:

What I believe is, comparing to other developing countries, we are the 07th country from the world who have developed a national adaptation plan. But the implementation is very low. Our NAP indicators and NDC indicators are almost the same. Because of that it is easy for us to go for climate change adaptation. Even though the implementation low our policy level development is higher.

4.Disaster Management Center (DMC) – Assistant Director (Conducted in English)

Role of DMC:

Initially we developed a national level plan. It's called "National Disaster Management Plan". That is the guiding framework for disaster risk management of the Sri Lanka. So, that is the national level document. Then we have the "national emergency operation plan". We develop it with the coordination of major stakeholder agencies. there we have develop our own SOPs (Standard Operation Procedures) to guide what the organizations have to do before, during and after a disaster. Apart from that we have district, divisional, Grama Niladari- GN (Village level) disaster management plans. Whereas you mentioned there you have the district hazard profile. There you have prioritized hazards prevailed in the district. If we get the Rathnapura, landslides and floods are the frequent disasters that they experienced. For that they develop their own plan including how to manage the situations, what are the emergency response equipment available, what is the responsibility of key stakeholder agencies, what are the resources available within the district in case of a disaster etc….. those plans known as preparedness and emergency response plans.

But the same time in those plans includes the mitigation option. Such as how to mitigate such disasters. For that they have to identify major reservoirs and have to do the risk assessments, river cross sections to get the amount of water flows and inundation areas etc. with that information they development their own plans whether to relocate the city for a safer location or resettle people. But for that they consult all the technical agencies. As an example, Irrigation Department is the responsible authority for flood disaster, and they have their own plans and strategies for flood prevention and mitigation. And for landslides NBRO is responsible and they have all plans mapped with potential landslide areas. Local landslide information also available within the Grama Niladari (Village development officer). So that is what happened in the district level.

Nationally what we do is, we develop national level hazard profiles. There we identify all the prevailing natural hazards in the country name as Tsunami, cyclones, flood, landslide, high wind droughts etc.…and also, we develop national level hazard maps. For the district level that you have to scale down. That is in the sense that they have their own GN level plans collecting together they develop a divisional level plans all the divisional collecting together they develop the district level plans. If you go through that documents you can identify what are the risk areas, what are the hazard area or what are the landslide or flood prone areas.

Financial Capacity:

Annual budget is less. As an example, if you go to the international context, it says that if you spend 1$ for the preparedness you can save 7$ for response. Likewise, for the preparedness money allocation is less. Annually we were given 25million for preparation of disaster management plans,

guideline, procedures, SOPs or the community level exercises, national/DS/GN level exercises etc.… however we have less funding rather than mitigation. Mitigation of course we have annual budget of 700million something.

Resources:

Capacity is bit differ. Because in the local context they manage, they manage the hazard what they have within the district. And also, they have dealing with district level stakeholder agencies. But in the national level of course you have to have a good relationship with the international agencies, foreign countries and the academia etc. we have to have a good rapport and have to have a better communication skill with agencies and also, we have to coordinate all the agencies from the national level. So that capacity is different from the district level. Sometimes you don't have academia in that particular districts or the foreign agency. Sometimes all the funding goes through particular district with their programs and the budget line. But of course, Rathnapura, I don't think any NGOs or any other working there. Only government funding will be there for this kind of a DRR activity.

In national level for response of course available capacity is enough. But of course, we have to develop our capacities frequently. Because the same disaster will never come, and it will come with a different way. We have to anticipate the unexpected things. So, capacity of the people in the sense that about the knowledge of the climate change, adaptation or some other related new subjects, of course we have to have that knowledge with the international experience sharing and all. Because that is new for us. And we didn't have experienced catastrophic evets like Japan, Indonesia or India experiences. We only experience a pocket wise or a small wise event. Those are not real disasters. If a flood happens sometimes it goes to Rathnapura, Kalutara, Galle and Matara, those areas will be inundated. But that is not a catastrophic event, that we can manage within the district sometimes within the GN itself it can manage. But devastation or loss and damage is high. For that we need the support from the national level but for the response do not need the support from the national or other stakeholders.

Apart from this we hired only people who are graduated from science stream. This is a technical area therefore they need to have technical capacities. We will give them necessary trainings, especially during the entry level, we will provide them comprehensive trainings related to disaster management, preparedness, evacuation and relief and after that will assign to district level offices.

Interrelationship between other sectors:

In our emergency operation plan we have divided different organizations into different sectors like technical agencies. Because disaster management center is a coordination body. We are doing the coordination part while technical agencies providing the technical information. As an example, metrological information. Hydro metrological information. Tsunami provided by Meteorology Department, landslide information provided by NBRO, flood by Irrigation Department, Atomic Energy Regulatory council is providing the nuclear and atomic exposure kind of information. Likewise, we have different stakeholder agencies. As per the National Emergency Operation plan, they provide us the technical information, warning, alert and evacuation messages to DMC. So, based on that information, we disseminate to the community and we evacuate, we safe guard the community.

But sometimes the prediction capabilities are lacking within the technical agencies because of their resources and the manpower that they have. As an example, Meteorology Department have a forecasting division for Tsunami, but they have only two people working in there. If there are a Tsunami occurrence three main international Tsunami agencies near to Sri Lanka (India, Indonesia and Australia) will send the messages related to wave height and necessary details at once to the Meteorology Department's tsunami Unit. And to analyze and come up with the alert, warning and

evacuation they have to deal with the limited time and man power. At the same time, we need the information, without information we cannot operation. So, that's thing, but that is not with us.

At the same time, we are also receiving technical information from those international agencies. If the message is not coming at the right time, we cannot wait for technical agencies. Sometimes we issue warning without proper procedures itself. For Tsunami 21/2 hours lead time is there, for that we are waiting for the message until required amount of time to evacuate people we are waiting. But otherwise we will send the message. But if a flood happens in central hill area, we immediately issue the warning to the districts in down stream to evacuate people. Because we cannot take the risks. If the warning message given to us without having time to evacuate people, the meaning of that warning is useless. Therefor based on the severity of the situation and time sometimes we issue warnings without getting alerts from the technical agencies. We have the capabilities and capacity to use all the tri forces, police and all the means of communications to disseminate the message to last person in the community.

5. Urban Development Authority (UDA), Ratnapura- Strategic Planner – (Translated from Sinhala)

Role and functions

UDA is the main planning body in Sri Lanka. It has all the powers to develop the plans, declare the lands mapping etc. each district in Sri Lanka has district level UDA officers. Ratnapura also a one of the district level office. In Ratnapura I am act as the strategic planner and I am the only person who works in this section. In recent we develop the Ratnapura Urban development plan for 2018-2030 and it comes with two volumes.

When developing this plan, we identified flood as a major threat to cities growth. Even in our new development plan 2018-2030, we have introduced new zones to Ratnapura MC area. Especially where the Kalu river bank is. Because Kalu river banks are inhabited by poor people. They don't have proper land permits to settle in those areas. Therefore, we are planning to remove them from these places and will resettle in some other place. And those unplanned settlement destroys the city's beautification and act as a barrier to natural adaptation practice. We need to save that natural beauty, so we planned to provide natural parks or river bank development with many recreational activities. What we believe is that while increasing city's aesthetic value we even can reduce the flooding. But apart from that we include many infrastructure improvements in the new development plan. Such as restoring the existing stormwater drainage system, elevated roads etc.

And people from that area must need to resettle because they are illegal settlers, they don't even have deeds for their lands to prove their ownership. Since Ratnapura located in the hill country we have both tea and rubber plantations. And the people who involved in those sectors gained even less than the minimum daily wage of Rs. 1000/= (5Euro). And they live in the highly vulnerable areas for flood and landslides. Even their houses are temporary houses.

Gap between institutions

In literally UDA works with all most all the government institutions. Because when we develop a plan we need information and ideas from government. But, there can be missing links in between. As an example, when developing the Ratnapura strategic development, we identified a suitable location to have a side channel to mitigate flood in Kalu River. But once we presented the idea it was rejected by the senior positions. There argument for rejection was if we include that in to the report and legalized. Then we must implement it. What they fear was that other necessary institutions might not agreed with it. For me this is a barrier for us to provide better solutions to this country.

Not only the institution, sometimes even local community against to our ideas. Once we tried to introduce a dry dam to Kalu River. But people who live either sides of the bank strongly disagree with us. They even conducted a protest against us and the irrigations department.

Resource and Capacity

I do believe we have a resources and capacity barriers. One good example was when developing the Ratnapura plan when having stakeholder meeting I was the only planners represented from the UDA. People who assigned in my team was assistance staff who were lack in planning knowledge. So, I must do everything by myself. I did the all data analysis, I wrote the whole report. In a way this is exhausting as well as shows that we really need right people at right place.

Another problem that I have overcome was, when comes to information and data. The problem in our system was we still in a very slow phase when adopting to new technology. Once I called to Metrological Department to get weather related data and asked them to send me a copy of those. What I received was bundle of hard copies. Which I must enter all by myself. These simple works take too much of time and sometimes hard to achieve the deadlines.

6. **Divisional secretary – Divisional Secretariat- Rathnapura (Translated from Sinhala)**

Role and Function

As the Divisional Secretary I directly work with Disaster Management Center and District Secretariat. When a disaster situation happened DMC first informed the District Secretariat and next the information comes to me via them. Then I will take necessary actions to reduce or prevent from the damages. We will provide monetary facilities to the community. We conduct evacuations, for that we provide human resource as well as equipment boats, trucks, life jackets etc.

There are places we have identified earlier as safety locations. After evacuation people will move to those safe campsites. Total management of those camps carried under the authority of Divisional Secretariat.

Coordination and Communication

Well, I experienced 2017 flood when I was in Kiriella. When right time comes mostly after the Sinhala Tamil new year (nearly after 45 days of new year) first flood of the year arrived. Since people knows so they get prepared for that anyway.

However, in 2017 we had the district disaster management committee in the early part of the year, there we were warned of that there will be a marginal level flood in May. The irrigation officer made us aware of the possible flood they expect it to be in the range of the flood that occurred in 2003.

For that committee all the government officers arrived including the District Secretariat officers, Meteorological department, geological survey, NBRO, CEB, water supply and drainage. All these groups came, and they are made aware, then the hospital, police they too come. So, the district coordination happens at that level and it happens well.

When we go to the DS level we have a DS level disaster management committee, like the district level program here also we invite all government officer and make them aware of the situation from that we reach the village through the GN officers and through the GN officer to the village disaster management committee.

So, we have a mechanism like that and in the year 2017 this happened very well, therefore we able to minimize the losses of lives in 2017. If I take my experience in 2017 in Kiriella only 3 people died one

person was an army officer who tried to swim in the flood using a barrel to collect his belongings, and a two people in a family dies because the tank bund collapsed in their house, but there were no direct flood victims like in 2003.

Also, we have created a twitter group for the GN officers to be informed, but sometimes a particular officer might get caught to the flood, then other people in the committee will get together and start the relief operations.

Resources and capacity building

Yes, we do provide training to our staff as well as the community. We have a better early warning system. We get the warning from the DMC and Irrigation then we inform our GN officer's through the twitter group and from the point we get the warning we carry out an announcement from the DS office.

Also, when making development plans we consider the district plans provided by DMC. However most of the time the plans we developed cannot achieved due to financial situations. As an example, our divisional planning committee predicted the flood risk and was planning to construct a stormwater drainage management system for many years, but it never became the priority in the budget because the city always had more burning issues to be addressed in the service delivery plan.

Gaps

There are certain issues, but we work well, in 2017 we all worked with a common agenda during the flood, we faced physical difficulties as the phone lines were broken and we couldn't charge our phones etc., most places did not have generators. Since we worked as a one team there were no institutional barriers for communication.

7. Asian Disaster Preparedness Center (ADPC) – Project Manager (Conducted in English)

Interaction with other institutes

I can share my experience in the context of ADPC, if you see the past historical losses and damages with respect to flood and landslides Rathnapura is the most vulnerable district, if you look at Tsunami damages Batticoloa was the most damaged district, but for flood and landslides its Rathnapura and Kalutara.

Currently we have one project going on in Rathnapura, which is called preparedness for emergency response its focused-on preparedness than on response and rehabilitation, it came on last year we got the funds from Bill & Melinda Gates foundation, we implement through partnerships. We are the implementing entity we have partners from 3 sectors government, private sector and local NGO's.

From government it's the disaster management center, from LNGO's its Janathakshan and from private sector its Ceylon chamber of commerce. We are focusing on capacity building of the so-called communities and those 3 partners. We have 3 main elements 1. Capacity building 2. strenthening coordination and 3. Knowledge Management. Among these 3 types of partners with the ultimate objective of increasing the disaster preparedness of the districts of Rathnapura, Batticoloa and Kalutara.

First, we will work in Rathnapura there are lot of chances to succeed here, as far as I know there are organizations like Worldvision, Oxfam, Plan International working on similar type of projects but now plan international is focusing on children and Oxfam more on relief work, they also have projects in Rathnapura.

Through this project we were able to develop a national platform called the Sri Lanka preparedness partnership with the 3 partners. We intend to take this partnership to district and village level also.

We identified key activities that we should conduct in Ratnapura as we did some consultations with the government officers, community and local NGO's in Rathnapura. From that we realized their coordination part is very poor in our country, when it comes to preparedness. Both capacity building and coordination parts has to improve, knowledge management is actually "zero".

Coordination and Communication

As an INGO whatever project, you implement you need to get the consent of the government, in this case it's the DMC. What happens Is most of the time the higher officials change from time to time, when this project came to date the ministry secretary has changed 4 times. In the DMC it's the second DG since the project began. This affects our activities as we have to explain the work we do every time a senior officer change. Another thing is there are district coordination units for disaster management in each and every district in Sri Lanka. Some of the officers are very passive and not corporative, in some district (especially in Rathnapura) they are corporative and active. But in Rathnapura the district disaster management unit's capacity is a problem.

Because of the officer level changes and other issues, the disaster management center was not able to finalize their national plan. There are several divisions in the DMC (preparedness planning, emergency operation center, mitigation) in most of the divisions the directors changed. Even between the other two partners Janathakshan the local implementation partner and Ceylon chamber of commerce the private sector partner there are gaps in coordination, so I feel before we go to district DM units to improve coordination, we should first focus in closing the coordination gap between these 3 partners of the project. We feel that every time we meet for coordination meetings the DMC acts as if they are in full control with the mindset that we are government we finally get the blame if something goes wrong the private sector has other businesses, NGO's also has other work but when a disaster strikes it's the government that is to be blamed. But we can't tolerate everything like that, in 2-3 years' time if we don't see anything happening in the ground level this will be a failed project.

Community Adaptation

You should never underestimate the knowledge and experience of the community. And their willingness to act in this preparedness sector, they have everything but from the authority level we have failed to give them a proper mechanism to act, that is what they said. They said that they know when the flood is coming, we know what the areas that are prone to landslides are, but we need some resources and we need a proper mechanism.

Now see immediate after a disaster happens what is happening in this country the National disaster relief center (NDRC) distribute the relief for that they need to receive. NDRC gets the list from the district agent (GA) the GA needs to receive the list from DS the DS receive the list from Grama Niladhari, this is the chain. Why can't we go beyond that , we always need to go with this letters and obtained the signature of all these people, why can't we empower the people to act during the disaster, people are now fed up with these systems now this has been happening since the '60s, 70's and now people have no empathy towards this slow system, they don't trust the DMC, NDRC anymore.

Financial Capacity (i.e. funds and budget allocation)

This project is for 3 years, we will receive an extension when we submit our progress next year. In countries like Philippines they have separate budget for disaster management, there system is different to ours they have provinces, the provinces themselves allocate a spate budget for disaster

management work, if we can have a similar system that will be very useful, because now every time a disaster happens they have to write to the central government and obtain funds. Countries like us every time expect donors to give money for disaster preparedness activities, we don't think of allocating our own funds for this. Most of the time National government contacted us when a disaster occurred. Other times they don't want to coordinate with us. For disaster relief situation they will invite us to have meetings and even get suggestions from us, because they knew that we mainly work towards relief and collect funds to help the necessary.

8. Meteorological Department – Assistant Director – (Translated from Sinhala)

Role and Functions

We are the focal point for the inter government panel on climate change, therefore we have a very scientific basis in our approach, we check the rain fall data temperature changes and terns and also the world Metrological organization has developed indices for climate change detection 21 indices and there are around another new set , some of the indices are not relevant for us (i.e. frost), but ones that are relevant for us we are checking and reporting the trend, for example during the 3rd national communication we are reporting on the vulnerability. Now There is another project run by ADPC on developing vulnerability maps we are supporting that also.

Coordination between other institutions

Now you are asking about the adaptation with respect to long term CC impacts, but if you take actual incidents for example if we know that a disaster is coming like a flood or cyclone, we call the irrigation department (as the flood warning entity), DMC, NBRO we call upon all these 3 entities and have a meeting. Now this time we expect the El-Nino conditions to develop, we have seasonal predictions for 3 months so when we predicted from the months of October, November, December the season is going to be Wet, but the next 3 months which we prepared yesterday is going to be Dry (Jan –March). So December is a critical month where there is a change from WET to Dry, so there could be extreme events , also the Oct – Dec season is the most active period in Bay of Bengal (depressions, low pressure etc.), Sri Lanka is a tropical country although cyclones get developed it is rarely that cyclones go through Sri Lanka, a country like Philippines get about 17 cyclones a year while in Sri Lanka for the past 100 years we have received only about 17 cyclones.

This year the South Asian climate forum was held in Sri Lanka, we invited the Irrigation Department, Mahaveli Authority, DMC etc, there also we discussed that Oct-Dec season is going to wet which was good as we were passing through a dry period. And in October it rained well so in Anuradhapura area the tanks were full, but in early November there were signs of a depression forming and there was a danger of floods occurring. There was another meeting called by the DMC there too we informed that in the eastern coast there is going to be heavy rains. And actually, there was rains about 300 mm, but the issue was that after Jan the prediction was an El-nino situation which is a dry condition, so you need to be very considerate when releasing water.

Now there is a team coming from UN as well to do an analysis, now actually all the tanks are full apart from Senanayake tank both in north central and Northern provinces, all the global predictions and the models we have prepared have shown less rain in the coming period. Now we are having discussions that if the rain increases in December and creates a flood situation and if the rain decreases and creates a dry spell afterwards, so we are developing two scenarios and discussing what we should do if either situation happens.

Gaps

This is my personal opinion, we need to consider the meteorology and hydrology together (NMHS- National meteorology and hydrology survey), worldwide these two actions are done together, it is not easy to predict the atmosphere, now we have new advance models to predict, still we are very close to the equator and is very turbulent, hence when we predict flood warnings etc. we have to be together and developed and issue together,

I was told by Dr Dasarath Jatasuriya in U.K he said that they predicted in huge flood in UK before it strikes but they couldn't reduce the damage, they realized the reason was the two parties MET and Hydrology people were at two different places, there after they decided to work I one station.

My subjects are seasonal forecast and climate change, it's the national metrological center that predicts heavy rain falls, they are the ones who best know about these communications gaps, they are very busy these days they have some international meetings these days.

Capacities (i.e. Funds, capital expenditure, human skills)

Human capacity is a big issue, we have only about 40 meteorologists and from them when you assign people for director boards and Maththala Airport, we have very few left for 24-hour day to day operational work. Now the climate change part is done by having research assistants. Now the issue I have is that we know rain is going to increase in short spells, but how it is going to affect floods we don't have the know-how. Under the government process, it takes a long process to recruit proper people and the good ones does not stay. We took a group in 2017 and that helped to manage the HR gap but again 5 of them left for masters, so HR is an issue. However, we have an office in Rathnapura, and we get data from them and is functioning well.

In the sense of capacity development, from some projects we get models and training etc., one gap I saw was that we can do the predictions, but we have a gap in converting that knowledge to vulnerability Maps, there is a gap there.

I believe we had an issue with respect to the confidence of our predictions, but we developed that confidence after lot of effort, but with some comments from other people the confidence tends to fall,

9.Divisional Secretariat Office - Grama Niladhari (Village Development Officer) (Translated from Sinhala)

Role and Function

My main role is I act as the communication and administrative officer in between village and local government. All most all the messages and administrative works must carry out via me. I was responsible for anything happened in the villages under my authority. When comes to flood situation my role is to disseminate the necessary warning information, management and safeguard the safety of community. For example, if there is 24-hour rain the DS office will inform us then we will inform the GN officers and the village committees, then the GN officers go to the field and continuously check the situation and if required people who need to go to camps will be set to camps. Camp management also comes under our role, in a situation where is it also possible to cook in camps, we purchase cooked food and provide to the camps. We are given a limit of money to spend we work within that budget. then we do a small assessment on how many people were affected what was the property damage etc.

Communication

It's like this, in Rathnapura people know by experience that there will be a flood in a particular period, most of the time from media people are made aware. And I firmly believe in Ratnapura we have a better communication mechanism. Because, now we have, GN level division committees, when the Divisional secretary declares a flood situation we inform the village committee, in village level we have formed several subcommittees to cover main areas such as water and sanitation, first-aid, camp, etc... in some incidents the people must be sent to camps, so we prepare all the requirements for cooking, we call a co-op and arrange the rations, the first step is the security of the people. As a post disaster step we provide the statues report to the DS Office and then if necessary government provide funds (financial support) to the victimized people.

Coordination and management

First, we take the list of names of affected people, if it's a camp we get details as how many men, women, children, elders, people with special needs etc. And when they leave the camps we will also record who is leaving and in what condition. To record that we have the GN officer working in the field all the time and in the camp, we will appoint a community leader to support them.

Main issue will be drinking water. Electricity will be disconnected during situations like this to avoid dangers, we provide drinking water somehow to all.

People don't like to get water from bowsers they expect bottled water they think it is cleaner, actually it is difficult to provide water from bowsers, it's easy to provide water from Bottles, but then there are issues regarding disposal, but during these days we ignore this issue but after a people leave the camp we get along with the army, CSD and community and clean the areas and collect PET bottles.

Community response for flooding

People know by experience when is flood situation arising, if it rains heavily in the morning and stops and again in the night you won't get floods, it has to rain whole day and when it rains above 160 mm people know, then there could be a flood situation, they have been made aware of what are the essential items (i.e.important documents like the NIC, birth certificate) to take, they get prepared accordingly and will move to safe locations.

If it is a normal flood they moved to the upstairs of the house. All most all the people ads additional floors to their houses. Apart from that usually in the MC area if a house is built you need to take a report from NBRO and produce to the MC to get building approval. In PS areas where locations that are defined as disaster prone areas you need to take a report from the NBRO prior to constructing.

10.Environment and Community Development Information Centre Ratnapura edia Reporter (Translated from Sinhala)

Role and Function

We are a small non-government organization worked in Ratnapura district. We basically focus on sustainable environment protection and socio-economic development sectors. Recently with the help of Plan International, our organization able to work on project called school disaster safety in Ratnapura. In that project our part was to conduct training and develop knowledge management for school Students, teacher and parents. We were able to conduct awareness and capacity building programs for selected schools in Ratnapura area.

Community response to flood

You might already know that most of the population in Ratnapura are poor especially ones who lives near to the city. Because rich people live outside of the city periphery due to congestion and other related issues. And half of them are Gem worker or work in tea/rubber plantations. They cannot afford good quality lands, so they tend live either sides of the Kalu River.

There are issues in several locations which are prone to flood, some people have given pledges (divurum prakaasha) that they will not leave even if they die. Most of these people either, low income or unemployment or doing some small day to day jobs. They don't have anywhere else to go. So, they remain in the same flood plain for years. Most of the people who are doing informal employments such as gem mining, agriculture, fishery is live next Kalu river bank. As far as I know they don't own those lands. But they are there for long time, in some land this is the second or third generation lives in.

If you give a pledge you can stay in that location, so if something happens the government will put forward the pledge given by the person, so he cannot claim or blame the government. But it is not a problem for them. They might not get anything from the government. But they will get monetary benefits, food and necessities given by NGO's and private sectors.

I believe this happened because there are too many procedures for people to do if they want to move or build a house in somewhere. Need to get approval and certification from UDA and NBRO then must go to MC and there are so many approvals to get. This might get easier if there are inter links and communication between different departments.

As a victim of flood, they got flood donations, they even get financial support to rebuild their lives. This is a main reason for people not to leave those high-risk area. According to my perceptions I feel like people think flood as a normal scenario in their day to day life, not only them even local and national government. If a flood comes they give donations and they tend to forget what happened until it strikes again. But if we look in to the recent floods the impacts and severity of attack was way bigger.

Gap between different institutions

As a reporter I gain information from every corner of the district. The biggest issue I believe is lack of coordination among different authorities. As an example, DMC develops there plans alone and then NBRO works separately then comes the UDA. Lack of connection leads to more chaos. What I think the best is there should be one governing body and others must follow the rules and regulations given by it.

As an example, during 2017 flood DMC asked to conduct evacuations in Ratnapura MC area. Then the DS office has requested resources but not all places have got the require amounts, in some places we have requested for 20 boats we have only 6. In certain locations motor boats can't go, as the waves created are too high and damage buildings, it can go in the river but in flooded land areas for those situations we need smaller boats. If they prepare a proper plan, then these kinds of mistakes will not happen.

11.Disaster Relief Officer – Divisional Secretariat office, Ratnapura (Translated from Sinhala)

Role and Functions

As the disaster relief officer, I must coordinate the disaster activities happening in Divisional Secretariat office. Under that first we established village level disaster committees. So far Ratnapura have 56 village level committees. Then we have the divisional disaster management committee. The

main task of this is to inform and aware the all district level institutions about the disasters and collect necessary information from them most of the time the committee consists with representatives from divisional secretary, district secretary, regional disaster management center, local meteorological office, local irrigation officer, police, army and hospital. As an example, in a flood situation details gained from the irrigation department about the rainfall and water level of Kalu River.

If the river closed to flooded, then we inform to GN officers and they will inform to village level disaster committees. If necessary evacuation conducted and people moved to pre-identified safety locations. GN officer is responsible to provide the necessary facilities to the victims including food, water, sanitary etc. from the annual budget certain amount of money was allocated for that purpose.

Gap

We don't have a technical early warning system. We spread the message via using telephones or by word. The biggest problem we have is with community. Sometimes people do not listen to the warning we released, and they wait until the river over flow. Then things get more complicated. Another thing we don't have any set rule and regulations for housing development in flood plain. One pressing issue of this system is we work closely with the village level disaster committees and it works well in minor disaster situations but when comes to major flood sometimes we lost the connection with village committees. Loosing that link is makes us unable to coordinate with the flood victims.