Climate Technology Centre and Network (CTCN) Technical Assistance for the Development of an Urban Adaptation Plan for Kurunegala

Training Workshop Report

"Capacity building of city planners on the integration of climate-resilient aspects into city development plan for Kurunegala City"

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The Climate Change Secretariat of the Ministry of Mahaweli Development & Environment and the Kurunegala Municipal Council acknowledges and thank the presenters for permission for using their material in this report.

The Climate Technology Centre & Network (CTCN) has provided Technical Assistance through pro-bono support from Korea Environment Institute (KEI) Korea Adaptation Center for Climate Change (KACCC) and Green Technology Center (GTC) to prepare an Adaptation Plan and to assess climate change vulnerability and risk of the Kurunegala city.

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1. Training Workshop (2nd and 3rd September 2019)

1.1 Welcome Address

[Hon. Sumith Kumara Udawasala, Deputy Mayor of Kurunegala]

The Korean mission and the stakeholders were welcomed by the Deputy Mayor.

He acknowledged and appreciated the technical assistance (TA) provided by the CTCN and the Korean government and thanked the Korean mission for its contribution to TA and the workshop.

He stated that people are now aware of the detrimental impacts of climate change and spoke of the uncertainty of the future with the destruction of the Amazon Forest.

He hoped that the Korea Environment Institute (KEI) would be able to prepare an Adaptation Plan for the city as well as be able to find funds for the implementation of the activities.

1.2 Introduction to Climate Change and Adaptation

[Dr. Hanna Cho, Research Fellow, Korea Adaptation Center for Climate Change, Korea Environment Institute]

Dr. Cho presented an introduction to the KEI stating that the KEI was established in 1993 by the Korean government and is the leading think tank on environmental policy and environmental impact assessment.

The Korean Adaptation Centre for Climate Change (KACCC) was established in 2009 and closely collaborated with the Ministry of Environment of Korea. The main role of KACCC is to support development of adaptation policy, dissemination of adaptation awareness and information and domestic and international cooperation on adaptation. In the TA, she mentioned that the KACCC of the KEI provided technical support towards the designing of an Adaptation Plan for Kurunegala.

Dr. Cho went on to introduce what is defined as climate change and what are the natural and anthropogenic causes of climate change. She also highlighted the impacts caused by climate change with examples from Korea and Sri Lanka. With respect to responses to climate change she defined mitigation and adaptation with causes and effects for sectors such as agriculture, biodiversity, coastal areas and water resources management.

Figure 1-1) Presentation of Dr. Hanna Cho

The simple processes of adaptation management are as follow:

1. The effects of climate change are scientifically measured and evaluated;
2. The vulnerability assessment is conducted based on measured data;
3. Policies are established by referring to the vulnerability assessment;
4. Adaptation actions are implemented.

1.3 Adaptation Planning in Local Government

[Dr. Jiyoung Shin, Research Fellow, Korea Adaptation Center for Climate Change, Korea Environment Institute]

Dr. Shin explained that both mitigation (reduction of greenhouse gases (GHGs)) and adaptation (prevention of impact from climate change) related approaches are required for climate change response.

Figure 1-2) Presentation of Dr. Jiyoung Shin

Climate change response planning has four steps which is summarized in the table below.

Table 1-1) Steps of climate response planning

	Measure	Plan	Action	Monitor
Mitigation	・ Measurement, assessment of GHG ・ Prediction of GHG ・ Reduction potential	・ Goal setting ・ Establishment of reduction measures ・ Designing roadmap	Operation of mitigation program	Evaluation of mitigation program
Adaptation	・ Climate change prediction ・ Impact assessment and prediction ・ Vulnerability assessment	・ Goal setting ・ Establishment of adaptation measures ・ Designing roadmap	Operation of adaptation program	Evaluation of adaptation program

Dr. Shin went on to highlight that even if the GHGs, which are the cause of climate change, is reduced, the effects of global warming, due to the already released GHGs, cannot be avoided. Local governments are parties that are directly affected by the effects of climate change (heat

waves and torrential rains). At the same time, they are key players in overcoming problems and creating opportunities.

She outlined the features to be considered when developing the Local Adaptation Planning (LAP):

1. Principles of local adaptation;
2. Making the LAP successful by integrated approach, two-way approach, governance and partnership and flexibility and feedback;
3. Contents of the LAP.

Dr. Shin further provided a comprehensive view of the execution of the LAP procedure. She introduced case studies so that the audience could understand the procedure precisely. The procedure of the LAP is summarized in the table below.

Table 1-2) Procedure of LAP

Stage	Step	Details
Preparation	Preparation of LAP	・ Building awareness of climate change adaptation (CCA) ・ Organizing a task force (TF) team for LAP
Planning	Identifying climate change risks	・ Understanding of the general characteristics of the city ・ Current status and future outlook of climate change ・ Climate change impact and vulnerability/risk assessment ・ Comprehensive analysis and selection of key areas
	Setting goals	・ Setting vision and objectives ・ Setting strategies for each key area
	Finding and selecting measures & Establishing the plan	・ Selecting adaptation measures for each key area ・ Preparing a detailed implementation plan
	Preparing action	・ Developing foundation for implementation ・ Building monitoring and evaluation system
	Confirming and sharing the plan	
Implementation	Monitoring & Evaluation	

1.4 Climate Change Disaster Risk Assessment

[Dr. Christabel Jane Rubio]

Dr. Rubio presented a risk assessment case study conducted in the Philippines to provide stakeholders with an insight as to what is a risk assessment, the methodologies used, the type of data needed and the type of assessment or analysis applied.

Figure 1-3) Presentation of Dr. Christabel Jane Rubio

She defined the components of risk as:

a) **Risk** = f (hazard, exposure, vulnerability, disaster coping and adaptive capacity)

b) **Hazard** = A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation

c) **Exposure** = The situation of people, infrastructure housing, production capacities, and other tangible human assets located in hazard-prone areas

d) **Vulnerability** = The conditions determined by physical, social, economic, and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards

e) **Disaster coping and adaptive capacity** = The combination of all the strengths, attributes and resources available within an organization, community or society to manage and reduce disaster risks and strengthens resilience.

The background to the methodology of the risk assessment was outlined as follows:

1. Phase 1 - Setting objective and scope of risk assessment;
2. Phase 2 - Selection of conceptual work;
3. Phase 3 - Review of available data and selection of indicators;
4. Phase 4 - Data collection and collation;
5. Phase 5 - Risk calculation and assessment.

Some points considered here were:

1. There are many risk assessment models, and you need to select the best model for the condition you are working in;
2. Reliability of the risk calculation highly depends on the available information, and a thorough literature review is necessary when selecting the indicators;
3. Indicators will need to be discarded if their data are unreliable or unavailable;
4. After finalizing the list of indicators, the input data must be collected, collated, converted (into shapefile or raster file), resampled and standardized;
5. If possible, the calculated risk should be spatially distributed by using GIS.

Dr. Rubio related the case study to the data collection process in Kurunegala where most of the data for indicators are not available or are in a condition that is not possible to be applied. In such cases, it is necessary to apply qualitative data analysis based on literature review, questionnaire surveys and weighting by experts.

1.5 Process of the Adaptation Action Plan for Kurunegala

[Dr. Hanna Cho, Research Fellow, Korea Adaptation Center for Climate Change, Korea Environment Institute]

Dr. Cho presented the process of the LAP in Korea. She provided similarities between the Korean process and the Sri Lankan process. She stated that the establishment of the Adaptation Action Plan for Kurunegala began with quantitative and qualitative risk assessment. As a result of the stakeholder workshops, water scarcity and heat stress were identified as the 'Risk' for Kurunegala city.

The list of risk indicators was:

1. Drinking water resources risk/vulnerability to drought
2. Water management risk/vulnerability
3. Water quality and aquatic ecosystem risk/vulnerability
4. Water resources risk/vulnerability
5. Sanitation risk/vulnerability of drought and flood
6. Health risk/vulnerability to flood
7. Health and infrastructure risk/vulnerability to heat stress

Figure 1-4) Presentation of Dr. Hanna Cho

Based on the field survey, the following results were obtained.

Gender (results from survey)

The top 3 climate change risks affecting the gender group were:

1) Lack of drinking water
2) Withered agricultural crop
3) Increasing risk of tropical diseases

The top 3 climate change actions that need to be prioritized were:

1) Greening the city
2) Supplying drinking water
3) Supplying living water

Other experts (results from survey)

The top 3 climate change risks affecting the group were:

1) Lack of drinking water
2) Increasing risk of tropical diseases
3) Withered agricultural crop

The top 3 climate change actions that need to be prioritized were:

1) Greening the city
2) Supplying drinking water
3) Greening buildings

Water and heat experts (results from survey)

The top 3 risk indicators identified through the survey were:

1) Drinking water resources risk/vulnerability to drought
2) Water resources risk/vulnerability
3) Health and infrastructure risk/vulnerability to heat stress

Results of the consultant workshop held in July 2019 is presented in the table below.

Table 1-3) Result of the consultant workshop

	Group 1	Group 2
Risk factor	Lack of drinking water resources due to drought	Lack of drinking water resources due to drought
Solution	1) Reduction of non-renewable water 2) Water recycling methodology 3) New water scheme	1) Development of Wendaru Wewa 2) Two line of water supply (drinking water and gray water) 3) Repairing of leaking pipelines
Risk factor	Drying streams and water bodies (natural and artificial) due to drought	Lack of water for building maintenance and management
Solution	1) Increasing the green coverage	1) Water reuse for building maintenance 2) Water recycling for plantation and agriculture 3) Rainwater storage system

1.6 Adaptation Action Plan for Kurunegala to Address Water Scarcity and Heat Stress

[Dr. Hanna Cho, Research Fellow, Korea Adaptation Center for Climate Change, Korea Environment Institute]

The Adaptation Action Plan to address water scarcity and heat stress of Kurunegala is comprised of three components, including (1) sustainable urban planning, (2) water supply management and (3) heat management. For each component, Dr. Cho has proposed possible measures that could be applied to Kurunegala city.

1.6.1 Sustainable Urban Planning

As Kurunegala city is an essential part of the Upper Deduru Oya Basin as well as the main access of the Northern Province to the city of Colombo, there is an urgent need to address water scarcity and wastewater treatment issues in the city. Adaptive measures should be taken into consideration to mitigate the effects of climate change. In this regard, it is required to incorporate sustainable urban design in Kurunegala city. Dr. Cho presented summary of the component 'sustainable urban planning,' and Mr. Reyes provided more details on this component in his

presentation (Climate Change Adaptation and Water Circulation Action Plan for the City of Kurunegala).

Figure 1-5) Presentation of Dr. Hanna Cho

Potential areas of development in Kurunegala city were based on the field survey in July 2019. The participants in the workshop could easily understand and grasp the concept of the proposed actions. In her presentation, examples of the adaptation activities were categorized into (a) Government offices and educational institutions, (b) Roads and parking spaces, and (c) Residential and commercial areas. Some of the examples are presented in this report. Cost-benefit analysis for Low Impact Developments (LIDs) was also shared during the presentation. More details on the adaptation activities for 'Sustainable Urban Planning' can be found in the Deliverable 7 (Climate Change Adaptation Action Plan for Kurunegala) of this TA.

a) Government Offices and Educational Institutions

At Maliyadeva College, it was suggested that infiltration trenches be constructed to treat and reduce stormwater runoff, instead of using open canals in the drainage system.

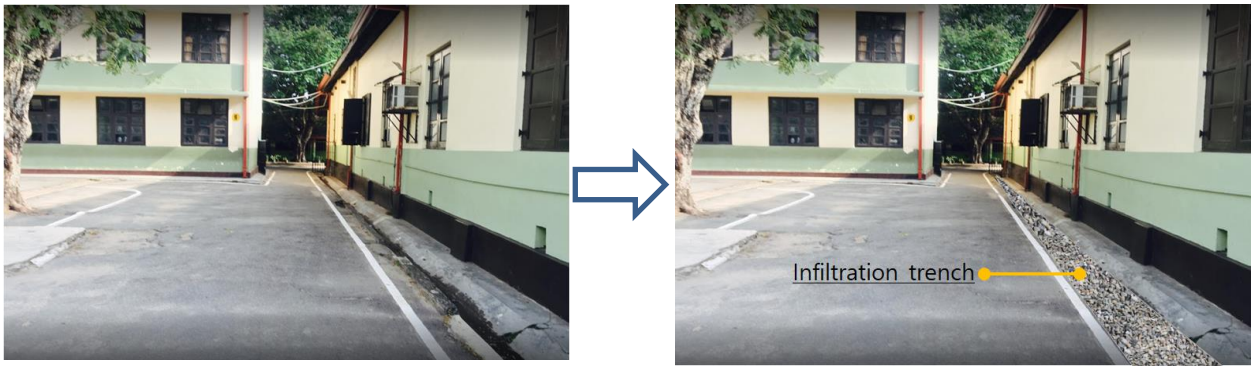


Figure 1-6) A LID facility (infiltration trench) applicable to Maliyadeva College

b) Roads and Parking Spaces

For Colombo Road, the following LID methods were suggested:

- Tree-box filter;
- Planter boxes;
- Vegetated swales;
- Bioretention facilities.

The expected benefits included pollutant treatment, reduced runoff volume, promotion of groundwater recharge, reduced surface temperature and aesthetic value.

Figure 1-7) Potential location of LID facilities along Colombo Road

c) Residential and Commercial Areas

As residential and commercial areas dominate the built-up areas in Kurunegala city, it is crucial to incorporate LID in local housing units of Kurunegala city. For this purpose, water circulation strategies and nature-based wastewater treatment techniques were introduced.

Among nature-based wastewater treatment techniques, constructed wetlands were given as an example. It refers to engineered systems used to mimic the function of a natural wetland. As a secondary treatment in a community's wastewater treatment system, it can be placed upstream in the treatment train from an infiltration system (tertiary treatment) to optimize the cost of secondary treatment.

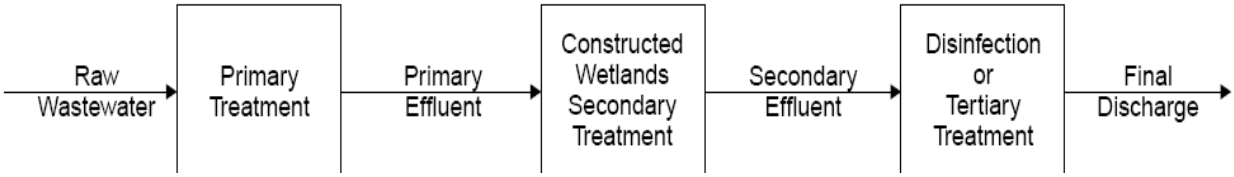


Figure 1-8) Wastewater treatment system with constructed wetland (secondary treatment)

1.6.2 Water Supply Management

a) Non-Revenue Water (NRW) Reduction

NRW is water that has been produced and is "lost" before it reaches the customer. Losses can be real losses (through leaks, sometimes also referred to as physical losses) or apparent losses (for example through theft or metering inaccuracies). High levels of NRW are detrimental to the financial viability of water utilities as well as the quality of water itself. NRW is typically measured as the volume of water "lost" as a share of net water produced. The main reasons for higher rate of NRW are:

- Leakage of water pipes;
- Faulty water meters;
- Unauthorized usage;
- Orphanages, schools and religious places are not billed for water consumption.

According to the report by the National Water Supply and Drainage Board (NWSDB) of Kurunegala, the NRW percentages have been documented as 43.91% (2014), 51.93% (2015) and 50.73% (2016). If it is possible to reduce the NRW by 20%, a lot of water could be conserved and managed.

The process for managing NRW in Korea, including inspection and correction of flow meter, leak detection, monitoring pressure, analysis of CCTV pipe survey and upgrading pipeline map, was introduced in the presentation.

b) Water Storage Systems

During the previous field trip, water samples were collected from the Kurunegala Wewa, a public well (bathing), domestic well, tube well and temporary storage for use during drought. Most of the samples contained small amounts of bacteria. After the treatment of the water samples by using the gravity-driven membrane (GDM) filter, the filtrates did not contain any bacteria. The

GDM technology could be used as a low-cost water treatment method in Kurunegala city. Large-scale GDM installations could be used for rainwater storage tanks.

1.6.3 Heat Management

Heat stress has not been addressed in Kurunegala. Different agencies take steps to inform the public when there is a temperature rise.

There is no single organization to address the heat management issue. Heat alerts are sent by the Meteorological Department, and warnings are sent by the Kurunegala Municipal Council (KMC). The Health Department advices patients and provides treatments. So far, no mortality has been documented to be linked to heat stress in Kurunegala. Advice on prevention and management of heat stress which could be applied in the Kurunegala situation was provided.

DO's

- Drink sufficient water as often as possible, even if not thirsty.
- If you work outside, use a hat or an umbrella and also use a damp cloth on your head, neck, face and limbs.
- Recognize the signs of heat stroke, heat rash or heat cramps.
- If you feel faint or ill, see a doctor immediately.
- Keep animals in shade and give them plenty of water to drink.
- Keep your home cool, use curtains, shutters or sunshade and open windows at night.
- Provide cool drinking water near workplace.
- Caution workers to avoid direct sunlight.
- Schedule strenuous jobs to cooler times of the day.
- Increase the frequency and length of rest breaks for outdoor activities.

DONT's

- Do not leave children or pets in parked vehicles.
- Avoid going out in the sun, especially between 12:00 (at noon) and 3:00 p.m.
- Avoid wearing dark, heavy or tight clothing.
- Avoid strenuous activities when the outside temperature is high.
- Avoid working outside between 12:00 (at noon) and 3:00 p.m.
- Avoid cooking during peak hours.
- Open doors and windows to ventilate cooking area adequately.
- Avoid alcohol, tea, coffee and carbonated soft drinks which dehydrates the body.
- Avoid high-protein food and do not eat stale food.

1.7 Climate Change Adaptation and Water Circulation Action Plan for the City of Kurunegala

[Mr. Nash Jett Reyes, PhD candidate, Kong Ju National University]

Figure 1-9) Presentation of Mr. Nash Jett Reyes

Mr. Reyes provided a brief on the current status of climate change in Sri Lanka. He identified four environmental hazards for Kurunegala which were drought, heat island effect, urban flooding and water related and vector borne health concerns.

He discussed that the urban flooding is mainly caused by reduced infiltration, greater surface runoff and low evapotranspiration. The effects of drought are mainly felt in cities due to uneven rainfall distribution, high atmospheric temperature and inadequate groundwater recharge.

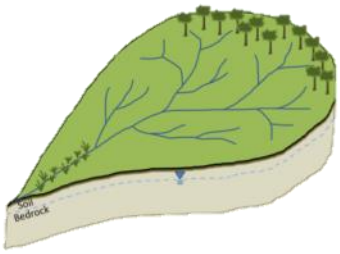
The Urban Heat Island (UHI) effect is felt intensely due to increase in the surface temperature of the city area caused by the expansion of road networks. Furthermore, vehicular traffic and machineries also cause an increase in temperature. Water borne and vector borne diseases are spread due to the spread of sewage and chemicals or polluted water during heavy rainfall and floods. Poor hygiene increases the susceptibility to diarrheal diseases during drought, increases growth of microbes and provides breeding grounds during rise in temperature due to pockets of water containment.

Mr. Reyes introduced the concept of smart urban development and a water-wise city. Smart urban development refers to providing an integrated urban area designed to promote economic growth, human well-being and environmental conservation simultaneously. It can be characterized as below:

Establishment of a water-wise city

A water-wise city ensures complete utilization of water reducing the heat effect and reducing conditions of drought and flood.

Formation of blue-green networks



The blue-green networks are designed to provide ecological services and amenities by incorporating natural systems associated with urban greening and storm water management.

Utilization of green infrastructure

Natural or semi-natural systems providing water resources management options with benefits

Figure 1-10) Smart urban development and water-wise cities

He also explained smart urban development strategies as below:

Table 1-4) Smart urban development strategies

Smart urban development strategy	Description
Nature-Based Solutions (NBS)	Mechanisms for promoting sustainable development by addressing societal challenges along with provisions in maintaining biodiversity and human well-being
Green Infrastructure (GI)	Natural or semi-natural systems providing water resources management options with benefits
Low Impact Development (LID)	Land planning and engineering design approach to manage storm water runoff as part of the green infrastructure

A water-wise city can have a variety of components (technologies) presented in the figure and the table below.

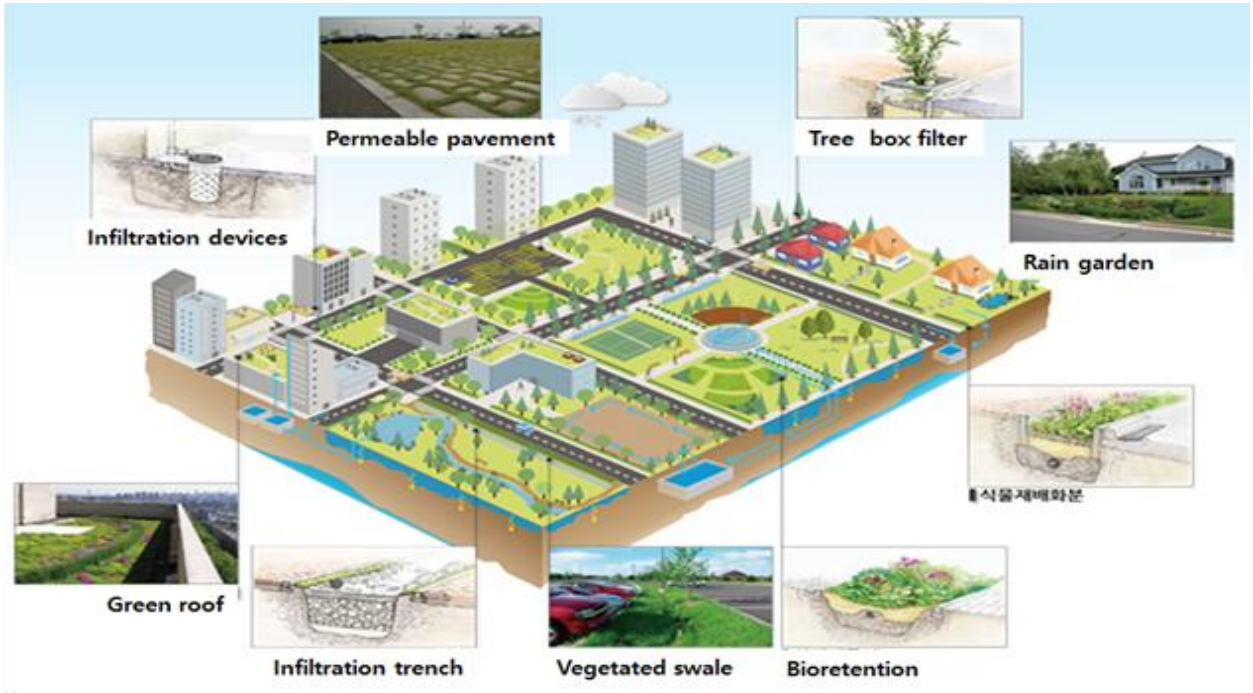


Figure 1-11) The components of a water-wise city

Table 1-5) Detailed description of a water-wise city

Facility	Description
Rain garden	A planted area that promotes infiltration and can be used to treat runoff from sidewalks, roads, parking lots and roofs.
Infiltration trench/ basin	Excavations located on roadsides of open areas used to reduce peak runoff volumes by means of infiltration. This can be also used to reduce pollutants in water by means of filtration.
Vegetative swale	Gently sloped vegetated areas underlain by permeable soil for infiltration and removal of debris in storm water
Tree-box filter/ planter box	Filtration and infiltration systems planted with a tree that is usually placed on roadsides to treat storm water runoff
Green roof	Vegetated systems placed on roofs for water retention and promote evapotranspiration. Membrane linings are employed upon installation to prevent damage in the underlying structure
Permeable pavement	A type of pavement with high porosity that allows water to infiltrate

Different components use diversified water sources, such as groundwater, rainwater and wastewater, to store water or for secondary utilizations. The LID, Green Infrastructure (GI) and Nature-Based Solutions (NBS) depicted in the figure above are potential interventions that could be used to establish the climate smart city in Kurunegala.

1.8 Background of Questionnaire Survey Conducted for Kurunegala

[Mr. Susantha Udagedara, Technical Coordinator, Vulnerability and Adaptation Measures (Third National Communication Project)]

Mr. Udagedara delivered a brief presentation on climate change in Sri Lanka. He described the process used in the preparation of the Adaptation Action Plan to address water scarcity and heat stress. Qualitative data was collected from the workshop where experts and stakeholders participated, and data for quantitative analysis was collected from institutions. The Kurunegala city is divided into 12 Grama Niladhari Divisions (GND). Data specific to the GND was not available. Therefore, questionnaires were prepared to obtain data at GND level, household level and commercial and business level. There were more than 15,000 units to obtain data. Due to limitation of time, it was not possible to enter all the data into the database.

This base line information would assist in the later creation of a GHG inventory for the city and decision making in the preparation of adaptation plans and early warning systems.

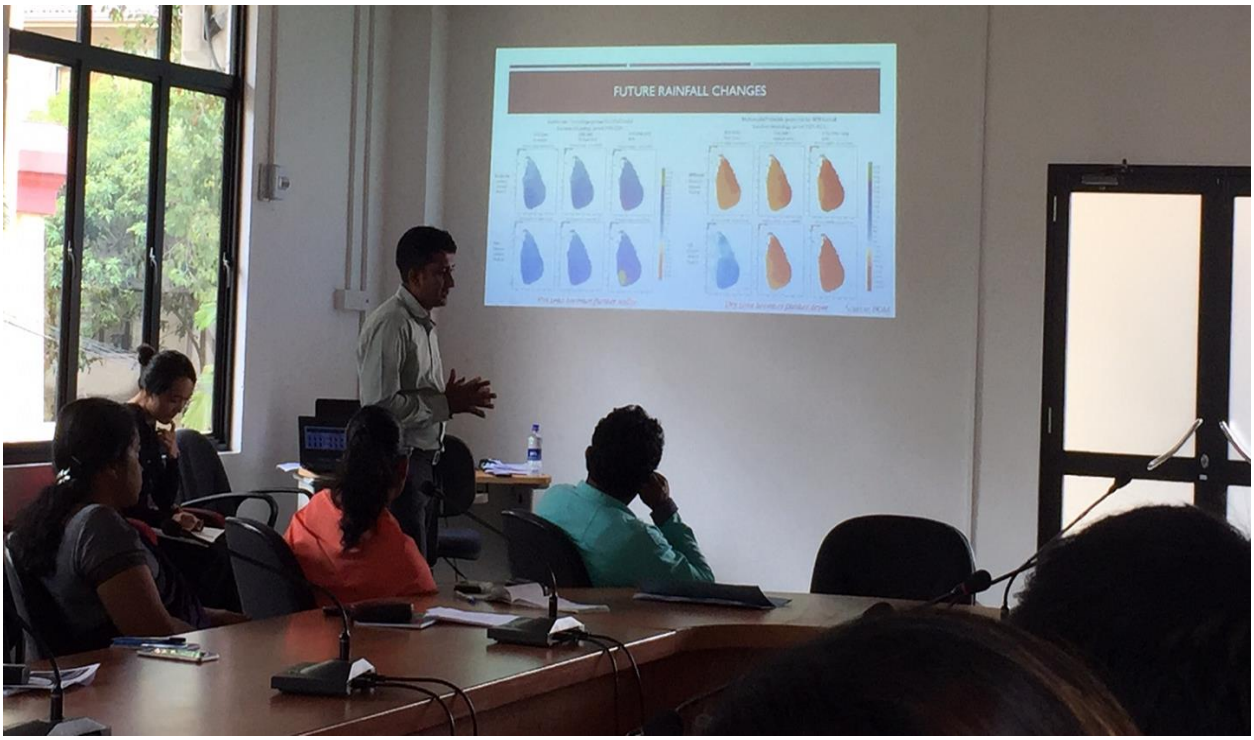


Figure 1-12) Presentation of Mr. Susantha Udagedara

1.9 Funding Sources

[Ms. Inhye Bak, Researcher, Green Technology Center]

Ms. Bak described the available funding sources such as the Adaptation Fund, the Green Climate Fund, the CTCN, the NAP Readiness Fund and many other available sources. Most of them require an accredited agency to funnel the funds and to write a sound proposal. Most funds for implementation are available as loans.

Figure 1-13) Presentation of Ms. Inhye Bak

1.10 Feedback from Stakeholders

Discussions were held with stakeholders with regard to draft Adaptation Action Plan. For each component of the Adaptation Action Plan, the key stakeholders provided feedback. Further details were interpreted from English into Sinhalese by Ms. Hasula Wickremasinghe when requested, in order to make sure of clear understanding of the contents. The discussions were meaningful and effective as comments from decision-making level as well as technical level were gathered at the same time. The discussions are summarized as follows:

- If it is possible to implement each component of Adaptation Action Plan or not;
- If relevant measures are underway;
- Some stakeholders raised questions and Dr. Cho and Mr. Reyes answered;
- Some stakeholders expressed their concerns about why it might not fit the situation of Kurunegala; or what obstacles there are to be addressed;
- What should be done to facilitate the implementation of the Adaptation Action Plan.

To sum up, most of the components suggested by the KEI received positive feedback. This could be attributed to the thorough field survey in previous visits. The feedback from the stakeholders has been reflected on the final draft of the Adaptation Action Plan.

Figure 1-14) Discussions and feedback about the draft Adaptation Plan

2. Discussions and Conclusion

2.1 Legislature and Regulations

Existing legislature should be strengthened, and regulations need to be introduced to conserve and manage water systems. There is a need to introduce rain water systems into newly constructed buildings. Green building guidelines are necessary to be applied based on present condition of the specific building and the site it is being built. Amendment needs to be in laws so that it permits treated and tested effluents from the sewerage plant to be used in hospitals and for industrial washing purposes. Recycling of water for the use of toilets, watering gardens and washing cars should be mandated after proper monitoring. Monitoring systems need to be set up for rainwater harvesting systems to ensure the smooth and efficient running of these plants (Rainwater systems were used in the dry zone, but, due to lack of monitoring, these systems were removed).

Preparation of Adaptation Action Plans at city level, district level and provincial level is incorporated into the annual workplans of associated institutions. Databases need to be established in each institution, and they need to be linked and networked to a central database which could possibly be established at the KMC. GIS units need to be established in these institutions.

2.2 Adaptation Interventions for the City

The participants discussed that most of the interventions presented for adaptation such as rainwater harvesting are possible to be applied to the city. Special consideration should be made that no surface water is left in these systems to avoid breeding of dengue and other mosquitos.

Cost is also another factor which needs to be considered in these applications. Technology to produce permeable bricks could be introduced to Sri Lanka.

Funding is essential to connect all households and businesses to the main sewerage line. This would reduce water contamination and make it possible to use well water.

These interventions should be incorporated into the plans of the Urban Development Authority (UDA), Road Development Authority (RDA), KMC and other related institutions for implementation.

2.3 Lack of Data

A major issue highlighted was the lack of data for the GND and the lack of systems that support climate data. Some of the data is available in hard copies or in ways that it takes time to extract. Some data has not been collected at all while some data consists of either annual figures or figures for the entire district.

Accurate GIS maps with high resolution are not available for the city.

Only 4 out of the 34 indicators were available to collect data. Their data was requested to make the quantitative assessment and support the qualitative analysis. Therefore, it is not possible to conduct a quantitative risk assessment for Adaptation Action Plan in Kurunegala city.

2.4 Awareness Increase

It is necessary to increase awareness on climate change to personnel working in government institutions and at schools. Institutional strengthening and technical know-how are necessary to create database and establish data collection, analysis and MRV (monitoring, verification and reporting) systems.

Awareness increase is necessary for health units, schools and the public. It is necessary to obtain documentation from hospitals with respect to climate related diseases.

2.5 Research and Development

It is necessary to conduct research on water scarcity and heat stress in Kurunegala. Research needs to be conducted on climate related health issues. Models need to be designed for the formulation of early warning systems. It is necessary to create a 1:2000 GIS map for the city and include all data gathered from questionnaires and from institutes into the map.

An issue came up regarding accuracy of data collected by the questionnaire. The KMC assured that the questionnaires were delivered and collected by the GND. These were thereafter checked by the Senior Public Health Inspector assigned to each Division for accuracy. Furthermore, since phone numbers were included in the questionnaires, it was possible to clarify certain issues with the householders.

2.6 Funding

Most of the introduced interventions could be applied if there is a source of funding. Most of the plans of the UDA, RDA and KMC could not be implemented due to the lack of funding. Most foreign funding sources which come as grants are for assessments and reporting and not for implementation. Loans have to be obtained for implementation purposes. Most institutes require funding sources to upgrade computers and databases as well as establish monitoring equipment and laboratories.

The other issue for funding is related to the lack of trained personnel to write proposals.

It is necessary to find sources of funding to replace faulty water meters, detect leakages and replace old pipes. With this, it is necessary to find funding to restore and improve existing tank systems and create new water retention areas.

3. Stakeholder Meetings (4th and 5th September 2019)

3.1 Climate Change Secretariat

In the discussion with Dr. R. D. S. Jayathunga, Director of Climate Change Secretariat, on 4th September 2019, he stated that a comprehensive adaptation plan for Kurunegala includes all issues, all suggested interventions and recommendations. He would also like to have a roadmap so that the adaptation plan for Kurunegala city could be put up for funding by the international community.

He hoped to set up a comprehensive plan for the water and heat sectors. He further stressed that, even though only water and heat stress have been considered, the roadmap could include all interventions for adaptation.

He stated that it is necessary to conduct surveys for other adaptation and mitigation sectors to derive a complete climate action plan for Kurunegala city.

For the upcoming mitigation assessment, he queried whether it is possible to allocate some funds to the KMC for data collection and purchase of computers for data systems.

Figure 3-1) Discussion with Dr. R. D. S. Jayathunga (Director) at Climate Change Secretariat

3.2 UN Habitat

In the discussion with Ms. Indu Weerasoori, Ms. Ramona and Mr. Thushan in UN Habitat, they assured that it is possible to provide training program to the members of the KMC and assist them to include their data into the map created through the 'State of Sri Lankan Cities 2018' project. They also highlighted that in the long term, the climate change adaptation action plan

should be integrated into the Kurunegala development plan. In this way, the adaptation action plan would be implemented.

Figure 3-2) Discussion with Ms. Indu Weerasoori, Ms. Ramona and Mr. Thushan in UN Habitat

3.3 Urban Development Authority

In the meeting with Ms. Gangadari Ranawaka of the Strategic Cities Development Project, she stated that the Strategic Cities Development Project of the Ministry of Megapolis and Western Development together with the Urban Development Authority has embarked on strategic investments such as integrated urban services improvement and public urban space enhancement to ameliorate the functional aspects of the city as well as the attractiveness and liability of the city. Furthermore, interventions are underway in Kandy, Galle and Jaffna cities as well as proposed infrastructure and institutional strengthening of Trincomalee, Dambulla, Kurunegala and Ratnapura cities targeting the development of cities outside Colombo with growth potential in priority economic corridors and important nodes across the country.

Figure 3-3) Meeting with Ms. Gangadari Ranawaka of the Strategic Cities Development Project

Appendix A. List of participants (2nd September 2019)

CLIMATE SMART CITY PROGRAMME. (KEi) ①

2019.09.02

No	Name	Designation	Office Address	E-mail Address	Telephone No	Signature
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	~~Dhammika~~					
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F	16	HM ~~[illegible]~~ M. S Herath	DO	MCK	-	-	
	17	W.G.C Kumara	Health Supervisor	mck			
	18	Dhammika Konara	[illegible]	mck	dhammikadevapriya@	0716389228	

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	No	Name	Designation	Office Address	E-mail Address	Telephone No	Signature
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	03	O.M.I. Obesekara (M)	PHI / MCK	—do—		071-8056200	
	04	D. Samaraweera (M)	D.Director	No. 76. Alles Watte Kurunegala	damitha@janathakshan.lk Janathakshan	0777-707411	
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	06	I.U. Wedage		No, 05, Lionel edirisinghe Road, Colombo 05	ishaniwedage@gmail.com	0710177664	
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	10.	Dr. I.P Aravamasinghe	Deputy RDHS	RDHS office Kurunegala	ipraseeth75@gmail.com	0777513487	
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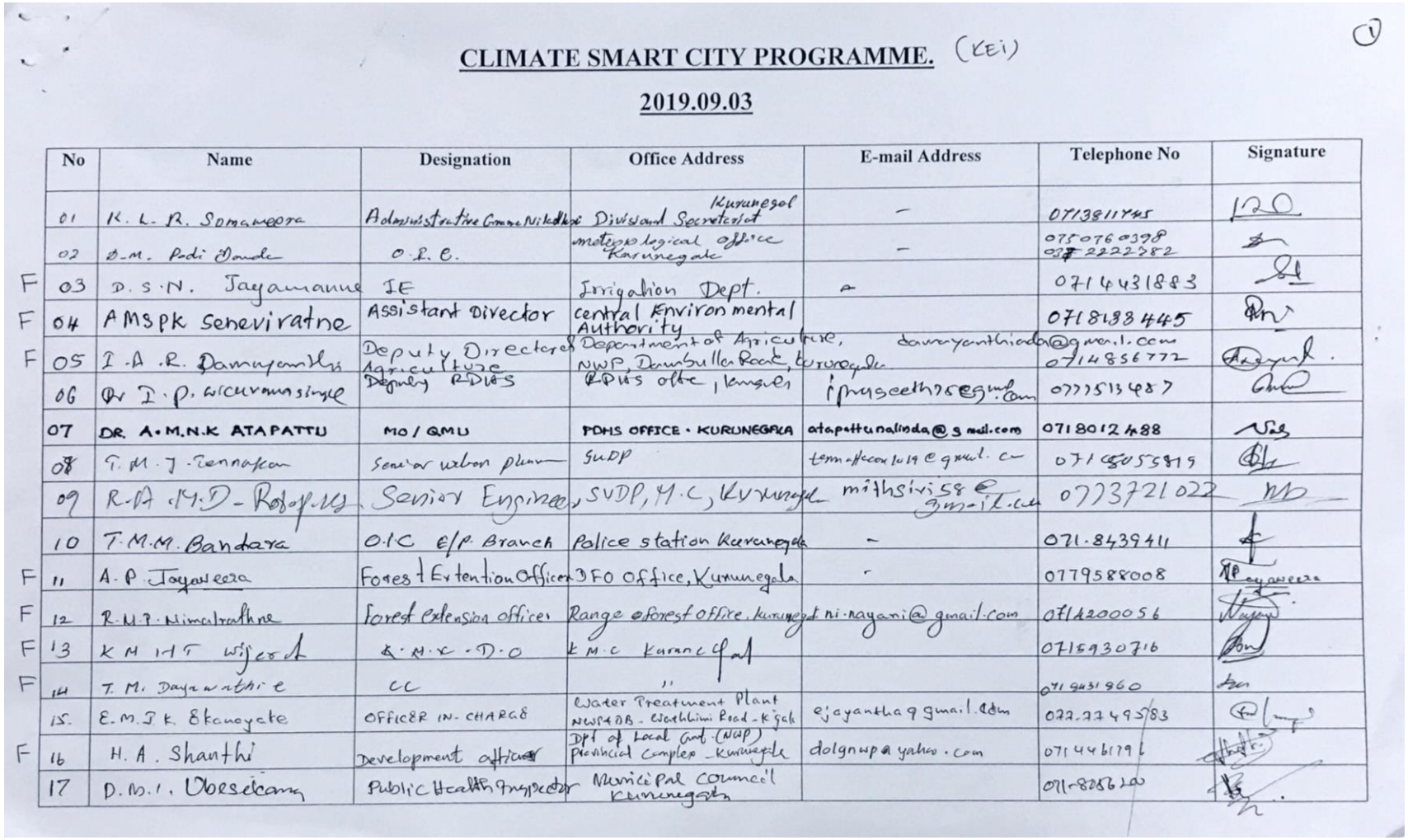
F	15	M.D Chandradasa (F)	Development Officer	Municipal council	-	-	
F	16	K.M.H.T Wijerathna (F)	- Do —	— Do —	-	-	

Appendix B. List of participants (3rd September 2019)



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F	04	AMSPK Seneviratne	Assistant Director	central Environmental Authority		0718188445	
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	09	R.A.M.D. Rajapaksha	Senior Engineer	SUDP, M.C, Kurunegala	mithsivi58@gmail.com	0773721022	
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F	14	T. M. Dayawathie	CC	"		0719431960	
	15	E.M.J.K. Ekanayake	OFFICER IN-CHARGE	Water Treatment Plant NWSDB - Wathhimi Road - Kiula	ejayantha@gmail.com	072-2749583	
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	21	R.D.D. Rajapakshe	P.H.I	MC - Kuru.	-	0714461798	
	22	K.A.M. Gnanathilaka	E.O	Provincial Env" Authority Kurunegala		071 9097681	
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	29	W.G.C Kumara	Health Supervisor	mck	-	071 5786999	
F	30	Hasula Wickum	PA	CCS, MMDE	hasulaw@yahoo.com	071829368S	
F	31	K.N.K. Vidyalankara	Assit. Director	CCS, MMDE	kumudinimex@gmail.com	0710702188	
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F		Kumudini Vidyalankara	Assit. Direct	"	kumudinimex@gmail.com		