Readiness Plan for Implementation of Intended Nationally Determined Contributions (INDCs) 2017 - 2019

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The Message of His Excellency the President

Paris Agreement is one of the key international agreements relating to climate change that the world community consented to under the United Nations Framework Convention for Climate Change (UNFCCC). This will lead to landmark decisions and actions at both national and international level to address the adverse impacts of climate change, and Sri Lanka is privileged to be a party to this important agreement.

Being a party to the UNFCCC Sri Lanka holds a mandate to take appropriate actions to achieve objectives of the UNFCCC and the Paris Agreement. The Agreement contains provisions to hold countries accountable to their commitments and mobilise greater investments to assist developing countries in building low-carbon, climate-resilient economies.

As a developing country and an island nation, Sri Lanka is particularly vulnerable to adverse impacts of climate change such as rise of temperature, variability of rainfall and extreme weather conditions that would be harmful for Sri Lanka's natural resources, economic growth and well-being of the people. Building resilience over these adversities is crucial for Sri Lanka and, hence, adaptation, methodologies to avert loss and damage have also been included in Sri Lanka's Intended Nationally Determined Contributions (INDCs) in addition to the mitigation targets.

We, in Sri Lanka, are willing to contribute to minimise the adverse impacts of climate change although our contribution to global warming through greenhouse gas emissions is negligible. With the "SRI LANKA NEXT- A BLUE GREEN ERA" programme launched in January this year, Sri Lanka has demonstrated its commitment to adopt climate smart strategies and ensure low carbon development pathways. Furthermore, the government of Sri Lanka has committed to achieving the Sustainable Development Goals (SDGs) including those to eliminate poverty and ensure food security, while promoting sustainable agriculture and protecting the environment.

We are confident that we will be able to complete what we have planned for the upcoming years, and sincerely hope that the objectives of the Paris Agreement in mitigating global warming and building resilience are achieved in collaboration with all nations because we believe that the existence of the mother earth will heavily depend on fulfilment of global commitments.

Maithripala Sirisena
President of Democratic Socialist Republic of Sri Lanka

The Message of Honourable Deputy Minister

Climate change which is the ultimate outcome of global warming is now universally recognized as one of the fundamental human development challenges of the 21st century. Anthropogenic activities, such as fossil fuel burning and land use change contribute to greenhouse gas emissions that have increased significantly since the pre-industrial era. Greenhouse gas emission is identified as the root cause of global warming and ultimately climate change.

Global warming is expected to lead to a rise in sea level, higher temperatures, more frequent and prolonged droughts, high intensity rainfalls and increased thunder activity. These anticipated changes present a significant threat to the coastal areas, the different sectors of the national economy and human health. Therefore, it is evident that Sri Lankan economy, society and environment will be heavily affected by the adverse impacts of climate change.

To avoid catastrophic impacts in the future, the parties to the United Nations Framework Convention on Climate Change (UNFCCC) have adopted a goal of limiting global warming and governments have determined what effort they should make to reduce emissions and address climate change. Countries are already planning to implement these commitments after 2020. Their attention is now drawn to convert their commitments to implementation plans for the post-2020 period, according to the pledges made through Intended Nationally Determined Contributions (INDCs).

Sri Lanka was among the 178 countries that signed the Paris Agreement on 22nd April 2016 at the High Level Signature Ceremony of the Paris Agreement held at the United Nations Headquarters in New York. This high-level signature ceremony was the culmination of negotiations held amongst member states that agreed on the landmark climate deal during the 21st Conference of Parties (COP21) to the UNFCCC held in Paris in December 2015.

With this effort of preparing an action plan, I believe that Sri Lanka has taken one more step forward in ratification of the Paris Agreement. Preparation of this document which includes our strategic policies and readiness to implement INDCs is a significant outcome in Sri Lanka's efforts to deal with adverse impacts of climate change. I wish to extend my sincere appreciation to all those who contributed to its preparation.

Anuradha Jayarathne M.P.
Deputy Minister of Mahaweli Development and Environment

Foreword

Sri Lanka has been a party to the United Nations Framework Convention for Climate Change (UNFCCC) since 1993 and to the Kyoto Protocol since 2002. The Paris Agreement, which is the latest agreement under the UNFCCC, The objective of which is to mitigate the increase in the global average temperature to well below 2 degrees centigrade above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees centigrade above pre-industrial levels while increasing the ability to adapt to the adverse impacts of climate change, foster climate resilience and reduce development of greenhouse gas emissions in a manner that does not threaten food production.

Prior to the Paris Agreement, at the 19th Conference of the Parties (COP) to the UNFCCC, a decision on Intended Nationally Determined Contributions (INDCs) was adopted. By that decision all Parties to the UNFCCC were invited to initiate or intensify domestic preparations for their INDCs and to communicate them before the 21st session of the COP in December 2015. Accordingly, Sri Lanka submitted its INDCs in October 2015 and resubmitted in April 2016. Sri Lanka's INDCs include five mitigation sectors such as energy, industry, transport, waste and forestry and eight adaptation sectors such as agriculture, fisheries and livestock, health, water and irrigation, coastal and marine, bio-diversity, tourism and recreation and urban, city planning and human settlement.

As the focal point to UNFCCC, the Ministry of Mahaweli Development and Environment has forwarded and obtained the approval of the Cabinet of Ministers for the Cabinet Memorandum on Agreement on Global Climate Change and National Strategic Accord (National Contribution towards Minimising Global Temperature) on 16th of March 2016. After ratification, our INDCs will come into force as NDCs under the Paris Agreement.

It is recommended in the above mentioned Cabinet Memorandum that strategic policies and implementation plans for each sector of INDCs be prepared through a Planning and Monitoring committee consisting of officials of the central government, Provincial Councils, scientists/technologists in universities and research institutions who are specialists in relevant fields presided by the Secretary to the relevant Ministry. This needs to be recommended by an Advisory Board consisting of the Minister in charge and Ministers in charge of the Provincial Councils. We are now launching these strategic policies and action plans for each sector.

I wish to take this opportunity to extend my sincere gratitude to all the ministers and secretaries of the relevant Ministries for preparing the strategic policies and action plans. My appreciation also extends to all the experts who worked hard for the success of these policies and plans.

Udaya R. Seneviratne
Secretary, Ministry of Mahaweli Development and Environment

List of Acronyms and Abbreviations

AirMAC	-	Air Resource Management Centre
BAU	-	Business-As-Usual
BDS	-	Biodiversity Secretariat
BOI	-	Board of Investment Sri Lanka
CAA	-	Civil Aviation Authority of Sri Lanka
CASL	-	Clean Air Sri Lanka
CBOs	-	Community Based Organisations
CC&CRMD	-	Coast Conservation and Coastal Resource Management Department
CCC	-	Ceylon Chamber of Commerce
CCF	-	Central Cultural Fund
CCS	-	Climate Change Secretariat
CEA	-	Central Environmental Authority
CEB	-	Ceylon Electricity Board
Chief Secs	-	Chief Secretaries (all provinces)
CMA	-	Condominium Management Authority
COP	-	Conference of the Parties
CO_{2eq}	-	Carbon dioxide equivalent
CRI	-	Coconut Research Institute
DAD	-	Department of Agrarian Development
DAPH	-	Department of Animal Production and Health
DFAR	-	Department of Fisheries and Aquatic Resources
DM	-	Department of Meteorology
DMC	-	Disaster Management Centre
DMT	-	Department of Motor Traffic
DOA	-	Department of Agriculture
DoI	-	Department of Irrigation
DOM	-	Department of Meteorology
DSD	-	Divisional Secretariat Division
DSM	-	Demand Side Management
DWLC	-	Department of Wildlife Conservation
EDB	-	Export Development Board
EP&E	-	Environmental Planning and Economics Division
EST	-	Environmentally Sustainable Transport
EW	-	Early Warning
FCCISL	-	Federation of Chambers of Commerce and Industry of Sri Lanka
FD	-	Forest Department
FOs	-	Farmer Organisations
GDP	-	Gross Domestic Product
Gg	-	Giga Gram
GHG	-	Greenhouse Gas

GNDs	-	Grama Niladari Divisions
GPS	-	Global Positioning System
GSMB	-	Geological Survey and Mines Bureau
GWh	-	Gigawatt Hour
ICT	-	Information and Communication Technologies
IDB	-	Industrial Development Board
IMD	-	Irrigation Management Division
INDCs	-	Intended Nationally Determined Contributions
IPCC	-	Intergovernmental Panel on Climate Change
ITI	-	Industrial Technology Institute
KPIs	-	Key Performance Indicators
LAs	-	Local Authorities
LECO	-	Lanka Electricity Company
LNG	-	Liquefied Natural Gas
LPG	-	Liquefied Petroleum Gas
LUPPD	-	Land Use Policy Planning Department
MASL	-	Mahaweli Authority of Sri Lanka
MBI	-	Market Based Instruments
MDM	-	Ministry of Disaster Management -
MEPA	-	Marine Environment Protection Authority
MH&C	-	Ministry of Housing and Construction
MI&WRM	-	Ministry of Irrigation and Water Resources Management
MIC	-	Ministry of Industry and Commerce
MJ	-	Megajoule
MMD&E	-	Ministry of Mahaweli Development and Environment
MMP&WD	-	Ministry of Megapolis and Western Development
MOA	-	Ministry of Agriculture
MoF	-	Ministry of Finance
MoH	-	Ministry of Health, Nutrition and Indigenous Medicine
MoHE&H	-	Ministry of Higher Education & Highways
MoM&WD	-	Ministry of Megapolis & Western Development
MOPI	-	Ministry of Plantation Industries
MoPPED	-	Ministry of Policy Planning and Economic Development
MoP&RE	-	Ministry of Power and Renewable Energy
MoT&CA	-	Ministry of Transport & Civil Aviation
MPC&LG	-	Ministry of Provincial Councils& Local Government
MREA	-	Ministry of Rural Economic Affairs
MRV	-	Monitoring, Reporting and Verification
MTDCRA	-	Ministry of Tourism Development and Christian Religious Affairs
MUSSD	-	Dept. of Measurement Units, Standards & Services
MVE	-	Ministry of Vocational Education
MW	-	Mega Watt

MWS&D	-	Ministry of Water Supply and Drainage
NAMA	-	Nationally Appropriate Mitigation Actions
NAQDA	-	National Aquaculture Development Authority of Sri Lanka
NARA	-	National Aquatic Resources Research and Development Authority
DoNBG	-	Department of National Botanic Gardens
NBRO	-	National Building Research Organisation
NCC	-	National Chamber of Commerce
NCPC	-	National Cleaner Production Centre
NCRE	-	Non-Conventional Renewable Energy
NCWSD	-	National Community Water Supply Department
NDRSC	-	National Disaster Relief Services Centre
NERDC	-	National Engineering Research and Development Centre
NGOs	-	Non Governmental Organizations
NHDA	-	National Housing Development Authority
NIPO	-	National Intellectual Property Office of Sri Lanka
NLDB	-	National Livestock Development Board
NMT	-	Non-motorized transport
NPD	-	Department of National Planning
NRMC	-	Natural Resource Management Centre
NTC	-	National Transport Commission
NWS&DB	-	National Water Supply and Drainage Board
DoNZG	-	Department of National Zoological Gardens
OECD	-	Organisation for Economic Co-operation and Development
PC	-	Provincial Council
PDAPH	-	Provincial Department of Animal Production and Health
PDOA	-	Provincial Department of Agriculture
PIDD	-	Provincial Irrigation Department
PMU	-	Project Management Unit
PRDS	-	Petroleum Resources Development Secretariat
QUELROs	-	Quantified Emissions Limitation and Reduction Objectives
RDA	-	Road Development Authority
RRI	-	Rubber Research Institute
M/SD&WL	-	Ministry of Sustainable Development and Wildlife
SEA	-	Sustainable Energy Authority
SLILG	-	Sri Lanka Institute Local Government
SLPA	-	Sri Lanka Ports Authority
SLITA	-	Sri Lanka Institute of Textile and Apparel
SLLRDC	-	Sri Lanka Land Reclamation and Development Corporation
SLSEA	-	Sri Lanka Sustainable Energy Authority
SLSI	-	Sri Lanka Standard Institute
SLTDA	-	Sri Lanka Tourism Development Authority
SLTPB	-	Sri Lanka Promotion Bureau
TDM	-	Transport Demand Management

TRI	-	Tea Research Institute
UDA	-	Urban Development Authority
UNFCCC	-	United Nations Framework Convention on Climate Change
UNREDD	-	United Nations Reduce Emission from Deforestation and Forest Degradation
USDA	-	Urban Settlement Development Authority
UTMP	-	Urban Transport Master Plan
WRB	-	Water Resource Board

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Introduction

The Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) by its decision 1/CP.19 under the Ad Hoc Working Group on Durban Platform for Enhanced Action (ADP), invited all Parties to initiate or intensify domestic preparations for their Intended Nationally Determined Contributions (INDCs) towards achieving the objective of the Convention as set out in its Article 2, without prejudice to the legal nature of the contributions, under the Convention applicable to all Parties.

The COP, by its decision 1/CP.19 and 1/CP.20, invited all Parties to communicate to the UNFCCC secretariat their INDCs well in advance of COP 21 (by the first quarter of 2015 by those Parties ready to do so) in a manner that facilitates the clarity, transparency and understanding of the INDC. In decision 1/CP.20, the COP also invited all Parties to consider communicating their undertakings in adaptation planning or consider including an adaptation component in their INDCs. Decision 1/CP.20 further specified that in order to facilitate clarity, transparency and understanding, the information to be provided by Parties communicating their INDCs may include, as appropriate, inter alia, quantifiable information on the reference point (including, as appropriate, a base year), time frames and/or periods for implementation, scope and coverage, planning processes, assumptions and methodological approaches including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals, and how the Party considers that its intended nationally determined contribution is fair and ambitious, in light of its national circumstances, and how it contributes towards achieving the objective of the Convention as set out in its Article 2.

Sri Lanka, through the Ministry of Mahaweli Development and Environment in Sri Lanka as the National Focal Point to the UNFCCC, submitted its INDCs in accordance with the decisions 1/CP.19 and 1/CP.20 as a support for achieving the set objectives of the Paris Agreement.

INDCs of Sri Lanka

Sri Lanka's INDCs consists of INDCs on mitigation, adaptation, loss and damage, and means of implementation. It focuses on 14 sectors and consists of unconditional as well as conditional INDCs. The base line year is set as 2010 as per Business-As-Usual (BAU) scenario, target period 2021-2030.

- **Mitigation** - Reducing the Greenhouse Gas (GHG) emissions against the Business-As-Usual (BAU) scenarios in the sectors of energy (electricity generation), transportation, industry, waste and forestry. The key contributors to GHG are Carbon Dioxide (CO_2), Methane (CH_4) and Nitrous Oxide (N_2O).

- **Adaptation -** Building resilience in most vulnerable communities, sectors and areas to adverse effects of climate change. Adaptation will focus on human health, food security (agriculture, livestock and fisheries), water and irrigation, coastal and marine, biodiversity, urban infrastructure and human settlement, tourism and recreation. Adaptation initiatives that derive mitigation co-benefits will be given due priority.

- **Loss and Damage** - In order to address issues related to losses and damages occurred due to extreme weather events, a local mechanism will be developed in accordance with the Warsaw International Mechanism for Loss and Damage.

- **Means of Implementation -** External support for finance, technology development and transfer, and capacity building for the above sectors are considered in the implementation process of the INDCs of Sri Lanka.

Readiness Phase

The readiness phase will extend till 2020 for the implementing of the INDCs allowing the country to prepare for the full-scale implementation of chosen INDCs. A host of groundwork and preparations need to be carried out to ensure successful implementation of INDCs to achieve the set GHG emission reduction targets by 2030.

Elements of focus for the readiness phase include;

1. *Policy support:* Formulating an overarching national policy supporting or guiding INDCs.
2. *Identifying INDCs:* This allows for identifying additional INDCs that will be suggested, without restricting contributions only to previously suggested INDCs as sub actions.
3. *External assistance:* Identifying financial and technical assistance that need to be received in order to implement the conditional INDCs, which will not be implemented through national support.
4. *Baseline setting:* It is important to identify baseline conditions of GHG emission for each INDC by taking 2010 as the base year. This task needs to be accomplished in the preparation phase for effective implementation of the INDCs.
5. *Scenario setting:* Once the baseline conditions for INDCs are established, it is necessary to forecast GHG emissions under Business as Usual (BAU) scenario for milestone years like 2020, 2030 and 2050.
6. *GHG emission reduction targets*: Establishing SMART (Specific, Measurable, Achievable, Realistic and Time bound) GHG mitigation targets for identified INDCs from 2020 to 2030 in two stages in 5 year cycles.
7. *Timeline:* The above will be accompanied by very precise implementation timelines, which are realistic and they should be in par with the country's development agenda. Identified INDCs will be fully integrated with the sectoral development plans without being treated as stand-alone or as isolated initiatives.
8. *Funding:* Funds required for the implementation of each INDC (including sub sectoral INDCs if any) needs to be estimated. Once the time required for the implementation is calculated and the investments are estimated, yearly breakdown will be indicated to

reflect funding requirements in the national budget for the unconditional INDCs, while for the conditional, international support will be sought and utilized. In order to achieve this, it is important to identify INDCs which could be implemented with the existing national capacity (utilizing national resources and knowledge) or those that require external funding support.

9. *Executing agency:* A specific agency for the implementation of the INDCs will be set up, while respective ministries for sectoral INDCs will take responsibility for the implementation of the INDCs which comes within the mandate of relevant ministries. Each agency will need a sound mechanism for the implementation of INDCs with an effective monitoring, evaluation and compliance system.
10. *KPIs:* Each INDC needs a SMART output based on Key Performance Indicators (KPI) to track the progress of its key activities. These KPIs should not be GHG emission reduction targets but the achievements and milestones of activities contributing to the realization of GHG emission reduction targets.
11. *MRV:* Identifying an internationally acceptable and nationally executable monitoring, reporting and verification (MRV) system to track the GHG emission reduction targets of each INDC. This could be through an existing mechanism set up for MRV of climate change related projects and activities.
12. *Aggregation:* Respective Ministries shall monitor the progress of GHG emission reduction of each INDC at Ministry level using the MRV system described under step 11.
13. INDCs of all sectors will be aggregated for reporting at the national as well as international level. The Climate Change Secretariat or the proposed Climate Change Commission of the Ministry in charge of the subject of Environment will be tasked to achieve this.

Process for Developing the Readiness Plan for Implementing the INDCs of Sri Lanka

The Readiness Plan for the implementation of INDCs of Sri Lanka has been developed in consultation with relevant line Ministries that cover the identified 14 sectors including loss and damage in the INDCs of Sri Lanka, submitted to the UNFCCC Secretariat. The relevant Ministries have provided information and recommendations on the implementation of the INDCs, the need for improvements in human and technical capacity, as well as financial and technical support to implement the INDCs by 2020. The information has been gathered through consultations led by the identified ministries, and the preparation of the readiness plan has been based on the data and recommendations provided through these consultations.

This document is open for future edits as needed in order to facilitate the implementation process of the INDCs, based on the availability of updated data for sectors, subject to not violating any policies and regulations that reflect the objectives set for achieving the targets set upon signing the Paris Agreement.

INDC Readiness Plan by Sectors

Mitigation

Global greenhouse gas emissions have grown since pre-industrial times, with an increase of 70% between 1970 and 2004. With current climate change mitigation policies and related sustainable development practices, these emissions will continue to grow over the next few decades. A wide variety of policies and instruments are available to governments to create the incentives for mitigation action. Mitigation is essential to meet the UNFCCC's objective of stabilizing GHG concentrations in the atmosphere. The UNFCCC requires all Parties, taking into account their responsibilities and capabilities, to formulate and implement programmes containing measures to mitigate climate change.

Mitigation actions could be economy-wide, cover several or single sectors, such as energy supply and demand, transport, buildings, industry, agriculture, forestry and waste management. Sri Lanka being a developing country, anticipates achieving the development objectives while moving in a low carbon development pathway. Mainly, five sectors have been identified under mitigation through reduction of the greenhouse gas emissions.

These are:

- Energy (electricity generation)
- Transport
- Industry
- Forests
- Waste

Possible emission reduction actions have been identified in each sector, which are to be implemented during the period of 2020 to 2030. INDCs for mitigation intends to reduce the GHG emissions against BAU scenario by 20% in energy sector (4% unconditionally and 16% conditionally) and by 10% in other sectors (transport, industry, forests and waste) by 3% unconditionally and 7% conditionally by 2030.

Energy Sector

Introduction

Sri Lanka has realized almost 100% electrification through the national grid and the current total installed power generation capacity of the country is 3,888 MW, consisting of 900 MW of coal power, 1,128 MW of oil burning thermal power and 1,860 MW of renewable energy - 1377 MW of large hydro, 328 MW of small hydro, 128 MW of wind, 25 MW of biomass and 1.36 MW of solar power. Out of the total annual electricity generation for the national grid, more than 50% is met using these renewable energy sources. In addition to that, solar rooftop systems operated under net-metering scheme contribute to a capacity of 28 MW.

The annual total electricity demand is about 13,227 GWh, comprising of 37% from domestic consumers, 29% from industries and 24% from commercial enterprises, and the rest representing energy supply needed for religious organizations and street lighting. The overall annual demand for electricity is expected to increase in average by 4%, and future electricity generation expansion programmes are expected to meet this demand growth.

1. Addition of Sustainable Energy Sources in Future Generation Expansion

Sri Lanka is on the path to becoming an internationally recognized middle-income country. Under the country's development drive, energy will be a key necessity, and developing energy towards a sustainable future will be of prime importance. As per the current economic trends, electricity generation using the most economical energy sources will be important for the country.

Sri Lanka is a country that holds many sources of renewable energy. In order to enhance the energy security of the country, reduce the economic burden on energy resource imports and as well as a way to move to environmentally friendly energy sources, attention has been given to utilise sustainable energy sources to their maximum potential in the future energy generation and its expansion.

2. INDCs of Energy Sector

As there has been an increasing trend in the use of petroleum based fuels - coal and liquid petroleum fuels in the energy sector, GHG emissions in the energy sector have been increasing. In that context, energy sector has been identified as one of the key sectors for GHG emission reduction in the future through the introduction of sustainable sources. Accordingly, 20% GHG emission reduction target has been included under the energy sector INDCs, which amounts to 39,383Gg, from the total GHG emissions of 196,915Gg for the period 2020-2030 as per the BAU scenario of the Long Term Generation Expansion Plan 2013-2032 published in October 2013. Out of this, 4% (9,173Gg) is unconditional reduction and 16% (30,210Gg) is conditional reduction.

Following are the different modes of intervention under INDCs that have been included under the submission of INDCs from Sri Lanka.

- INDC 1: Establishment of large scale wind power plants of 514 MW
- INDC 2: Establishment of 115 MW of solar power plants

- INDC 3: Establishment of 105 MW of biomass power plants
- INDC 4: Establishment of 176 MW of mini hydro power plants
- INDC 5: Introduction of Demand Side Management (DSM) activities
- INDC 6: Strengthening sustainable energy related policies, with a view to increasing renewable energy share from the present 50%, to 60% in 2020 and maintaining that level until renewable energy technology is further developed.
- INDC 7: Converting existing fuel oil based power plants to Liquefied Natural Gas-LNG (Newly proposed INDC)

3. Present Initiatives

Sri Lanka has recently taken strong initiatives for implementing effective and efficient sustainable energy programmes for the future. This includes the elimination of introducing coal power plants of a capacity in the range of 4700 MW to the national electricity system by 2030, primarily by way of introducing renewable energy sources and introducing LNG for thermal power generation in place of solid and liquid petroleum fuels.

Under the renewable energy sources, available hydro potentials will be absorbed within a few years' time, and the country has high potentials of solar and wind resources, and those will contribute to a major share in the future renewable energy based power generation expansion.

Details of the current interventions in renewable energy are given below.

(a) Development of the maximum hydro potential in the country, through the remaining large hydro power plants (Uma Oya, Ginganga, Broadlands) and the remaining small hydro power plants - the overall potential of these is expected to be in the range of 500 MW.

(b) Wind parks: mainly in Mannar islands, which has been identified as one of the best potential sites in the South Asian region, and other potential sites which are in the northern part of the country will be developed. These are expected to contribute to a potential of around 300 MW.

(c) Promotion of solar has been initiated through different modalities, such as solar rooftops and solar parks, and it will provide around 500 MW in the short term (in a few years' time) which will be able to expand to a considerably high level by 2030.

(d) Biomass power generation to be added to a considerable extent.

In context of existing fuel oil based power plants, Sri Lanka has taken a decision to shift them to LNG, and 6 power plants with a cumulative capacity above 500 MW are expected to be shifted to LNG.

In addition to the interventions from the generation side, the Government has identified DSM also as one of the priority areas, and a Presidential Task Force has been appointed to implement an island wide DSM programme encompassing all the related sectors.

Note
In earlier documents, separate targets have been given for Non-Conventional Renewable Energy (NCRE), however, now NCRE and large hydro are commonly included as renewable energy and the targets are provided accordingly.

4. Strategic Policies

Some of the projects that have been earmarked have already started or are expected to be implemented. However, in order to ensure full-fledged implementation within the period from 2020 to 2030 and to assess the GHG emissions at each milestone, implementation of a readiness action plan primarily focusing on the strategic policies mentioned below is expected within the period 2017-2019.

(a) Establishment of a sound policy framework supporting large scale renewable energy development

(b) Strengthening institutional capacity for easy implementation of sustainable energy programmes

(c) Identification of financial requirements and opening up of funding avenues

(d) Technology need assessment and building up capacity in line with the technological advancements at the international level

(e) Introduction of capacities and methodologies to carry out overall economic analysis of sustainable energy technologies, incorporating environmental benefits and other costs/benefits so far unaccounted for under the conventional techno-economic analyses of projects

5. Readiness Action Plan

Energy Sector INDCs-1	1. Establishment of large scale wind power plants of 514 MW					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Review the performance of existing wind power plants (124MW) according to the best available data.	SEA	Assessment report			
2	Prepare a report on wind power potential in the country using available data and information.	SEA	Wind power projection report			
3	Identify top potential sites in the country.	SEA, CEB, LAs	Identified sites			
4	Introduce technological interventions to address grid inter connection issues.	CEB, SEA	Grid interconnection capacity report			
5	Identification of the adequacy of policies and regulations for large scale wind power plants.	MoP&RE, SEA, CEB	Availability of updated adequacy of policies			
6	Identification of existing gaps in policies through stakeholder consultation		Number of policies reviewed and gaps identified			
7	Study and propose solutions/mechanisms to fill the above gaps		Filled the gaps			
8	Calculate emission reduction through the implementation of wind power plants.	MoP&RE, SEA, CEB	Emission reduction projection report			
9	Develop the required institutional capacity for large scale wind power development.	MoP&RE, SEA, CEB	Institutional capacity Developed			
10	Incorporate externalities in economic analysis of introducing wind power plants	MoP&RE, SEA, CEB	Prepared report			
11	Find out avenues to open up the climate financing mechanism for wind power generation	MoP&RE, SEA	Number of funding sources accessed			
12	Prepare a comprehensive plan to implement INDC No. 1	MoP&RE, SEA, CEB	Prepared plan			

Energy Sector INDCs-2	2. Establishment of 115 MW of solar power plants					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Review the performance of existing solar power plants (including net-metering) as per available data.	SEA	Assessment report			
2	Carry out studies on fluctuation of solar energy and technological interventions to address fluctuation issues.	SEA	Report prepared on the studies conducted			
3	Identify top potential sites and suitable mechanisms for introducing solar roof tops in the country.	SEA, LAs	Number of identified sites			
4	Introduce technological interventions to address grid interconnection issues.	CEB, SEA	Grid interconnection capacity report			
5	Identify the adequacy of policies and regulations for appropriate modalities of solar power generation.	MoP&RE, SEA, CEB	Availability of updated adequacy of policies			
6	Identify existing policy gaps through stakeholder consultation	MoP&RE, SEA, CEB	Number of policies reviewed and identified gaps			
7	Study and propose solutions/mechanisms to fill the above gaps	MoP&RE, SEA, CEB	Filled gaps			
8	Calculate emission reduction through the implementation of solar power plants.	MoP&RE, SEA, CEB	Emission reduction projection report			
9	Develop required institutional capacity for solar power development.	MoP&RE, SEA, CEB	Institutional capacity developed			
10	Incorporate externalities in economic analysis of introducing solar power plants	MoP&RE, SEA, CEB	Prepared report on the incorporation of externalities			
11	Find out avenues to open up climate financing mechanisms for solar power generation	MoP&RE, SEA	Number of funding mechanisms identified			
12	Prepare a comprehensive plan to implement INDC No. 2	MoP&RE, SEA, CEB	Prepared a plan			

Energy Sector INDCs-3	3. Establishment of 105 MW of biomass power plants					
Action		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Review the availability of biomass to meet targeted power generation (105MW)	SEA	Biomass availability report			
2	Collect information related to biomass (especially from previous studies and pilot projects)	SEA	Report			
3	Identify top potential sites and suitable mechanisms to establish the biomass supply chain.	SEA, LAs	Identified sites			
4	Study and identify modern biomass energy technology for power generation	SEA	Identified modern technologies			
5	Identify co-firing and co-generation possibilities using biomass	SEA	Completed feasibility study			
6	Identify the adequacy of policies for promoting biomass based power generation.	MoP&RE, SEA	Policy analysis			
7	Identify existing gaps in policy through stakeholder consultation	MoP&RE, SEA, CEB	Number of policies reviewed and gaps identified			
8	Study and propose solutions/mechanisms to fill the above gaps	MoP&RE, SEA, CEB	Filled gaps			
9	Identify suitable financial sources (external and local) to establish biomass power plants.	MoP&RE, SEA, MoF	Availability of funding sources			
10	Build an enabling environment for commercial investment for fuel wood suppliers, growers and other relevant stakeholders	MoP&RE, MoPI, SEA	Established enabling environment			
11	Calculate emission reduction through the implementation of biomass power plants.	MoP&RE, SEA, CEB	Emission reduction projection report			
12	Incorporate externalities in economic analysis of introducing biomass power plants	MoP&RE, SEA, CEB	Prepared report on externalities in economic analysis			
13	Prepare a comprehensive plan to implement INDC No. 3	MoP&RE, SEA, CEB	Prepared plan			

Energy Sector INDCs-4	4. Establishment of 176 MW of mini hydro power plants					
Action		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Review the performance of existing mini hydro power plants according to the best available data.	SEA	Assessment report			
2	Identify potential new sites in the country.	SEA, CEB, LAs	Identified sites			
3	Identify the issues related to mini hydro power projects at present, in the project approval pipeline.	MoP&RE, SEA, CEA, DoI, LAs, DWLC, CEB	Identified issues			
4	Introduce solutions for the identified issues related to project in the pipeline	MoP&RE, SEA, CEB	Number of projects approved			
5	Calculate emission reduction through the implementation of mini hydro power plants.	MoP&RE, SEA, CEB	Emission reduction projection report			
6	Prepare a comprehensive plan to implement INDC No. 4	MoP&RE, SEA, CEB	Prepared plan			

Energy Sector INDCs-5	5. Introduction of Demand Side Management (DSM) activities					
Action		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Enhance the implementation of energy labeling programme	SEA, SLSI, SLCustoms, Test labs	Enhanced / updated programme			
2	Introduce tax incentives for the promotion of energy efficient appliances	SEA, MoF, MoPRE	Number of introduced schemes.			
3	Make a mandatory code of practice for energy efficient buildings	SEA, UDA, MoP&RE, Mega Polis	Introduced mandatory codes			
4	Introduce mechanisms for phasing out obsolete technologies	SEA	Introduced phasing out systems			
5	Introduce Life Cycle Cost in evaluation of products	SEA, MoF, MoP&RE	Introduced LCC based evaluation			
6	Strengthen institutional mechanisms	SEA, MoP&RE	Strengthened mechanism			
7	Strengthen and encourage Energy Services Companies, Energy Managers, Energy Auditors	SEA, MoP&RE	Enhanced energy saving capacities			
8	Introduce mechanisms for research & development, and demonstration projects in energy efficient technologies	SEA, MoP&RE, CEB, NERD, Universities, Industries, etc.	Established mechanisms			
9	Introduce monitoring, reporting and verification systems for energy efficiency projects	SEA, MoP&RE	Introduced MRV system			
10	Prepare a comprehensive plan to implement INDC No. 5	SEA, MoP&RE	Prepared plan			

Energy Sector INDCs-6	6.Strengthening sustainable energy related policies, with a view to increasing renewable energy share from the present 50%, to 60% in 2020 and maintaining that level until renewable energy technology is further developed					
Action		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Review existing sectoral policies related to energy	MoP&RE, NPD, MoPPED	A review report with recommended policies			
2	Identify policies and strategies to fill the policy gaps	MoP&RE, MoPPED, SEA	Prepared report			
3	Identify feasible levels of NCRE development	MoP&RE, SEA	Identified possible NCRE			
4	Prepare a comprehensive action plan to implement INDC No. 6	MoP&RE, SEA	An action plan developed			

Energy Sector INDCs-7 (New INDC proposed)	7. Converting existing fuel oil based power plants to LNG					
Action		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Conduct comprehensive feasibility studies on the introduction of LNG in Sri Lanka	MoP&RE, CEB, PRDS	Feasibility study report			
2	Conduct feasibility studies on converting existing fuel oil power plants to LNG	MoP&RE, CEB, PRDS	Feasibility report			
3	Identify existing gaps in policy through stakeholder consultation	MoP&RE, CEB	Identified gaps			
4	Study and propose solutions/mechanisms to fill the above gaps	MoP&RE, CEB, MoPPED	Proposed solutions			
5	Identify suitable financial sources to establish LNG power plants.	MoP&RE, CEB	Identified funding sources			
7	Calculate emission reduction through the implementation of LNG power plants.	MoP&RE, CEB	Emission reduction report			
7	Prepare a comprehensive plan to implement INDC No. 7	MoP&RE, CEB, PRDS	Prepared action plan			

Transport Sector

Introduction

Among the energy end-use sectors, there exists a demand for fossil oil (petroleum) primarily driven by the growth in the number of vehicles. The transportation sector is responsible for approximately 30% of global final energy demand. Road transport accounts for more than 70% of that total and 95% of energy for transport comes from oil-based fuels. Present global vehicle population exceeds 1 billion and estimated to reach 2 billion by 2035. It is estimated that the transport sector will account for over 95% of the increase in world primary oil during next 15 years.

In Sri Lanka, the transport sector is one of the major GHG emitting sectors. This sector includes road, railway, air and sea transportation, among which road transport plays a dominant role. It contributes 95% to passenger transport and 97.5% to freight transport. The annual passenger transport is about 130 billion passenger-km and freight transport is approximately 7 million ton-km. The present active vehicle fleet of Sri Lanka is about 5 million, which is a three-fold increase with respect to year 2000. The main contributions for this change are from three wheelers and two wheelers, where the numbers have increased in average 8 times and 4 times, respectively. The cars, dual-purpose vehicles, and land vehicles have increased by approximately 2 to 2.5 times, while number of buses has not increased significantly, indicating a shift from public transport modes to private vehicles. At present, about 51% of the active vehicle fleet is motor cycles, 22% three wheelers (motor tricycles) and 11% motor cars. Although buses are less than 1% of the active vehicle fleet, it contributes to about 50% of passenger transport.

Increase in private vehicles has resulted in increased traffic congestion, reduction in fuel economy and higher emissions. The vehicles are primarily powered by imported petroleum oil (crude and refined). About 70% of the petroleum is consumed by the transport sector, which is about 3 billion litres per annum, where the main fuel is diesel. This contributes to about 65% and the rest is through gasoline. Per capita petroleum oil consumption per annum has increased from about 50 litres in 1990 (where 73% is diesel) to 90 litres in 2000 (where 82% is diesel) and 150 litres in 2015. The average fuel economy of road transport is about 0.025 litres/passenger-km. Some indicative values for the fuel economy in passenger transportation of different vehicle categories could be estimated based on average values for transport distance, occupancy and fuel consumption as 0.01 for buses, 0.05 for cars, 0.04 for three wheelers, 0.02 for motor cycles and 0.03 for duel-purpose vehicles. This indicates the potential for reducing fuel consumption, thereby the GHG emissions, in the road transport sector by switching from private vehicles to public (or mass) transport modes.

The high expenditure for the importation of petroleum has become a major factor which is adversely affecting the economy of the country. Presently, the total expenditure for petroleum imports is about 6% of gross domestic product (GDP) of the country. Thus improvement of energy efficiency/fuel economy in the transport sector becomes a national priority, apart from its contribution to GHG emission reduction as stipulated through the INDCs.

Under the above circumstances, synergistic approaches are required to realize GHG mitigation targets in the transport sector. GHG emissions in the transport sector can be reduced by the following:

- *Avoid/reduce journeys*: by densifying urban landscapes, sourcing localized products, internet shopping, restructuring freight logistics systems, and utilizing advanced information and communication technologies (ICT);
- *Modal shift*: through low-carbon transport systems, encouraged by increasing investment in public transport, walking and cycling infrastructure, and by modifying roads, railways, airports, ports, and waterways to become more attractive for users and minimising travel time and distance;
- *Improve energy efficiency of modes of transport and vehicle technologies*: improving fuel-economy of transport (litre/passenger-km or litre/ton-km) by enhancing vehicle and engine performance, using lightweight materials, increasing freight load factors and passenger occupancy rates, deploying new technologies such as electrification of vehicles.
- *Improve fuel*: reducing carbon intensity of fuels (CO_{2eq}/MJ) by substituting petroleum-based products with natural gas, bio-methane, or bio fuels, electricity or hydrogen produced from low GHG sources.

It is important to harmonize the GHG mitigation options and related transport policies with other national development programmes and related policies, while mobilizing resources and expertise of all the stakeholders/institutions.

1. INDCs of Transport Sector

INDCs proposed for the transport sector has gone through a number of amendments, and the following are the key activities listed as the most recent version:

1. Establishment of energy efficient and environmentally sustainable transport systems by 2030
   - 1.1 Develop of Urban Transport Master Plans (UTMP) to improve transport systems in line with the Megapolis Plan that is currently being finalised into other main urban areas of the country
   - 1.2 Introduce an Intelligent Transport System (ITS) based bus management system
   - 1.3 Introduce canal transport system
2. Upgrade Fuel Quality Standards to reduce harmful emissions causing environmental pollution and health hazards
   - 2.1 Introduce 95 octane petrol
3. Reduce unproductive transport systems from current usage
   - 3.1 Reduce unproductive vehicles by 25% in 2025 unconditionally and this could be increased by 50% with conditions.
4. Shift passengers from private to public modes of transport
   - 4.1 Introduce the park & ride system
   - 4.2 Establish bus depots next to railway stations.

5. Enhance the efficiency and quality of modes of public transport
    5.1 Electrification of the railway system from Veyangoda to Panadura
    5.2 Purchase new rolling stock for Sri Lanka Railway
    5.3 Rehabilitate Kelani valley railway line.
6. Reduce GHG emissions in the maritime sector
    6.1 Implement international laws and regulations on maritime safety & security related to climate change
    6.2 Maintain international standards related to climate change in maritime transportation
7. Gazette new emission standards to reduce GHG emissions
    7.1 Improve vehicle emission testing programme/spot testing for all vehicles
    7.2 Introduce heavy smoke vehicles spotter programme
    7.3 Introduce Road side vehicle emission testing programme
    7.4 Inspect and monitor vehicle emission testing centres
8. Encourage and introduce low emission vehicles such as electric and hybrid vehicles
    8.1 Introduce electrified three - wheelers to reduce emissions
    8.2 Introduce electrified boat service
    8.3 Introduce electric buses
    8.4 Introduce other electrified vehicles such as cars
9. Reducing traffic congestion to reduce GHG emission
    8.1 Introduce canal based transport
    8.2 Introduce Centralized Traffic Management Systems
    8.3 Establish highways
    8.4 Transport heavy loads by railway.
10. Reduce GHG emissions in the aviation sector.

10.1 Identify the current profile of GHG emissions from Sri Lankan aviation operators (Sri Lankan Airline, Mihin Lanka and FITS Aviation) in international operations and domestic operators

10.2 Forecast the BAU future emissions from the above operators

10.3 Study applicable international conventions / commitments related to GHG emission (and emission of other pollutants)

10.4 Identify GHG mitigations options

10.5 Identify implementation mechanisms and resource requirements for implementing mitigation options

11. Establish a database management system for monitoring INDCs.
    11.1 Establish a separate unit for implementing INDCs
    11.2 Develop relevant software
    11.3 Develop and build capacity

2. Strategic Policies

Table 2.1 presents a set of strategic policy elements under which the activities of the INDCs in the transport sector are formulated. Primarily, these policy elements are in accordance with the Reduce-Shift-Improve concept of environmentally sustainable transport (EST) systems, which means reduce (or avoid) the need to travel, shift or maintain share of more environmentally friendly modes, and improve the energy efficiency of transport modes and vehicle technology. These three aspects cover system efficiency, trip efficiency and vehicle efficiency, thus contributing to a significant GHG emission reduction.

Table 2.1: Strategic policy elements and related INDCs in the transport sector

Number	Strategic Policy Elements	INDCs Activities
1	Conducive environment and sound MRV system for the effective implementation of INDCs are ensured.	1.1; 1.2; 1.3; 1.4; 1.5; 2.1; 2.2; 2.3; 2.4; 2.5; 13.1; 13.2; 13.3; 13.4; 13.5; 13.6
2	Sustainable mobility through the reduction of motorized travel is promoted.	4.5; 9.1; 9.2; 9.3; 9.4; 9.5; 9.6; 10.1; 10.2; 10.3
3	Socially acceptable, environmentally sustainable, economically viable, technically sound modes of public transport, mass transit systems and transport infrastructure are established (to facilitate the shift from modes of private transport to public).	3.1; 3.2; 3.3; 3.4; 3.5; 3.6; 3.8; 4.1; 4.2; 4.3; 4.4
4	Energy efficient and environmentally sustainable vehicle technologies are promoted, while performances of in-use vehicles are enhanced or maintained.	7.1; 7.2; 7.3; 7.4; 7.5; 8.1; 8.2; 8.3; 8.4; 8.5; 8.6; 8.8
5	Cleaner fuels and alternative energy resources are introduced.	5.1; 5.2; 5.3; 5.4; 5.5; 8.7
6	Non-motorized transport modes are advocated.	4.5; 9.1; 9.2; 9.3; 9.4; 9.5; 9.6
7	Efficient use of transport systems and infrastructure is facilitated, while promoting transport demand management (TDM) and intelligent transport systems together with discouraging inefficient technologies and modes.	3.7; 6.1; 6.2; 6.3; 10.1; 10.2; 10.3
8	Environmentally sustainable transport concepts are promoted in aviation and maritime sectors.	11.1; 11.2; 11.3; 11.4; 11.5; 12.1; 12.2; 12.3; 12.4; 12.5

3: Readiness Action Plan

Strategy 1	Establish a sound policy & institutional framework for the implementation of INDCs					
Activity		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1.1	Review related policies & legislations	Ministry of Transport & Civil Aviation (MoT&CA)	Number of review reports	1		
1.2	Analyze institutions & stakeholders			1		
1.3	Assess national agendas, priorities and drives			1		
1.4	Develop a sound policy framework including an effective setup for stakeholder engagement and institutional coordination, with particular emphasis on an enabling environment for avoidance/ reduction of journeys and modal shift towards public transport.	MoT&CA	Number of policy reports	1		
1.5	Develop and conduct awareness programs for stakeholders and institutions	MoT&CA, Ministry of Mahaweli Development & Environment (MMD&E)	Number of awareness programs	4	4	4
			Number of participants	80	80	80
Strategy 2	**Establish an information management system for the transport sector**					
2.1	Establish an inter-agency officers committee for transport information management system (IMS)	MoT&CA	Number of committee meetings	4	4	4
2.2	Establish a comprehensive information resource center and a centralized database /IMS for transport sector	National Transport Commission (NTC), MoT&CA, Ministry of Higher Education & Highways (MoHE&H), Road Development Authority (RDA)	Operationilising of the database	30%	80%	100%
2.3	Annual publications on the transport sector performance reviews; fleet characteristics/data	NTC, Department of Motor Traffic (DMT)	Number of publications	2	2	2
2.4	Conduct training programs on IMS in the transport sector	MoT&CA, MMD&E	Number of training programs	2	2	2
			Number of participants	40	40	40

2.5	Establish the present GHG emission profile of the transport sector	MoT&CA, MMD&E, Central Environment Authority (CEA)	% of coverage	25%	50%	100%
Strategy 3	**Establish an efficient and effective public transport system**					
Activity		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
3.1	Develop Urban Transport Master Plans (UTMPs) for major urban areas of the country	Ministry of Megapolis & Western Development (MoM&WD), MoT&CA	Number of urban areas covered	1	3	5
3.2	Characterize key mitigation options related to introducing new modes in UTMPs such as urban railway improvements with electrification and modernization, light rail transit (LRT), inland water transport, modernization of buses.	MoM&WD, MoT&CA	Number of major projects	6	4	4
3.3	Characterize the transport infrastructure development projects (capacity improvement of road links including national roads and existing expressway network; construction of new expressways)	RDA, MoM&WD, MoHE&H	Number of projects	2	3	4
3.4	Review the proposal for purchasing new rolling stock for Sri Lanka Railway and identify GHG mitigation potential	MoT&CA, MMD&E	Review report	1		
3.5	Characterize the rehabilitation of Kelani valley railway line in relation to the GHG mitigation potential	MoT&CA, MMD&E	Review report	1		
3.6	Conduct training/awareness programs on transport interventions proposed in the UTMPs	MoM&WD	Number of training programs	3	3	3
			Number of participants	60	60	60
3.7	Study the impact of introducing ITS (Intelligent Transport System) based passenger and freight transport systems	Universities, MoM&WD, MoT&CA	Number of ITS concepts developed	2	4	6
Strategy 4	**Shift passengers from modes of private transport to public transport**					
Activity		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
4.1	Review options for different infrastructure development and the promotion of the modal shift	MoT&CA, Universities, NTC	Review report	1		

4.2	Characterize the options identified in 4.1 above in relation to their potential as GHG mitigation (such as introducing the Park and Ride system, bus depots next to railway stations)	MoT&CA	Number of provinces covered	2	2	2
4.3	Develop and implement mass media campaign to promote the modal shift	MoT&CA	Number of media campaigns	4	4	4
4.4	Introduce travel restrictions, parking restrictions, minimum occupancy limits, electronic road pricing etc. for private vehicles	RDA, Local authorities (LAs)	Number of interventions	1	2	3
4.5	Organize car-free days and car-free zones	LAs	Number of programs	2	2	2
Strategy 5	**Enforce the fuel quality roadmap in order to reduce harmful emissions of air pollutants**					
5.1	Review and update the draft fuel quality roadmap	MMD&E	The roadmap	1		
5.2	Establish a fuel quality management committee	MMD&E	Number of committee meetings	3	3	3
5.3	Identify GHG mitigation options in the fuel quality roadmap and characterize them	MMD&E	Number of projects	2	2	2
5.4	Estimate the financial implications and impacts of each intervention of the fuel quality roadmap	MMD&E	% of completion	30%	60%	100%
5.5	Identify the existing fuel quality testing facilities and develop a proposal for an independent fuel testing facility and operationalization program	Universities, CEA; Industrial Technology Institute (ITI), National Building Research Organization (NBRO)	Proposal for the independent fuel quality testing facility	1		
Strategy 6	**Reduce unproductive transport systems from current usage**					
Activity		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
6.1	Prepare a country report on fuel economy of in-use vehicles and make recommendations for benchmarking of fuel economy levels for categories of different vehicles	DMT	Review report	1		
6.2	Develop a vehicle scrap page program and related regulation for its enforcement	MoT&CA	The regulation	10%	20%	25%
6.3	Develop and implement a mass media campaign to facilitate	DMT	A mass media	1	2	4

	effective implementation of the scrap page program		campaigned			
Strategy 7	**Revise emission standards to reduce GHG emissions**					
7.1	Enforce revised emission standards	DMT, MMD&E	Enforced revised standards	100%	100%	100%
7.2	Implement a smoke spotter program for gross emitters	DMT, MMD&E	Number of vehicles spotted	2500	2500	2500
7.3	Implement a road-side vehicle emission testing program	DMT, MMD&E, Sri Lanka Police	Number of vehicles tested	3000	3000	3000
7.4	Inspect and monitor vehicle emission testing centres	DMT, MMD&E, CEA, Dept. of Measurement Units, Standards & Services (MUSSD)	Number of centers inspected	100	100	100
7.5	Establish the relationship between emission factors and fuel economy/ GHG emissions	Universities, CEA, DMT	Number of categories of vehicles covered	1	3	6
Strategy 8	**Promote energy efficient and environmentally sustainable vehicle technologies including electric and hybrid vehicles**					
Activity		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
8.1	Study the performance and impacts of in-use electric and hybrid vehicles	DMT, Universities	Study report	1		
8.2	Analyze the recycling of battery on electric and hybrid vehicles	CEA, MMD&E	Study report	1		
8.3	Establish charging infrastructure (and electricity tariff methodology) for electric and hybrid vehicles	Ceylon Electricity Board (CEB), Lanka Electric Company (LECO)	Number of charging stations	50	100	200
8.4	Study potential impacts of introducing electric buses	MoT&CA, NTC, Universities	Study report	1		
8.5	Study potential impacts of importation of electric three-wheelers and converting conventional three-wheelers to electric ones	MoT&CA, NTC	Study report	1		
8.6	Study potential impacts of introducing an electrified boat service	MoM&WD, MoT&CA	Study report	1		
8.7	Study potential of bio fuels and biogas as transport fuels	Universities	Study report	1		
8.8	Develop a fuel economy labeling program for vehicles	Universities, Sri Lanka	Number of vehicle	1	2	4

		Sustainable Energy Authority (SLSEA), Sri Lanka Standard Institute (SLSI)	categories covered			
Strategy 9	**Promote non-motorized modes of transport (cycling and walking)**					
Activity		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
9.1	Conduct a study on the present status of non-motorised transport (NMT) systems in Sri Lanka	Universities, RDA, LAs, NTC, Clean Air Sri Lanka (CASL), AirMAC	Survey report	1		
9.2	Develop a national action plan / roadmap for to promote non-motorized transport (NMT) systems; with particular emphasis on optimum utilizing of existing infrastructure by improving accessibility and establishing networks, while integrating NMT into the transport system including transport and spatial planning	Universities, NTC, AirMAC, CASL	Action plan	1		
9.3	Establish a walkability index in different regions	Universities, AirMAC, CASL, LAs	Number of regions	5	10	20
9.4	Implement pilot zones to promote NMT modes, in accordance with the outputs of item 9.2 above	Universities, RDA, LAs, CASL	Number of zones	3	6	10
9.5	Implement tree planting programs along cycle paths / walk-ways (including along water-ways)	LAs; UDA, RDA, CASL	Number of programs	5	10	20
9.6	Develop and implement mass media campaigns to promote NMT	AirMAC, CASL	Number of media campaigns	1	2	4
Strategy 10	**Promote sustainable mobility through avoidance or reduction of motorized travel**					
10.1	Conceptualize different options to avoid or reduce motorized travel applicable to the local context (e.g. flexible working time; compressed workweeks; use of ICT for e-commerce, e-governance, e-materialization, etc, increasing densities and concentration and mixed use development in city planning)	Universities	Appraisal report	1		

Activity		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
10.2	Develop guidelines or a framework to operationalize each option identified in item 10.1	Universities	Number of options considered	2	3	4
10.3	Develop and implement mass media campaigns to promote the avoid/reduce concept of transport	AirMAC, CASL	Number of campaigns	2	2	2
Strategy 11	**Reduce GHG emissions in the aviation sector**					
11.1	Identify the current profile of GHG emissions from Sri Lankan operators (Sri Lankan Airline, Mihin Lanka and FITS Aviation) in international operations and from the domestic operators at the local level	Civil Aviation Authority (CAA)	Report on the emission profile	1		
11.2	Forecast the BAU future emissions from the above operators	CAA	Report on emission forecast		1	
11.3	Study applicable international conventions / commitments related to GHG emission (and emission of other pollutants)	CAA	Study report	1		
11.4	Identify GHG mitigations options	CAA	Number of options	2	2	2
11.5	Identify implementation mechanisms and resource requirements for the implementation of mitigation options	CAA	Study report			1
Strategy 12	**Reduce GHG emissions in the maritime sector**					
12.1	Establish the present GHG emission profile of the maritime sector	Sri Lanka Ports Authority (SLPA), Universities	Report on the emission profile	1		
12.2	Forecast the BAU future emissions from the sector	SLPA, Universities	Report on the emission forecast		1	
12.3	Identify GHG mitigation options for the maritime sector	SLPA, Universities	Number of options	2	2	2
12.4	Study the GHG mitigation potentials for implementation of international laws and regulations	SLPA, Universities	Study report	1		
12.5	Identify implementation mechanisms and resource requirements to implement mitigation options	SLPA, Universities	Study report			1

Strategy 13	Prioritize GHG mitigation options in the transport sector					
Activity		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
13.1	Set baselines / BAU scenario for identified mitigation options	MMD&E, MoT&CA	% of baselines set	50%	85%	100%
13.2	Establish marginal abatement cost (MAC) curves for the selected mitigation options	MMD&E, MoT&CA	Number of mitigation options considered	15	25	30
13.3	Assign responsible agencies and get their commitment / endorsement	MMD&E, MoT&CA	Number of agencies committed			
13.4	Identify resource and capacity requirements, and develop, and implement training programs	MMD&E, MoT&CA	Number of training programs	2	2	2
			Number of participants	50	50	50
13.5	Establish an MRV system	MMD&E	% coverage	10%	25%	50%
13.6	Develop an implementation plan for the INDCs in the transport sector	MMD&E, MoT&CA	% of completion		25%	100%

Industry

Introduction

Industrial sector includes energy consuming industries, technology intensive industries, small and medium enterprises and micro industries. Apart from emissions generated from energy consumption, the key industries contributing to GHG emissions are cement manufacture and lime production. Energy required for industrial purposes is generated from several sources such as biomass, petroleum oil and electricity. It is noted that most of the industries are using very old and high energy consuming technologies which need to be reviewed and improved with new technology.

Proposed INDCs in the industry sector are suggesting further actions and sub actions that could directly and indirectly influence in reducing GHG emissions in the industrial sector by modifying, adopting and applying new technology available in the field targeting the time frame of 2020-2030.

1. INDCs of Industrial Sector

The INDCs of the industrial sector include:

1. Modernize and facilitate industries to follow recognized standards related to GHG emission reduction (environmental management systems such as ISO 14000, ISO 14040 series, ISO 14062, design for environment, ISO 14064-greenhouse gas emission standards, Oeko-Tex 1000 garment and textile industry; Hazard Account Critical Control Points (HACCP) or ISO 22000/25 certification, etc)
2. Continue fuel switching to biomass in industries
3. Improve industrial energy/water/ raw material efficiency
4. Introduce and promote tax structures to promote sustainable technologies
5. Encourage industries to reduce GHG emissions by introducing a reward system
6. Establish eco-industrial parks (EIPS) and villages
7. Implement the national green reporting system of Sri Lanka.
8. Apply eco-efficiency and cleaner production
9. Greening the supply chain by introducing life cycle management and industrial symbiosis to managing zero waste
10. Introduce high efficient motors for the entire industrial sector

2. Strategic policies and related INDCs in the industrial sector

Number	Strategic Policy	INDCs Activities
1	Introduce GHG emission standards for the effective implementation of INDCs.	1,5
2	Encourage clean energy sources through biomass energy generation.	2
3	Enhance capacity building of industrialists and relevant stakeholders by using modern technology as well as including low interest credit schemes	3,4,10
4	Efficient use of resources for industry by using cleaner production and sustainable consumption and production	6,7, 8,9

3. Readiness Action Plan

Industry Sector INDCs-1	1. Modernise and facilitate industries to follow recognized standards related to GHG emission reduction					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Assess the current environment standards related to GHG emission reduction (adverse industry sectors)	MIC, NCPC, BOI, IDB, CEA,CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of industries	20%	60%	100%
2	Identify the adequacy of policies and regulations to implement the identified INDCs	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Identified policies and regulations	20%	60%	100%
3	Identify existing policy gaps through stakeholder consultation	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Identified policy gaps	20%	60%	100%
4	Identify existing gaps in legal framework through stakeholder consultation	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Identified gaps in the legal framework	20%	60%	100%
5	Study and propose solutions/mechanisms to fill the above gaps	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	New solutions/ mechanisms	20%	60%	100%
6	Identify baseline information of GHG	MIC, NCPC ,BOI, IDB, CEA, CCS, SLSI, FCCISL, ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Baselines	20%	60%	100%
7	Identify responsible organizations to fill the gaps	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Identified responsible organisations	100%		

8	Identify adequacy of institutional capacity to implement such INDCs and the consent of other executing agencies	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of institutions	100%		
10	Identify adequate human capacities to implement such INDCs	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of institutions	100%		
11	Set up capacity building programmes related to GHG emission reduction and baseline scenarios	MIC, NCPC, CCS, Universities	Number of programmes	20%	60%	100%
12	Identify suitable financial sources (external and local) to implement such INDCs	MIC, CCS, ERD	Financial sources	50%	50%	
13	Setup an INDC monitoring mechanism in the respective Ministry	MIC, CCS	Number of monitoring bodies	50%	50%	
14	Facilitate industries to implement the standards related to GHG emission reduction	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of industries	20%	60%	100%
Industry Sector INDCs-2	**2. Continue fuel switching to biomass in industries**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify the adequacy of policies that support switching to alternative energy sources	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of policies	100%		
2	Identify adequacy of institutional support to implement the INDC	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of institutions	100%		

3	Identify barriers for switching to alternative energy sources through stakeholder consultation	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Identified barriers	100%		
4	Study and identify modern alternative energy sources technology (both heat and energy technology applications)	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, ITI, SLITA, NERDC, Universities	Number of identified modern technologies	20%	60%	100%
5	Assess technical feasibility to switch to alternative energy sources	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, ITI, SLITA, NERDC, Universities	Technical feasibility	50%	100%	
6	Conduct research on existing efficient energy technologies in selected industry categories to improve the level of efficiency	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, ITI, SLITA, NERDC, Universities	Number of researches conducted	30%	60%	100%
7	Identify adequate human capacities of stakeholder institutions to implement the INDC	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	human capacities	100%		
8	Set up a database for fuel switching in industries	MIC, NPD, CCS	Database	20%	100%	
9	Identify suitable financial sources (external and local) to implement the INDC	MIC, NPD, CCS,ERD	Identified financial sources	50%	100%	
10	Setup a monitoring mechanism in the respective Ministries	MIC, CCS	Monitoring mechanisms	50%	100%	
11	Develop a market for sustainable fuel (promotional campaign)	MIC, NPD, CCS	% of campaign completion	30%	60%	100%
12	Establish a special loan scheme to apply the modern fuel technologies	MIC, NPD, CCS	Number of loan schemes		20%	100%
13	Carryout pilot projects on fuel switching technologies	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), SLITA, EDB, NERDC, CCC, NCC	Number of pilot projects conducted	20%	60%	100%

Industry Sector INDCs-3	3. Improve industrial energy/water/raw material efficiency					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify adequacy of policies supported for effective use of energy, water and raw materials	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Identified adequacy of policies	100%		
2	Assess adequacy of environmental regulations to implement such INDCs	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	An assessment report	100%		
3	Remove barriers for efficient usage of energy, water and materials through stakeholder consultation	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Barriers removed	20%	60%	100%
4	Identify and assign responsibilities to the selected executing agencies to ensure the effective use of energy, water and raw materials	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Identified responsible agencies, and responsibilities of agencies	100%		
5	Study best available technology for the efficient use of energy , water and raw materials	MIC, CCS, ITI, NERDC, Universities	Identified best technologies	20%	60%	100%
6	Review the MRV system developed for the NAMA in the energy end use sector related energy sector	MIC,CCS,CEA,ITI, NERDC, Universities	Review reports	100%		
7	Conduct a feasibility study to adopt the NAMA and the MRV system for water and materials	MIC,CCS,CEA,ITI, NERDC, Universities	Feasibility report	50%	100%	
8	Conduct research on technologies of selected critical industry categories	MIC,CCS,CEA,ITI, NERDC, Universities	Number of research	20%	60%	100%
9	Identify potential industrial relationships on resource sharing	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Identified industrial relationships	50%	100%	

10	Identify and implement human capacity development programs to implement identified INDCs	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Human capacity development programmes	20%	60%	100%
11	Establish a database for usage of energy, water and raw materials in the industry sector	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Database	20%	60%	100%
12	Study the data collected and set baselines and targets to achieve	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Baselines and targets	50%	100%	
13	Set GHG emission reduction targets through expert consultations	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Targets for each sector	50%	100%	
17	Setup a monitoring mechanism in the respective Ministry	MIC, CCS	Monitoring mechanism			100%
18	Facilitate industries in the implementation of industrial energy, water, raw materials efficiency.	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Available facilities	20%	60%	100%
Industry Sector INDCs-4	**4. Introduce and develop tax structures to promote sustainable technologies**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Review the existing tax structure in consultation with stakeholders	MIC, Treasury, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB	Number of revisions	100%		
2	Assess the adequacy of fiscal policies supporting sustainable technologies	MIC, Treasury, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB	An assessment report	100%		

3	Study sustainable technologies available in the market and their prices through a market survey	MIC, CCS, SLSI, FCCISL, ITI, ,EDB, NERDC, CCC, NCC, Universities	% of the completion of the market survey	20%	60%	100%
4	Identify and remove barriers to promote sustainable technologies through stakeholder consultation	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Removed barriers	20%	60%	100%
5	Validation of the green procurement policy and guidelines	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Validated document			100%
6	Introduce a new tax structure to promote sustainable technologies through consultations with the Ministry of Finance	MIC, Treasury, BOI, IDB, CEA, CCS, Chief Secs (all provinces), SLITA, EDB	New tax structure		100%	
7	Popularize soft economic instruments such as payments for ecosystem services to shift from polluter pays principle to user pays principle	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of economic instruments	20%	60%	100%
8	Conduct research on sustainable innovative technologies for selected industry categories	MIC, CCS, ITI, NERDC, Universities	Number of research	20%	60%	100%
9	Encourage investors to engage and use the sustainable technology application	MIC, BOI, IDB, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC	Schemes for encouragement	20%	60%	100%
10	Establish a unit to monitor the tax structure	MIC, Treasury, CCS, Chief Secs (all provinces),	Monitoring reports	20%	60%	100%
Industry Sector INDCs-5	**5. Encourage industries to reduce GHG emissions by introducing a reward system**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Create platforms to motivate industrialists based on rewards	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of industries	30%	60%	100%

2	Develop guidelines for a rewarding system	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of guidelines	100%		
3	Review the existing criteria with through stakeholder consultations	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of reviewed criteria	100%		
4	Identify industry categories	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of identified categories	100%		
5	Conduct capacity building programmes for industrialists to develop scenarios	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of programmes	30%	60%	100%
6	Identify evaluation teams and TORs	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of evaluation teams and ToRs developed	100%		
7	Develop a database on GHG emission reduction	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs(all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Database developed	100%		
8	Develop baseline scenarios	MIC, NCPC, CCS, Universities	Number of scenarios	20%	60%	100%
9	Develop GHG scenarios	MIC, NCPC, CCS, Universities	Number of scenarios	20%	60%	100%
10	Set GHG emission reduction targets through expert consultations	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of targets set	30%	60%	100%

11	Establish a monitoring mechanism	MIC, CCS	% of the completion of the monitoring mechanism	50%	100%	
12	Create a platform to share experiences with other industries	MIC, NCPC, BOI, IDB, CEA, CCS, FCCISL, Chief Secs (all provinces), SLITA, EDB, NERDC, CCC, NCC, Universities	A platform established		30%	100%
13	Promote and introduce market based instruments	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Instruments introduced			
14	Introduce tax holidays/concessions for green investments and imports	MIC, Treasury, BOI, IDB, CEA, CCS, Chief Secs (all provinces), EDB	Number of concessions offered	20%	60%	100%
Industry Sector INDCs-6	**6. Establish eco- industrial parks (EIPS) and villages**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Develop regulating criteria for existing and new industrial zone and estate	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	No of criteria developed	50%	100%	
2	Identify locations for industries	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of locations	100%		
3	Identify gaps in policies for industrial zones	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of gaps identified	100%		
4	Validate Green Procurement Policy and guidelines	MIC, NPD, CCS, Chief Secs (all provinces), SLSI	Number of policies/ guidelines			100%

5	Issue EPL and monitor parameters on soil, water and air	MIC, BOI, CEA, Chief Secs (all provinces)	Number of EPL	30%	60%	100%
6	Identify eco industrial parks/zones clustered industries including high polluting industries.	MIC, NCPC, BOI, IDB, CEA,CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of industries	100%		
7	Call for expressions of interest to cluster eco industrial parks/villages	MIC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces)	Number of expressions		50%	100%
8	Identify an arm to monitor Eco- Industrial Zones and villages	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Identified organisation	100%		
9	Conduct a feasibility study on an integrated waste management system	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of covered industrial zones	50%	100%	
10	Develop a baseline survey for integrated waste management	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, ITI, SLITA, NERDC, Universities	Survey report	100%		
11	Strengthen an integrated waste/waste water exchange network	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of exchangeable waste producing industries	20%	60%	100%
12	Create awareness among industrialists and the general public	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of programmes, leaflets, etc	20%	60%	100%
13	Facilitate to strengthen/convert/re-zone existing industrial zones/parks into eco industrial zones	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of facilitated zones/parks	20%	60%	100%

Industry Sector INDCs-7	7. Implement the National Green Reporting System of Sri Lanka					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Review the existing National Green Reporting Guidelines	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of reviewed guidelines	100%		
2	Identify the gaps and find a solution for identified gaps	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of solutions	20%	60%	100%
3	Incorporate solutions to the National Green Reporting System	MIC, EP&E	Number of incorporated solutions	20%	60%	100%
4	Creation of Mega scale awareness on the reporting system	MIC, EP&E	Number of awareness programmes	20%	60%	100%
5	Call for expression of interest to enroll with the system	EP&E	Number of enrolments	30%	60%	100%
6	Identify innovative promotional campaign methods	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of identified methods	50%	100%	
7	Identify evaluation teams	MIC, NCPC, BOI, IDB, CEA, EP&E, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of teams identified	50%	100%	
8	Conduct capacity building programmes for industrialists and verification agencies	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of conducted programmes	30%	60%	100%

9	Identify a suitable financial mechanism for the reporting system	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of identified mechanisms	100%		
10	Develop a database for the National Green Reporting system	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	% of completion	30%	60%	100%
11	Strengthen/build capacity of the evaluation team	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of programmes conducted	30%	60%	100%
12	Identify a suitable mechanism to be associated with Government sector institutions for this system	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Identified mechanism	100%		
13	Create a platform to share best practices and lessons with others	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of shared best practices	30%	60%	100%
14	Facilitate soft loan/grants for green investments and practices	MIC, Treasury, BOI, IDB, CEA, EP&E, Chief Secs (all provinces), EDB	Value of the loans/grants	30%	60%	100%
15	Implement the National Green Reporting System	EP&E	Number of registered industries	30%	60%	100%

Industry Sector INDCs-8	**8. Apply eco-efficiency and cleaner production**				
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**	
				2017	**2018**	**2019**
1	Conduct an industrial survey to identify the current situation	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of industries	30%	60%	100%

2	Develop baseline scenarios	MIC, NCPC, EP&E, CCS, Universities	Number of scenarios	30%	60%	100%
3	Conduct training programmes to reduce waste of resources from industries	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of programmes	30%	60%	100%
4	Conduct a study to increase Environmental and Social Responsibility of SMEs	MIC,CCS, Universities	Number of SMEs	30%	60%	100%
5	Conduct a feasibility study for the promotion of renewable/green energy efficiency in the industrial sector	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of sectors covered	50%	50%	
6	Recognize and appreciate industrialists switching to green industries	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of recognized industries	30%	60%	100%
7	Formulate sectoral cleaner production policies and strategies for the effective implementation of RECP	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of sectors	30%	60%	100%
8	Conduct capacity building programmes and awareness creation on RECP	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of programmes	30%	60%	100%
9	Encourage R&D in industries to support eco innovation	MIC, BOI, IDB, CEA, CCS, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of recorded R&D	30%	60%	100%
10	Develop annual assessment reports on industrial pollutants	MIC, BOI, IDB, CEA, EP&E, Chief Secs(all provinces), ITI, SLITA, EDB, NERDC, Universities	Annual reports	20%	60%	
11	Facilitate application of eco-efficiency and cleaner production	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of industries	30%	60%	100%

Industry Sector INDCs-9		9. Greening the supply chain by introducing Life Cycle Management and industrial symbiosis to manage zero waste				
Action		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Formulate policy and guidelines for green public procurement	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of policies/guidelines	100%		
2	Obtain Cabinet approval for green public procurement	MIC, EP&E, Chief Secs (all provinces),	Cabinet approval		100%	
3	Promote green purchasing among enterprises	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of enterprises	30%	60%	100%
4	Promote eco-design and green building applications for the industrial sector	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of promoted applications	30%	60%	100%
5	Conduct capacity building programmes for eco design/green building consultants & architects	MIC, NCPC, EP&E, Universities	Number of persons /programmes	30%	60%	100%
6	Develop a national eco/energy labels certification programmes	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of eco/energy labels	30%	60%	100%
7	Encourage resource recovery through a waste exchange platform	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Amount of waste exchange	30%	60%	100%

8	Encourage substitution of renewable material use	MIC, NCPC, BOI, IDB, CEA, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of substitution	30%	60%	100%
9	Establish a green procurement network	MIC, NCPC, BOI, IDB, EP&E, SLSI, FCCISL, Chief Secs (all provinces), SLITA, EDB, CCC, NCC, Universities	Number of green suppliers	100%		
10	Promote industries to recover and share resources from selected waste streams within and between industries	MIC, NCPC, BOI, IDB, EP&E, SLSI, FCCISL, Chief Secs (all provinces), SLITA, EDB, CCC, NCC, Universities	Amount of waste recovered or shared	30%	60%	100%
11	Create platforms to motivate the use of locally recycled material symbiosis within closely located industries	MIC, NCPC,BOI,IDB, EP&E, SLSI, FCCISL, Chief Secs (all provinces), SLITA, EDB, CCC, NCC, Universities	Amount of locally recycled materials used	30%	60%	100%
12	Conduct research and development for Life Cycle Assessment	MIC, EP&E CCS, ITI, NERDC, Universities	Number of R & D	30%	60%	100%
13	Identify financial sources	MIC, EP&E, CCS, ERD	Identified sources	100%		
14	Strengthen the institutional mechanism to monitor the INDC	MIC, CCS, EP&E	Number of institutions	50%	100%	
13	Green the supply chain through the introduction of Life Cycle Management, policy formulation, capacity building and training for the promotion of eco products, and industrial symbiosis to manage zero waste INDC	MIC, NCPC, BOI, IDB, CEA, CCS, EP&E, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of industries	30%	60%	100%
Industry Sector INDCs-10	**10. Introduce high efficient motors for the entire industrial sector**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Conduct a research dissemination forum for green innovation on high efficient motors	MIC, CCS, ITI, NERDC, ,Universities	Number of conferences/ symposiums	20%	60%	100%

2	Create platforms to motivate the use of high efficiency motors	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of platforms created	20%	60%	100%
3	Conduct a feasibility study on introducing high efficient motors for industries	MIC,CCS, ITI, NERDC, Universities	Number of types of motors	50%	100%	
4	Create Awareness among industrialists on the relevant INDC actions	MIC, NCPC, BOI, IDB, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of awareness programmes	20%	60%	100%
5	Conduct capacity building programmes for the technical officers and machine operators	MIC, NCPC, BOI, IDB, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Number of programmes	20%	60%	100%
6	Avoid double counting of the INDC with transport and energy sectors	MIC, CCS	Mechanisms developed to avoid double counting	100%		
7	Assess mitigation potential of technology or practices for each INDC	MIC,NCPC,CCS, ITI, NERDC, Universities	Number of assessments	30%	70%	100%
8	Set GHG emission reduction targets through expert consultations	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Targets for each sector	50%	100%	
9	Publish GHG reduction targets in the MRV system	MIC,CCS,CEA,ITI,NERDC, Universities	Number o of publications	30%	60%	100%
10	Identify external funding assistance required for this technology	MIC, CCS,ERD	Value of funding identified	100%		
11	Identify a lead executing agency for the INDCs	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Lead executing agency identified	100%		

12	Identify supporting executing agencies for each INDC	MIC, NCPC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC, Universities	Supporting executing agencies identified	100%		
13	Introduce high efficient motors to the entire industrial sector	MIC, BOI, IDB, CEA, CCS, SLSI, FCCISL, Chief Secs (all provinces), ITI, SLITA, EDB, NERDC, CCC, NCC,	Amount of energy saved	20%	60%	100%

Forestry Sector

Introduction

Forest cover is globally accepted as a key element in combating climate change. This is through the contribution that forests make to curb the increasing trend of average surface temperature. The crucial role that trees play in absorbing carbon from air through a process referred to as carbon sequestration, has now been recognized globally as an effective way to remove rapidly increasing atmospheric carbon. However, once trees are cut down, this process is reversed as most of the sequestrated carbon is once again emitted to the atmosphere. Therefore, deforestation and forest degradation has been identified as one of the major issues that contribute to global warming. The Intergovernmental Panel on Climate Change (IPCC) estimated that deforestation and forest degradation account for 12% of earth's human induced carbon emission, which is more emissions than the entire global transportation put together.

Proposed INDCs of this sector are directly or indirectly influencing the reduction of GHG emission, through the increase of forest cover in the country up to a healthy level and through the management of deforestation. It further focuses on enriching land use by introducing perennial crops during the time frame of 2020-2030.

1. INDCs of Forest Sector

1. Increase forest cover of Sri Lanka from 29% to 32% by 2030.
   1.1 Identify land for reforestation/forestation (suitable non forest land for forestry by conducting land use planning at national scale).
2. Improve quality of growing stock of natural forests and plantations.
   2.1 Natural Forests
      2.1.1 Completion of boundary demarcation
      2.1.2 Conservation to increase non carbon benefits
   2.2 Plantation forests
      2.2.1 Demarcation of boundaries including buffer zones
      2.2.2 Develop plantation management plans for sustainable forest management practices for productive and protective purposes
3. Restoration of degraded forests and hilltops (shrubs, grasslands and state lands)
4. Increase river basin management for major rivers of Sri Lanka.
   4.1 Multi hazard prioritisation of catchment/ river basins
   4.2 Preparation of catchment management plan/s (demarcation and protection of riverine vegetation etc.)
   4.3 Implementation of protective measures
5. Forestation of underutilized private lands and marginal tea lands.
   5.1 Promote forestation/afforestation through a non-carbon benefit/payment for ecosystem service mechanism.
6. Urban forestry (tree planting along roadside, temple lands, schools and other government lands).
   6.1 Improve better coordination among relevant authorities
7. Establishment/ reactivation of the National Forest Monitoring System (NFMS).

7.1 Regular implementation of the national forest inventory and national forest cover assessment

8. Promote private and public sector companies to investment in environmental conservation projects through CSR programs.

8.1 Establish an institutional setup and a mechanism to implement such programs.

2. Strategic Policies

Number	Strategic Policy
1	Conservation and enhancement of the forest cover of Sri Lanka
2	Sustainable forest management through enhancing the quality of biomass and restoration of degraded forests
3	Watersheds and river basin management
4	Promotion of private sector participation in forest conservation
5	Promotion of tree planting outside the forest areas
6	Promotion of community/community based organizations (CBOs)/religious entities and general public in tree planting
7	Use of international guidance and experience in capacity building
8	Intersectoral coordination in planning and implementation
9	Use of affordable technology
10	Use of viable alternatives for environmental destructive practices

3. Readiness Action Plan

Forestry Sector INDCs-1	**1. Increase forest cover of Sri Lanka from 29% to 32% by 2030** 1.1 Identify land for reforestation/forestation (suitable non forest land for forestry by conducting land use planning at national scale)

Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Prepare current forest extent, classification and preparation of forest inventories	FD, DWLC	Forest inventory data, forest cover maps	50%	50%	
2	Identify land requirement for reforestation/forestation/forest restoration	FD, MA, DWLC	Identified land area	100%		
3	Analyze the potential for converting non-forest land to forestry by conducting land use planning at national level (while considering socio-economic challenges).	FD, LUPPD	Study report	50%	50%	
4	Address socio-economic issues relation to forest management	FD	Resolved socio-economic issues		50%	50%
5	Identify suitable forest restoration methods and potential plant species for different localities according to the geo-physical boundaries.	FD	Number of methods/species	20%	40%	40%
6	Identify and rectify policy gaps	FD, DWLC, MA	A report of policy gaps identified	50%	100%	
7	Conduct awareness and training programmes for stakeholders	FD, MA, DWLC	Number of programmes	20	20	20
8	Implementation of reforestation/forestation programme	FD, DWLC, MA	Number of hectares restored/planted	200	200	200
9	Build a mechanism to calculate the carbon sequestration of different types of forests	FD, MA, DWLC	Developed mechanism			100%
10	Identify institutional capacity gaps and rectification	FD, MA, DWLC	Report	50%	50%	
11	Demarcate and declare of newly established forest area	FD, MA, DWLC	Number of hectares			100%

Forestry Sector INDCs-2	**2. Improvement of quality of growing stock of Natural Forests and Forest Plantations** 2.1 Natural Forests 2.1.1 Completion of boundary demarcation 2.1.2 Conservation to increase non carbon benefits 2.2 Plantation Forests 2.2.1 Demarcation of boundaries including buffer zones 2.2.2 Develop plantation management plans for sustainable forest management practices for productive and protective purposes

	Action	Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Prioritize forest areas for quality improvement	FD,DWLC	Map & report	50%	50%	
2	Prepare natural forest management plans	FD,DWLC	Management plan	30%	30%	40%
3	Prepare site specific restoration plans and intervention strategies	FD,DWLC	Plans	30%	30%	40%
4	Develop plantation management plans	FD	Management plans	50%	50%	
5	Prepare feasibility plans for increasing mixed cultures instead of monocultures, introducing native varieties in selected forest plantations	FD,DWLC	Management plans	50%	50%	
6	Survey and declare forests and buffer zones	M/SD&WL,FD,DWLC	Number of forests declared			100%
7	Implement management plans	FD,DWLC	Area under management		20%	20%

Forestry Sector INDCs-3	**3. Restoration of degraded forests and hilltops**

	Action	Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Identify areas and their present status	FD,DWLC	Maps & reports		100%	
2	Assess restoration potential of degraded forests and hill tops through field investigations	FD,DWLC	Assessment report		100%	
3	Prioritize identified areas for restoration	FD,DWLC	Maps & reports		100%	
4	Prepare management plans to improve degraded forests and hilltops	FD,DWLC	Management plans			100%

5	Conduct baseline survey to assess climate impacts	FD,DWLC	Established baseline			100%
6	Implement management plan	FD,DWLC	Progress reports	X	X	X

Forestry Sector INDCs-4	**4. Increase river basin management for major rivers of Sri Lanka** 4.1 Multi hazard prioritization of catchment/ river basins 4.2 Preparation of catchment management plan/s (Demarcation and protection of riverine vegetation etc.) 4.3 Implementation of protective measures

Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify priority river basins and watersheds and assess the current status/ multi hazard prioritization of catchment/ river basins	MA,DoI, LUPPD,FD, DWLC	Analyzed report	20%	40%	40%
2	Assess forest status on critical catchments/river basins	MA,DoI, LUPPD,FD,DWLC	Map & report	20%	40%	40%
3	Impact assessment and analysis of lessons learnt of major watershed management activities undertaken in the past	MMD&E	Assessment report	100%		
4	Prepare catchment management plan/s (demarcation and protection of riverine vegetation etc.)	MA/DoI, LUPPD,FD,DWLC	Catchment management plan			100%
5	Implement program	MA/DoI, LUPPD,FD,DWLC	Area under improved management			*2020

Forestry Sector INDCs-5	**5. Forestation of underutilized private lands and marginal Tea/Rubber lands** 5.1 Promote forestation/afforestation through non carbon benefit/payment for ecosystem service mechanism

Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify underutilized private lands and marginal state tea lands for	FD,MOPI,L	Area of land	50%	50%	

	forestation	UPPD,MED	identified			
2	Create incentive schemes for the promotion of planting programme/s for productivity enhancement through land management	FD,MOPI,L UPPD,MED	Documents and reports	50%	50%	
3	Create awareness on conservation and forestation for private land owners and promote forestation/afforestation and introduction of incentive schemes	MMD&E,FD ,MOPI,MED	Number of programmes conducted	20%	40%	40%
4	Prepare detailed project implementation plan	MMD&E, FD,MOPI,M ED	Area reforested/afforest ed under private forests			100%

Forestry Sector INDCs-6	**6. Urban forestry (Tree planting along roadside, temple lands, schools and other govt. lands)** 6.1 Improve better coordination among relevant authorities					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify sites for urban forestry (tree planting along roadside, car parks, housing schemes temple lands, schools and other govt. lands)	FD	Number of sites identified	50%	50%	
2	Prioritize the areas for tree planting	FD, Dept. of Commissioner of local Govt.	Number of sites prioritized	50%	50%	
3	Develop greening plans in the selected local authorities and other relevant stakeholders	FD, Dep. of Commissioner of local Govt.	Number of plans	50%	50%	
4	Identify tree species suitable for roadside, temple lands, schools and other government lands	FD, Dept. of Commissioner of local Govt.	Species List for selected categories	50%	50%	
5	Prepare detailed project implementation plan to implement the INDCs including actions such as; implementation of the greening plans, provision of planting materials	FD, Dept of Commissioner of local Govt.	Number of sites for planting initiated		50%	50%

Forestry Sector INDCs-7	7. Establishment/ reactivating of the National Forest Monitoring System (NFMS) 7.1 Regular Implementation of National forest inventory and national forest cover assessment					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Establish the National Forest Monitoring System	FD, UNREDD	NFS system		100%	
2	Conduct awareness creating programmes for stakeholders	FD	Awareness programmes		50%	50%
3	Regular monitoring of national forest cover	FD,DWLC, MA	Established monitoring plan		100%	
4	Conduct assessments on growing stocks, carbon sequestration, etc	FD/DWLC	Assessment report			100%

Forestry Sector INDCs-8	8. Promote private and public sector companies for investment in environmental conservation projects through CSR programs 8.1 Establishment of institutional setup and a mechanism to implement such programs					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify private and public sector companies for supporting environmental conservation projects through CSR programs.	FD	Number of identified companies			
2	Identify land base	FD	Land base	100%		
3	Establish the institutional setup and a mechanism to implement such programs.	MMD&E /FD	Institutional setup		50%	50%

Waste Management Sector

Introduction

GHG emissions from solid waste depend on the disposal methods. The main waste collection and disposal systems currently practiced in Sri Lanka are composting, recycling, sanitary land filling, open dumping, waste burning through incineration (for clinical waste) and waste water treatment.

Waste collection and disposal have become a serious problem in Sri Lanka with the expansion of urban population and the rapid changes in the consumption pattern. Local Authorities (LAs) are responsible for municipal solid waste management in Sri Lanka. However, the capacity of LAs in general is not sufficient to manage all waste generated within the LA. Only 40% of the waste is regularly collected.

Currently, only a limited number of LAs are running sanitary land filling practices. The generation of Methane from landfill sites is likely to be an acute problem. In almost all the Municipal Councils' landfill sites are located within the respective city limits, amidst highly populated residential areas. One ton of biodegradable waste gives 300 liters of Methane (0.4 tons of Methane or 8 tons of CO_2, equivalent GHG). Providing solutions to solid waste management issue will help solve the multifaceted dimensions on health hazard, environment pollution and GHG emission reduction.

The proposed INDCs for waste sector are directly or indirectly influencing the reduction of GHG emission in waste sector by modifying, adopting and applying appropriate technology during the period of 2020-2030.

1. INDCs of Waste Sector

The INDCs for the waste sector include:

1. Introducing a source separation system at household level and a proper collection mechanism.
2. Improving the compost preparation system for each local authority and increasing organic fertilizer for agricultural purposes by providing facilities to control the quality of compost, and introducing a market for produced compost
3. Introducing energy generation by waste (waste to energy programmes).
4. Improving waste collection mechanism
5. Designing and implementing comprehensive solid waste management strategies for 40%-60% local authorities before 2030
6. Monitoring of waste management activities
7. Systematic management of industrial/hazardous and clinical waste

2. Strategic policies identified for the waste sector

1. Introduce and implement a 3R System among all LAs

2. Improve compost making facilities for LAs where the waste collection is below 30 MT/Day

3. Introduce other integrated waste management systems for waste collection where it is more than 30MT/Day (incinerators, waste to energy system, mechanically operated compost, machinery)

4. Introduce sanitary landfills for residues (maximum of 3 per province in cluster basis among LAs)

5. Introduce new legal provinces to LAs for the improvement of waste collection and management.

3. Action Plan

Waste management action plan is prepared for every province with the inclusion of the following factors.

1. Introduce a proper waste management system taking into consideration of the amount of collection in each LA
2. Possibility of clustering among LAs.
3. Capacity for composting.
4. Collection calendar for LAs.
5. Improvement of facilities for collection and treatment of waste, and night soil.
6. Conduct awareness programmes among public through mass media and other ways.

4. Readiness Action Plan

Waste Sector INDCs-1	1.Introduce a source separation system at household level and a proper collection mechanism					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify suitable segregation points for different waste categories	LAs	Number of identified segregation points	x	x	x
2	Identify and increase suitable collection points for different waste categories	LAs	Number of collection points	x	x	x
3	Identify waste collection industries/ centres for different waste categories	MPCs&LG	Number of industry representatives	x		
4	Conduct frequent surveys for waste minimization, segregation and recycling	MPCs&LG, Interested Stakeholders	Number of surveys conducted			x
5	Develop waste management plans at the LA level, and improve up to provincial level	MPCs&LG, LA, Department of Local Governments	Number of waste management plans developed	x	x	x
6	Create legislation for sorting, collecting at household level	MPCs&LG, MMD&E	Legislation formulated			
7	Adapt Polluter Pays Principle for mixed waste	MPCs&LG, MMD&E	Polluter Pays Principle implemented			
8	Amend the waste management policy to implement and enforce INDCs	MPCs&LG, MMD&E	Waste management policy amended	x		
9	Obtain Cabinet approval for the policy	MPCs&LG, MMD&E	Approval obtained	x	x	
10	Strengthen institutional coordination among LAs for waste segregation	MPCs&LG, LAs	Institutional coordination strengthened	x	x	x
11	Conduct awareness creating programmes at the household level	MPCs&LG, LAs	Number of awareness creation programmes	x	x	x
12	Conduct capacity building programmes for workers	MPCs&LG, MVE, SLILG	Number of capacity building programmes conducted	x	x	x

13	Establish appropriate infrastructure with interested sector participation as needed	MPCs&LG, LAs	Number of advertisements, notices and call for bids	x	x	x
14	Introduce and amend necessary legal framework and instruments to initiate MBIs	MPCs&LG, MMD&E	Number of MBI initiated			

Waste Sector INDCs-2	**2. Introduce and improve a compost preparation system for each Local Authority and increase production of 'soil conditioner' for agricultural purposes by providing facilities to control the quality of compost and introduce a market for compost product**

Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Find out national and external resources for composting and identify compost sites at LAs levels	MPCs&LG	Number of sites identified Number of resources identified	x	x	x
2	Identify technical know-how and human capacities for the preparation of composting (MEQ)	MPCs&LG, LAs	Number of trainings conducted	x	x	x
5	Identify research and development needs for composting	MOA, SLLRDC	Gap analysis report	x		
6	Create a mechanism to establish a laboratory to check the quality of compost produced	LA, Private sector and other stakeholders	Laboratory established	x	x	x
7	Establish a certification service for fertilizer	MOA	Number of certifications given			
8	Conduct assessments of existing compost sites	CEA	Number of assessments completed			
9	Identify gaps in the current system	MPCs&LG, Interested stakeholder groups	Number of gaps identified	x		
10	Identify and recognize individuals, communities and champions engaged in the best composting practices	MPCs&LG, LAs	Provision of awards and financial incentives	x	x	x
11	Update the website information system on composting at LAs	MPCs&LG, Provincial Councils	Number of articles published	x	x	x
12	Conduct training and awareness programmes for composting	MPCs&LG	Number of awareness programmes conducted	x	x	x

13	Sensitize and provide worker welfare and safety including suitable material	MPCs&LG, MoH	Number of safety material prepared			
14	Distribute free compost bins	MPCs&LG, LAs	Number of bins distributed	x	x	x
15	Set GHG reduction targets	MMD&E	Identified targets, technical report		x	
16	Analyze MACC(Marginal Abatement Cost Curve)	MPCs&LG and expert panel	Number of of technology prioritized			x
17.	Introduce suitable incentive schemes to encourage green initiatives in composting	MPCs&LG, Provincial Councils	Awards provided, number of individuals provided incentives	x	x	x

Waste Sector INDCs-3	**3. Develop open dumping sites into sanitary landfill sites**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Prioritize activities related to selection of open dumping sites to be converted to sanitary landfill	MPCs&LG, CEA	Number of sites prioritized	x		
2	Identify sites	MPCs&LG, CEA	Number of sites identified	x	x	
3	Conduct feasibility studies and identification of technology	MPCs&LG, CEA	Number of feasibility studies conducted		x	x
4	Monitor and evaluate the process	MPCs&LG, CEA	Number of programmes monitored & evaluated		x	x

Waste Sector INDCs-4	**4. Introduce energy generation by waste (waste to energy programmes)**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify national and external support including infrastructure facilities for energy generation by waste	MPCs&LG	Number of identified external support providers	x	x	x
2	Identify suitable segregation points for different waste categories	MPCs&LG, LAs	Number of identified segregation points	x	x	x
3	Identify suitable collection points for different waste categories	MPCs&LG, LAs	Number of collection points identified	x	x	x
4	Update and edit collection systems as needed	MPCs&LG, LAs	Plan for collection system	x	x	x
5	Identify and fill gaps of the current system	Ministry of PCs, LAs	Number of gaps identified	x	x	

7	Identify infrastructure facilities	Ministry of PCs, LAs	List of infrastructure facilities available	x		
8	Conduct a feasibility study on introducing energy generation by waste	MPCs&LG, LA, UDA, ITI	Number of feasibility studies conducted	x		
9.	Conduct a feasibility study of producing biogas	NERD, SEA,CEA	Number of studies	x		
10	Conduct a feasibility study of producing biofertilizer from by-products of biogas	NERD, SEA,CEA	Number of studies	x	x	
11	Develop research and development on waste to energy	MP&RE,SEA,CEA	Number of research studies	x		
12	Develop a database on waste to energy	MP&RE,SEA,CEA, MPCs&LG	Number of database established			
13	Set the baseline scenario	MPCs&LG	Baseline scenario established		x	
14	Set GHG emission scenarios	MPCs&LG	GHG emission scenarios established		x	x
15	Identify technology transfer needs	MP&RE,SEA,CEA, MPCs&LG	Number of technologies identified		x	x
16	Avoid double counting with the energy sector INDCs	MMD&E, MP&RE,SEA,CEA, MPCs&LG	Overlaps identified	x	x	x
17	Evaluate success and monitor waste-energy projects	MPCs&LG, LAs, Interested stakeholders, ITI	Monitoring based on reports from LAs. Field visits through the office of the Assistant Commissioner of Local Govts, publications, etc	x	x	x
18	Identify possible funding sources (Grants, loans, etc.)	Ministry of PCs	Number funding sources identified	x	x	x

Waste Sector INDCs-5	5. Improve waste collection mechanism					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify gaps of current system	MPCs&LG, LAs	Number of gaps identified	x	x	x
2	Identify suitable segregation points for different waste categories	LAs	Number of segregation points	x	x	x
3	Identify waste collection industries for different waste categories	MPCs&LG, LAs	Number of industries identified	x	x	x
4	Conduct waste mapping for the waste collecting system	MPCs&LG, CEA	Number of maps prepared	x	x	x
5	Conduct awareness programmes for the general public and school children	MPCs&LG, CEA	Number awareness programmes conducted	x	x	x
6	Conduct capacity building programmes	MPCs&LG, CEA	Number of capacity building programmes conducted	x	x	x
7	Introducing waste collection and transport compactors	MPCs&LG, CEA	Number of compactors	x	x	x
8	Formulate a waste management policy	MPCs&LG, CEA	Waste Management Policy prepared			
9	Identify infrastructure needed to implement the INDC	MPCs&LG, CEA	Infrastructure identified	x	x	
Waste Sector INDCs-6	**6. Design and implement comprehensive solid waste management strategies for 40%-60% of LAs before 2020**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify policy gaps in the current system	MPCs&LG, CEA	Number of policy gaps identified	x		
2	Identify legal gaps in the current system	MPCs&LG, CEA	Number of legal gaps identified	x	x	
3	Conduct gap analysis of the system	MPCs&LG, CEA	Gap analysis conducted	x	x	x
4	Amend relevant policies	MPCs&LG, CEA	Number of policies amended	x	x	x

5	Conduct a study on the life cycle analysis in designing, manufacturing, consumption and disposal of the product	MPCs&LG, CEA	Number of life cycles analysed	x	x	
6	Identify key waste sectors , key products and waste generating nodes	MPCs&LG, CEA	Number of key waste sectors, products and waste generating nodes identified	x	x	
7	Quantify the amount of waste for integrated solid waste management	MPCs&LG,CEA	Amount of waste generated	x	x	x
8	Identify suitable land facilities for disposal	MPCs&LG, CEA	Number of land facilities identified	x	x	x
9	Prepare a database for relevant information documenting	MPCs&LG, CEA, SEA	Database prepared	x	x	
14	Develop a MRV system for waste sector	MPCs&LG, CEA,SEA, MMD&E	A MRV system established			

Waste Sector INDCs-7	**7. Monitor waste management activities**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Conduct a survey to evaluate the system	MPCs&LG, CEA,SEA, MMD&E	A Survey conducted	x	x	
2	Monitor the targets to be achieved	MPCs&LG,CEA,SEA, MMD&E	Number of targets monitored	x	x	
3	Quantify amount of waste for integrated solid waste management	MPCs&LG,CEA,SEA,MMD&E	Number of waste quantified	x	x	x
4	Strengthen instructional capacity for monitoring	MPCs&LG,CEA,SEA, MMD&E	Number of instructional capacity monitored	x	x	x
5	Maintain and operate secure landfill units and keep updated reports	MPCs&LG,CEA,SEA, MMD&E	Number of secure landfill units updated	x	x	x
6	Prepare waste management plans at the provincial level	MPCs&LG,CEA,SEA, MMD&E	Number of waste management plans prepared	x	x	x
7	Provide input to upgrade the system	MPCs&LG, CEA, SEA, MMD&E	Number of inputs implemented	x	x	x

8	Establish a regular monitoring system	MPCs&LG, CEA	Number of regular monitoring systems established	x	x	x
9	Provide information on municipal and hazard waste generation and research focused on waste characterization	MPCs&LG, CEA	Waste types identified	x	x	x
10	Create a mechanism for recognizing and publishing R &D activities, findings and applications	MPCs&LG, CEA	A Mechanisms established	x	x	x
11	Facilitate technology transfer through an adaptive R&D	MPCs&LG, CEA	Number of technologies transferred	x	x	x
12	Update web sites	MPCs&LG, CEA	Number of updates	x	x	x
13	Inculcate social responsibility and ethical behavior through education	MPCs&LG, CEA	Number of awareness programmes conducted	x	x	x

Waste Sector INDCs-8	**8. Systematic management of industrial/hazardous and clinical waste management**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify industrial/hazardous and clinical waste sources	MPCs&LG, CEA	Number of industrial/hazardous and clinical waste sources identified	x	x	x
2	Conduct gap analysis of the system	MPCs&LG, CEA	Number of gaps identified	x	x	x
3	Fill identified gaps	MPCs&LG, CEA	Number of gaps filled	x	x	x
4	Develop infrastructure	MPCs&LG, CEA	Number of infrastructure developed	x	x	x
5	Develop a efficient collection system	MPCs&LG, CEA	Number of collection systems developed	x	x	x
6	Create a mechanism for recognizing and publishing R &D activities, findings and applications	MPCs&LG, CEA	A Mechanism developed	x	x	x
7	Facilitate technology transfer through adaptive R&D	MPCs&LG, CEA	Number of transferred technologies	x	x	x
8	Prepare a database	MPCs&LG, CEA	Database in place	x	x	x
9	Develop the MRV systems for waste	MPCs&LG, CEA	MRV system established	x	x	x

11	Minimize occupational health hazards and risk	MPCs&LG, CEA	Percentage of health hazards minimized	x	x	x
12	Conduct capacity building programmes for workers	MPCs&LG, CEA	Number of capacity building programmes conducted	x	x	x
13	Upgrade regulations and guidelines on industrial/hazardous and clinical waste	MPCs&LG, CEA	Number of guidelines updated	x	x	x

Adaptation

In addressing adverse impacts of climate change, adaptation is very important to developing countries. Climate adaptation is widely defined as actions taken to moderate, cope or take advantage of experienced or anticipated changes in the climate.

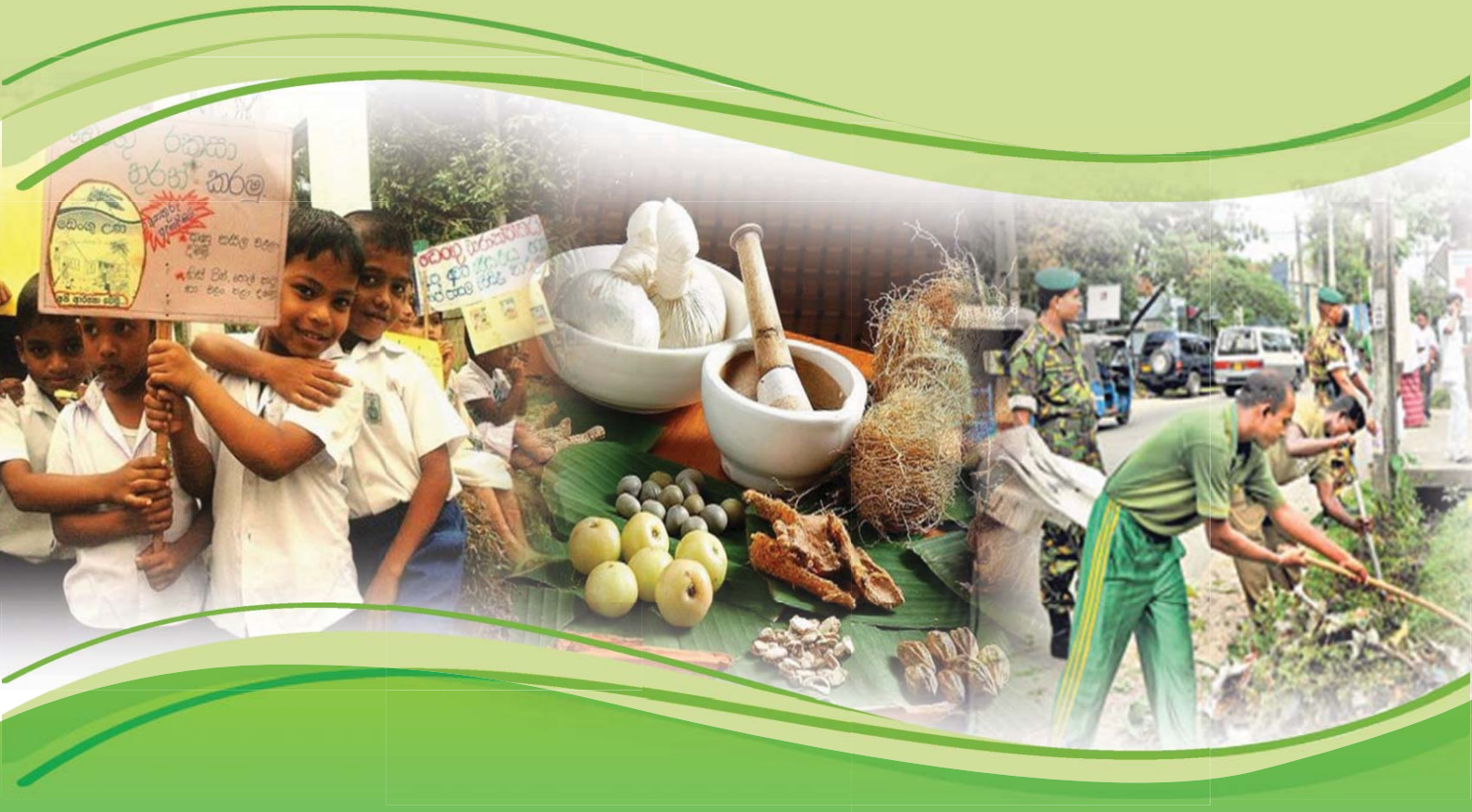
Adverse effects of climate change are becoming more frequent and intense and all countries are facing increased climate risks and adaptation needs. Paris Agreement and its relevant sections on adaptation present an unparalleled opportunity to elevate and advance climate adaptation. Accordingly, the Paris Agreement encouraged all parties to strengthen their cooperation on enhancing action on adaptation, taking into account Cancun Adaptation Framework (CAF) which could establish a clearer global vision for adaptation under the Convention; provide a framework for presenting national adaptation contributions to catalyse adaptation actions, streamline and enhance UNFCCC institutions; and mobilise resources to help particularly vulnerable developing countries to cope with climate impacts.

Adaptation measures are required to address the potential impacts of climate change. Proper adaptation can prevent losses and damages while creating a conducive environment for low carbon development. The Adaptation INDCs of Sri Lanka have been developed in consultation with relevant stakeholders, based on the *National Climate Change Adaptation Strategy (NCCAS*) and the draft *National Adaptation Plan for Climate Change Impacts in Sri Lanka (NAP*). Consequently five major broader adaptation targets have been identified:

1. Mainstreaming climate change adaptation into national planning and development
2. Enabling climate resilient and healthy human settlements
3. Minimising climate change impacts on food security
4. Improving climate resilience of key economic drives
5. Safeguarding natural resources and biodiversity from climate change impacts

The most vulnerable eight sectors to adverse effects of climate change have been identified under the INDCs on the sectors relating to adaptation, including health, food security (agriculture, livestock and fisheries), water, irrigation, coastal and marine, biodiversity, tourism and recreation, and urban, city planning and human settlements.

Health Sector



Introduction

Climate change is predicted to create significant impacts in the health sector. Studies around the world have revealed the possibility of increasing health hazards with the changing climate patterns. Vector borne diseases have been predicted to be a significant public health problem linked with impacts of climate change. Several countries have reported a rising number of fatalities due to heat waves disasters.

Sri Lanka has reported relatively high achievements in the health sector compared with other developing nations. In spite of that, the country has recently experienced outbreaks of diseases which are closely connected with the environment and weather patterns. Seasonal outbreaks of Dengue are a prime example for this. Additionally, extreme weather conditions can lead to disasters causing injuries and fatalities. Sri Lanka has an ageing population which would particularly be vulnerable to climate related health hazards. Hence, serious efforts towards adaptation against potential health hazards associated with climate change need to be given high priority in the health sector.

1. INDCs of Health Sector

1. Establish clinical waste disposal systems to all hospitals in Sri Lanka in collaboration with relevant agencies
   1.1 Establish solid clinical waste disposal systems
   1.2 Establish liquid clinical waste disposal systems
2. Control of vector borne and rodent borne diseases (Dengue, Malaria, Leptospirosis)
   2.1 Control of dengue
   2.1.1 Improve the solid waste management system by local authorities including recycling of non-degradable items
   2.1.2 Implement integrated vector control methods
   2.1.3 Redesign housing structures to prevent breeding of mosquitoes
   2.1.4 Strengthen diseases and vector surveillance systems
   2.2 Maintain the malaria-free status
   2.2.1 Surveillance and screening of all forms of migrants from malaria endemic areas
   2.2.2 Establish an early and rapid response system in the event of outbreaks
   2.3 Control of Leptospirosis
   2.3.1 Continue prophylactic treatment for farmers
   2.3.2 Continue farmer education on prevention and prophylactic treatment
   2.3.3 Continue the surveillance system including Global Positioning System (GPS).
   2.4 Establish early warning systems for vector borne and rodent borne diseases using and networking for information exchange on extreme weather events to reduce climate induced health impacts (in highly vector borne disease prone areas)

3 Control of food borne and water borne diseases including Non Communicable Diseases (NCD) such as Chronic Kidney Disease of unknown origin (CKDu) and mental diseases which can increase due to extreme heat and drought.

3.1 Strengthen/establish a laboratory system for analysis of chemicals including agrochemical residues and microbiology.

3.2 Strengthen the water quality surveillance system and strengthen the disease surveillance system

2. Strategic Policies

Number	Strategic Policy	INDCs Number
1	Strengthen the clinical waste disposal system to ensure proper management of waste	1, 1.1, 1.2
2	Enhance resilience to combat climate induced vector borne diseases	2, 2.1, 2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.2, 2.2.1, 2.2.2 2.3, 2.3.1, 2.3.2, 2.3.3 2.4
3	Reduce food borne and water borne diseases including NCDs	3, 3.1, 3.2

3. Readiness Action Plan

Health sector INDCs-1	**1. Establish clinical waste disposal systems for all hospitals in Sri Lanka in collaboration with relevant agencies**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Conduct assessment on the clinical waste disposal system in Sri Lanka at present and finalise report	Ministry of Health (MoH)	Final report	100%		
2	Develop a policy on Health Care Waste Management (HCWM) for Sri Lanka	MoH	Finalised policy on HCWM	75%	100%	
3	Develop an action plan for HCWM for Sri Lanka	MoH	Finalised action plan on HCWM	75%	100%	
4	Develop guidelines for solid and liquid clinical waste management	MoH	Finalised guidelines for clinical solid waste management and clinical liquid waste management	50%	75%	100%
5	Assess financial requirements	MoH	Finalised financial plan	30%	100%	
6	Calculate technology requirements (equipment needs and etc)	MoH	Technology needs assessment report	40%	80%	100%
7	Develop an implementation plan on HCWM	MoH	Finalised implementation plan on HCWM	40%	80%	100%
8	Conduct R&D on HCWM	MoH	Research reports	40%	70%	100%
9	Develop a monitoring and evaluation (M&E) plan for HCWM	MoH	Finalised M&E plan for HCWM	40%	70%	100%
10	Carry out training of staff for implementation and monitoring of the system	MoH	Number of staff trained Number of training workshops conducted	30%	60%	100%
11	Establish standards for effluents etc.	MoH and CEA	Gazette standards related to final disposal of waste	30%	60%	100%

Health sector INDCs-2	**2. Control of vector borne and rodent borne diseases (Dengue, Malaria, Leptospirosis etc.)** 2.1Control of Dengue 2.1.1 Improve solid waste management systems by LAs including recycling of non-degradable items 2.1.2 Implement integrated vector control methods 2.1.3 Redesign housing structures to prevent breeding of mosquitoes 2.1.4 Strengthen disease and vector surveillance systems 2.2 Maintain the malaria-free status 2.2.1 Surveillance and screening of all forms of migrants from malaria endemic areas 2.2.2 Establish early and rapid response systems in the event of outbreaks 2.3 Control of Leptospirosis 2.3.1 Continue prophylactic treatment for farmers 2.3.2 Continue farmer education on prevention and prophylactic treatment 2.3.3 Continue the surveillance system including GPS 2.4 Establish early warning systems for vector borne and rodent borne diseases using and networking for information exchange on extreme weather events to reduce climate induced health impacts (in highly vector borne disease prone areas)

	Action	Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Study the current patterns of vector borne and rodent borne diseases in Sri Lanka	MoH	Finalised report	80%	100%	
2	Strengthen the vector borne and rodent borne surveillance system in Sri Lanka	MoH	Strengthened surveillance system	40%	80%	100%
3	Strengthen inter-sectoral coordination with LAs and the Ministry of Health at district, provincial and national level in relation to solid waste management	MoH	Number of steering committee meetings held per annum	100%		
4	Assess critical factors for controlling climate-induced vector and rodent borne disease incidents	MoH	Finalised report	50%	100%	
5	Identify plausible strategies to manage climate-induced disease incidents	MoH	Finalised report	50%	100%	
6	Prepare vulnerability maps on climate related health hazards	MoH	Availability of vulnerability maps	50%	100%	
7	Implement integrated vector control methods	MoH	Availability of functioning integrated vector control methods	40%	80%	100%

8	Identify the adequacy of policies to implement the control of vector and rodent borne diseases	MoH	Finalised report	40%	70%	100%
9	Identify the adequacy of institutional capacity to implement the INDCs	MoH	Finalised report	50%	100%	
10	Prepare national guidelines on redesigning of building structures to prevent breeding of mosquitoes	MoH	Prepared national guidelines	50%	100%	
11	Calculate financial requirements	MoH	Finalised report	40%	80%	100%
12	Calculate technology requirements (equipment needs and etc)	MoH	Finalised report	40%	80%	100%
13	Promote R&D on vector borne diseases in relation to climatic factors	MoH	Number of research studies conducted	40%	80%	100%
14	Prepare strategic plans for controlling vector borne diseases	MoH	Finalised strategic plans	70%	100%	
15	Conduct research studies to assess the impact of climate change on prevalence and spread of – Vector borne diseases – Climate induced communicable diseases	MoH	Finalised research reports	40%	75%	100&
16	Establish a mechanism for sharing meteorological , clinical and entomological information	MoH	Established mechanism	50%	100	
17	Promotion of R&D on vector management using indigenous plants	Indigenous Medicine	Finalised research studies	50%	70%	100%

Health sector INDCs-3	3. **Control of food borne and water borne diseases including Non Communicable Diseases such as Chronic Kidney Disease of unknown origin and mental diseases which can increase due to extreme heat and drought** 3.1 Strengthen/ establish a laboratory system for analysis of chemicals including agrochemical residues and microbiology 3.2 Strengthen the water quality surveillance system and disease surveillance system					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Study the current status of food borne and water borne diseases including climate sensitive NCDs	MoH	Finalised report	70%	100%	
2	Risk prediction on CKDU considering climatic factors	MoH	Finalised report	60%	100%	
3	Conduct research studies on heat/thermal stress on human health	MoH	Finalised report	50%	100%	
4	Identify and assess -Diagnostic tools and treatment procedures	MoH	Finalised report	60%	100%	
5	Increase public awareness on health risks of increasing temperatures	MoH	Number of sessions conducted	50%	70%	100%
6	Develop disaster risk preparedness guidelines for health workers in vulnerable areas	MoH	Finalised guidelines	60%	100%	
7	Increase the knowledge and awareness on health impacts of extreme weather events/ heat events among public health staff	MoH	Number of sessions conducted	50%	70%	100%
8	Improve coordination between disaster management and health management agencies	MoH	Number of meetings held per annum	100%		
9	Identify the adequacy of policies to implement the relevant INDCs	MoH	Finalised report	80%	100%	
10	Prepare plans to strengthen analytical facilities in the health sector	MoH	Finalised report	50%	70%	100%
11	Design a plan to strengthen the water quality surveillance system	MoH	Finalised plan	50%	70%	100%
12	Calculate financial requirements to implement the INDCs identified under this area	MoH	Finalised report	70%	100%	

13	Calculate technology requirements (equipment needs and etc)	MoH	Finalised report	70%	100%	
14	Prepare a full project implementation plan to implement the INDCs in all three areas	MoH	Finalised plan	70%	100%	
15	Prepare the Bill of Quantity (BoQ) for the plan	MoH	Finalised BoQ	70%	100%	
16	Assess critical factors for controlling climate-induced disease incidents	MoH	Finalised report	60%	100%	
17	Identify plausible strategies for management of climate-induced disease incidents and natural disasters with relevant stakeholders	MoH	A report with identified strategies	60%	100%	

Food Security

Food Security is one of the most vulnerable areas to adverse effects of climate change in Sri Lanka. Sri Lanka's INDCs on food security consist of three major areas. These are agriculture, livestock and fisheries. Climate change will affect these areas through the impacts it has on food security, food availability, food accessibility, food utilization and food system stability. It will also impact human life in many ways, including human health, livelihoods assets, food production and distribution channels as well as changing purchasing power and market flow.

Adverse effects of climate change will have both short term as well as long term implications. Short term impacts resulting from more frequent and more intense extreme weather events, and long term impacts caused by changing temperature and precipitation patterns.

Sri Lanka as an agriculture based country faces greater consequences of extreme weather events due to temperature rise in the dry zone and higher precipitation in the wet zone, as well as changing of seasonal rainfall patterns on both zones, the dry and wet zones. Livelihood systems those are already vulnerable to food insecurity face immediate risk of increased crop failure, net pattern of pests and diseases, lack of appropriate seeds and planting materials, and loss of livestock.

Coastal communities depend on fisheries and fish farmers involved in aquaculture are already profoundly affected by climate change wherein rising sea levels, ocean acidification and floods are among impacts that are felt. Climate change is modifying the distribution and productivity of marine and fresh water species and is already affecting biological processes and altering food webs. The impacts this has on sustainability of aquatic ecosystem for fisheries and aquaculture are highly adverse.

Agriculture Sector

Introduction

Sri Lanka is an agriculture based country with agriculture remaining a key component of the economy as well as the island's cultural base. It is also one of the key sectors on which the impacts of climate change have adverse effects. Agriculture, especially crop production, is highly dependent on the prevailing weather conditions and therefore is highly sensitive to climate change, both short-term and long-term. It is imperative that a well-coordinated and sustained effort is set in motion to increase the capacity of Sri Lankan agriculture to adapt to short and long-term impacts of climate change. In order to reach this, a clear policy framework identifying the measures to be pursued and the roles of different stakeholders is needed for allocating and channeling the necessary financial and human resources for successful adaptation to climate change in the agriculture sector.

1. INDCs of Agriculture Sector

1. Promote/introduce/develop Integrated Pest Management (IPM) practices to minimize pest damages to improve environmental impacts and health
   1.1 Introduce environmentally friendly bio-degradable pesticides for IPM.
   1.2 Introduce /promote/develop suitable bio-pesticides and bio control agents for IPM.
   1.3 Introduce /promote/develop post-harvest management with environmentally friendly technology packages.
2. Develop/introduce varieties resistant/tolerant to biotic and abiotic stresses arising from climate change
   2.1 Introduce/promote/develop heat tolerant varieties
   2.2 Introduce/promote/develop drought tolerant varieties
   2.3 Introduce /promote/ develop flood tolerant varieties
   2.4 Introduce /promote/ develop salt tolerant varieties
   2.4 Develop and promote mature varieties

3. Re-demarcating Agro Ecological Regions (AERS) maps of Sri Lanka with current climate and future climate and recommend appropriate crops for different areas to reduce vulnerability to climate change impacts.

4. Introduce suitable land and water management practices for central highlands and other marginal areas to minimize land degradation and to improve the land and water productivity.
   4.1. Adaptation of Soil Conservation Act to sustain land productivity.

2. Strategic Policies

Number	Strategic Policy	INDCs Number
1	Enhance crop resilience for pest through IPM practices	1
2	Develop/introduce resistant/tolerant crop varieties for climate induced damages	2
3	Combating climate damages and impacts on agriculture through updating of Agro Ecological Zones (AEZ), and identify the best climate zones for different crops, and identify best possible times	3
4	Enhance the land and water management practices in central highlands and other marginal areas	4

3. Readiness Action Plan

Agriculture sector INDCs-1	**1. Promote/introduce/develop IPM practices to minimise pest damages to improve environmental impacts and health** 1.1 Introduce environmentally friendly bio degradable pesticides for IPM 1.2 Introduce /promote/develop suitable bio pesticides and bio control agents for IPM 1.3 Introduce /promote/develop post-harvest management with environmentally friendly technology packages

	Action	Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Conduct research and development studies to develop IPM practices	DOA, CRI, RRI, TRI, Universities	Number of packages			
2	Identify suitable areas and package of practices for different crops	DOA, crop institutes, DAD	Number of crops identified			
3	Identify production facilities and formulations	DOA, private sector	Number of products/formulations			
4	Identify the transport and storing mechanism	DOA, private sector	Adequate storage and transport			
5	Produce and supply required amount of ingredients	MOA, DOA, private sector	Adequacy of raw material			
6	Develop application models	DOA, crop institutes	Number of developed models			
7	Establish the market mechanism for the proposed products	DOA, MOA, private sector	Well established market structure			
8	Identify policy gaps to implement the INDCs and amendment of policies if needed	MOA, MMD&E	Survey results			
9	Identify responsible and other institutions to implement the INDCs	MOA, DOA, crop institutes	Survey results			
10	Identify the adequacy of institutional capacity to implement the INDCs and build capacity accordingly	MMD&E, MOA, DOA	Identified capacity building need			
11	Calculate technology requirements (equipment needs and etc)	MMD&E, MOA, DOA	Technology needs identified			
12	Calculate financial requirements (conditional and unconditional)	MMD&E, MOA, DOA	Financial needs identified			

13	Prepare a full project implementation plan to implement the INDCs	MMD&E, MOA, DOA	Finalized plan implemented			
14	Prepare the BoQ for the Plan	MMD&E, MOA, DOA	Prepared BoQ plan			

Agriculture sector INDCs-2	2. **Develop/introduce varieties resistant/tolerant to biotic and abiotic stresses arising from climate change** 2.1 Introduce/promote/develop heat tolerant varieties 2.2 Introduce/promote/develop drought tolerant varieties 2.3 Introduce /promote/ develop flood tolerant varieties 2.4 Introduce /promote/ develop salt tolerant varieties 2.4 Develop and promote mature varieties

Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify affected areas and reasons for crop damage and mapping	NRMC of DOA, LUPPD,DOM,	Finalised map			
2	Conduct research and development to develop varieties	DOA, Crop Institutes	Number of varieties developed			
3	Carry out adoptability testing in farmers' fields	DOA, Crop Institutes, PDoA	Number of farmers involved in different AER			
4	Establish planting material/seeds production facilities	DOA, PDoA, private sector	Availability of certified seeds			
5	Identify a transport and storing mechanism	DOA, private sector	Proper transport and adequate storage			
6	Conserve seeds and germplasm	DOA	Conserved number of lines			
7	Develop the distribution modality to disseminate among affected areas	DOA, MOA	The lists of seeds distributed			
8	Identify policy gaps to implement the INDCs and amendment of policies if necessary	MOA, DOA	Finalized policy analysis, and amendments made			
9	Identify responsible institutions to implement the INDCs	MOA	Number of identified institutions			

10	Identify adequacy of institutional capacity to implement the INDCs and build capacity accordingly	MOA	Identified capacity building need			
11	Calculate technology requirements (equipment needs and etc)	DOA, private sector, PDoA	Technology needs identified			
12	Calculate financial requirements (conditional and unconditional)	DOA, private sector, PDoA	Financial needs identified			
13	Prepare a full project implementation plan in-order to implement the INDCs	MOA, MMD&E, DOA	Finalized implementation plan			
14	Prepare the BoQ for the Plan	MOA	Prepared BoQ plan			
15	Improve technical capacity of research/extension staff	MOA, DOA, Crop institutes, universities	Number of capacity building prgrammes conducted			

Agriculture sector INDCs-3	**3. Re-demarcating AER maps of Sri Lanka with current climate and future climate, and recommend appropriate crops for different areas to reduce vulnerability to climate change impacts**					
Action		**Responsible Agencies**	**KPI**	**Time Line**		
				2017	**2018**	**2019**
1	Study the current status of AERs and find the gaps	NRMC (DOA), DOM	Identified technical gaps in AERs			
2	Conduct the studies and collect the required information	DOA	Available data			
	Establish spatial and temporal variation of drought and floods based on AEZs	DOA	Finalised maps			
3	Purchase relevant data such as satellite images and rainfall data	DOA, DOM	Available data			
4	Analyse data	DOA	Completed analysis			
5	Prepare sample maps	DOA	Finalised maps			
6	Conduct validation studies	DOA, PDoA	Successful production			
7	Identify adequacy of policies to implement the INDCs	DOA, MOA	Policy analysis report			
8	Identify policy gaps to implement the INDCs and amend policies if necessary	DOA, MOA,	Revised policies			
9	Identify responsible and other institutions to implement the INDCs	MOA, DOA, MMD&E	Number of identified institutions			

10	Identify adequacy of institutional capacity to implement the INDCs and build capacity accordingly	MOA, MMD&E	Identified capacity building needs			
11	Calculate technology requirements (equipment needs and etc)	MOA, DOA	Technology needs identified			
12	Calculate financial requirements (conditional and unconditional)	MOA, DOA	Financial needs identified			
13	Prepare a full project implementation plan to implement the INDCs	MOA, DOA	Finalized plan			
14	Prepare the BoQ for the Plan	MOA, DOA	Prepared BoQ plan			

Agriculture sector INDCs-4	**4. Introduce suitable land and water management practices for central highlands and other marginal areas to minimize land degradation and to improve the land and water productivity** 4.1. Adaptation of Soil Conservation Act to sustain land productivity					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify degraded lands and vulnerable areas for degradation and mapping	NRMC(DOA)	Number of hectares of land identified			
2	Calculate target areas to be covered through the INDCs	DOA, PDoA	Extent Identified			
3	Identify institutional collaboration gaps for implementation of INDCs	DOA	Number of gaps identified			
4	Develop suitable management practices through research	DOA	Number of packages			
5	Run the pilot application as the experiment model to get feedback	DOA, PDoA	Number of demonstration			
6	Improve knowledge on land conservation and water management	DOA, PDoA	Number of officers/farmers trained			
7	Identify best land and water management practices	DOA, DAD,ID	Number of packages			
8	Provide information to relevant stakeholders who cultivate in the central highlands and other marginal lands	DOA, PDoA, Hadabima	Number of stakeholders information received			
9	Identify policy gaps to implement the INDCs and amendment policies if necessary	DOA, MOA	Number of gaps identified, and amendments made			

10	Identify responsible and other institutions to implement such INDCs	DOA, MOA	Number of identified institutions			
11	Identify adequacy of institutional capacity to implement such INDCs and build capacity accordingly	DOA, MOA	Identified capacity building needs			
12	Calculate technology requirements (equipment needs and etc)	DOA, MOA	Technology needs identified			
13	Calculate financial requirements (conditional and unconditional)	DOA, MOA	Financial needs identified			
14	Prepare a full project implementation plan to implement the INDCs	DOA, MOA	Finalized plan			
15	Prepare the BoQ for the Plan	DOA, MOA	Prepared BoQ plan			

Livestock Sector

Introduction

Livestock is an integral part of the agricultural economy in Sri Lanka and it enhances food security, reduces malnutrition and poverty. There are approximately 500,000 families directly engaged in the livestock sector in dairy, poultry, goat, swine and other livestock. Dairy industry is earmarked as the priority area for investment and development in the livestock sector. The development programs launched by the Ministry of Livestock and Rural Community Development enabled the country to reach 40% self-sufficiency in local milk production. There is an increase of milk production by 15.85 % from 258.3 million litres in 2011 to 299.25 million litres in 2012.Collection of milk also has increased by 27.7% from 143.7 million litres in 2011 to 183.58 million litres in 2012.

A major driving factor of dynamics in livestock of Sri Lanka appears to be climatic variability. The rising temperature and uncertainties in rainfall associated with global warming are likely to increase the frequency and magnitude of climate variability and extremes. Further, changes in climate would also increase the risk of unexpected changes in nature and environment. The key risks from climate change to livestock are increased incidence of drought, flood and heat that impact the livestock and the livestock industry. In this context, Sri Lanka identified the following INDCs for the livestock sector in order to build resilience in the livestock sector to meet adverse impacts of climate change.

1. INDCs of Livestock Sector

1. Identify vulnerabilities in the livestock sector
    - 1.1 Establish data on vulnerabilities to climate change
        - 1.1.1 Identify vulnerabilities in livestock species
        - 1.1.2 Identify vulnerabilities in agro-climate areas
        - 1.1.3 Identify vulnerabilities in farming communities
        - 1.1.4 Identify vulnerabilities in production systems
        - 1.1.5 Identify vulnerabilities in processing pathways
2. Introduce adoptive measures to avoid or minimize adverse effects
    - 2.1 Identify adverse impacts on animal production systems
        - 2.1.1 Identify specific adverse impacts on animal production systems
    - 2.2 Identify adverse impacts on processing
        - 2.2.1 Identify stage-wise adverse effects on processing
    - 2.3 Collect and conserve traditional knowledge and practices
        - 2.3.1 Conduct and disseminate surveyed results to stakeholders
    - 2.4 Introduce technological innovations
        - 2.4.1 Encourage innovations
        - 2.4.2 Disseminate knowledge on technological innovation through extension
3. Mitigate GHG emissions by adopting smart and green livestock practices
    - 3.1 Introduce alternative measures to minimise adverse effects of climate change
        - 3.1.1 Identify alternative measures to minimise adverse effects of climate change

3.1.2 Disseminate knowledge

3.2 Explore potential clean and renewable energy sources for livestock related activities

3.2.1 Identify potential clean & renewable energy sources

3.2.2 Increase accessibility to alternative energy services

3.3 Adapt integrated waste management systems

4. Promote responsible consumption and sustainable production

4.1 Promote green livestock procedures & processing techniques

4. 1.1 Conduct promotional programs to popularise green livestock procedures & processing techniques

4.2 Promote consumption of green livestock produce

4.2.1 Conduct promotional programmes for consumption of green livestock produce

5. Enhance education, awareness and capacity building

5.1 Conduct awareness & educational programmes on smart green livestock activities

5.1.1 Introduce smart green livestock activities

5.1.2 Promote smart green livestock activities

5.2 Promote emerging green technologies

5.3 Identify and encourage the exchange of novel technologies

Note

Newly proposed INDCs

2. Strategic Policies

Number	Strategic Policy	INDCs Number
1	Enhance feeding practices by considering agro climatic zones in Sri Lanka	1
2	Reduce GHG generation through waste management practices	2
3	Enhance soil fertility by proper livestock management	3
4	Introduce climate tolerant breeding varieties	4
5	Reduce diseases related to climate change on livestock	5
6	Establish early warning systems to combat hazard to livestock and poultry	6

3. Readiness Action Plan

Livestock sector INDCs-1	**1.Identify vulnerabilities in the livestock sector** 1.1 Establish data on vulnerabilities to climate change 1.1.1 Identify vulnerabilities in livestock species 1.1.2 Identify vulnerabilities in agro-climate areas 1.1.3 Identify vulnerabilities in farming communities 1.1.4 Identify vulnerabilities in production systems 1.1.5 Identify vulnerabilities in processing pathways

	Action	**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Conduct a baseline survey	DAPH/PDAPH	Number of studies conducted	22	2	2
2	Identify vulnerabilities	DAPH/PDoA	Number of vulnerabilities identified	2	0	0
2	Mapping & reporting	DAPH/PDAPH	Number of reports produced	4	1	1
3	Dissemination of information	DAPH/PDAPH	Number of sources for dissemination	3	1	1
Total				**27**	**4**	**4**

Livestock sector INDCs-2	**2. Introduce adoptive measures to avoid or minimize adverse effects** 2.1 Identify adverse impacts on animal production systems 2.1.1 Identify specific adverse impacts on animal production systems 2.2 Identify adverse impacts on processing 2.2.1 Identify stage-wise adverse effects on processing 2.3 Collect and conserve traditional knowledge and practices 2.3.1 Conduct and disseminate surveyed results to stakeholders 2.4 Introduce technological innovations 2.4.1 Encourage innovations 2.4.2 Disseminate knowledge on technological innovation through extension

	Action	**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Conduct pilot studies to identify adverse impacts of climatic change on animal production systems and processing chains	DAPH/PDAPH	Number of studies conducted	2	0.1	0.05
2	Conduct descriptive and analytical studies based on findings of the pilot studies	DAPH/PDAPH	Number of studies conducted	5.5	0.5	0.5
3	Disseminate information	DAPH/PDAPH	Number of meetings conducted	1	1	1
4	Conduct surveys to gather information on traditional knowledge	DAPH/PDAPH	Number of surveys conducted	1	0.5	0.5
5	Establish facility to facilitate innovations	DAPH/PDAPH	Number of innovations facilitated	5	5	5
6	Promote technological innovations island wide	DAPH/PDAPH	Number of programs conducted	0.5	0.5	0.5
7	Disseminate information through extension	DAPH/PDAPH	Number of programs conducted	0.5	0.5	0.5
Total				**15.5**	**8.1**	**8.05**

Livestock sector INDCs-3	**3. Mitigate GHG emissions by adopting smart and green livestock practices** 3.1 Introduce alternative measures to minimise adverse effects of climate change 3.1.1 Identify alternative measures to minimise adverse effects of climate change 3.1.2 Disseminate knowledge 3.2 Explore potential clean and renewable energy sources for livestock related activities 3.2.1 Identify potential clean & renewable energy sources 3.2.2 Increase accessibility to alternative energy services 3.3 Adapt integrated waste management systems

Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Conduct descriptive and analytical studies to gather alternative measures	DAPH/PDAPH	Number of studies conducted	18	1.0	1.5
2	Analyse the alternatives and select the best options	DAPH/PDAPH	Number of options analyzed			
3	Conduct training and awareness programmes	DAPH/PDAPH	Number of training programs conducted			
4	Monitor and evaluate alternate practices	DAPH/PDAPH	Number of practices monitored and evaluated			
5	Explore new potential clean & renewable energy sources through studies	DAPH/PDAPH	Number of identified/promoted renewable energy sources	0.5	0.25	0.25
6	Promote utilization of suitable renewable energy sources	DAPH/PDAPH/MREA				
7	Conduct impact evaluation	DAPH/PDAPH	Number of cases conducted			
8	Study the potential of integrated waste management systems	DAPH/PDAPH	Number of studies conducted	13.0	5.0	4.5
Total				**31.5**	**6.25**	**6.25**

Livestock sector INDCs-4	4. **Promote responsible consumption and sustainable production** 4.1 Promote green livestock procedures & processing techniques 4. 1.1 Conduct promotional programs to popularise green livestock procedures & processing techniques 4.2 Promote consumption of green livestock produce 4.2.1 Conduct promotional programmes for consumption of green livestock produce					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Conduct promotional programmess for green livestock procedures	DAPH/PDAPH	Number of programmes conducted	1.0	0.5	0.5
2	Conduct promotional programmess to promote consumption of green livestock produce	DAPH/PDAPH	Number of programmes conducted	2.0	1.0	1.0
Total				3.0	1.5	1.5

Livestock sector INDCs-5	**5. Enhance education, awareness and capacity building** 5.1 Conduct awareness & educational programmes on smart green livestock activities 5.1.1 Introduce smart green livestock activities 5.1.2 Promote smart green livestock activities 5.2 Promote emerging green technologies 5.3 Identify and encourage the exchange of novel technologies					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Conduct awareness and promotional programmes	DAPH/PDAPH	Number of programmes conducted	2.0	1.5	1.5
2	Identify the incidences of using green technologies	DAPH/PDAPH	Number of incidences identified	7.0	5.2	5.2
3	Identify the events of using novel technologies	DAPH/PDAPH	Number of events identified	20.0	10.0	10.0
Total				29.0	16.7	16.7

Grand Total (Rs. Mn)	**84.7**

Fisheries Sector

1. Marine environment and fisheries (Culture and Capture)

Sri Lanka's coastal region supports almost one third of its total population, slightly more than 10% of its population depend on fishing or related activities for their livelihood. Ocean warming and acidification exert a profound impact on the sensitive marine habitats and fisheries. As the oceans warm up, the ideal water temperature for the species shifts, which could result in fish stock diminishing or moving to different areas. Ocean acidification would make it more difficult for shellfish, crabs, lobsters and corals to build calcium carbonate shells. This could cause diminishing of their stock and – in the case of corals; destroying the habitat.

Nearly all of Sri Lanka's reefs are located within 40 km from the coast, the coral reefs regenerated from 1998 bleaching is currently undergoing severe bleaching in the period between 2015-16. Primary produce, which are the base of food chain, are also susceptible to ocean warming, leading to a cascading impact on the fisheries. Warmer sea temperatures are also associated with the spread of invasive species and marine diseases, leading to possible forced migrations and even extinction of species. Ocean warming may result in exceeding the optimal range of tolerance of farmed food fish and ornamental fish. Furthermore, it may retard the growth and breeding pattern of culture species, while increasing the spread of diseases.

2. INDCs of Marine and fisheries (culture and capture) Sector

1. Establish a systematic monitoring system to assess ocean warming and acidification around Sri Lanka
   1.1. Establish a national oceanographic data base.
   1.2 Start required long term data collection programme to;
   - Monitor oceanographic parameters, including sea surface temperature
   - Monitor impact of extreme meteorological events, including coastal flooding and drought on the inland/coastal environment and resources
   - Status of marine sensitive habitats, including coral reefs
   - Fish stock and its distribution

   1.3 Conduct laboratory/infield experiments to assess the impacts on fish maturity, breeding and growth
   1.4 Acquire globally available technology for prediction and forecasting of ocean warming.
   1.5 Enhance institutional capacity in monitoring of marine environment and resources, assessing climate induced socioeconomic impacts, prediction and planning
2. Identify the impacts on capture fisheries, farmed food fish, ornamental fish species and marine sensitive habitats.
   2.1 Re-assess fish stocks periodically
   2.2 Re-assess the status sensitive habitats periodically
   2.3 Assess the impacts of extreme meteorological events on inland waters, source of aquaculture

2.4 Develop culture species of high temperature and disease tolerance
2.5 Assess the impacts of climate change and climate change induced extreme events on the socioeconomic status of the fishers and employed on fisheries related activities

3. Restore, conserve marine and inland fisheries resources
   3.1 Develop marine fisheries resource management plans based on fish stock assessments
   3.2 Identify breeding and spawning grounds/seasons for conservation
   3.3 Conduct trial farming of new species
   3.4 Identify mode of restoration of inland waters to continue/intensify aquaculture
4. Formulate tools for better management of inland/marine fisheries resources
   4.1 Implement vessel monitoring system
   4.2 Prohibit environmentally harmful fishing practices
   4.3 Identify suitable marine/coastal sites for protection/conservations
   4.4 Identify and introduce alternative livelihoods for fishermen and release stress on coastal fisheries
   4.5 Restore inland waters and raise their storage capacity to continue with aquaculture, even during drought
   4.6 Develop cascading water systems and transform seasonal reservoirs into perennial reservoirs by interconnecting reservoirs and rivers to sustain aquaculture
   4.7 Develop technology to intensify aquaculture practices
   4.8. Promote rain water harvesting, especially among the coastal community to overcome water crisis, including enhanced salt water intrusion
   4.8 Promote mari-culture to overcome depleting coastal/marine fish resources

Ministry of Fisheries and Aquatic Resources Development is currently in the process of developing “National Fisheries Policy and Master Plan” under the Sri Lanka – Norway Bilateral Cooperation. The proposed activities would be appropriately included into short, medium and long term activities in the Fisheries Master Plan.

3. INDCs of Fisheries Sector

1. Establish fish barricade devices for each perennial reservoir to prevent fish escape, in consultation with the Irrigation Department.
   1.1 Identify vulnerable perennial reservoirs
   1.2 Identify barricades and planning
   1.3 Implement planning.
2. Cryopreserve for stocking fish sperms for artificial breeding.
   2.1 Identify suitable species
   2.2 establish storage facilities for cryopreservation
3. Convert existing open breeding facilities into indoor facilities and design same as at inception of construction to control temperature impacts.
   3.1 Identify suitable locations
   3.2 Develop facilities
4. Introduce appropriate fish fingerlings stocking programme for stock enhancement for culture fisheries.
   4.1 Identify new reservoirs
   4.2 Capacity development for fingerling breeding suitable to environmental status
5. Develop temperature tolerant species to aquaculture and promote mari-culture.
   5.1 Identify suitable species
   5.2 Capacity development for research & development
6. Minimise aquatic pollution due to water scarcity in lagoons and inland water bodies
   6.1 Identify present status of aquatic pollution levels
   6.2 Identify pollutants that make water sector vulnerable
   6.3 Capacity building for research & development
   6.4 Design and conduct awareness programmes
7. Increase the production capabilities of fisheries, aquatic resources in lagoons.
   7.1 Conduct stock assessment of lagoons
   7.2 Conduct capacity assessment
   7.3 Assess primary productivity
   7.4 Assess water quality
   7.5 Conduct awareness programmes

4. Readiness Action Plan

Fisheries Sector INDCs-1	**1. Establish of fish barricade devices for each perennial reservoir to prevent fish escape, in consultation with Irrigation Department** 1.1 Identify vulnerable perennial reservoirs 1.2 Identify barricades and planning 1.3 Implement planning

Action		**Responsible Agencies**	**KPI**	**Time Line**		
				2017	**2018**	**2019**
1	Study the existing situation of the fish barricade in SL	NAQDA	Considerable number of reservoirs with barricade devices are established			
2	Identify potential vulnerable reservoirs and perennial reservoirs	NAQDA		x		
3	Design the fish barricade	NAQDA		x		
4	Run the pilot study and get the feedback on it	NAQDA		x		
5	Identify policy gaps to implement the INDCs and amendment of policy if necessary	NAQDA		x		
6	Identify responsible and other institutions to implement the INDCs	NAQDA		x		
7	Identify the adequacy of institutional capacity to implement the INDC and build capacity accordingly	NAQDA		x		
8	Calculate technology requirements (equipment needs, etc)	NAQDA		x		
9	Calculate financial requirements (conditional and unconditional)	NAQDA		x		
10	Prepare a full project implementation plan to implement the INDCs	NAQDA		x		
11	Prepare the BoQ for the Plan	NAQDA			x	
12	Select suitable contractor through procurement process	NAQDA			x	
13	Construction works	NAQDA			x	x

Fisheries Sector INDCs-2		**2. Cryopreserve for stocking fish sperms for artificial breeding** 2.1 Identify suitable species 2.2 establish storage facilities for cryopreservation				
Action		**Responsible Agencies**	**KPI**	**Time Line**		
				2017	**2018**	**2019**
1	Identify valuable fish species for artificial breeding	NARA,NAQDA	Fish sperm bank of the suitable fish species is located	x		
2	Research on effective breeding techniques	NARA,NAQDA		x		
3	Establish storage facilities for cryopreservation in selected area	NARA,NAQDA		x		
4	Establish commercial culturing facilities	NARA,NAQDA		x		
5	Conduct the monitoring and feedback session	NARA,NAQDA		x		
6	Select the possible areas to introduce stock and introduction	NARA,NAQDA		x		
7	Identify responsible and other institutions to implement the INDCs	NARA,NAQDA		x		
8	Identify adequacy of institutional capacity to implement the INDC and build capacity accordingly	NARA,NAQDA		x		
9	Assess technology requirements (equipment needs, etc)	NARA,NAQDA		x		
10	Calculate financial requirements (conditional and unconditional)	NARA,NAQDA		x		
11	Prepare a full project implementation plan to implement the INDCs	NARA,NAQDA		x		
12	Implement the project	NARA,NAQDA			x	x
Fisheries Sector INDCs-3		**3. Convert existing open breeding facilities into indoor facilities and design same as at inception of construction to control temperature impacts** 3.1 Identify suitable locations 3.2 Develop facilities				
Action		**Responsible Agencies**	**KPI**	**Time Line**		
				2017	**2018**	**2019**
1	Research on current breeding localities	NAQDA,NARA	Adequate indoor breeding facilities are	x		
2	Identify suitable and possible locations to introduce	NAQDA,NARA		x		

	breeding facilities		established			
3	Maintain the rare and important brood stock for the breeding	NAQDA,NARA		x	x	x
4	Implement suitable mechanism for delivery	NAQDA,NARA		x	x	x
5	Identify the adequacy of policies to implement the INDCs	NAQDA,NARA		x		
6	Identify responsible and other institutions to implement the INDCs	NAQDA,NARA		x		
7	Identify the adequacy of institutional capacity to implement the INDC and build capacity accordingly	NAQDA,NARA		x		
8	Assess technology requirements (equipment needs, etc)	NAQDA,NARA		x		
9	Calculate financial requirements (conditional and unconditional)	NAQDA,NARA		x		
10	Prepare a full project implementation plan in-order to implement the INDCs	NAQDA		x		
11	Select a suitable bidder through procurement process	NAQDA			x	
12	Implement the project	NAQDA			x	x

Fisheries Sector INDCs-4	**4. Introduce appropriate fish fingerlings stocking programme for stock enhancement for culture fisheries** 4.1 Identify new reservoirs 4.2 Capacity development for fingerling breeding suitable to environmental status

Action		**Responsible Agencies**	**KPI**	**Time Line**		
				2017	**2018**	**2019**
1	Research on current breeding localities	NARA,NAQDA	Appropriate fish fingerling stocks for culture fisheries are available	x		
2	Identify suitable and possible localities to implement breeding facilities	NARA,NAQDA		x		
3	Maintain the rare and important brood-stock for the breeding	NAQDA		x		
4	Implement suitable mechanism for delivery	NAQDA		x		

5	Identify the adequacy of policies to implement the INDCs	NAQDA		x		
6	Identify responsible and other institutions to implement the INDCs	NAQDA		x		
7	Identify the adequacy of institutional capacity to implement the INDC and build capacity accordingly	NAQDA		x		
8	Calculate technology requirements (equipment needs, etc)	NAQDA		x		
9	Calculate financial requirements (conditional and unconditional)	NAQDA		x		
10	Prepare a full project implementation plan to implement the INDCs	NAQDA		x		
11	Project implementation	NAQDA			x	x

Fisheries Sector INDCs-5	**5. Develop temperature tolerant species to aquaculture and promote mari-culture** 5.1 Identify suitable species 5.2 Capacity development for research & development					
Action		**Responsible Agencies**	**KPI**	**Time Line**		
				2017	**2018**	**2019**
1	Identify climate change impacts on fish species	NARA	Temperature tolerant fish species are developed for both the aquaculture and mari-culture	x		
2	Identify fish species to be developed as tolerant varieties	NARA,NAQDA		x		
3	Develop tolerant varieties	NAQDA		x		
4	Establish breeding facilities	NAQDA		x		
5	Introduce varieties to suitable locations	NAQDA		x		
6	Identify the adequacy of policies to implement the INDCs	NAQDA		x		
7	Identify responsible and other institutions to implement the INDCs	NAQDA		x		
8	Identify the adequacy of institutional capacity to implement the INDC and build capacity accordingly	NAQDA		x		
9	Calculate technology requirements (equipment needs, etc)	NAQDA		x		
10	Calculate financial requirements (conditional and unconditional)	NAQDA		x		

11	Prepare a full project implementation plan to implement the INDCs	NAQDA		x		
12	Project implementation	NAQDA			x	x

Fisheries Sector INDCs-6	**6. Minimize the aquatic pollution due to water scarcity in lagoons and inlands water bodies** 6.1 Identify present status of aquatic pollution levels 6.2 Identify pollutants that make water sector vulnerable 6.3 Capacity building for research & development 6.4 Design and conduct awareness programmes

Action		**Responsible Agencies**	**KPI**	**Time Line**		
				2017	**2018**	**2019**
1	Conduct a study on current status and identify pollution amount, generation locations and sources	NARA	Aquatic pollution due to water scarcity in lagoons and inland water bodies are minimized	x		
2	Design pollution reduction programmes such as awareness	NARA,NAQDA,DFAR		x		
3	Establish control mechanisms in all the fishing sources such as lagoons and inland water bodies	NARA,NAQDA,DFAR		x		
4	Introduce community driven task force for elimination of pollution for fishery sources	NARA,NAQDA,DFAR		x		
5	Identify the adequacy of policies to implement the INDCs	NARA,NAQDA,DFAR		x		
6	Identify responsible and other institutions to implement the INDCs	NARA,NAQDA,DFAR		x		
7	Identify the adequacy of institutional capacity to implement the INDC and build capacity accordingly	NARA,NAQDA,DFAR		x		
8	Assess technology requirements (equipment needs, etc)	NARA,NAQDA,DFAR		x		
9	Calculate financial requirements (conditional and unconditional)	NARA,NAQDA,DFAR		x		

10	Prepare a full project implementation plan to implement the INDCs	NARA,NAQDA,DFAR		x		
11	Project implementation	NARA,NAQDA,DFAR			x	x

Fisheries Sector INDCs-7	**7. Increase the production capabilities of fisheries, aquatic resources in lagoons** 7.1 Conduct stock assessment of lagoons 7.2 Conduct capacity assessment 7.3 Assess primary productivity 7.4 Assess water quality 7.5 Conduct awareness programmes

Action		**Responsible Agencies**	**KPI**	**Time Line**		
				2017	**2018**	**2019**
1	Conduct stock assessment of the lagoon and estuaries	NARA,NAQDA	Fishery production capabilities of aquatic resources in lagoons are increased	x		
2	Introduce suitable varieties if required	NARA,NAQDA		x		
3	Introduce a programme to monitor environment factors in the lagoon	NARA,NQDA,DFAR		x		
4	Identify the requirement of laboratory facilities in each location	NARA,NQDA,DFAR		x		
5	Establish required laboratory facilities	NARA,NQDA,DFAR		x		
6	Identify the adequacy of policies to implement the INDCs	NARA,NQDA,DFAR		x		
7	Identify responsible and other institutions to implement the INDCs	NARA,NQDA,DFAR		x		
8	Identify the adequacy of institutional capacity to implement the INDC and build capacity accordingly	NARA,NQDA,DFAR		x		
9	Assess technology requirements (equipment needs, etc)	NARA,NQDA,DFAR		x		
10	Calculate financial requirements (conditional and unconditional)	NARA,NQDA,DFAR		x		

11	Prepare a full project implementation plan to implement the INDCs	NARA,NQDA,DFAR		x		
12	Project implementation	NARA,NQDA,DFAR			x	x

Water Sector

Introduction

Water resources are important to the survival of both society and ecosystems. Human needs are reliant on the availability and access to clean drinking water to sustain good health. Water is also a prime requirement for agriculture, energy production, navigation, recreation and manufacturing.

The continued utilisation and demand for water puts pressure on water resources. These stresses that are likely to be exacerbated by climate change. In many areas climate change is likely to increase water demand while shrinking water supplies. This shifting balance would challenge water resources to simultaneously meet the needs of growing communities and sensitive ecosystems.

The adverse impacts of climate change affect the inland water bodies highly as evidenced by prolonged droughts, flash floods and sea level rise. This vulnerability could be minimized through precautionary measures. Following INDCs for water sector have been identified as such precautionary actions;

1. INDCs of Water Sector

1. Establish erect sand bags across the river during the drought season to prevent saline water intrusion wherever intakes are subjected to saline water intrusion
   1.1. Identify areas, design implementation and monitoring
2. Identify new water supply projects and schemes and implemented in areas with water scarcity
   2.1. Assess and map the water scarcity areas of the country
   2.2. Explore new water sources, identify alternative sources, implement schemes, design quantification and qualitative analysis etc
3. Water safety management plans for the entire country to overcome pollution and climate change related issues
   3.1. Introduce modern techniques and management plans on climate change
4. Improve protection and conservation measures in all drinking water catchment areas
   4.1. Establish island wide surface and ground water monitoring networks for long term monitoring of water levels, flow patterns, water quality
   4.2. Enforce laws and regulations
5. Implement permanent water supply schemes with pipeline systems through new water supply schemes
   5.1. Identify safe water sources qualitatively and other alternatives such as desalinization
6. Establish a few mobile laboratories to ensure safety during water supply
   6.1. Onsite water quality monitoring system for more adequate measurement on toxicity, pesticide etc
7. Establish monitoring and recording of saline water intrusion into drinking water sources during the drought period.
   7.1. Introduce an automated monitoring system

8. Establish the safety of water management facilities and minimize disturbances to water supply due to extreme weather events
   8.1. Introduce a new management system focusing on community, awareness programmes and water supply plan

2. Strategic Policies

Number	Strategic Policy	INDCs Number
1	Improve water quality through the elimination of saline water intrusion	1
2	Ensure continuous drinking water supply in drought prone areas	2
3	Reduce adverse effects of climate change for drinking water safety	3
4	Conserve water resources within the catchments areas	4
5	Ensure water supply to community through the introduction of sustainable water supply methods	5
6	Enhance health conditions through improved water quality	6
7	Improve water quality through eliminating saline water intrusion	7
8	Build resilience to adverse effects of climate change for drinking water supply	8

3. Readiness Action Plan

Water Sector INDCs-1	1**. Establish erect sand bags across the river during the drought season to prevent saline water intrusion wherever intakes are subjected to saline water intrusion** 1.1 Identify areas, design implementation and monitoring

	Action	Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Identify affected areas and forecast required time period in consultation with relevant organizations	ID, IMD, WRB, NWS&DB,CEA, DMC, CC&CRMD	Number of projects	25%	25%	50%
2	Establish salt water monitoring systems in selected upstream of rivers	ID, IMD, WRB, NWS&DB, CEA, DMC/CBOs,FOs, CC&CRMD	Number of projects	50%	25%	25%
3	Establish a mechanism to introduce erect sand bags if required	ID, IMD, NWS&DB, CEA, DMC,CBOs,FOs, CC&CRMD	Number of projects	50%	25%	25%
4	Conduct research on best alternative techniques	MI&WRM, MWS&D, MMD&E.	Number of research conducted	20%	30%	50%
5	Identify adequacy of policies to implement such INDCs	MI&WRM, MWS&D, MMD&E.	An Evaluation report With the gap	100%		
6	Identify policy gaps to implement the INDCs and amend policies if necessary	ID, IMD, WRB, NWS&DB, CEA, DMC,CBOs,FOs, CC&CRMD	Number of policy gaps identified and amended		50%	50%
7	Identify responsible and other institutions to implement the INDCs	MI&WRM, MWS&D, MMD&E, ID, IMD, WRB, NWS&DB, CEA,DMC,CBOs,FOs, CC&CRMD	Number of responsible authorities and institutions identified	100%		
8	Identify the adequacy of institutional capacity to implement the INDCs and build capacity accordingly	MI&WRM, MWS&D, MMD&E, ID, IMD, WRB, NWS&DB, CEA, DMC,CBOs,FOs, CC&CRMD	Report on required capacity	20%	30%	50%
9	Calculate technology requirements (equipment needs, etc)	NWS&DB, ID, IMD, DSD, WRB, CBOs, CEA LAs, NCWSD, CC&CRMD	Technological requirements identified	50%	50%	
10	Prepare a BoQ for the implementation plan	NWS&DB, ID, IMD, DSD, WRB, CBOs, CEA, LAs, NCWSD,	Number of BoQs		50%	50%

		CC&CRMD				
11	Calculate financial requirements	NWS&DB, ID, IMD, DSD, WRB, CBOs, CEA LAs NCWSD, CC&CRMD	Number of estimates completed	30%	30%	40%
12	Prepare a full project implementation plan to implement the INDCs	MI&WRM, MWS&D, MMD&E, NWSDB, ID, IMD, DSD, WRB, CBOs, CEA LAs, NCWSD, CC&CRMD	Completed implementation plan		50%	50%
Water Sector INDCs-2	**2. Identify new water supply projects and schemes and implemented in areas with water scarcity** 2.1. Assess and map the water scarcity areas of the country 2.2. Explore new water sources, identify alternative sources, implement schemes, design quantification and qualitative analysis, etc					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify areas with water scarcity	NWS&DB, ID, WRB, DWLC, NCWSD, MASL	Number of projects	25%	25%	50%
2	Identify potential water sources	NWS&DB, ID, IMD, WRB, MASL	Number of sources identified	20%	30%	50%
3	Prepare a map indicating areas of water availability and those which require water	NWS&DB, ID, WRB, DWLC, NCWSD, MASL	Number of maps prepared	20%	30%	50%
4	Design water supply implementation mechanism	NWS&DB, ID, WRB	Number of designs completed	20%	30%	50%
5	Identify policy gaps to implement the INDCs and amend policies if necessary	MI&WRM, MWS&D, MMD&E, NWS&DB, ID, WRB, DWLC, NCWSD, MASL	Number of policy gaps identified	50%	50%	
6	Identify responsible and other institutions to implement the INDCs	MI&WRM, MWS&D, MMD&E, ID, IMD, WRB, NWS&DB, CEA,DMC/CBOs/FOs	Number of institutions identified	20%	30%	50%
7	Identify adequacy of institutional capacity to implement the INDCs and build capacity accordingly	MI&WRM, MWS&D, MMD&E, ID, IMD, WRB, NWS&DB, CEA,DMC/CBOs/FOs	Report on capacity requirement	100%		
8	Calculate technology requirement (equipment needs and etc)	MI&WRM, MWS&D, MMD&E, ID, IMD, WRB, NWS&DB, CEA,	Technological requirements	20%	30%	50%

		DMC/CBOs/FOs	identified			
9	Prepare a BoQ for the plan	NWSDB, ID, IMD, DSD, WRB, CBOs, CEA, LAs, NCWSD	Number of BoQs	50%	50%	
10	Calculate financial requirements (conditional and unconditional)	NWSDB, ID, IMD, DSD, WRB, CBOs, CEA, LAs, NCWSD	Number of estimates completed	30%	30%	40%
11	Prepare a full project implementation plan to implement the INDCs	MI&WRM, MWS&D, MMD&E, NWSDB, ID, IMD, DSD, WRB, CBOs, CEA, LAs, NCWSD	Completed implementation plan		50%	50%
Water Sector INDCs-3	**3. Water safety management plans for the entire country to overcome pollution and climate change related issues** 3.1. Introduce modern techniques and management plans on climate change					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Conduct surveys on pollution and climate change related issues for water	MI&WRM, MWS&D, MMD&E, NWSDB, ID, IMD, DSD, WRB, CBOs, CEA, LAs, NCWSD, DOA, DM, IDB	Number of surveys completed	20%	30%	50%
2	Conduct research on safety management plans	NWS&DB, ID, IMD, DSD, WRB, CBOs, CEA, LAs, NCWSD, DOA, DM, NBRO, GSMB, Universities and Other Research Institutions	Number of research conducted	20%	30%	50%
3	Introduce safety management plans for most affected areas	MI&WRM, MWS&D, NWS&DB, ID, IMD, DSD, WRB, CBOs, CEA LAs, NCWSD, DOA, DM, NBRO, GSMB	Number of safety management plans introduced		50%	50%
5	Identify policy gaps to implement the INDCs and amend policy if necessary	MI&WRM, MWS&D, MMD&E, NWSDB, ID, IMD, DSD, WRB, CEA LAs, NCWSD, DOA, DM, NBRO, GSMB	Number of policy gaps identified	50%	50%	
6	Identify responsible and other institutions to implement the INDCs	MI&WRM, MWS&D, MMD&E, ID, IMD, WRB, NWS&DB, CEA,DMC/CBOs/FOs	Number of institutions and responsible authorities identified	20%	30%	50%

7	Identify the adequacy of institutional capacity to implement the INDCs and build capacity accordingly	MI&WRM, MWS&D, MMD&E, ID, IMD, WRB, NWS&DB, CEA,DMC/CBOs/FOs	Report on required capacity	100%		
8	Calculate technology requirement (equipment needs and etc)	MI&WRM, MWS&D, MMD&E, ID, IMD, WRB, NWS&DB, CEA,DMC/CBOs/FOs	Technological requirements identified	20%	30%	50%
9	Prepare a BoQ for the plan	NWS&DB, ID, IMD, DSD, WRB, CBOs, CEA LAs, NCWSD	Number of BoQs	50%	50%	
10	Calculate financial requirements (conditional and unconditional)	NWSDB, ID, IMD, DSD, WRB, CBOs, CEA LAs, NCWSD	Number of estimates completed	30%	30%	40%
11	Prepare a full project implementation to implement the INDCs	MI&WRM, MWS&D, MMD&E, NWS&DB, ID, IMD, DSD, WRB, CBOs, CEA LAs, NCWSD	Completed implementation plan		50%	50%
12	Identify responsible and other institutions to implement the INDCs	MI&WRM, MWS&D, MMD&E, ID, IMD, WRB, NWS&DB, CEA,DMC/CBOs/FOs	Number of institutions and responsible authorities identified	20%	30%	50%

Water Sector INDCs-4	**4. Improve protection and conservation measures in all drinking water catchment areas** 4.1. Establish island wide surface and ground water monitoring networks for long term monitoring of water levels, flow patterns, water quality 4.2. Enforce laws and regulations

Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify catchment areas	NWS&DB, ID, IMD, DSD, WRB, CEA NCWSD, PC	Number of catchment areas identified	25%	25%	50%
2	Identify potential threats on catchment area	NWS&DB, ID, IMD, DSD, WRB, CEA NCWSD, PC	Number of catchments identified	25%	25%	50%
3	Map the entire catchment area	NWS&DB, ID, IMD, DSD, WRB, CEA NCWSD, PC	Number of maps prepared	25%	25%	50%
4	Introduce programmes to conserve the catchment	NWS&DB, ID, IMD, DSD, WRB,CEA NCWSD, PC	Number of programmes Introduced	10%	30%	60%
5	Identify policy gaps to implement the INDCs and	MI&WRM, MWS&D, MMD&E,	Number of policy	50%	50%	

	amend policy if necessary	NWS&DB, ID, IMD, DSD, WRB, CEA LAs, NCWSD, DOA, DM, NBRO, GSMB	gaps identified and policies amended			
6	Identify responsible and other institutions to implement the INDCs	MI&WRM, MWS&D, MMD&E, ID, IMD, WRB, NWS&DB, CEA,DMC/CBOs/FOs	Number of institutions and responsible authorities identified	20%	30%	50%
7	Identify adequacy of institutional capacity to implement the INDCs and build capacity accordingly	MI&WRM, MWS&D, MMD&E, ID, IMD, WRB, NWS&DB, CEA,DMC/CBOs/FOs	Report on Capacity Requirements	100%		
8	Calculate technological requirement (equipment needs and etc)	MI&WRM, MWS&D, MMD&E, ID, IMD, WRB, NWS&DB, CEA,DMC/CBOs/FOs	Technological requirements identified	20%	30%	50%
9	Prepare the BoQ for the plan	NWS&DB, ID, IMD, DSD, WRB, CBOs, CEA LAs, NCWSD	Number of BoQs	50%	50%	
10	Calculate financial requirements (conditional and unconditional) to implement the INDC	NWS&DB, ID, IMD, DSD, WRB, CBOs, CEA LAs, NCWSD	Number of estimates completed	30%	30%	40%
11	Prepare a full project implementation plan to implement the INDCs	MI&WRM, MWS&D, MMD&E, NWS&DB, ID, DSD, WRB, NCWSD	Completed implementation plan		50%	50%
12	Identify responsible and other institutions to implement the INDCs	MI&WRM, MWS&D, MMD&E, ID, WRB, NWS&DB,	Number of institutions and responsible authorities identified	20%	30%	50%

Water Sector INDCs-5	**5. Implement permanent water supply schemes with pipeline systems through new water supply schemes** 5.1. Identify safe water sources qualitatively and other alternatives such as desalinization

	Action	**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify new permanent water supply schemes	MWS&D, MI&WRM, NWSDB, ID, IMD, DSD, WRB, CEA PC, NCWSD	Number of water supply schemes identified	25%	25%	50%
2	Identify drawbacks	MI&WRM, MWS&D, NWSDB, ID, IMD, DSD, WRB, CEA PC,	Number of issues identified	30%	30%	40%

		NCWSD				
3	Identify policy gaps to implement the INDCs and amend policies if necessary	MI&WRM, MWS&D, MMD&E, NWSDB, ID, IMD, DSD, WRB, LAs, NCWSD,	Number of policy gaps identified and amendments made	50%	50%	
4	Identify responsible and other institutions to implement the INDCs	MI&WRM, MWS&D, MMD&E, NWS&DB, ID, IMD, DSD, WRB, LAs, NCWSD,	Number of institutions and responsible authorities identified	20%	30%	50%
5	Identify the adequacy of institutional capacity to implement the INDCs and build capacity accordingly	NWS&DB, ID, IMD, DSD, WRB, LAs, NCWSD,	Report on capacity requirement	100%		
6	Calculate technology requirements (equipment needs and etc)	MI&WRM, MWS&D, MMD&E, NWSDB, ID, IMD, DSD, WRB, NCWSD,	Technological requirements identified	20%	30%	50%
7	Prepare the BoQ for the plan	NWS&DB, ID, DSD, WRB, NCWSD	Number of BoQs	50%	50%	
8	Calculate financial requirements (conditional and unconditional)	NWS&DB, ID, DSD, WRB,NCWSD	Number of estimates completed	30%	30%	40%
9	Prepare a full project implementation plan to implement the INDCs	MI&WRM, MWS&D, MMD&E, NWS&DB, ID, IMD, DSD, WRB, NCWSD	Completed implementation plan		50%	50%
10	Identify responsible and other institutions to implement the INDCs	MI&WRM, MWS&D, MMD&E, ID, WRB, NWS&DB,	Number of institutions and responsible authorities identified	20%	30%	50%
Water Sector INDCs-6	**6. Establish a few mobile laboratories to ensure safety during water supply** 6.1. Onsite water quality monitoring system for more adequate measurement on toxicity, pesticide, etc					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify water requirement and potential required areas	WRB, CEA, NWS&DB	Number of sensitive areas identified	25%	25%	50%
2	Compare various mobile laboratories available and select suitable model for Sri Lanka	WRB, CEA, NWS&DB	Number of mobile units selected	60%	20%	20%

3	Identify required monitoring parameters	WRB, CEA, NWS&DB	Number of monitoring parameters identified	100%		
4	Identify policy gaps to implement the INDCs and amend policies if necessary	MI&WRM, MWS&D, MMD&E, WRB, CEA, NWS&DB	Number of policy gaps identified and amended	50%	50%	
5	Identify responsible and other institutions to implement the INDCs	MI&WRM, MWS&D, MMD&E, WRB, CEA, NWS&DB	Number of institutions and responsible authorities identified	20%	30%	50%
6	Identify adequacy of institutional capacity to implement the INDCs and build capacity accordingly	MI&WRM, MWS&D, MMD&E, WRB, CEA, NWS&DB	Report on capacity requirement	100%		
7	Calculate technology requirements (equipment needs and etc)	MI&WRM, MWS&D, MMD&E, WRB, CEA, NWS&DB	Technological requirements identified	20%	30%	50%
8	Prepare the BoQ for the plan	WRB, CEA, NWS&DB	Number of BoQs	50%	50%	
9	Calculate financial requirements (conditional and unconditional)	WRB, CEA, NWS&DB	Number of estimates completed	30%	30%	40%
10	Prepare a full project implementation plan to implement the INDCs	MI&WRM, MWS&D, MMD&E, WRB, CEA, NWS&DB	Completed implementation plan		50%	50%
11	Identify responsible and other institutions to implement the INDCs	MI&WRM, MWS&D, MMD&E, WRB, CEA, NWS&DB	Number of institutions and responsible authorities identified	20%	30%	50%

Water Sector INDCs-7	7. **Establish monitoring and recording of saline water intrusion into drinking water sources during the drought period** 7.1. Introduce an automated monitoring system					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify intrusion areas and required time period	WRB, NWS&DB, CEA, CC&CRMD	Number of areas identified	25%	25%	50%
2	Conduct research on alternative techniques	WRB, NWS&DB, CEA, CC&CRMD, Universities and other	Number of alternative techniques identified	30%	30%	40%

		research institutions				
3	Identify policy gaps to implement the INDCs and amend policies if necessary	MI&WRM, MWS&D, WRB, NWS&DB, CEA, CC&CRMD	Number of policy gaps identified and amended	50%	50%	
4	Identify responsible and other institutions to implement the INDCs	MI&WRM, MWS&D, WRB, NWS&DB, CEA, CC&CRMD	Number of institutions and responsible authorities identified	20%	30%	50%
5	Identify the adequacy of institutional capacity to implement the INDCs and build capacity accordingly	MI&WRM, MWS&D, WRB, NWS&DB, CEA, CC&CRMD	Report on capacity requirement	100%		
6	Calculate technology requirements (equipment needs and etc)	MI&WRM, MWS&D, WRB, NWS&DB, CEA, CC&CRMD	Technological requirements identified	20%	30%	50%
7	Prepare the BoQ for the plan	WRB, NWS&DB, CEA, CC&CRMD	Number of BoQs	50%	50%	
8	Calculate financial requirements (conditional and unconditional)	WRB, NWS&DB, CEA, CC&CRMD	Number of estimates completed	30%	30%	40%
9	Prepare a full project implementation to implement the INDCs	MI&WRM, MWS&D, WRB, NWS&DB, CEA, CC&CRMD	Completed implementation plan		50%	50%
10	Identify responsible and other institutions to implement the INDCs	MI&WRM, MWS&D, WRB, NWS&DB, CEA, CC&CRMD	Number of institutions	20%	30%	50%

Water Sector INDCs-8	8. **Establish the safety of water management facilities and minimize disturbances to water supply due to extreme weather events** 8.1. Introduce a new management system focusing on community, awareness programmes and water supply plan

Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify current water distribution lines	NWS&DB	Number of distribution lines identified	50%	50%	
2	Introduce a new management system	NWS&DB, MWS&D	Number of system established	50%	50%	
3	Identify potential disturbances	NWS&DB	Number of categories	50%	50%	

			identified			
4	Introduce the implementation plan to address the minimization of disturbances	NWS&DB	Number of categories minimized	50%	50%	
5	Identify policy gaps to implement the INDCs and amend policies if necessary	NWS&DB, MCPWS	Policy gaps minimized, and policies amended	50%	50%	
6	Identify responsible and other institutions to implement the INDCs	NWS&DB	Number of organizations identified	100%		
7	Identify adequacy of institutional capacity to implement the INDCs and build capacity accordingly	NWS&DB, MCPWS	Areas of capacity improvement needed	50%	50%	
8	Calculate technology requirements (equipment needs and etc)	NWS&DB, MCPWS	Technological requirements identified	100%		
9	Prepare the BoQ for the plan	NWS&DB, MCPWS	Prepared BoQ Plan	100%		
10	Calculate financial requirements (conditional and unconditional)	NWS&DB, MCPWS	Financial needs identified	50%	50%	
11	Prepare the full project implementation plan to implement the INDCs	NWS&DB, MCPWS	Finalized plan	25%	50%	25%
12	Identify responsible and other institutions to implement the INDCs	NWS&DB, MCPWS	Number of identified institutes	50%	50%	

Irrigation Sector

Introduction

Water management is a crucial task that needs to adapt in the face of both climate change impacts and socio-economic pressures. The best water management practices which increase the productivity of water irrigation may provide significant adaptation potential for all land production systems. Further, improvements in irrigation efficiency are critical to ensure the availability of water both for food production and for competing human and environmental needs in preparing for future climate change risks.

Sri Lanka's inland water bodies are the most important supplier of water for agriculture, wherein the irrigated waters are vital for enhancing productivity of the sector. The impacts of temperature increase on water availability include increased rates of evaporation and vapours-transpiration. Due to this, during drought periods water availability for irrigation will be affected due to high evaporation rates. This is especially true for the dry zone tanks and rivers. Increased evaporation and transpiration can also reduce soil moisture, stream flow and groundwater re-charge, thereby diminishing water available for food production, and increasing the irrigation requirement. Adaptation measures in this context are critical for Sri Lanka as more than 65% of agricultural lands are located in the dry zone where water scarcity exists.

1. INDCs of Irrigation Sector

1. Restore and rehabilitate all abandoned tanks and irrigation canals of Sri Lanka.
   1.1 Identify tanks and canals to be rehabilitated in the dry zone of Sri Lanka.
   1.2 Prepare a cost estimation and implementation plan by identifying national capacity and international support.
   1.3 Identify tanks and canals to be rehabilitated in other areas of the country.
2. Establish water flow and sediment loads monitoring systems in selected streams in the central highlands.
   2.1 Location identification and designing of gage stations.
   2.2 Purchasing modern equipment to measure the sediment load.
   2.3 Establish gage in identified location.
   2.4 Calibration, data collection, data analysing, etc.
3. Introduce boreholes/tube wells as a drought intervention for domestic water supply.
   3.1 Identify high quality and potential ground water sources and aquifers.
   3.2 Construct tube wells; pump testing, water quality testing to determine water quality and quantity.
   3.3 Implement irrigated water schemes where possible
4. Enhance productivity of irrigation water use by introducing improved on-farm water application technologies.
   4.1 Introduce water saving applications like water micro irrigation system (sprinkle) and water saving crops.
   4.2 Farmer training and awareness on water saving applications
5. Assess river floods and mitigation measures and early warning systems for possible flash floods.

5.1 Collect the rainfall data and river flow
5.2 Prepare digital elevation maps
5.3 Capacity building programs for new technological applications
5.4 Introduce flood mitigation structures

6. Develop water resource management plans and strategies for selected major rivers in Sri Lanka adopting traditional knowledge and new technology.
7. Adopt water-efficient technologies to 'harvest' water, conserve solid moisture (e.g. crop residue retention) and reduce siltation and saltwater intrusion.
8. Modify irrigation techniques, including amount, timing or technology.
9. Introduce conservation measures for irrigation of tanks and canals to ensure a sustainable water supply.

2. Strategic Policies

Number	Strategic Policy	INDCs Number
1	Increase the land productivity per unit area of land through irrigated agriculture, by assuring minimum crop water demand.	1
2	Reduce vulnerable areas in riverine degradation through the introduction of improved riverine management mechanisms.	2
3	Ensure domestic water supply and supplementary irrigation through ground water abstractions in a sustainable manner in rural and selected areas in Sri Lanka.	3
4	Increase water use efficiency and productivity per unit volume of water in irrigated agriculture.	4
5	Ensure safety of humans and animals as well as minimizing property and environmental losses.	5
6	Develop water resources to accommodate the growing water demand of all stakeholders and solving issues related to water sharing and allocations among different water user sectors especially during droughts.	6
7	Adapt improved technological measures for the conservation and development of productive lands in low lying areas which are subjected to degradation due to salt water intrusion.	7
8	Ensure standard limits of water usage in irrigated agriculture sector through the introduction of improved water saving techniques and adaptation of participatory irrigation management concepts.	8
9	Assure a reliable, efficient and effective water supply for irrigated agriculture with sustainable operation and maintenance mechanisms to alleviate rural poverty and minimize risks in rural economy.	9

3. Readiness Action Plan

Irrigation Sector INDCs-1	**1. Restore and rehabilitate all abandoned tanks and irrigation canals of Sri Lanka** 1.1 Identify tanks and canals to be rehabilitated in the dry zone of Sri Lanka 1.2 Prepare a cost estimation and implementation plan by identifying national capacity and international support 1.3 Identify tanks and canals to be rehabilitated in other areas of the country

	Actions	Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Establish a PMU	MI &WRM	A PMU established	**100%**		
2	Make financial arrangements for preliminary actions	MI &WRM	SLR	**To be decided**		
3	Identify current status about the tanks, anicuts and canals in Sri Lanka including those abandoned (including ponds, water holes, etc..)	ID, MASL, DAD, PIDD	1. Number of tanks 2. Number of anicuts 3.% of canal length	15000 25%	16000± 25%	 50%
4	Identify tanks, anicuts and canals to be rehabilitated in Sri Lanka	ID, MASL, DAD, PIDD	1. %. of tanks 2. %. of anicuts 3. % length of canals	25%	25%	50%
5	Identify responsible and other institutions to implement the INDCs	DOA,NLDB,NWS&DB,CEB, UDA,CBO,DWLC	Number of Institutions and responsible authorities identified	100%		
6	Prepare a cost estimation and implementation plan	ID, MASL, DAD, PIDD	Number of PIPP		50%	50%
7	Identify barriers to implement the INDCs	ID, MASL, DAD, PIDD	Number of barriers removed	100%		
8	Identify policy gaps to implement the INDCs and amendment policies if necessary	ID, MASL, DAD, PIDD	Number of gaps identified and policies amended	50%	50%	
9	Identify the adequacy of institutional capacity to implement the INDCs and build capacity accordingly	PMU/MI&WRM	Institutional strengths/weakness	20%	30%	50%
10	Identify technology and resource requirements (equipment needs and etc)	PMU/MI&WRM	Report for each institution	50%	50%	

11	Identify financial sources (conditional and unconditional)	PMU,MI&WRM	Cost estimation		50%	50%
12	Prepare a full project implementation to implement the INDCs	PMU, MI&WRM	Number of reports			100%

Irrigation Sector INDCs-2	**2. Establish water flow and sediment loads monitoring systems in selected streams in the central highlands** 2.1 Location identification and designing of gage stations 2.2 Purchasing modern equipment to measure the sediment load 2.3 Establish gage in identified location 2.4 Calibration, data collection, data analyzing, etc

Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify current status of physical water monitoring systems in Sri Lanka	ID,MASL,PIDD	Number of reports	100%		
2	Identify and design gauging stations	ID,MASL,PIDD	Number of stations	40%	60%	
3	Select modern equipment to measure flow, quality and sediment load.	PMU, MI&WRM	Number of equipment		50%	50%
4	Identify and establish laboratories	PMU,MI&WRM	Number of laboratories	25%	50%	25%
5	Purchase modern equipment to measure and analyze flow, quality and sediment load.	PMU,MI&WRM	Number of equipment		25%	75%
6	Arrange budgetary provisions to purchase modern equipment and establish laboratories	PMU,MI&WRM	Establish laboratories	20%	40%	40%
7	Identify policy gaps to implement INDCs and amend policies if necessary	PMU,MI&WRM	Report	40%	60%	
8	Identify responsible and other institutions to implement the INDCs	PMU,MI&WRM	Number of Institutions identified	100%		
9	Identify the adequacy of institutional capacity to implement the INDCs and build capacity accordingly	PMU,MI&WRM	Institutional strengths/weakness	25%	35%	40%
10	Identify financial requirements (conditional and unconditional)	PMU,MI&WRM	Cost estimation		25%	75%
11	Prepare a full project implementation plan to implement the INDCs	PMU,MI&WRM	Number of reports			100%

Irrigation Sector INDCs-3	3. Introduce boreholes/tube wells as a drought intervention for domestic water supply 3.1 Identify high quality and potential ground water sources and aquifers 3.2 Construct tube wells, pump testing, water quality testing to determine water quality & quantity 3.3 Implement irrigated water schemes where possible

Action		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Identify required areas	ID, IMD, DSD, WRB, NWS&DB, LAs, RWD, DMC	Number of projects	25%	25%	50%
2	Conduct a test run to find out possible localities	WRB, NWS&DB, DSD	Number of projects	20%	30%	50%
3	Design distribution lines taking into consideration the flow rate and elevation	ID, IMD DSD, RWD, WRB, NWS&DB, LAs, CBOs, DMC	Number of projects	25%	25%	50%
4	Identify adequacy of policies to implement such INDCs	MI&WRM, MWS&D, MMD&E,	Number of policies identified	100%		
5	Identify responsible and other organizations, and institutions to implement the INDCs	MI&WRM, MWS&D, MMD&E,	Number of organizations identified	50%	50%	
6	Identify policy gaps to implement the INDCs and amend policies if needed	MI&WRM, MWS&D, MMD&E,WRB, NWS&DB, ID, CEA, IMD	Number of gaps identified	60%	40%	
7	Identify adequacy of institutional capacity to implement such INDCs and build capacity accordingly	MI&WRM, MWS&D, MMD&E,WRB, NWS&DB ID, IMD, DSD, CBOs, WRB,NWS&DB, LAs	Number of institutions	100%		
8	Calculate technological requirements (equipment needs etc)	WRB, NWS&DB ID, IMD, DSD, CBOs, LAs	Number of equipment	50%	50%	
9	Prepare the BoQ for the plan	WRB, NWS&DB ID, IMD, DSD, CBOs, LA, NCWSD	Number of BOQs			
10	Calculate financial requirements	WRB, NWS&DB ID, IMD, DSD, CBOs, LAs, NCWSD	Number of estimates completed	30%	30%	40%
11	Prepare the full project implementation plan to implement the INDCs	MI&WRM, MWS&D, MMD&E,WRB, NWS&DB ID, IMD, DSD, CBOs, LAs, NCWSD	Completed implementation plan		50%	50%

Irrigation Sector INDCs-4	**4. Enhance productivity of irrigation water use by introducing improved on-farm water application technologies** 4.1 Introduce water saving applications like water micro irrigation system (sprinkle) and water saving crops 4.2 Farmer training and awareness on water saving applications

Action		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Make financial arrangement for preliminary actions	MI & WRM	Preliminary actions completed	30%	30%	40%
2	Identify required area through baseline survey	ID,MASL,IMD/DAD,PIDD	Number of schemes	10%	30%	60%
3	Conduct research on water saving applications	ID,MASL,IMD,DAD,PIDD	Number of researches	20%	30%	50%
4	Introduce water saving applications like micro irrigation systems	ID,MASL,IMD,DAD,PIDD	Number of applications	15%	25%	60%
5	Identify adequacy of policies to implement such INDCs	PMU, MI & WRM	Report	100%		
6	Identify responsible and other organizations to implement the INDCs	PMU, MI & WRM	Number of organizations	100%		
7	Amend policy gaps if necessary	PMU, MI & WRM	Amendments		50%	50%
8	Identify adequacy of institutional capacity to implement the INDC and build capacity accordingly	ID,MASL,IMD/DAD,PIDD	Institutional strengths/ weaknesses	50%	50%	
9	Identify technology and resources requirements (equipment needs etc.)	PMU, MI&WRM, ID,MASL, IMD,DAD,PIDD	Reports	20%	40%	40%
10	Identify financial requirements (conditional and unconditional)	PMU,MI&WRM	Cost estimation		40%	60%
11	Prepare a full project implementation to implement the INDCs	PMU, MI&WRM	PIP		50%	50%

Irrigation Sector INDCs-5	**5. Assess river floods and mitigation measures and early warning systems for possible flash floods** 5.2 Collect the rainfall data and river flow 5.2 Prepare digital elevation maps 5.3 Capacity building programs for new technological applications 5.4 Introduce flood mitigation structures

Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify data collection areas	ID,MASL,MD,DAD,PIDD	Number of river basins	25%	35%	40%
2	Collect rainfall & river flow data, and prepare the digital elevation maps	MD,ID,SD,MASL,DMC,DOA, DAD	Number of maps prepared	25%	25%	50%
3	Introduce capacity building programmes for new technological applications	MD,ID/SD,MASL,DMC,DOA, DAD	Number of programs	35%	35%	30%
4	Study and introduce flood mitigation structures	ID,MASL	Number of flood mitigation structures		25%	75%
5	Identify responsible and other institutions to implement such INDCs	PMU,MI&WRM	Number of institutions	100%		
6	Identify policy gaps to implement the INDCs and amend policies if necessary	ID, MASL, DAD, PIDD	Number of gaps	50%	50%	
7	Identify adequacy of institutional capacity to implement the INDCs, and build capacity accordingly	PMU,MI&WRM	Institutional strengths/weakness	20%	30%	50%
8	Identify technology and resources requirements (equipment needs etc.)	PMU,MI&WRM	Report for each institution	50%	50%	
9	Identify financial sources (conditional and unconditional)	PMU,MI&WRM	Cost estimation		50%	50%
10	Prepare a full project implementation plan to implement the INDCs	PMU , MI&WRM	Number of reports			100%

Irrigation Sector INDCs-6	6. Develop water resource management plans and strategies for selected major rivers in Sri Lanka adopting traditional knowledge and new technology					
Action		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Identify required rivers through a prioritization processes	ID,MASL	Number of river basins	30%	40%	30%
2	Identify and collect traditional knowledge and new technology on water management	ID, IMD, MASL	Number of river basins	25%	45%	30%
3	Introduce a management plan by considering traditional knowledge and technology	ID, IMD, MASL	Number of river basins		40%	60%
4	Evaluate effectiveness and lessons learnt	ID, IMD, MASL	Number. of river basins		15%	85%
5	Identify responsible and other institutions to implement the INDCs	PMU & MI&WRM	Number of institutions	100%		
6	Identify policy gaps to implement the INDCs and amend policies if necessary	ID, MASL, PMU & MI&WRM	Number of gaps	50%	50%	
7	Identify adequacy of institutional capacity to implement the INDCs and build capacity accordingly	PMU,MI&WRM	Institutional strengths/weakness	20%	30%	50%
8	Identify technology and resource requirements (equipment needs etc.)	PMU,MI&WRM	Report for each institution	50%	50%	
9	Identify financial sources (conditional and unconditional)	PMU,MI&WRM	Cost estimation		50%	50%
10	Prepare the full project implementation to implement the INDCs	PMU, MI&WRM	Number of reports			100%
Irrigation Sector INDCs-7	7. Adopt water-efficient technologies to 'harvest' water, conserve solid moisture (e.g. crop residue retention) and reduce siltation and saltwater intrusion					
Action		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Identify the required areas and saltwater intruded areas	ID, MASL, DAD & DOA	Number of river basins	30%	40%	30%
2	Identify water-efficient technologies to harvest water	DOA, IMD	Number of water efficient technologies	50%	50%	

3	Conduct research to find the best solutions	DOA, IMD, ID & MASL	Number of research		25%	75%
4	Develop implementation plans	DOA, IMD, ID & MASL	Number of plans		40%	60%
5	Identify responsible and other institutions to implement the INDCs	PMU & MI&WRM	Number of institutions	100%		
6	Identify policy gaps to implement the INDCs and amend policies if needed	ID, MASL, DOA, IMD, PMU & MI&WRM	Number of policy gaps, and amended policies	40%	60%	
7	Identify adequacy of institutional capacity to implement the INDCs and build capacity accordingly	PMU,MI&WRM	Institutional strengths/weakness	15%	30%	55%
8	Identify technology and resource requirements (equipment needs etc.)	PMU,MI&WRM	Report for each institution	40%	50%	10%
9	Identify financial sources (conditional and unconditional)	PMU,MI&WRM	Cost estimation		50%	50%
10	Prepare a full project implementation plan to implement the INDCs	PMU, MI&WRM	Number of reports			100%
Irrigation Sector INDCs-8	**8. Modify irrigation techniques, including amount, timing or technology**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify the modification requirement	ID, MASL, /DAD, PIDD	Number of schemes	20%	30%	50%
2	Identify modification in irrigation techniques	ID,MASL,DAD, PIDD	Number of schemes	15%	30%	55%
3	Select best available techniques	ID,MASL,DAD,PIDD	Number of techniques	20%	40%	40%
4	Implement as pilot projects and conduct feedback sessions to compare the effectiveness	ID,MASL,DAD,PIDD	Number of pilot projects		45%	55%
5	Identify responsible and other institutions to implement the INDCs	PMU & MI & WRM	Number of institutions	100%		
6	Identify policy gaps to implement the INDCs and amend policies if necessary	ID, MASL, DOA, IMD, PMU & MI & WRM	Number of gaps identified and policies amended	35%	65%	
7	Identify adequacy of institutional capacity to implement the INDCs and build capacity accordingly	PMU,MI&WRM	Institutional strengths/weakness	15%	30%	55%
8	Identify technology and resource requirements (equipment needs etc.)	PMU,MI&WRM	Report for each institution	40%	50%	10%

9	Identify financial sources (conditional and unconditional)	PMU,MI&WRM	Cost estimation		50%	50%
10	Prepare a full project implementation plan to implement the INDCs	PMU, MI&WRM	Number of reports			100%
Irrigation Sector INDCs-9	**9. Introduce conservation measures for irrigation of tanks and canals to ensure a sustainable water supply**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Study the current status of irrigation tanks, anicuts and canals in Sri Lanka	ID, MASL,DAD, PIDD	1. Number of tanks 2. Number of anicuts 3. % of canal	2000 25%	2000 25%	3000 50%
2	Identify possible conservation techniques	ID, MASL, DAD, PIDD	Number of techniques	25%	35%	40%
3	Conduct research on solutions and test as a pilot study	ID, MASL,DAD	Number of researches & pilot studies	40%	35%	25%
4	Identify responsible and other institutions to implement the INDCs	PMU & MI & WRM	Number of institutions	100%		
5	Identify policy gaps to implement the INDCs and amend policies if necessary	ID, MASL, DOA, IMD, PMU & MI&WRM	Number of gaps identified and policies amended	35%	65%	
6	Identify the adequacy of institutional capacity to implement the INDCs and build capacity accordingly	PMU,MI&WRM	Institutional strengths/weakness	15%	30%	55%
7	Identify technology and resource requirements (equipment needs etc.)	PMU,MI&WRM	Report for each institution	40%	50%	10%
8	Identify financial sources (conditional and unconditional)	PMU,MI&WRM	Cost estimation		50%	50%
9	Prepare a full project implementation plan to implement the INDCs	PMU, MI&WRM	Number of reports			100%

Coastal Sector

Introduction

Sri Lanka is an island nation surrounded by a low-lying coastal belt. Around a third of the country's population lives along the costal belt.

The effects of climate change seen in the rise of sea level rise and ocean warming impact Sri Lanka in several aspects. Being an island, sea level rise will pose many challenges to coastal communities, their livelihoods, and coastal ecosystems. With this rise, coastal systems and low-lying areas will experience adverse impacts such as submergence, coastal flooding, saltwater intrusion an coastal erosion. In many regions, changing precipitation pattern and melting of snow/ice are altering hydrological systems, affecting water resources of the ocean in terms of quantity and quality. There is evidence that many marine species have shifted their geographical ranges, seasonal activities, migration patterns, relative abundance and species interactions in response to climatic changes.

Sea level rise, a major physical effect associated with climate change, is likely to create significant impacts across the coastal zone. Besides, rising incidences of extreme and unpredictable weather events have created uncertainties over costal livelihoods sometimes even causing life and property damages. Therefore, proper adaptation can prevent losses and damages while creating a conducive environment for low carbon development. Costal and marine sector represent one of the most vulnerable sectors to the adverse effects of climate change.

1. INDCs of Coastal Sector

1. Establish an accurate sea level rice forecasts system for Sri Lanka.
    1.1. Re-establish the existing Mean Sea Level (MSL).
        1.1.1 Establish the required database with historical sea level.
        1.1.2 Start required long term data collection programmes, including wave measurements and a sediment transport study.
    1.2. Establish additional sea level stations, in addition to the existing stations.
    1.3. Acquire globally available technology for prediction and forecasting.
2. Map inundation prone areas assessing vulnerability to sea level rise along the coastal belt.
    2.1 Re-assess inundation maps according to the sea level rise forecast
    2.2 Periodically validate and update inundation maps according to the revised forecast
3. Restore, conserve and manage coral, sea grass, mangroves and sand dunes in sensitive areas.
    3.1 Survey and map coastal habitats (coral, sea grass, mangroves and sand dunes) for the entire coastal region, based on a Survey Department compatible methodologies.
        3.1.1 Identify suitable sites for conservation, rehabilitation and restoration
        3.1.2 Conduct pilot projects at high prioritized sites
4. Prepare risk maps for the coastal zone with mapping. With 0.5m contour intervals and take appropriate actions.

4.1 Prepare vulnerability databases for the coastal zone with mapping, using 0.5m contour intervals

4.2 Establish Digital Elevation Model (DEM) for the entire coastal zone (2 km landward).

5. Establish 1000 ha of coastal forests and a green belt along the island.

5.1 Identify suitable sites for prioritization

5.2 Implement the programme at the identified sites

2. Strategic Policies

Number	Strategic Policy	INDCs Number
1	Introduce sea level monitoring mechanisms to climate forecast sea level changes	1
2	Establish new mechanisms to map inundation prone areas due to sea level rise	2
3	Map and introduce coastal associated habitat restoration	3
4	Enhance capabilities on coastal belt mapping	4
5	Enhance coastal green belt coverage for better carbon sequestration	5

Biodiversity Sector

Introduction

Sri Lanka is one of the 35 biodiversity hotspots in the world. The country was endowed with a truly remarkable bequest of biodiversity and ecosystems. This includes both fauna and flora resources. Furthermore, Sri Lanka's endowments cover terrestrial, aquatic as well as the marine ecosystem that extend up to 200 nm into the Indian Ocean, area covering eight times of its land area and the water depth extending up to 3,500m.

Impacts of climate change could be multifaceted with both negative and positive impacts. Despite the potential impacts, very little is known about what changes have already taken place or where the ensuing changes would eventually lead. Hence, biodiversity and ecosystems are areas where Sri Lanka needs to pay special attention to in terms of adapting to climate change.

1. INDCs of Biodiversity Sector

1. Restore degraded areas inside and outside the protected areas (PA) network to enhance resilience.
   1.1 Identify degraded areas outside the PA network
      1.1.1 Map the degraded areas
      1.1.2 Reforest identified areas
   1.2 Identify degraded areas inside the PA network
      1.2.1 Map the areas
      1.2.2 Habitat enrichment
      1.2.3 Control of invasive species
2. Increase connectivity through corridors, landscape/matrix improvement and management.
   2.1 *Minimize human-animal conflict*
3. Improve management, and consider increasing the extent of protected areas, buffer zones and create new areas in the vulnerable zones.
4. Identify biodiversity hotpots in Sri Lanka and upgrade them.
   4.1. Conduct baseline surveys to identify the status of the biodiversity hotspot
   4.2. Upgrade legal status
5. Promote traditional methods of biodiversity conservation for increased resilience in agroecosystems.
   1.1 *Promotion of traditional methods and indigenous knowledge*
   1.2 *Promote non-traditional methods which are in harmony with nature*
6. Implement community driven conservation projects and programmes.
7. *Establish and implement ex-situ conservation programs*

Note

Newly proposed INDCs presented in italicised font.

2. Strategic Policies

Number	Strategic Policy
1	Enhance resilience of eco-systems and biodiversity of the country to withstand the adverse impacts of climate change
2	Facilitate free movement of species and genes
3	Ensure effective management of the protected area (PA) network
4	Ensure long term conservation of biodiversity hotspots
5	Ensure long term resilience of agro biodiversity
6	Establish a conservation culture
7	Enhance capacity for ex-situ conservation
8	Ensure an effective regulatory institutional set up to manage biodiversity of Sri Lanka

3. Readiness Action Plan

Biodiversity Sector INDCs-1	1. **Restore degraded areas inside and outside the protected areas (PA) network to enhance resilience** 1.1 Identify degraded areas outside the PA network 1.1.1 Map the degraded areas 1.1.2 Reforest identified areas 1.2 Identify degraded areas inside the PA network 1.2.1 Map the areas 1.2.2 Habitat enrichment 1.2.3 Control of invasive species

	Action	Responsible Agencies	Existing plans	Output Indicators	Time Line		
					2017	2018	2019
1	Update the PA gap analysis and identify degraded areas outside the PA network and inside the PA network through collection of relevant data and analysis (all ecosystems including coastal and marine)	DWLC, FD, NARA, CC&CRMD, MEPA, DoA, DoNBG, DoNZG, Universities	NBSAP 2016-2022	Gap analysis completed, degraded areas identified	25%	25%	50%
2	Prioritize degraded areas/restoration interventions/ecosystems	DWLC, FD, CEA, CC&CRMD, MEPA		Reports published		100%	
3	Map degraded areas	DWLC, FD, CEA, CC&CRMD, MEPA	NBSAP 2016-2022	Maps prepared		5 areas	10 areas
4	Prepare management plans for prioritized areas identifying causes for habitat degradation and providing solutions	DWLC, FD, CEA, CC&CRMD,	Draft Haritha Lanka 2015-2022	Number. of PA's having Management Plans		25%	25%
5	Conduct research on IAS and establish a mechanism for updating national IAS list	BDS, Universities, NARA,DWLC, MEPA, FD	NBSAP	Mechanism established		50%	
6	Develop and implement species specific management plans for controlling IAS	BDS, DoA, NAQDA, CEA, DFAR, MASL, MEPA, SLPA	NBSAP	Number. of Management Plans		50%	50%
7	Establish a management mechanism by developing an implementation strategy to protect critical habitats outside PA network with reference to climate change adaptation	DWLC, FD, CEA, NARA, CC&CRMD	NBSAP	Number. of PAs and MPAs established			20%

8	Identify policy gaps to implement the INDCs and amend policy if necessary	BDS, M/SD &WL		Final Policy			100%
9	Identify adequacy of institutional capacity to implement the INDC and build capacity accordingly and strengthen the newly established marine division in the DWLC	DWLC, FD, CEA, CC&CRMD, MEPA	NBSAP	Marine unit established in DWLC, Number of officers trained in Marine sector	10%	10%	10%
10	Recover/Restoration/ threatened and endemic species	FD, DoNBG, DWLC,	Draft Haritha Lanka 2015-2022 NBSAP	Number. of threatened /endemic species recovered/restored		3 species	3 species
11	Restore identified degraded areas including terrestrial, freshwater and marine	DWLC, FD, CEA, CC&CRMD, MEPA	Draft Haritha Lanka 2015-2022 NBSAP	Detailed implementation plan			25%
12	Prepare detailed implementation plan in-order to implement the INDCs including actions such as; assessment of technology requirements, calculation of financial requirements (conditional and unconditional), demarcation of the identified land/acquisition, introduction of incentive schemes for restoration, habitat enrichment, publication of ecosystem specific best practices, etc	BDS, DWLC, FD, CEA, CC&CRMD		Detailed implementation plan		25%	75%
Biodiversity Sector INDCs-2	**2. Increase connectivity through corridors, landscape/matrix improvement and management** 2.1 Minimize human-animal conflict						
Action		**Responsible Agencies**	**Existing Plans**	**Output Indicators**	**Time Line**		
					2017	**2018**	**2019**
1	Identify current status (data) on distribution, migratory corridors, landscape/ matrix and identify the need of corridors	DWLC, FD, BDS, SEA, CC&CRMD, MoPRE		Report	10%	40%	50%

2	Conduct studies on species migration and areas needing connectivity (for elephants, whales and dolphins)	FD, DWLC,CC&CRMD, MEPA,BDS		Number. of studies	10%	40%	50%
3	Prioritize areas for connectivity	FD, DWLC,CC&CRMD, MEPA,BDS		Report		25%	75%
4	Map corridors to be connected	FD, DWLC, BDS		Maps prepared		25%	75%
5	Declare corridors to link fragmented critical habitats	FD, DWLC, BDS	Draft Haritha Lanka 2015-2022	Number. of corridors, Extent of linkages established			10%
6	Identify key wildlife species that come into conflict with humans and implement an action plan in adaptive manner in minimizing human-animal conflict	FD, DWLC, Min. of Shipping	Draft Haritha Lanka	Number. of initiatives taken	10%	10%	10%
7	Identify policy gaps to implement the INDCs and amendment of policy if necessary	BDS, M/ WL&SD		Amendments to policy	25%	25%	25%
8	Prepare a detailed implementation plan in-order to implement the INDCs including actions such as; calculation of financial requirements (conditional and unconditional), land acquisition, demarcation of proposed lands to use as connectivity, identification of the adequacy of institutional capacity to implement the INDC and build capacity accordingly, study the effectiveness of the connectivity and redesign, establishment of monitoring mechanism, developing an action plan to minimize human – animal conflict, etc	DWLC,FD, BDS, BDS, SEA, MoPRE, Irrigation Dept.		Detailed Plan			100%

Biodiversity Sector INDCs-3		3. Improve management, and consider increasing the extent of protected areas, buffer zones and create new areas in the vulnerable zones				
Action		Responsible Agencies	Output Indicators	Time Line		
				2017	2018	2019
1	Study and identify additional areas to be under protected area network, buffer zones and new areas in vulnerable zones	FD, DWLC and CEA, MEPA, CC&CRMD	Gap analysis completed, Baseline surveys conducted at critical sites	5%	15%	15%
2	Take inventory of all sites that are identified as critical habitats for biodiversity conservation	BDS, universities, National Museum, DoNBG	Inventories		20%	20%
3	Prepare and implement management plans for prioritized areas including marine, wetlands etc.	FD, DWLC and CEA, MEPA, CC&CRMD, CEA	Number. of Management Plans		25%	50%
4	Prepare a detailed implementation plan in-order to implement the INDCs including actions such as; identification of policy gaps, identification the adequacy of institutional capacity to implement the INDC, calculation of financial requirements (conditional and unconditional), declaration of new areas, demarcation of the required land/land acquisition according to legal/gazette boundaries, provide alternative livelihood for affected persons, etc	FD, DWLC, CEA, MEPA, CC&CRMD, BDS	Detailed Plan			100%
5	Declare new PAs and MPAs	FD, DWLC, MEPA, CC&CRMD, Min of Tourism, Shipping, Archaeology	Number of areas declared	25%	25%	50%

Biodiversity Sector INDCs-4	**4. Identify biodiversity hotpots in Sri Lanka and upgrade them** 4.1Conduct baseline surveys to identify the status of the biodiversity hotspot 4.2 Upgrade legal status

Action		Responsible Agencies	Existing plans	Output Indicators	Time Line		
					2017	2018	2019
1	Define biodiversity hotspots	BDS		Local BD hotspots defined	100%		
2	Conduct a literature survey and screening of development plans/Red List to short list hotspots and conduct research for data deficient species	BDS, DWLC	Red list 2012	Identified hotspots		10%	10%
3	Conduct a preliminary survey to verify status with literature / Conduct baseline surveys to identify the status of the biodiversity hotspot	BDS, DWLC	NBSAP 2016-2017	Number. of surveys		25%	25%
4	Conduct and facilitate the research on biodiversity hotspots	DWLC, FD, BDS, Universities, NARA		Number. of research conducted in areas/number. species covered		25%	30%
5	Update the research results in a common portal for validation	BDS, DWLC		Number. of validation workshops conducted		30%	70%
6	Update the conservation status of the species with National Red List	BDS	BCAP and NBSAP	Red list Publication-2017		100%	
7	Prepare management plans for highly threatened species	BDS, DoNZG, DoNBG, DWLC, MEPA, CC&CRMD, Shipping		Number. of Management Plans		10%	15%
8	Develop a mechanism to include biodiversity hotspots in a PA and MPA network	BDS, DoNZG, DoNBG, DWLC, MEPA, CC&CRMD	Draft Haritha Lanka 2015-2022 NBSAP	Number. of new hotspots identified, extent of PA network increased		20%	30%
9	Identify policy gaps to implement the INDCs and amendment of policy if necessary	DWLC, BDS, FD. CC&CRMD, CEA		Number of Policy gaps Identified	25%	75%	

10	Identify responsible and other institutions to implement the INDCs	BDS		Institutions identified	100%		
11	Identify adequacy of institutional capacity to implement the INDC and build capacity accordingly	BDS, DoNZG, DoNBG, MEPA, CC&CRMD, NARA, FD, DWLC,		Evaluation Reports		25	25
12	Establish a powerful agency to regulate/coordinate all the agencies work in biodiversity sector and implement effectively the policy recommendation and INDCs	BDS, DWLC, FD, Presidential secretariat,		Number of policies, regulations implemented, number of PAs and MPSs established, Amount of fund raises			
13	Assess technology requirements	BDS, DoNZG, DoNBG, MEPA, CC&CRMD, NARA, FD, DWLC, MEPA		Detailed INDCs implementation report	25%	25%	50%
14	Calculate financial requirements (conditional and unconditional)	BDS, DoNZG, DoNBG, MEPA, CC&CRMD, NARA, FD, DWLC, MEPA		Calculated report on conditional and unconditional		50%	50%
15	Prepare detailed implementation plan in-order to implement the INDCs including actions such as; declaration of biodiversity hotspots legally according to threatened status, implementation of management plans	BDS, DoNZG, DoNBG, MEPA, CC&CRMD, NARA, FD, DWLC,		Detailed implementation plan		20%	80%

Biodiversity Sector INDCs-5	5. Promote traditional methods of biodiversity conservation for increased resilience in agroecosystems 5.1 Promotion of traditional methods and indigenous knowledge 5.2 Promote non-traditional methods which are in harmony with nature

Action		Responsible Agencies	Existing plans	Output Indicators	Time Line		
					2017	2018	2019
1	Collect data, document and protect traditional methods, traditional forecasting methods, availability of traditional varieties with resilient character, etc	Department of Agriculture, Agrarian Services and Export Agriculture, NIPO, D/Ayurveda, BDS	NBSAP	Documented traditional knowledge	10%	40%	50%
2	Check traditional knowledge at the ground level	Department of Agriculture, Agrarian Services and Export Agriculture, D/Ayurveda	Action plan of Dept of Agriculture	Reports	10%	50%	40%
4	Identify farmer groups, to create seed banks according to agro ecological zones and facilitate them for creation of seed banks by provision of technology and other requirements	Department of Agriculture, Agrarian Services and Export Agriculture	Action plan of Dept of Agriculture	Number. of farmer groups identified,	20%	30%	30%
5	Identify traditional varieties to be cultivated by farmers in dry season, and transfer such knowledge to farmers	Department of Agriculture, Agrarian Services and Export Agriculture	Action plan of Dept of Agriculture	Identified varieties-Report, Number. of awareness creation programmes	40%	50%	10%
6	Identify implementing gaps/conflict of interests with regard to mandates within institutions	Department of Agriculture, Agrarian Services and Export Agriculture		Gaps identified, implementing mechanism identified		50%	50%

7	Prepare a detailed implementation plan in-order to implement the INDCs including actions such as; identification of policy gaps to implement the INDCs, identification the adequacy of institutional capacity to implement the INDC, establishment of seed banks of resilient varieties, calculation of financial requirements (conditional and unconditional)maintain plots of traditional varieties by farmers, awareness creation/ transfer of knowledge to other farmers, etc	Department of Agriculture, Agrarian Services and Export Agriculture, D/Ayurveda, BDS		Detailed plan			100%
Biodiversity Sector INDCs-6	**6. Implement community driven conservation projects and programmes**						
Action		**Responsible Agencies**	**Existing plans**	**Output Indicators**	**Time Line**		
					2017	**2018**	**2019**
1	Identify and document current status on community driven conservation projects and programmes, lessons learnt in implementation and categorization of the community driven programs with existing set-up	DWLC, FD, NARA, CC&CRMD, MEPA, BDS		Report on lessons learnt	100%		
2	Identify target areas and places that needs community driven conservation projects and programmes and assessment of conservation benefits	DWLC,FD,NARA, CC&CRMD,MEPA, BDS		Number. of identified places	50%	50%	
3	Conduct awareness programmes for local communities on impacts on climate change, local biodiversity and ecosystems in vulnerable areas	DWLC, FD, CC&CRMD, MMD&E, NGOs, BDS, MEPA	Draft NAP	Number. of awareness programmes conducted.	20%	20%	20%
4	Organize local CBOs for monitor the changes in local ecosystems and biodiversity	FD, DWLC, CC&CRMD, NGOs, MMD&E, MEPA	Draft NAP	Number. of CBOs organized	20%	20%	20%
5	Increase participation of local communities in adaptive management programmes and increase employment opportunities in conservation	FD, DWLC, CC&CRMD, NGOs	Draft NAP	Number. of new employment opportunities created	20%	20%	50%

	programmes						
6	Design the conservation programmes with relevant experts and conduct pilot studies to see effectiveness of the planned programmes	FD, DWLC, CC&CRMD, NGOs		Number. of pilot studies conducted		20%	50%
7	Develop a mechanism to improve livelihood of surrounding communities thereby reducing dependency on PA resources	DWLC, BDS, CC&CRMD,	Draft Haritha Lanka	Number. of programmes developed		20%	50%
8	Prepare a detailed implementation plan in-order to implement the INDCs including identification of policy gaps to implement the INDCs and amendment of policy if necessary, identification the adequacy of institutional capacity to implement the INDC and build capacity accordingly, assessment of technology requirements and calculation of financial requirements (conditional and unconditional)	FD, DWLC, CC&CRMD, NGOs, BDS					100%

Biodiversity Sector INDCs-7	**7. Establish and implement ex-situ conservation programs**						
Action		**Responsible Agencies**	**Existing plans**	**Output Indicators**	**Time Line**		
					2017	**2018**	**2019**
1	Identify species requiring ex-situ conservation measures, and prioritization of species	DWLC, FD, DoNBG, DoNZG, NARA, MEPA, CC&CRMD	Draft Haritha Lanka 2015-2022 NBSAP 2016-2022	Prioritized species lists	50%	50%	
2	Identify indicator species/ point endemic or critically endangered species	DWLC, FD, DoNBG, DoNZG, NARA, BDS, MEPA	Draft Haritha Lanka 2015-2022 NBSAP 2016-2022	Identified species lists	50%	50%	
3	Facilitate research on identified species requiring ex-situ conservation measures	DWLC, FD, DoNBG, DoNZG, NARA, BDS	Draft Haritha Lanka 2015-2022	Number. of research conducted	5%	30%	30%

			NBSAP 2016-2022				
4	Prepare recovery and management plans for prioritized species	DWLC, FD, DoNBG, DoNZG, NARA, BDS	Draft Haritha Lanka 2015-2022 NBSAP 2016-2022	Number. of recovery/management plans		50%	50%
5	Identify suitable areas and locations for restore their habitats and provide for their reintroduction and translocation	DWLC, FD, DoNBG , DoNZG, NARA, BDS	Draft Haritha Lanka 2015-2022 NBSAP 2016-2022	Identified species lists, Number. of threatened conserved	10%	20%	40%
6	Establish ex-situ facilities (botanic, zoological, medicinal, cultural gardens, weland parks, arboreta, field gene banks, Urban parks) and mandate them to undertake ex-situ conservation of biodiversity	DoNBG, DoNZG, BDS, DoA, UDA	Draft Haritha Lanka 2015-2022, Draft NBSAP	Number. of botanic, zoological, medicinal, cultural gardens, field gene banks established	10%	10%	25%
7	Establish ex-situ breeding / propagation programmes for threatened flora and fauna	DWLC, FD, DoNBG, DoNZG, NARA, BDS, MEPA, CC&CRMD, NAQDA	Draft Haritha Lanka 2015-2022	Number. of breeding/ propagation programmes conducted		25%	50%
8	Prepare detailed implementation plan; identification of policy gaps to implement INDCs, amendment of policy if necessary, identification of the adequacy of institutional capacity to implement the INDC and build capacity accordingly, assessment of technology requirements, calculation of financial requirements (conditional and unconditional), to be included in-order to implement the INDCs	DWLC, FD, DoNBG, DoNZG, NARA, BDS, MEPA, CC&CRMD,					100%

Urban, City Planning and Human Settlements Sector

Introduction

Today most of the dwellers in urban and cities struggle with the consequences of unsustainable physical growth expansion. Urban, city planning and human settlements are closely connected areas that come under the direct influence of climate change impacts. Local Authorities and their inhabitants are faced with droughts, floods, air pollution, land degradation, deforestation and rising sea levels. These impacts have direct repercussions on basic living standards of the population. In Sri Lanka, city planning and human settlements are two areas that received limited attention despite their importance in connection to climate change adaptation.

1. INDCs of Urban, City Planning and human Settlements Sector

1. Mainstream climate reliance in physical and urban planning and incorporated them for planning for development projects.
   1.1 Incorporate mechanisms to improve urban macro/micro climatic conditions.
   1.2 Conserve wet lands and water bodies close to urban and settlement areas.
   1.3 Protect & enhance green coverage, green corridors in urban and settlement planning.
   1.4 Improve air circulation when planning urban areas.
   1.5 Incorporate disaster prevention, environmental friendly mechanisms
2. *Development of disaster prevention and environment friendly mechanisms especially for floods in western province and incorporate them for planning in development projects*
3. Promote climate resilience building designing and alternative materials for construction.
   3.1.Design based on green building guidelines
   3.2.Incorporate disaster prevention guidelines
   3.3.Incorporate low cost environment friendly materials
4. Minimize the impacts on human settlements and infrastructure due erratic changes in population.
   4.1. Follow NPPD and NBRO guidelines
   4.2. Enforce rules and regulations to prevent unauthorized settlements
5. Enhance the resilience of human settlements and infrastructure to extreme weather event.
   5.1.Infrastructure facilities giving due consideration to contour line and soil conservation methods particularly in hilly areas
   5.2.Design and maintenance of infrastructure giving due consideration to the run off system and flooding
6. Minimize the impact of sea level rise on costal settlements and infrastructure.
   6.1.Design infrastructure & structures to face sea level rise
   6.2.Shifting urban densification inward
   6.3.Demarcate protection areas from sea level
7. Greening cities by introducing urban forest parks, roof top gardens, vertical gardens, wetland parks and road side planting.

Note

Newly proposed INDCs presented in italicised font.

2. Strategies, related Ministries and their responsibilities

Number	Strategy	Related Ministry/Ministries and percentage responsibilities
1	Mainstream climate amelioration in physical and urban planning and incorporate them in planning for development projects	MMP&WD (100%)
2	Development of disaster prevention and environment friendly mechanisms especially for floods in western province and incorporate them in planning for development projects.	MMP&WD (100%)
3	Implementation of green and environmentally friendly building guidelines (G&EFBG) including the aspects of climate resilience	MMP&WD (75%), MH&C (25%)
4	Minimize the impacts on human settlements and infrastructure due to erratic changes in population	MH&C (100%)
5	Enhance the resilience of human settlements and infrastructure to extreme weather events	MH&C (100%)
6	Minimize the impacts of sea level rise on coastal settlements and infrastructure	MMP&WD (50%) MH&C (50%)
7	Greening cities by introducing green areas to increase the green cover	MMP&WD (75%) MH&C (25%)

Planning Division
Ministry of Mega polis & Western Development

Readiness Action Plan of Urban & city planning, and human settlements sector for INDCs of Sri Lanka

Physical performance Target 2017-2019

Subsector-Urban & city planning

Strategy -01

Strategy- **Mainstream climate amelioration in physical and urban planning and incorporated them for planning for development projects**

KPI -Percentage improvement and Number of climate change adaptation related environment services.

Action		Responsible Agencies	Output Indicator	Time Line		
				2017	2018	2019
01	Identify further requirements of the improvements of urban climatic conditions	UDA	Number of required climate conditions	xxx		
02	Identify the potential importance of declaration and or conservation of selected wetlands and water bodies close to urban and settlement areas	UDA,SLLRDC, NPPD	Number of important and selected wetlands and water bodies	xxx		
03	Identify potential importance of green coverage and green corridors and gaps in greening plan - 2020	UDA,SLLRDC, NPPD	Number of green structures	xxx		
04	Introduce/Incorporate policy guidelines for green building technologies and energy efficient building technologies.	UDA	Number of buildings constructed according to the policy guidelines			xxx
05	Identify gaps in existing urban plans on improvements of air circulation	UDA	Number of identified gaps	xxx		
06	Review the all aspects and collected information of the above 01,02,03 and 05 and establishment of database on mainstream climate amelioration in planning	MMP&WD	Number of revived aspects and the database established	xxx		
07	Identify gaps in existing plans related to the above 01,02,03 and 05 and prepare report to incorporate the gap filling activities to this action plan	UDA,SLLRDC, NPPD	Number of gap reports		xxx	
08	Preparation of draft consolidated action plan including the above 01,02,03,05 and 07	MMP&WD	Consolidated Action Plan		xxx	
09	Review the draft action plan and finalization	MMP&WD	Finalized Action Plan		xxx	
10	Conduct (mini) Strategic Environment Assessment for Action Plan and identify all mitigation measures to minimize the environment impacts.	MMP&WD	Conducted Strategic Environment Assessment		xxx	
11	Formulation of projects to implement the action plan	MMP&WD	Number of projects			xxx
12	Obtain required approvals for the projects and make institutional arrangements	MMP&WD	Number of approved projects		xxx	xxx
13	Donor coordination and provide financial assistant for action plan preparation	MMD&E	Number of donors, amount of funds	xxx	xxx	xxx

Planning Division
Ministry of Mega polis & Western Development

Action Plan of Urban & city planning and human settlements sector For INDCs of Sri Lanka

Physical performance Target 2017-2019

Subsector - Urban & city planning

Strategy -02

Strategy-**Development of disaster prevention and environment friendly mechanisms especially for floods in W. province incorporate them for development projects**

KPI-Reduction in incidence & impact of floods& expenditure on flood related relief

Action		Responsible Agencies	Output Indicator	Time Line		
				2017	2018	2019
01	Collect floods and meteorology information in western province and study the existing mechanisms of protection and prevention of floods	MMP&WD,SLLRDC, UDA	Study reports, Identified gaps	xxx		
02	Review the existing mechanisms and conduct gap analysis study for existing mechanisms	MMP&WD,SLLRDC, UDA	Identified gaps	xxx		
03	Identify highly vulnerable flood prone areas in Western province and implement new mechanisms in pilot scale	MMP&WD,SLLRDC, UDA	Prioritized flood prone areas, Number. of pilot projects	xxx		
04	Asses the existing and ongoing projects in above areas and identify the best practices	MMP&WD,SLLRDC, UDA	Assessment report	xxx		
05	Formulate a database on floods protection and prevention in Western province including all mechanisms	MMP&WD,SLLRDC, UDA	Database established	xxx	xxx	
06	Formulate the projects to prevent the local flood in Western Province.	MMP&WD,SLLRDC	Number of persons benefitted	xxx	xxx	xxx
07	Prepare floods protection and prevention Action Plan for Western Province for 2020-2030	MMP&WD,SLLRDC, UDA	Prepared plan		xxx	
08	Decide on national contribution and external financial support and identify sources of external financial support.	MMP&WD,SLLRDC, UDA, MMD&E	Budget estimates		xxx	xxx
09	Create awareness on flood protection and preventions.	MMP&WD,SLLRDC, UDA	Number of events/programmes		xxx	xxx
10	Strengthen the present rules and regulations to prevent filling marshy lands and blocking canals.	MMP&WD,SLLRDC	Strengthened rules and regulations	xxx	xxx	
11	Donor coordination and provide financial assistance for preparatory programme	MMD&E	Number of Donor, amount of funds	xxx	xxx	xxx

Planning Division
Ministry of Mega polis & Western Development

Action Plan of Urban & city planning and human settlements sector For INDCs of Sri Lanka

Physical performance Target 2017-2019

Subsector-Urban & city planning
Strategy -03
Strategy- **Implementation of green and environmentally friendly building guidelines (G&EFBG) including the aspects of climate resilience**
KPI-Percentage reduction of GHG in building construction sector and impacts on biodiversity and environment Percentage increase of protection of biodiversity and environment

Action		Responsible Agencies	Output Indicator	Time Line		
				2017	2018	2019
01	Review the G&EFBG for government sector buildings	UDA	Number of reviews	xxx		
02	Identify suitable institutional arrangements and establishment of institutional setup	UDA	Number of institutes	xxx		
03	Implement pilot project for G&GFBG for government buildings including testing of rating system	UDA	Number of pilot projects	xxx	xxx	
04	Conduct all island survey on all buildings and initiate application of G&EFBG for all buildings and improvement of existing G&EFBG with information of all buildings	UDA	Number of surveys, Number. of initiatives, % implement	xxx	xxx	
05	Make regulations & legalize the G&EFBG under UDA Act	UDA	Number of regulations		xxx	xxx
06	Study for calculation of reduction of GHG in construction sector through application of G&EFBG	MMD&E	Number of studies		xxx	xxx
07	Make arrangements for green building award scheme and create awareness by conducting events and publishing documents	UDA	Number of award schemes, events &Documents			xxx
08	Provide financial assistance for preparatory programme	MMD&E	Amount of funds	xxx	xxx	xxx

Planning Division
Ministry of Housing and Construction

Action Plan of Urban & City Planning, and Human Settlements Sector for INDCs of Sri Lanka

Physical Performance Target 2017-2019

Subsector-Human Settlements
Strategy -04
Strategy-**Minimize the impacts on human settlements and infrastructure due to erratic changes in population**
KPI- Number of Improvements in minimizing the Impacts on Human Settlements and Infrastructure due to Erratic Changes in Population

	Action	**Responsible Agency**	**Output Indicator**	**Time Line**		
				2017	**2018**	**2019**
01.	Develop settlement plans and new settlements according to the NPPD and NBRO guidelines, guidelines of land use plan, land reclamation	NHDA/ USDA	Number of Plans improved	xxx	xxx	xxx
02.	Formulate guidelines, rules and regulations for housing settlements	NHDA/ USDA	Number of guidelines, rules, regulations formulated	xxx	xxx	
03.	Strengthen the enforcement of rules and regulations to prevent unauthorized constructions in condominiums	CMA	Number of rules and Reg. enforced to prevent unauthorized settlements	xxx	xxx	xxx
04.	Identify policy gaps to implement such INDCs and amend policy if necessary	Min. of H & C/ NHDA/ CMA/ USDA	Number of Gaps identified	xxx	xxx	
05.	Identify responsible and other institutions to implement such INDCs	Min. of H & C	Number. identified	xxx		
06.	Donor coordination and provide financial assistance for action plan preparation and implementation	MMD & E	Number of donors, Amounts of funds	xxx	xxx	xxx

Planning Division
Ministry of Housing and Construction

Action Plan of Urban & city planning and human settlements sector for INDCs of Sri Lanka

Physical performance Target 2017-2019

Subsector-Human Settlements
Strategy -05
Strategy-**Enhance the resilience of human settlements and infrastructure to extreme weather events**
KPI- Number of improvements for enhancing resilience of human settlements & infrastructure to extreme weather events

	Action	**Responsible Agency**	**Output Indicator**	**Time Line**		
				2017	**2018**	**2019**
01.	Identify policy gaps to implement INDCs and amend of policy if necessary	Min. of H & C/ NHDA/ USDA/CMA	Number. of Gaps identified	xxx	xxx	
02.	Identify responsible and other institutions to implement such INDCs	Min. of H & C	Number. identified	xxx		
03.	Plan and design settlements designing considering disaster prevention and environmentally friendly mechanisms	NHDA/ USDA	Number. of designs	xxx	xxx	
04.	Prepare draft action plan	Min. of H & C/ NHDA/ USDA	Draft action plan		xxx	
05.	Review Draft action plan	Min. of H & C/ NHDA/ USDA	Finalized action plan		xxx	
06.	Formulate projects for action plans	Min. of H & C/ NHDA/ USDA	Number. of projects			xxx
07.	Obtain required approvals for projects and make institutional arrangements	Min. of H & C/ NHDA/ USDA	Number. of approvals			xxx
08.	Donor coordination and provide financial assistance for action plan preparation	MMD & E	Number. of Donor / Amounts of funds	xxx	xxx	xxx

Planning Division
Ministry of Housing and Construction

Action Plan of Urban & city planning and human settlements sector for INDCs of Sri Lanka

Physical performance Target 2017-2019

Subsector-Urban & city planning
Strategy 06
Strategy-**Minimize the impact of sea level rise on coastal settlements and infrastructure**
KPI –Percentage increase of protection from and adaptability for sea level rise

Action		Responsible Agencies	Output Indicator	Time Line		
				2017	2018	2019
01	Review of prepared vulnerability maps in coastal areas including human settlement and infrastructure	CCS,CC&CRMD, MEPA,UDA,NPPD	Number. of reviewed aspects	xxx	xxx	xxx
02	Identify activities related to above (1) which will be planned to implement after 2020	CCS MMP&WD, UDA	Number of activities identified	xxx		
03	Identify most vulnerable coastal areas related to above (2) and prioritizing	CCS Min. of H & C MMP&WD,UDA	Complete report on vulnerable areas	xxx	xxx	xxx
04	Determine and plan suitable protective & preventive structures, for prioritized areas	MMP&WD CC&CRMD, MEPA,UDA	Effective plan	xxx	xxx	
05	Identify the policy gaps in resettlement planning	UDA	Gaps identified	xxx		
06	Amend policies / acts according to (5)	MMP&WD, UDA	Number of amendments took place		xxx	xxx
07	Create awareness among coastal communities on green & environmental friendly building guidelines	UDA, SLLRDC	Number. of awareness programs conducted	xxx	xxx	xxx
08	Prepare detailed plan including financial/technical requirements, institutional strengthening & capacity building related to activities of above 2	UDA, SLLRDC	Comprehensive plan	xxx	xxx	xxx
09	Identify the need of resettlement and prepare resettlement plan	UDA	Completed plan	XXX	XXX	XXX
10	Prepare project proposals, obtain approval and make institutional arrangements	UDA, SLLRDC	Number of projects implemented	XXX	XXX	

Planning Division
Ministry of Mega polis & Western Development

Action Plan of Urban & city planning and human settlements sector for INDCs of Sri Lanka

Physical performance Target 2017-2019

Subsector -Urban & city planning
Strategy on -07
Strategy-**Greening cities by introducing green areas to increase the green cover**
KPI-Percentage increase of local (urban areas and settlement) green cover and environmental services related to green cover

Action		Responsible Agencies	Output Indicator	Time Line		
				2017	2018	2019
01	Collect information and study the manmade green areas in urban areas and settlements	UDA, MH&C	Number. of green areas	XXX		
02	Identify the requirement of new green areas except areas under the project upto 2020	UDA, MH&C	Number. of green area	XXX		
03	Calculate potential sink capacity of the green area in the above 2	MMD&E , UDA	Giga grames of carbon		XXX	
04	Categorize required green areas mention in above 2	UDA, MH&C	Number. of categories	XXX		
05	Prepare action plan for greening urban areas and settlements for green areas in the above 2	MMP&WD, UDA	Number. of action plans		XXX	
06	Prepare basic landscape designs for the green areas mention in above 2	UDA	Number. of landscape designs		XXX	XXX
07	Conduct (mini) SEA for action plan and identify all mitigation measures to minimize the environment impacts.	MMP&WD	Number of SEAs			XXX
08	Formulate projects, obtain required approvals and make institutional arrangements	MMP&WD, UDA, MH&C	Number of approved projects, Number. of units			XXX
09	Donor coordination and provide financial assistance for action plan preparation	MMD&E	Number of Donor, amount of funds	XXX	XXX	XXX

Tourism and Recreational Sector

Introduction

According to the Davos Declaration signed during the second International Conference on Tourism and Climate Change; tourism is estimated to contribute at least 5% of global CO_2 emissions. The sector contributes to the global economy as well as local economy to a great extent. In the process of preparing INDCs special attention needs to be given to reduce the sector's GHG emission levels and pave the way for into sustainable tourism.

Being a tropical island nation, Sri Lanka is an attractive destination for tourists. Among the country's attractions are scenic and sunny beaches, cultural heritage, ecological endowments of rich biodiversity, opportunities for nature recreation (e.g. whale watching, beach surfing, wildlife watching) as well as comfortable climate zones. Climate change can affect the desirable characteristics associated with each of those attractions, thereby creating problems for the operational undertaking of travelling and leisure activities. Furthermore, it can affect infrastructure facilities of the tourism industry making them vulnerable to various hazards. Tourism industry, by its nature, is highly sensitive and susceptible to disturbing conditions such as natural disasters and violence. Hence, maintaining Sri Lanka's position as an attractive destination and ensuring efficient operation of the industry under rising incidence of climate hazards, needs to take into account carefully planned adaptation measures.

At the same time consequences of climate change may result in loss of livelihood and jobs in various sectors such as agriculture, fisheries and livestock. Tourism and recreation sector would be an area wherein more livelihoods options and jobs can be sourced without affecting the structures of the existing environment and national economy. Nature based tourism and recreational activities can be enhanced despite future climate change impacts.

Improving nature based tourism and recreational activities would encourage local community to protect their environment as they provide livelihoods for many people. Stakeholders in tourism sector in Sri Lanka may have engage in terms of taking actions which take into consideration environmental friendly ways of preserving ecosystem and sharing responsibilities with other national and local agencies in managing ecosystems for a longer run.

In this context potential adaptation options in Tourism and recreational sector would curb current tourism trends with increasing waste generation and over exploitation of resources around, and transition into more sustainable energy consuming environment friendly alternatives.

1. INDCs of Tourism and Recreational Sector

1. Adjustment of tourism and recreation industry to altered conditions of the destinations.
2. Increase the preparedness of tourism and recreation operation to extreme weather conditions.
3. Assess the current promotional strategies in connection to emerging scenarios of climate change; beach tourism and nature destinations.
4. Improve energy efficiency in tourism establishments by using available best alternative environmental friendly energy sources, solar and wind power, biomass.
5. Introduce resources management mechanism into tourism in order to minimize damage to the existing ecosystem by contributing in waste management, solid and waste water, in tourism areas which could affect to the ecosystem.

2. Strategic Policies

Number	Strategic Policy	INDCs Number
1	Enhancement of tourism development focusing on climate change and its impacts	1
2	Arrange necessary remediation action on the preparedness of tourism and recreation operation due to extreme weather conditions	2
3	Introduction of promotional strategies to tourism and nature destinations special attention to climate change impacts scenarios	3
4	Introduce waste management, solid and waste water, in tourism areas	4
5	Revision of current policies, regulations and guidelines Development of management plan	5

3. Readiness Action Plan

Tourism and Recreational Sector INDCs-1	**1. Adjustment of tourism and recreation industry to altered conditions of the destinations**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Advise and select a suitable consultant for the study	MTDCRA	%			
2	Conduct research studies on climate change and make recommendations for climate change adaptation actions (proposed)	MTDCRA,SLTDA, SLTPB,SLCB	%			
3	Find separate actions for government and private sector	MTDCRA,SLTDA	%			
4	Identify and recognise island wide resources, and create new themes	SLTDA	%			
5	Introduce / improve specific infrastructure for tourism	TAASL	%			
6	Raise awareness among travel agencies in Sri Lanka	MTDCRA	%			
7	Form a steering committee with all tourism resource managing organizations	SLTDA	%			
8	Create awareness among tourism resource managing agencies	MTDCRA, SLTDA	%			
9	Carry out a study and prepare suitable guidelines for tour operators and tours	SLTDA	%			
10	Introduce and implement a monitoring plan with relevant stakeholders	MTDCRA,SLTDA	%			
11	Create awareness for government and private stakeholders on marketing themes	MTDCRA,SLTPB	%			
12	Identify policy gaps to implement the INDCs and amend policy if necessary	MTDCRA	%			
13	Identify responsible and other institutions to implement the INDCs	MTDCRA,SLTDA	%			
14	Identify adequacy of institutional capacity to implement the INDCs and build capacity accordingly	MTDCRA	%			
15	Calculate technology requirements (equipment needs, etc)	MTDCRA ,SLTDA	%			
16	Calculate financial requirements (conditional and unconditional)		%			
17	Prepare a full project implementation plan in-order to implement the INDCs	MTDCRA,SLTDA	%			
18	Prepare a BoQ for the plan	MTDCRA, SLTDA, Climate change commission of Sri Lanka	%			

Tourism and recreational Sector INDCs-2	2. Increase the preparedness of tourism and recreation operation to extreme weather conditions					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
2.1	IDENTIFY TOURISM FACILITIES IN VULNERABLE AREAS 2.1.1 Conduct study on vulnerable areas of tourism by SLTDA in assistance with relevant line ministries (Meteorology department / CC&CRMD / Fisheries Department / NBRO / Disaster Management and Wildlife)	SLTDA	Tourism Zones/ Tourism Activities			
	2.1.2 Conduct potential study on extreme climate conditions and its challenges towards tourism industry with recommendations to overcome the challenges.	SLTDA	Extreme Climatic Conditions identified / Challenges vs remedies			
2.2	PREPARE GUIDELINE ON EMERGENCIES IN TOUR OPERATION 2.2.1 Identify best practices of emergency handling in developed destinations in the world. (Collect data guidelines from other competitive destinations)	SLTDA	Best Practises of Competitive destinations			
	2.2.2 Prepare/amend emergency management system for hotels.	SLTDA	Response Time			
	2.2.3 Prepare guidelines to overcome the outcome of the study with the participation of private sector (SLITO, THASL, and TAASL) and relevant government agencies mentioned above.	SLTDA	Best applicable guidelines			
2.3	TRAIN TOUR OPERATORS ON EMERGENCY MANAGEMENT STRATEGIES 2.3.1 Conduct awareness programmes for stakeholders (travel agents / tour operators / hoteliers…etc.)	SLTDA	Number of sessions per annum / drills for emergency situations			

2.4	DESIGN TOURISM INFRASTRUCTURE TO MEET THE SAFETY NEEDS OF OPERATION 2.4.1 Identify the infrastructure requirement in a disaster situation in corporation with disaster management centres.	SLTDA	Infrastructure Units and categories			
2.5	ESTABLISH EMERGENCY COMMUNICATION CHANNELS FOR TOURIST AND OPERATORS2.5.1 Identify the potential communication channels (Ex. Apps, Guidebooks, Links to Hotel websites, Inter Airport communication systems, etc)	SLTDA	Potential channels identified			
	2.5.2 Establish communication devises	SLTDA	Communication methods			
2.6	DEVELOP A SYSTEM FOR TIMELY ISSUING OF SHORT TERM WEATHER FORECAST 2.6.1 Research and identify the best systems of issuing weather forecasts to foreigners.	SLTDA	Best systems / practices applicable to SL			
	2.6.2 Develop test model in collaboration with media communication partners (pvt/gvt) and metrology department and forces.	SLTDA	Number of defects identified / How many preventable?			
	2.6.3 Implementation	SLTDA				
2.7	STRENGTHEN EARLY WARNING SYSTEM Conduct study on existing local system and best practices in other competitive destinations.	SLTDA	Existing local practices / Best global practices can be incorporated to SL system			
2.8	Develop gap analysis in collaboration with related line agencies for tourism.	SLTDA	Identified related agencies / gaps			
2.9	Identify responsible other institutions to implement such INDCs	SLTDA	Number of responsible			

			institutes			
2.10	Identify overlapped functions by internal government and private departments and inform to streamline the policies.	SLTDA	Number of overlapped areas / number of amendments.			
2.11	Identify adequacy of institutional capacity to implement the INDC and build capacity accordingly	SLTDA	Number of employees / work hours			
2.12	Calculate technology requirements (equipment needs, etc.)	SLTDA	re-equipment need			
2.13	Calculate financial requirements (conditional and unconditional)	SLTDA	Budgets			
2.14	Prepare a complete strategic plan to implement the INDCs	SLTDA				

Tourism and recreational Sector INDCs-3	**3. Assess the current promotional strategies in connection to emerging scenarios of climate change; beach tourism and nature destinations**				
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**	
				2017	**2018**	**2019**
1	Conduct study on existing system and propose need in policy documents	SLTDA				
2	Adopt into planning approval process	SLTDA				
3	Introduce concession/loan/credit system for investors those who using alternative energy source	SLTDA				
4	Identify adequacy of policies to implement the INDCs	SLTDA				
5	Identify responsible and other organization to implement the INDCs	SLTDA, SLTPB				
6	Identify policy gaps to implement the INDCs and amend policy if necessary	SLTDA, SLTPB, CC&CRMD,CEA, Ministry of Environment				
7	Identify responsible and other institutions to implement the	SLTDA, SLTPB,				

	INDCs	CC&CRMD, CEA				
8	Identify adequacy of institutional capacity to implement the INDC and build capacity accordingly	SLTDA				
9	Calculate technology requirements (equipment needs, etc)	SLTDA				
10	Calculate financial requirements (conditional and unconditional)	SLTDA				
11	Prepare a full project implementation plan to implement the INDCs	SLTDA, SLTPB				
12	Prepare a BoQ for the Plan	SLTDA, CC&CRMD				
13	Develop new strategies for this sector					
14	Develop a continuous programme to plant trees when tourists come to Sri Lanka before their departure through an introduced mechanism (contributing US$ 1 for each plant for the future maintenance of the trees and visitors can see the plants through internet through a technical chip how it grows. And the lands should be provided by the Ministry of Tourism, Dept. of Forest Conservation, UDA, CC&CRMD, etc. by as a model concept for Sri Lanka)	SLTPB, SLTDA, CC&CRMD, Dept. of Forest Conservation, CEA, Ministry of Tourism Development, UDA	At least 60% of the tourists visiting Sri Lanka to contribute for this programme			
15	Continue campaign with involvement of all three forces including Sri Lanka Police, Coast Guard Dept. together with government, private sector organizations including NGOs, school children and local community to engage to set up a best beach in respective coastal areas in each district. Introduce a rewarding system to in order to encourage the community by providing awards for the community who maintain a best beach in the respective districts through a rating system.	SLTPB, SLTDA, CC&CRMD, Dept. of Forest Conservation, CEA, Respective provincial council, MEPA	1. Identify the relevant organizations/Community groups for setting up best beaches 2. Identify criterion for incentive programme 3.Incentive programe for the community			

			groups/relevant organizations best beaches			
16	Introduce a waste management system including solid & water in selected tourist destinations including beach areas and introduce a mechanism to recycle the plastic, polythene and re-use the same by introducing an incentive system to produce compost as a byproduct as a construction project. Further, compost generated by the above plants will be using for the tree plantation project mentioned in the above Ref. Number. 14 for long term sustainable tourism project.	SLTPB, SLTDA, CC&CRMD, Dept. of Forest Conservation, CEA, Respective provincial council, MEPA, UDA	1. Relevant areas to be identified through a survey 2.Feasibility study to be carried out on this to find out required capacity & construction methodologies according to the area 3. Project plan for implement the project			
17	Conduct promotional plan to set up & encourage local community, government. & private organizations, NGO's, school children to engage in planting trees using suitable varieties of plants near lagoon areas, canals, rivers in the country in order to create green covers, increase bio diversity and also to make avenues to promote the area as alternative tourist places in order to reduce the carrying capacity in popular tourist destinations. (Coral plantation project in the respective coastal areas.	SLTPB, SLTDA, CC&CRMD, Dept. of Forest Conservation, CEA, Respective provincial council, MEPA, UDA, Education Dept., Universities, Education Institutes, NGO's, NARA	1.Relevant areas to be identified through a survey 2. Report on selection of related stakeholder categories 3. Project plan for implement			

			the project			
18	Conduct promotional plan to create avenues for tourists by introducing lesser known sites around most popular tourist attraction places in order to reduce the carrying capacity and to promote the destinations in consideration with future country promotions and provide maximum economic benefits to the local community in the areas.	SLTPB, SLTDA, CC&CRMD, Dept. of Forest Conservation, CEA, Respective provincial council, MEPA, UDA, Education Dept., Universities, Education Institutes, NGO's	1.Relevant areas to be identified through a survey 2. Promotional & conservation plan to promote the sites in sustainable manner			
19	Conduct awareness creation campaign targeting all stakeholders to conserve & protect the bio diversity through setting up butterfly gardens in the country.	SLTPB, SLTDA, Dept. of Forest Conservation, CEA, Education Dept., Universities, Education Institutes, Ministry if Environment & Mahaweli Development, NGO's	1.Relevant areas to be identified through a survey 2. Report on selection of related stakeholder categories 3. Project plan for implement the project			
20	Promote other special interest tourist attraction segments for the tourists by involving all related stakeholders Eg. Ship Wrecks,	SLTDA, SLTPB, Sri Lanka NAVY, CCF, Dept. of Archeology, NARA, MEPA	1. Relevant segments to be identified through a study 2. Identification			

			of stakeholders for the project 3.Implementation plan			

Tourism and recreational Sector INDCs-4	**4. Improve energy efficiency in tourism establishments by using available best alternative environmental friendly energy sources, solar and wind power, biomass**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Conduct a survey to collect the existing information about energy utilization	SLTDA and Sri Lanka Sustainable Energy Authority	Survey Report on Green Energy Utilization			
2	Identify policy gaps to implement such INDCs and amendment of policy if necessary	SLTDA and Central Environment Authority	A Report on Policy Gap Identification in implementation of INDCs			
3	Identify responsible and other institutions to implement the INDCs	SLTDA, CEA, NERD CENTRE, SEA.	A Stakeholder Mapping Matrix for Implementation of INDCs			
4	Identify adequacy of institutional capacity to implement the INDC and build capacity accordingly	SLTDA, SEA. UNIVERSITY OF MORATUWA.	Report on training requirement for SLTDA staff for implementation of INDCS Capacity Building			

			Programmes			
5	Calculate technology requirements (equipment needs, etc)	SLTDA, SLTPB, Sustainable Energy Authority NERD Centre	Technology Requirement Report in Tourism Industry			
6	Calculate financial requirements (conditional and unconditional)	SLTDA and Sustainable Energy Authority Banks in Sri Lanka	Financial Plan for Investment on green energy in Tourism sector			
7	Prepare a full project implementation plan to implement the INDCs	SLTDA and Sustainable Energy Authority University of Moratuwa	Project Plan for Implementation of INDCs			
8	Prepare a Bill of Quantity (BOQ) for the Plan	SLTDA and Sustainable Energy Authority	BOQ			
	Other Proposed Actions					
9	Promote usage of Green Energy sources for new investment projects in tourism industry	BOI CEA SLTDA	Introduce tax holidays through BOI for the project over 50 million /investment ceiling for tax concessions or holidays.			
10	Encourage foreign investors or foreign experts on investment in green energy power plants through international conferences and/or MOUs	SLTDA, SLTPB	International Investment Forums theme on Green Energy sources in tourism industry			

11	Introduce a recognition system to identify as a “sustainable tourism partner”	SLTDA, CEA, SUSTAINABLE ENERGY AUTH.	A guideline for recognition system to recognize as an “Energy Star” Introduction of “Energy Star”			
12	Introduce an “Energy Audit System” in tourism industry	SLTDA, provincial council members	Energy Audit system and Energy audit team			
13	Establish energy consumption control methods including occupancy sensors/light controls, master cards and even computerized building management system as a mandatory requirements to get registration from SLTDA.	SLTDA	Update the Mandatory requirement list for registration			

Tourism and recreational Sector INDCs-5	**5. Introduce resource management mechanisms into tourism in order to minimize damage to existing ecosystem by contributing in waste management, solid and waste water, in tourism areas which could affect to the ecosystem**					
Action		**Responsible Agencies**	**Output Indicators**	**Time Line**		
				2017	**2018**	**2019**
1	Identify adequacy of policies to implement the INDCs	MTDCRA	%			
2	Identify responsible and other organization to implement the INDCs	MTDCRA	%			
3	Identify adequacy of institutional capacity to implement the INDC	MTDCRA	%			
4	Identify gap to implement the INDCs	MTDCRA	%			
5	Study the current waste management mechanism in tourist sector	SLTDA	%			
6	Identify possible mechanism to eliminate damage	SLTDA	%			
7	Disseminate information by various modes	SLTDA	%			

8	Calculate technology and research requirements (equipment needs, etc)	MTDCRA	%			
9	Calculate financial requirements	MTDCRA	%			
10	Prepare a full project implementation plan to implement such INDCs	MTDCRA	%			
11	Prepare a Bill of Quantity (BOQ) for the plan	MTDCRA	%			

Loss and Damage

Introduction

Following the requests by the developing world for the need to focus on loss and damage from climate impacts, COP 19 of the UNFCCC held in Warsaw, established the 'Warsaw International Mechanism on Loss and Damage with the objective to address losses and damages associated with adverse impacts of climate change at the international level.

The changes of climate and impacts of climate change subject Sri Lanka to new challenges and risks. Recent decades have seen a significant growth in the number and severity of reported climate induced disasters. Climate change is altering the face of disasters, not only through increased weather-related and other hydro-climatologically risks, but also through increased risks on social, economic, and environmental vulnerabilities.

Losses and damages Sri Lanka face due to impacts of climate change cost the country high amount in financial resource needs each year. According to the data provided by the National Disaster Relief Services Centre, the total relief expenditure for the period of 2007-2011 was SLR 1,786 million (US$12.75million) which was borne by the Consolidated Fund of Sri Lanka. Nevertheless, this calculation has been done without considering the damages to infrastructure as well as other physical damages. According to the Integrated Post Flood Assessment in May 2010 carried out after the floods in the Western and Southern provinces by the Disaster Management Centre of the Ministry of Disaster Management, the total damages and losses from the floods amounted to over SLR 5,000 million (US$ 35.71 million).

1. INDCs for Loss and Damage:

1. Improve the forecasting capabilities –at all time scales
   1.1. Enhance the existing automated observational network
   1.2. Implement the lightning detection network
   1.3. Improve the numerical weather prediction capacity with data assimilation
   1.4 Improve the weather forecasting capabilities – extended range forecasting (longer period) and seasonal forecasting
2. Analysis of total loss and damage of climate induced disasters from 2000 and the gap that was not compensated/recovered. This includes making recommendations to establish a mechanism at the national level which will contribute to the Warsaw International Mechanisms for Loss and Damage in an effective and efficient manner.
3. Establish a local mechanism in line with the Warsaw International Mechanism for Loss and Damage.
4. Strengthen the existing national mechanism to recover the loss and damage to the maximum possible.
5. Introduction of possible insurance schemes to recover the loss and damage to livelihood, properties, infrastructure, agriculture and fisheries, and other affected sectors due to adverse impacts of climate change.

2. Strategic Policies

Number	Strategic Policies	INDCs Number
1.	Institutional capacity for observing and forecasting meteorological related hazards in Sri Lanka is developed	1
2	Capacity of institutions involved in assessing the loss and damage related to climate change induce disasters is enhanced	2 and 3
3	Institutional capacity to develop plans for disaster recovery and implementation is strengthened	4
4	Mechanism should be in place to transfer or share disaster risk among parties best place to manage it.	5

3. Readiness Action Plan

Loss and Damage Sector INDC-1	**1.Improve the forecasting capabilities –at all time scales**				
Action	**Responsible Agency**	**Output Indicators**	**Timeline**		
			2017	**2018**	**2019**
1. Fine-tune the proposal to upgrade the forecasting capabilities of the Department of Meteorology consisting of 1.1 Institutional strengthening 1.2 Training and capacity building 1.3 Modernise observation system infrastructure 1.4 Modernise data, communication and IT systems 1.5 Improve numerical weather prediction systems 1.6 Improve the hydrological forecasting system 1.7 Improve service delivery	Department of Meteorology	A fine-tuned proposal available, which addresses the deficiencies 1.1 to 1.7	X		
2. Seek necessary approvals for implementation		Proposal approved for implementation	X		
3. Identify a funding source		Funding secured	X		
4. Implement the proposal		Improved weather and climate forecasting, early warning and user services		X	X
5. Conduct multi hazard risk profiles for all major climatological hazards	DMC/NBRO/ ID	Multi hazard risk profiles are available		X	X
6. Review and identify gaps in the current EW system covering aspects such as knowledge of the risk, technical monitoring and warning service, dissemination of meaningful warnings to at-risk people and public awareness and preparedness to act.	DMC/DOM/NBRO/ID	Recommendation for improvement of the EW system available	X		

7. Develop comprehensive EW system and full operationalization of the National Emergency Operations Plan	DMC/DOM/NBRO/ID	NEOP is in operation	X		
		Secure funding for developing the EW system	X		
		Comprehensive island wide EW system in place		X	
8. Develop and launch public awareness campaign on climatological disasters and conduct disaster preparedness activities	Disaster Management Centre /NDRSC/ Met Department/ NBRO	Public awareness campaign with the support of mass media in place	X		
		Disaster preparedness plans for all districts and divisional levels are available			
		Disaster risk incorporated development plans available for all high and moderate risk villages			X
		Disaster preparedness contingency plans are available for all above GN divisions			X

Loss and Damage Sector INDC-2	2. Analyse the total loss and damage of climate induced disasters from 2000 and the gap that was not compensated/recovered (This includes making recommendations to establish a mechanism at the national level which will contribute to the Warsaw International Mechanisms for Loss and Damage in an effective and efficient manner)

Action	Responsible Agency	Output Indicators	Timeline		
			2017	2018	2019
1. Study the process of the Warsaw International Mechanisms for Loss and damage and identify the areas relevant to assessing losses and damages based on the Warsaw International Mechanisms for Loss and damage	**DMC**	Study report on the analysis and the relation to WIM	X		
2. Estimate the damages and losses in the major climate induced disasters for the main sectors since 2000	**DMC**	Damage and loss assessment reports for major climate induced disasters covering the main sectors	X		
3. Investigate the recovery /compensate programmes implemented under main sectors with respect to the major climate induced disasters considered in activity 2	**DMC**	Recovery/Compensation reports for major climate induced disasters covering the main sectors	X		
4. Identify the recovery/compensate gap in each sector with respect to the major climate induced disasters considered in activity 2 , based on the each sector requirement	**DMC**	Report on the gap analysis on damage and loss assessment and the recovery programme implemented	X		
5. Carry out SWOT analysis and proposed process for the damage and loss assessment considering policy, legal institutional and technical aspects. Idenfity opportunities to contribute to the WIM process	**DMC**	1. SWOT analysis report 2. Submission or input provided to the WIM/ negotiations on loss and damage		X	
6. Strengthen dialogue, coordination, coherence and synergies among relevant sector agencies to assess the damage and losses due to climate induced disasters	**DMC**	1 Mechanism available to collect data on loss and damage in each sector 2.National level forums to discuss the best practices, challenges, experiences and lessons learned in undertaking approaches to address loss and damage		X	X

7. Enhance knowledge and understanding of comprehensive risk management approaches to address loss and damage associated with the adverse effects of climate change,	**DMC**	1 Risk assessment methodologies and guidelines available 2.Tools and guidelines for mainstreaming DRR into development sectors available 3.Risk sensitive investment guidelines available		X	X
8. Prepare finance, technology and capacity-building, requirement reports in detail to address loss and damage associated with the adverse effects of climate change	**DMC**	Detailed budget for implementation	X		

Loss and Damage Sector INDC-3	**3.Establish a local mechanism in line with Warsaw International Mechanism for Loss and Damage**				
Action	**Responsible Agency**	**Output Indicators**	**Timeline**		
			2017	**2018**	**2019**
1. Establish the a local mechanism in line with the Warsaw International Mechanisms for Loss and damage focusing on the action areas of the WIM	**DMC**	Local mechanism in line with the Warsaw International Mechanisms for loss and damage to forecast extreme weather events available	X	X	X
2. Conduct in depth study on vulnerability of the elements at risk in each major sectors	**DMC**	Vulnerability assessment for major sectors available and risk transferring and sharing options identified	X	X	X
3. Develop scenarios on the extreme weather events and the vulnerability	**DMC**	Scenarios available		X	X
4. Assess and monitor loss and damage scenarios	**DMC**	Assessment and monitoring mechanism available		X	X
5. Prepare finance, technology and capacity-building, requirements reports in details to address loss and damage associated with the adverse effects of climate change	**DMC**	Detailed budget for implementation	X		

6. Establish a coordination system for multi-stakeholder engagement related to the action areas of the WIM, and for knowledge sharing on thematic issues	**DMC**	Coordination mechanism in place	X	X	X

Loss and Damage Sector INDC-4	**4.Strengthen the existing national mechanism to recover the loss and damage to the maximum possible**				
Action	**Responsible Agency**	**Output Indicators**	**Timeline**		
			2017	**2018**	**2019**
1. Conduct an in depth study on the existing mechanism to recover loss and damage	**DMC**	Study report available	X		
2. Identify strengths and weaknesses of the existing mechanism	**DMC**	Report on strengthens and weakness of the existing mechanism	X		
3. Recommend an appropriate mechanism and make recommendation to strengthen existing mechanisms	**DMC**	Recommendation report available	X	X	
4. Prepare finance, technology and capacity-building, requirement reports in details to address loss and damage associated with the adverse effects of climate change	**DMC**	Detail budget for the implementation	X		
Loss and Damage Sector INDC-5	**5.Introduction of possible insurance schemes to recover loss and damage to livelihood, properties, infrastructures, agriculture and fisheries and other affected sectors due to climate change adverse impacts**				
Action	**Responsible Agency**	**Output Indicators**	**Timeline**		
			2017	**2018**	**2019**
1. Identify insurance companies to recover the loss and damage related climate change adverse impacts	MDM/NDRSC	List of capable insurance companies	X		
2. Identify possible available insurance schemes to recover the loss and damage related to adverse impacts of climate change	MDM/NDRSC	List of / number of available insurance schemes	X		
3. Establish a mechanism to assess the national and local level loss and damage requirement	MDM/NDRSC	Availability of the mechanism	X	X	
4. Review the existing insurance policies and amend the policies if necessary	MDM/NDRSC	Availability of a National Insurance Policy	X		
5. Identify responsible and other institutions for implementing the INDCs	MDM	Availability of a data base for relevant agencies	X		

6. Identify technology requirements (equipment needs and etc.)	MDM	Availability of equipment	X	X	
7. Identify financial requirement	MDM	Availability of funds	X	X	X
8. Prepare the implementation plan	MDM	Availability of a comprehensive implementation plan	X		

Means of Implementation

Fourth group of INDCs for Sri Lanka falls under means of implementation, and caters to the mode in which the contributions country is willing to make will be operationalised. This includes the institutional structure, as well as the support which needs to be mobilised for the implementation of the INDCs.

The means of implementation of INDCs of Sri Lanka requires three pre-conditions:

Finance - Finance is a crucial factor in achieving the set targets. The Sri Lankan government is willing to contribute its finances to achieve the target but the level of ambition will always be high with supported actions. As a developing nation, the enhanced finance for adaptation and low carbon development will be a necessity to achieve the set intended conditional targets.

There needs to be a methodology to address the needs of financial resources measuring the financial needs for each sector and the divisions of contribution at the national budgetary level, and the evaluation of the feasibility and the availability of international funding.

In the implementation of the INDCs, and resource mobilization for their implementation, a transparent and accountable means of monitoring and reporting, as well as verification needs to be set up. This could be developed at the country level to reflect the international standards of MRV as per the Paris Agreement, and adapted to the countries needs and capacity for implementation.

Technology - Predominantly mitigation technology transfer and scaling up adaptation technologies are required without burdening the country's socio-economic development. The INDCs can be achieved with the right mix of access, affordability and scale of technologies.

In addressing countries technology needs for the implementation of the INDCs, a technology needs assessment for each sector for the implementation of the contributions will be needed. The financial and technical support required for this will need to be assessed and incorporated into the needs for financial support requested at the national and international level for implementing the INDCs.

Further, there needs to be an evaluation of the technology available at the national level, and the level at which international technological support is needed. This will be done in partnership with the relevant line ministries, with the coordination lead by the Ministry of Environment and Mahaweli Development, and the relevant departments.

In utilization of technology that will contribute to the implementation of Sri Lanka's INDCs, it is vital that local technology will be prioritized, used when available and promoted for use and supported for development to be used in the implementation of the INDCs of Sri Lanka.

Relevant line ministries will be invited and requested to lead the process of assessing the availability, the suitability, and ways to promote and facilitate the development for the use of local based technologies in the implementation of INDCs in Sri Lanka.

Capacity Building - (Human Resource Development and Institutional Mechanism)

Climate change impacts are not limited to impacts of infrastructure, and also includes impacts to humans and ecosystems. It is important that Sri Lanka develops an appropriate institutional mechanisms to ensure climate change is mainstreamed into development processes, while focusing on infrastructure development as well as human resource development, and also the resilience building of individuals to adapt to adverse effects of climate change.

Investing in time and resources for capacity building to address impacts of climate change will ensure a higher degree of deviation from the BAU emission projections while resilience built will contribute to reducing loss and damage.

An appropriate institutional mechanism needs to be set up, and this will be done in consultation with the relevant sectoral ministries, as well as multi-stakeholder engagement. In the capacity building efforts, different actors will be reached out to for contributions based on their expertise. This will include multiple stakeholders including, but not limited to policy makers, private sector, CSOs, academia, media, as well as individual experts in sectoral and cross cutting themes.

Capacity building in a structured and institutional manner will help to execute the integrated plans and utilize the finances effectively and efficiently. The institutional mechanisms encompass coordination bodies, engagement platforms and communication channels. Lack of capacities in terms of data proved to be a barrier for Sri Lanka as to many other developing country parties in the INDC development process, and in the readiness activities of each sector the need for data collection and resource mobilizing for data collection will be included.

In order to effectively and gradually implement the capacity building on climate change, and address the capacity needs of Sri Lanka to implement the proposed INDCs, an independent institutional mechanism is proposed to be set up, with multiple stakeholders being included, and also an operationalization mechanism falling under the proposed Climate Change Commission Act.

Implementation Mechanism

INDCs of Sri Lanka will be implemented under the guidance of the Climate Change Commission of Sri Lanka, in coordination with the relevant ministries. A coordinating body consisting of relevant ministries will provide input to the implementation of INDCs, while the monitoring, reporting and verification component of the INDCs implementation is entrusted to the Climate

Change Commission of Sri Lanka, within the Ministry of Environment and Mahaweli Development of Sri Lanka.

The Commission will implement the INDCs based on the Climate Change Commission Act of Sri Lanka, which is to be ratified for the purpose of setting up the Commission, and will also be governed as applicable by the international laws and agreements including and not limited to the Paris Agreement on climate change, UNFCCC, Kyoto Protocol, Hugot Framework on Disaster Risk Reduction, and other relevant international law and regional agreements relevant and applicable.