NATIONALLY DETERMINED CONTRIBUTIONS IMPLEMENTATION PLAN (2021-2030)

SRI LANKA

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Ministry of Environment

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ABBREVIATIONS

AAC	Automobile Association of Ceylon
AAIB	Agricultural and Agrarian Insurance Board
AERs	Agro Ecological Regions
AGD	Attorney Generals Department
AIS	Automatic Identification Systems
ASMET	Association of Small and Medium Enterprises in Tourism
BAU	Business-As-Usual
BDS	Biodiversity Secretariat
BOI	Board of Investment
C&HSs	Cities and Human Settlements
CAASL	Civil Aviation Authority of Sri Lanka
CARP	Council for Agricultural Research Policy
CBOs	Community Based Organisations
CBSL	Central Bank of Sri Lanka
CC&CRMD	Coast Conservation and Coastal Resources Management Department
CCB	Coconut Cultivation Board
CCC	Ceylon Chamber of Commerce
CCF	Central Cultural Fund
CCS	Climate Change Secretariat
CDA	Coconut Development Authority
CDMA	Code Division Multiple Access
CEA	Central Environment Authority
CEB	Ceylon Electricity Board
CIAs	Chambers and Industry Associations
CIDA	Construction Industry Development Authority
CMC	Colombo Municipal Council
COP	Conference of Parties
CPC	Ceylon Petroleum Cooperation
CPSTL	Ceylon Petroleum Storage Terminals Limited
CRI	Coconut Research Institute
CRIP	Climate Resilience Improvement Project
CRIWMP	Climate Resilient Integrated Water Management Project
CRWSP	Climate Resilient Water Safety Plan
CSA	Climate Smart Agriculture
CSC	Ceylon Shipping Corporation
CWC	Ceylon Workers Congress
CZMP	Coastal Zone Management Plan
D4S	Design for Sustainability
DAD	Department of Agrarian Development
DAPH	Department of Animal Production and Health
DArch	Department of Archeology
DC	Desiccated Coconut
DCS	Department of Census and Statistics
DEA	Department of Export Agriculture
DEM	Digital Elevation Model
DFAR	Department of Fisheries and Aquatic Resources
DMC	Disaster Management Centre
DMT	Department of Motor Traffic
DNBG	Department of National Botanic Gardens
DNCWS	Department of National Community Water Supply
DNM	Department of National Museums
DNZG	Department of National Zoological Gardens
DoA	Department of Agriculture
DoGI	Department of Government Information
DoI&EC	Department of Imports and Exports Control
DPRD	Disaster Preparedness and Response Division
DRR	Disaster Risk Reduction
DS	Divisional/District Secretariat
DSM	Demand Side Management
DSS	Department of Social Services
DWC	Department of Wildlife Conservation
EAFM	Ecosystem Approach to Fisheries Management
EDB	Export Development Board
EE	Energy Efficiency
EEI&C	Energy Efficiency Improvement & Conservation
EFC	Employers' Federation of Ceylon

EPL	Environment Protection License
EPZs	Export Processing Zones
ERD	Department of External Resources
ESA	Environmental Sensitive area
ESCO	Energy Service Company
ESCAMP	Ecosystem Conservation & Management Project
EVs	Electric Vehicles
FAO	Food and Agriculture Organisation
FCRDI	Field Crops Research and Development Institute
FD	Forest Department
FHB	Family Health Bureau
FMD	Foot & Mouth Disease
FMRC	Farm Mechanization Research Centre
FOs	Farmer Organizations
FRDI	Fruit Research & Development Institute
FSMP	Forestry Sector Master Plan
GAP	Good Agriculture Practices
GBCSL	Green Building Council of Sri Lanka
GCF	Green Climate Fund
GHG	Greenhouse Gas
GoSL	Government of Sri Lanka
GPP	Green Public Procurement
GPPP	Green Public Procurement Policy
GSMB	Geological Survey and Mines Bureau
GSTC	Global Sustainable Tourism Council
HARTI	Hector Kobbekaduwa Agrarian Research and Training Institute
HBASL	Hadabima Authority of Sri Lanka
HEM	High Efficiency Motors
HHAP	Heat-Health Action Plan
HORDI	Horticulture Research and Development Institute
HPB	Health Promotion Bureau
ICE	Internal Combustion Engine
IAS	Invasive Alien Species
ICT	Information and Communication Technology
ICTA	Information and Communication Technology Agency
ID	Department of Irrigation
IDB	Industrial Development Board
IESL	Institution of Engineers, Sri Lanka
ILO	International Labour Organization
IMD	Irrigation Management Division
INGO	International Non -Governmental Organisation
INM	Integrated Nutrient Management
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
IPNS	Integrated Plant Nutrient System
IPs	Industrial Parks
IRBM	Integrated River Basin Management
IRCSL	Insurance Regulatory Commission of Sri Lanka
IRD	Inland Revenue Department
ISB	Industrial Services Bureau
IT	Information Technology
ITI	Industrial Technological Institute
IUCN	International Union for Conservation of Nature
IWMI	International Water Management Institute
IWRM	Integrated Water Resource Management
KPIs	Key Performance Indicators
L&D	Loss and Damage
LAs	Local Authorities
LCA	Life Cycle Assessment
LECO	Lanka Electricity Company
LHI	Lanka Hydraulic Institute
LINDEL	Lanka Industrial Estates Limited
LRC	Land Reforms Corporation
LRT	Light Rail Transit
LRWHF	Lanka Rain Water Harvesting Forum
LTGEP	Long Term Generation Expansion Plan
LUPPD	Land Use Policy Planning Department
M&E	Monitoring and Evaluation
MASL	Mahaweli Authority of Sri Lanka
MCs	Municipal Councils
MD	Department of Meteorology
MDGs	Millennium Development Goal

MEPA	Marine Environment Protection Agency
MoA	Ministry of Agriculture
MoD	Ministry of Defense
MoDM	Ministry of Disaster Management
MoE	Ministry of Environment
MoEd	Ministry of Education
MoF	Ministry of Finance
MoFish	Ministry of Fisheries
MoH	Ministry of Health
MoI	Ministry of Industries
MoIrri	Ministry of Irrigation
MoP&E	Ministry of Power & Energy
MoPlant	Ministry of Plantation
MoRR&HRA	Ministry of Rehabilitation, Resettlement & Hindu Religious Affairs
MoSD&VT	Ministry of Skills Development and Vocational Training
DoSS	Department of Social Services
MoSTR	Ministry of Science Technology and Research
MoT	Ministry of Transport
MoTrad	Ministry of Trade
MoUD&H	Ministry of Urban Development and Housing
MoWL&FC	Ministry of Wildlife and Forest Conservation
MoWS	Ministry of Water Supply
MoWCSD	Ministry of Women, Child Affairs and Social Development
MRI	Medical Research Institute
MRV	Measurement Reporting and Verification
MSMEs	Micro, Small and Medium Enterprises
MSS	Merchant Shipping Secretariat
MSW	Municipal Solid Waste
NAICC	National Agriculture Information and Communication Centre
NAQDA	National Aquaculture Development Authority
NaPID	National Policy for Industrial Development
NARA	National Aquatic Resources Research and Development Agency
NBD	Dept of National Budget
NBSAP	National Biodiversity Strategic Action Plan
NCD	Non Communicable Disease
NCPC	National Cleaner Production Centre
NCPI	National Consumer Price Index
NCRE	Non Conventional Renewable Energy
NDCs	Nationally Determined Contributions
NDRSC	National Disaster Relief Support Centre
NEAP	National Environmental Action Plan
NECCC	National Expert Committee on Climate Change
NEDA	National Enterprise Development Authority
NEEA	National Energy Efficiency Award
NERDC	National Engineering Research and Development Centre
NGO	Non Governmental Organisation
NGRS	National Green Reporting System
NH	National Herbarium
NHDA	National Housing Development Authority
NHSPEC	National Strategic Plan for Health, Environment and Climate Change
NIPHM	National Institute of Post-Harvest Management
NLDB	National Livestock Development Board
NOU	National Ozone Unit
NPD	Department of National Planning
NPP	National Physical Plan
NPPD	Department of National Physical Planning
NRC	National Research Council
NRE	New Renewable Energy
NRMC	Natural Resource Management Centre
NRW	Non-revenue Water
NSC	National Steering Committee
NSF	National Science Foundation

NSWMSC	National Solid waste Management Support Center
NTC	National Transport Commission
NWPEA	North Western Province Environmental Authority
NWSDB	National Water Supply and Drainage Board
O&M	Operation and Maintenance
PAEA	Protected Agriculture Entrepreneurs Association
PAs	Protected Areas
PC	Provincial Council
PDAPH	Provincial Department of Animal Production and Health
PDHS	Provincial Director of Health Services
PDNA	Post Disaster Needs Assessment
PDoAs	Provincial Department of Agriculture
PGRC	Plant Genetic Resources Centre
PHDT	Plantation Human Development Trust
PHS	Private Health Services
PID	Provincial Irrigation Department
PMC	Planning and Monitoring Committee
PMoA	Provincial Ministry of Agriculture
PMoH	Provincial Ministry of Health
PPP	Public-Private Partnership
PRDA	Provincial Road Development Authority
PRPTAs	Provincial Road Passenger Transport Authorities
PUCSL	Public Utility Commission of Sri Lanka
PV	Photo -voltaic
RDA	Road Development Authority
RDHS	Regional Director of Health Services
RE	Renewable Energy
RECP	Resource Efficient Cleaner Production
RISC	Regional Industry Service Committee
RMPs	Risk Management Plans
RPCs	Regional Plantation Companies
RRDI	Rice Research and Development Institute
RRI	Rubber Research Institute
RWH	Rain Water Harvesting
RWHS	Rain Water Harvesting System
RWSSs	Rural Water Supply Schemes
SCP	Sustainable Consumption and Production
SD	Survey Department
SD&CC	State Development and Construction Corporation
SDGs	Sustainable Development Goals
SEPC	Socio Economics and Planning Centre
SLAITO	Sri Lanka Association of Inbound Tour Operators
SLC	Sri Lanka Customs
SLCF	Sri Lanka Climate Fund
SLCG	Sri Lanka Coast Guard
SLEB	Sri Lanka Energy Balance
SLECIC	Sri Lanka Export Credit Insurance Corporation
SLEMA	Sri Lanka Energy Managers Association
SLGAP	Sri Lanka Good Agriculture Practices
SLIA	Sri Lanka Institute of Architects
SLIE	Sri Lanka Institute of Engineers
SLINTGL	Sri Lanka Institute of National Tourist Guide Lecturers
SLIP	Sri Lanka Institute of Packaging
SLMA	Sri Lanka Medical Association
SLN	Sri Lanka Navy
SLLDC	Sri Lanka Land Development Corporation
SLP	Sri Lanka Police
SLPA	Sri Lanka Ports Authority
SLR	Sri Lanka Railway
SLSDC	Sri Lanka Sustainable Development Council
SLSEA	Sri Lanka Sustainable Energy Authority
SLSI	Sri Lanka Standards Institution
SLT	Sri Lanka Telecom
SLTB	Sri Lanka Tea Board
SLTDA	Sri Lanka Tourism Development Authority
SLTrB	Sri Lanka Transport Board
SLVET	Sri Lanka Vehicle Emission Testing
SMART	Specific, Measurable, Achievable, Relevant, and Time-bound
SME	Small and Medium Enterprises
SMIs	Small and Medium Industries
STEM	Science, Technology, Engineering, and Mathematics
STC	State Timber Corporation
STrC	State Trading Corporation
THASL	The Hotels Association of Sri Lanka
TMR	Total Mixed Ration
TOU	Time-of-Use
ToT	Training of Trainers
TR	Tons of Refrigerent
TRC	Telecommunications Regulatory Commission
TRI	Tea Research Institute
TROF	Trees Outside Forests
TSHDA	Tea Small Holdings Development Authority
UCs	Urban Councils
UDA	Urban Development Authority
UGC	University Grants Commission
UN	United Nations
UNDP-SGP	United Nations Development Project – Small Grants Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children' Fund
UNIDO	United Nations Industrial Development Organization
UoSJP	University of Sri Jayewardenepura
UoM	University of Moratuwa
UoP	University of Peradeniya
USDA	Urban Settlement Development Authority
VFD	Variable Frequency Drives
VIC	Veterinary Information Centre
VOC	Volatile Organic Compound
VMS	Vessel Monitoring System
VRI	Veterinary Research Institute
VTA	Vocational Training Authority
WFH	Work-From-Home
WIM	Warsaw International Mechanism
WIMS	Weather Information Management System
WM	Waste Management
WMA-WP	Waste Management Authority (Western Province)
WRB	Water Resources Board
WSP	Water Safety Plan
WSSs	Water Supply Schemes
YEDD	Youth, Elderly, Displaced and Disabled

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EXECUTIVE SUMMARY

Sri Lanka is a low-emitting nation and a unique illustration of a nation that has attained both high levels of human development and maintained emissions considerably below the long-term average required to meet global warming targets. However, as Sri Lanka's economic activities that are connected to energy consumption are growing, there is a tendency that the country's emissions could rise. Sri Lanka also ranks high among the nations that are most susceptible to hazards brought on by climate change that have a negative impact on economy, environment (including ecosystem services), and people. Natural disasters have wreaked havoc on the nation's economy and way of life during the previous few decades.

As a signatory to the Paris Agreement on Climate Change, Sri Lanka has submitted its updated Nationally Determined Contributions (NDCs) in 2021, in order to pave the path for the nation to realise its economic, human, and social advancements along a more sustainable trajectory, while contributing to the global Climate Action efforts. The updated NDCs include six mitigation sectors (Electricity, Transport, Industry, Waste, Forestry and Agriculture), nine adaptation sectors (Agriculture, Fisheries, Livestock, Water, Biodiversity, Coastal & Marine, Health, Urban Planning & Human Settlement and Tourism & Recreation) and Loss & Damage (L&D). The purpose of the NDC Implementation Plan presented in this report is to operationalize the updated NDCs.

Social inclusion and gender responsiveness are crucial components of NDC implementation, as expressed in the updated NDC Communication of 2021[1]. The gender relations and dynamics in Sri Lanka limit women's ownership and access to production resources such as land, credit, technology, information, energy, water, as well as for social protection and employment. Women are also behind in their representation in the governing bodies and decision-making positions.

Women and girls are less able to adapt to changes in climatic conditions. They are also more likely to be exposed to disaster-induced risks and losses relating to their livelihoods. Gender responsiveness is a key criterion to realize the optimum potential of men and women through climate action and to narrow down existing disparities. The NDC Implementation Plan has integrated actions in four sectors, namely, Power, Fisheries, Livestock and Water to improve gender responsiveness in those sectors. Further, generalized gender actions have been recommended to increase gender sensitivity for other NDC sectors. Thus, the NDC implementation plans provide a vehicle to support the national policy commitments on gender equality and sustainable development commitments.

Another important aspect of the NDC Implementation Plans is that the activities and subactivites identified under each NDC should be further elaborated by the agencies responsibe for implementation in developing their own comprehensive action plans in-line with the institutional frameworks in order to achieve the commitment of 14.5% greenhouse gas emission reduction from the BAU while increasing climate resilience.

1 Ministry of Environment, Updated Nationally Determined Contributions under the Paris Agreement on Climate Change, July 2021

To support the nation, accomplishing its development goals in tandem with NDCs, an SDG alignment exercise was carried out by primary consideration of the direct interlinkages to align all activities under each NDC implementation plan with the SDGs.

The implementation mechanism of the NDC and the supporting legal and policy factors are outlined in Chapter 1. The COVID-19 pandemic and the current economic crisis have negative effects on the implementation of the NDCs, and these effects are also examined in this section along with a possible way forward. Further, the multi-stakeholder inclusive and participatory approach used in the development of NDC implementation plans is described in Chapter 2.

The NDC Implementation Plan for the six mitigation sectors are presented in Chapter 3 along with sectoral introductions. Chapter 4 presents the NDC implementation plans for the nine adaptation sectors. Chapter 5 presents the NDC implementation plans for the loss and damage (L&D) sector. Chapter 6 outlines the Means of Implementation including general recommendations for gender mainstreaming and social inclusion. The country would encounter numerous obstacles in the areas of finances, technology, and human capital when operationalizing the proposed NDC Implementation Plan into action. The final chapter, Chapter 6, introduces and discusses these challenges. Further, the results of the SDG alignment exercise are also presented to illustrate the degree of alignment of NDCs in this chapter, along with an explanation of how gender responsiveness was addressed. This chapter also includes a section on the monitoring mechanism.

1. BACKGROUND AND OVERVIEW OF NDC

Despite being listed as a low-risk country for 2023 in the INFORM risk index, which ranks Sri Lanka 106th out of 191 countries[2], the island nation is extremely vulnerable to the effects of climate change. In the past 20 years, in general, Sri Lanka has achieved significant progress in boosting incomes and lowering poverty, though there has been a setback during COVID-19 pandemic and present economic crisis. The effects of climate change, however, pose a serious threat to much of these advancements. Commercial agriculture, manufacturing, tourism, and other primary economic drivers are all particularly vulnerable to extreme weather conditions and sea level rise. Deforestation, soil erosion, and biodiversity loss, among others, also pose a threat to the nation's economic production. Sri Lanka has long sought to expand its economy and human development in a low-carbon manner. It has also taken many measures to increase its resilience to global climate change and to keep climate change at a low level through mitigation activities.

In particular, Sri Lanka has also undertaken several efforts that are in line with the global coordinated mission to combat the detrimental impacts of climate change. The submission of Intended Nationally Determined Contributions (INDCs) in response to Decisions 1/CP.19 and 1/CP.20 of the Conference of Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) was one of these early initiatives. The first version was submitted in October 2015, followed by an improved version in April 2016. Subsequently, NDCs of Sri Lanka were prepared covering 14 sectors based on the Readiness Plan 2017-2019 for the implementation of INDCs, and submitted in September 2016. Sri Lanka's updated NDCs, which constituted a more ambitious, quantitative, and thorough assessment of the mitigation potential (in six sectors) and adaptation strategies (in nine sectors) and loss & damage (L&D) for the next decade (2021-2030), were submitted in 2021. The National Adaptation Plan for Climate Change Impacts in Sri Lanka -2016-2025 (NAP) was also developed in accordance with the extensive set of rules and guidelines outlined by the UNFCCC. It is currently being revised and Provincial Adaptation Plans are also being prepared.

As the global net anthropogenic GHG emissions have continued to rise, the achievement of the Paris Agreement's temperature goals of holding temperature rise to well below 2°C and pursuing efforts to limit to 1.5°C) has become more challenging[3]. In response, some notable decisions have been taken related to climate actions at the recent sessions of COP climate summits. At the 26th meeting of the COP (COP26) held in Glasgow, UK in November 2021, the parties agreed to the Glasgow Climate Pact that expects an accelerated action on climate in this decade by moving away from coal power, halting and reversing deforestation, reducing methane emissions and speeding up the switch to electric vehicles (EVs). For the first time, COP agreed on phasing out unabated coal power. In its updated NDCs, Sri Lanka too has committed to no capacity addition of coal power plants in the future. Set against a difficult geopolitical backdrop, the 27th meeting of the COP (COP27) held in Sharm El Sheikh resulted in countries delivering a package of decisions that reaffirmed their commitment to the temperature goal of the Paris Agreement. The package also strengthened action by countries to cut GHG emissions and adapt to the inevitable impacts of climate change, as well as boosting the support of finance, technology and capacity building needed by developing countries. It endorsed the requirement of rapid, deep and sustained reductions in GHG emissions, including reducing global CO2 emissions by 45% relative to the 2010 level by 2030 with more ambitious NDCs and to net-zero around mid-century. Creating a specific fund for loss and damage (L&D) marked an important point of progress, with the issue added to the official agenda and adopted for the first time at COP27.

2 The INFORM Risk Index is a global, open-source risk assessment for humanitarian crises and disasters. https://drmkc.jrc.ec.europa.eu/inform-index

3 IPCC Sixth Assessment report (AR6), 2023. https://www.ipcc.ch/assessment-report/ar6/

In relation to the policy environment, one of Sri Lanka's historic efforts to combat climate change was the launching of the National Environmental Action Plan (NEAP) in the 1990s. NEAP 2022-2030 is the fourth and most recent series of NEAPs. In order to solve environmental challenges of the twenty-first century and achieve sustainable development in line with the NEAP 2022-2030 is crucial because it contains strategies and action plans under nine thematic areas, in line with the National Environment Policy of 2021. Action plan of each of these nine thematic areas provides information on key performance indicators (KPIs), targets, timelines, responsible lead agencies, other key agencies, indicative budgets, and the relevance to SDGs. While the nine thematic areas are related to the NDC mitigation and adaptation sectors, thematic area 3 is explicitly on Climate Actions. There are several key initiatives taken by the Ministry of Environment to reduce global warming under several Multilateral Agreements. Some of which is the "Colombo Declaration on Sustainable Nitrogen Management" which was adopted in 2019 and outlines an ambition to 'halve nitrogen waste by 2030'. In 2022 it was later defined as "Encourage member states to accelerate actions to significantly reduce nitrogen waste globally by 2030 and beyond through the improvement of sustainable nitrogen management." A National Nitrogen Policy Report was prepared in 2022 and will be followed by the development of a Roadmap and Action Plan[4]. The Kigali Cooling Plan (2020-2038)[5] was developed under the Montreal Protocol to reduce use of Ozone Depleting Substances (substitution of refrigerants that have less Global Warming Potential while not harming the ozone layer),

Other initiatives of Sri Lanka include, but are not limited to:

- National Climate Change Policy (2012) [under review]
- National Environment Policy (2022)
- National Environmentally Sensitive Areas Policy (2022)
- National Policy on Disaster Management (2013)
- Sri Lanka Disaster Management Plan 2018-2030
- Coastal Zone and Coastal Resource Management Plan (2018)
- Strategic Action Plan for Adaptation of Irrigation and Water Resources Sector for Climate Change (2018)
- National Policy on Waste Management (2019)
- National Agriculture Policy (draft)
- National Energy Policy & Strategies of Sri Lanka (2019)
- Long-Term Electricity Generation Expansion Plans
- National Policy on Sustainable Consumption and Production for Sri Lanka (2019)
- National REDD+ Investment Framework and Action Plan (NRIFAP) (2017)
- National Policy on Natural Gas (2019)

4 Nissanka, S.P., Jayaweera, A., & Yang A. (2022). Nitrogen Policy Report: Sri Lanka. South Asia Nitrogen Hub (SANH): Peradeniya, Sri Lanka, and Edinburgh, UK

5 https://www.cleancoolingcollaborative.org/wp-content/uploads/2021/07/Sri-Lanka-NCAP-Final.pdf

1.1 NDC Sectors of Sri Lanka

As stated in Table 1-1. Sri Lanka identified six (6) sectors for mitigation and nine (9) for adaptation. andLoss and damage.

Table 1-1 Mitigation and Adaptation Sectors of Sri Lanka

NDC Category	Sector
Mitigation Sectors	Electricity (Power) Sector
	Transport Sector
	Industry Sector
	Waste Sector
	Forestry Sector
	Agriculture Sector (inclusive of Livestock)*
Adaptation Sectors	Agriculture Sector*
	Fisheries Sector
	Livestock Sector
	Water Sector
	Biodiversity Sector
	Coastal and Marine Sector
	Health Sector
	Urban Planning and Human Settlement Sector
	Tourism and Recreation Sector
Loss and Damage	Relevant to all sectors

** Agriculture is considered under both mitigation and adaptation sectors.*

Women contribute significantly to climate change adaptation by building resilience to it, particularly in the fields of agriculture, livestock management, energy, disaster risk reduction, forestry, water management, and health. By addressing gender equality and social inclusion issues in gender-sensitive sectors, gender-responsive NDC Implementation Plans will create economic opportunities that cater to the skills and ambitions of women and men, ensuring that benefits are enjoyed and attained by those who traditionally lack access. The NDC implementation plans have highlighted four sectors that are gender-sensitive, including the Energy (Power) Sector under Mitigation and the Water, Fisheries, and Livestock Sectors under Adaptation.

1.2 Monitoring of NDC Implementation

Sri Lanka has implemented a number of actions to execute the overarching NDC at the operational, strategic, and policy levels. The broad framework that directs the nation's priorities on climate change was initiated with the introduction of Sri Lanka's Climate Change Policy (2012), which was followed by several related national policy instruments[6]. Sri Lanka produced a Readiness Plan 2016-2019 to identify and fulfil the prerequisites for NDC implementation to assist NDC implementation and monitoring as well as the mainstreaming of climate measures into sectoral strategies.

It should be highlighted that the NDCs identified are high level actions and each agency responsible for implementation is expected to develop their own comprehensive action plan in line with their mandates and institutional framework. In this process, the lead agency should consult the other key agencies identified in the activities and sub-activities, as appropriate, in developing and implementing the plan.

The NDC implementation and monitoring mechanism is overseen by the National Steering Committee and Planning & Monitoring Committees established through a Cabinet decision (Cabinet Paper ME/2021/12 dated 07.07.2021).

1.2.1 Institutional Arrangement for Implementation

Figure 1-1 shows the general institutional framework, while the following subsections briefly focus on the important institutional structures. As the country's UNFCCC focal point, the Ministry of Environment (MoE) oversees the institutional framework.

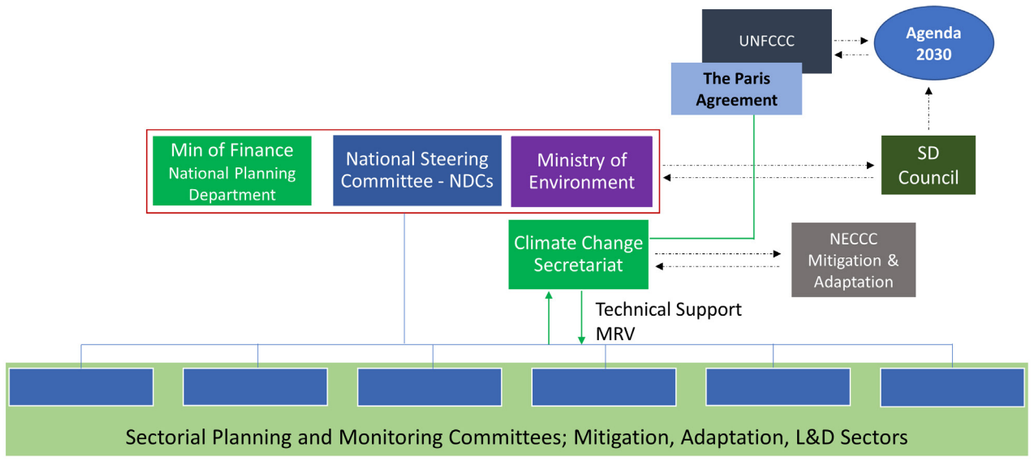


Figure 1-1 Institutional architecture for climate response (Source: Updated NDC,2021)

6 These include National Adaptation Plan (NAP) in 2016 and the updated Nationally Determined Contributions (NDCs) in 2021, and National Environment Action Plan (NEAP) 2022-2030.

1.2.2 National Steering Committee for NDC Implementation

The Government of Sri Lanka (GoSL) established an inter-agency National Steering Committee (NSC), which is chaired by the Secretary of the Ministry of Environment, to oversee the implementation of NDCs. Members of the NSC are the line ministry secretaries in charge of NDC sectors. Further, the National Sustainable Development Council, the Department of Fiscal Policy, the National Planning Department, and the Ministry of Finance are all represented in the NSC and collaborate closely. The NSC is responsible for making sure that NDCs are carried out as intended, with adequate inter-agency coordination on duties that require cooperation with other agencies. To further encourage policy consistency at the highest level, the NSC also reduces duplication of effort, offers practical solutions to implementation barriers, and tracks overall progress in comparison to timelines (Please refer Annex[7]).

1.2.3 Ministry of Environment & Climate Change Secretariat

The national focal point to the UNFCCC is the Ministry of Environment. The Climate Change Secretariat (CCS), a specialised division within this ministry, was established in 2008. Since then, the CCS has established an Inter-Agency Committee on Climate Change as well as National Expert Committees (NECs) on climate change adaptation and mitigation. The CCS, which was created to assist the Ministry of Environment in its capacity as the country's focal point for the UNFCCC and climate funds (such as the Green Climate Fund and Adaptation Fund), is in charge of creating national inventories of GHGs, assisting technology transfer to the adaptation and mitigation sectors, facilitating the implementation of GHG reduction and resilience-building actions, collecting and disseminating climate data, and more. Reporting of the National Communications (NCs) to the convention and the reporting requirements under the Paris Agreement are the mandate of CCS. Further, CCS serves as the facilitator, coordinator, and communicator supporting the implementation and monitoring of climate action within this institutional framework.

1.2.4 Sectoral Planning and Monitoring Committees

Each NDC sector has its own Planning and Monitoring Committee (PMC). These PMCs are comprised of the relevant department and/or institute leaders. The sectoral development plans will fully incorporate the NDC implementation and monitoring plans, which are supported by the PMCs. The inclusion of climate measures into the regular planning framework of all sectors will give the NDCs precedence for domestic/public finance or foreign donor support. Each sectoral PMC is chaired by the secretary of the ministry responsible for the subject. The PMC is tasked with carrying out the NDC implementation plans with the support from the public and private sectors. The technical, budgetary, and capacity requirements for NDC implementation are carefully examined by each PMC, and they make sure that the NSC and CCS are aware of these requirements. The sectoral PMC must also monitor implementation delays to ensure that safeguards are in place for climate initiatives that can jeopardise sustainable development. (Please refer Annex[8]).

7 Annex details the ToRs of the National Steering Committee and the Planning and Monitoring Committee. (National Steering Committee Meeting 20 December 2022, Sri Lanka.)

8 Annex details the ToRs of the National Steering Committee and the Planning and Monitoring Committee. (National Steering Committee Meeting 20 December 2022, Sri Lanka.)

1.3 Key Legal and Policy Underpinnings of NDC Implementation

The legal and policy foundations for NDC implementation will be provided by national policies and legislations including the Climate Change Policy, National Environment Act, and National Environment Policy as well as policies and acts of relevant NDC sectors.

1.4 Circumstantial Implications on NDC Implementation

As NDCs are formulated in consideration of the country's particular circumstances and development priorities, it is customary that the identified activities and related attributes represent a dynamic state-of-affairs, which need revisits and revisions as appropriate in the implementation process to realize the achievement of climate goals. However, the occurrence and subsequent evolutions of the state-of-affairs of the COVID-19 pandemic are unprecedented, and the influences on the NDCs may need particular considerations and could lead to significant changes. It is a global scenario that the pandemic is not just a health issue but also a human development crisis affecting the economy and society at large, as emphasized in the Human Development Report (HDR) 2020. For the first time since the Human Development Index (HDI) started to be measured, the year 2020 showed a negative value for HDI. In Sri Lanka, the situation has become more critical with urgent and serious issues such as critically low forex, sovereign debt, political instability, the rising cost of living, and shortage of essential goods (energy, food, and medicines). As per the National Consumer Price Index (NCPI), the consumer price inflation has been very high, particularly since March 2022 to date. In 2020 and 2021, the year-on-year percentage change of NCPI remains around 4% to 8%, while in January 2022, it was around 15% and continued to increase with reaching 74% in September 2022. In January 2023, it was recorded as 54%[9]. Under these circumstances, the GoSL was compelled to respond to the immediacy, rather than long-lasting solutions to other known issues, in particular, the climate actions/NDCs and SDGs.

Yet, there have been positive consequences that arose from the pandemic, too. Technology advancements, digitization (including e-commerce and virtual platforms), innovations, decentralization of supply chains, and opportunities for local value addition are a few examples. Further, new forms of local and global partnerships and networks of actors have emerged stretching well beyond the country level to cities, institutions, businesses, health professionals, scientists, researchers, civil society, the media as well as individuals. In the meantime, the development partners and donors have pledged to support developing countries in COVID-19 recovery by aligning the investments and technical assistance to leverage development progress, while meeting climate change goals.

Accordingly, many countries and regions have reformulated their development agendas with the concept of "build-back-better" through green/low-carbon development in several sectors of the economy as the most effective pathway to recover from the present crisis and progress towards climate goals and SDGs. Sri Lanka too, as highlighted in the updated NDC document, recognizes its responsibility to uphold the Paris Agreement's objective of containing global warming. It is affirmed that the country will strive to steer development, especially post- COVID-19 economic recovery and livelihood needs, along a low-emission trajectory that supports both mitigation and adaptation to climate change, with a strong focus on reaching high-income and human development in the next decade.

9 CBSL (2023), Consumer price inflation, online. Available: https://www.cbsl.gov.lk/measures-of-consumerprice- inflation, Accessed on 16th March 2023.

Thus, in the development of the implementation and monitoring plans, the implications of the change in circumstances that arose from post-pandemic state-of-affairs on NDCs will be appraised, along with the gender responsiveness, social inclusivity, and SDG alignment.

1.5 Way Forward

Despite many constraints, for the successful NDC implementations, as stated in Section 1.4, active participation of all relevant stakeholders is essential through developing their own comprehensive action plans based on high-level NDCs in the implementation plans in line with their institutional frameworks, thus, the following way-forward actions are proposed.

1. Dedicated / Designated unit within each stakeholder organization for NDC implementation, monitoring and coordination
2. Assembly of a climate action group for each sector and firming up of a programme of action
3. Mainstreaming of NDCs in to sectoral annual / long term development plans of stakeholders and providing budget allocations
4. Aligning with activities / outputs of donor funded projects
5. Capacity building of stakeholders
6. Implement an effective communication strategy to improve awareness of all stakeholders
7. Build awareness & competencies on NDCs at all levels (strategic, tactical & operational)
8. Obtain top-management endorsement and commitment throughout the NDC cycle.
9. Rapid development of sector capacity to prepare project proposals to seek external support (Means of implementation)
10. Formulate and operationalize multi-agency engagement platform
11. Effective coordination mechanism of sectoral stakeholders
12. Effective system for data management
13. Establishment of a compliance, Measurement, Reporting and Verification (MRV) and data submission frameworks
14. Enforce regulations on meeting climate obligations to cover all sector entities
15. Incorporate progress reporting of NDCs as a mandatory section in Annual Reports
16. Integrate gender responsiveness in all sector NDCs.

2. METHODOLOGY

2.1 Methodology Followed for the Preparation of NDC Implementation Plans

Updated NDCs (2021) were developed by the Climate Change Secretariat of the Ministry of Environment following a a Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) approach. Simultaneously, the draft NDC implementation plans were prepared in consultation with relevant stakeholders. Thus, as depicted in figure 2-1, the process of developing the NDC implementation plans commenced with reviewing the existing draft plans and identifying the gaps. Recommendations were made for gender inclusion in four prioritized sectors (power, water, fisheries, and livestock). The key activities of the process are listed in Table 2-1.

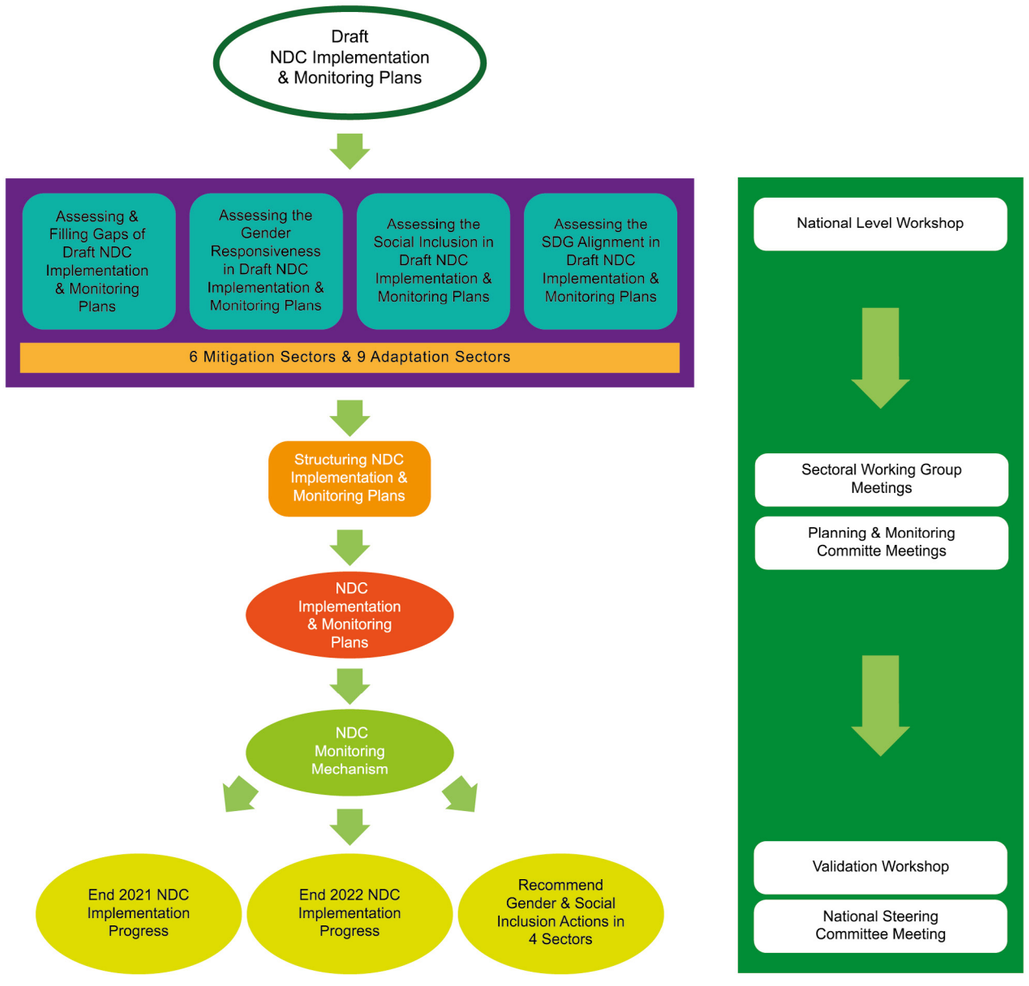


Figure 2-1: Schematic diagram of the methodology

Table 2-1 Activities followed

Activity No	Key Activity	Description
1	Gap Assessment	Existing gaps in the draft NDC Implementation Plans developed by CCS/MoE during the process of updating NDCs in 2021 were assessed. A strategic framework for the gap analysis was followed to ensure the entirety and transparency.
2	NDC Implementation Plans Structure	The structure for the NDC Implementation Plans was finalized with the consent of CCS and UNDP Sri Lanka.
3	Gap Filling	By conducting a series of sectoral working group meetings, the gaps in the draft NDC Implementation Plans (developed by CCS/MoE in 2021) were filled.
4	SDG Alignment Assessment	This activity had been conducted during the preparation of updated NDCs with the use of SCANtool of UNDP. This SDG alignment assessment was reviewed and updated.
5	Key Stakeholder Meetings	A series of stakeholder consultation meetings (Working groups, Planning & Monitoring committees) was conducted to develop NDC implementation plans through inclusive and participatory approach.
6	Gender Responsiveness and Social Inclusion Assessment	A rapid assessment was conducted to assess: (i) the gender and social inclusion in the draft NDC Implementation Plans, (ii) the available gender-related information such as national and sectoral policies, (iii) the existing mechanisms in the prioritized sectors (power, water, fisheries, and livestock) to mainstream gender in the NDC implementation plans, and (iv) gaps in institutional mechanism and staff capacity through a questionnaire survey.
7	Recommendation for Gender & Social Inclusions	Integrated gender-responsive and socially inclusive actions for NDC Implementation Plans in prioritized mitigation and adaptation sectors (i.e., power, water, fisheries, livestock,)[10] were identified based on the outcomes of the assessments and examples/best practices drawn from other countries and those that can be applied from Sri Lanka as well.
8	NDC Monitoring Mechanism	Outline a monitoring framework that is consistent and mutually reinforcing. The national level monitoring framework agreed by the stakeholders at the time of revising NDCs in 2021 was further endorsed. In consultation with relevant stakeholders, SMART KPIs and targets were set enabling the closer monitoring of implementation plans.
9	NDC Implementation Plans	The NDC Implementation Plans in a publishable format through the consent of CCS were developed.
10	Progress reporting	Progress of NDCs was identified for the years 2021 and 2022, and GHG emission reduction estimates were calculated for mitigation sectors.
11	SDG Alignment	Alignment of NDCs with SDGs was appraised in consideration of direct interlinkages of each NDC activity/ sub-activity with relevant SDG target/s.
12	Validation Workshop	Sectoral validation workshops were conducted to validate the developed implementation and monitoring plans.
13	National Steering Committee (NSC) Meeting	NDC implementation plans were presented to the NSC for their endorsement.

10 In addition to these four sectors, a similar assessment has been done for Agriculture (adaptation) sector under another project.

2.2 Data Sources and/or Scenarios Relied Upon

The development of NDC implementation plans followed in-depth stakeholder consultations. Thus, when developing the implementation plans, activities, and KPIs, sector-specific policies, pertinent national policies, sectoral data, and constraints were considered. The implementation plans were also validated to make sure that the KPIs and targets are specific, measurable, attainable, realistic and time-bound (SMART).

3. NDC IMPLEMENTATION – MITIGATION

3.1 Overview

Sri Lanka has historically pursued 'low carbon' socio-economic development and has one of the lowest per capita carbon emissions rates (1.0 CO^2 MT per capita as at 2020 according to the World Bank[11]) for a lower middle-income country. This could be attributed to the economic model utilized by the country, where less reliance on energy-intensive industries and greater use of renewable energy (RE) resources such as biomass, hydro, solar, and wind are promoted. However, over the past decade, a variety of fundamental systemic issues, arisen particularly from the gaps in policies, institutions and structures, have undermined the low-carbon growth
trajectory and lowered the environmental sustainability of the country, as evident in many sectors such as energy, industry, transport, waste, agriculture, and forestry, as well as natural resource management. This situation is further worsened with the multiple and complex socioeconomic challenges that have emerged post COVID-19 pandemic.

In order to address these issues, the GoSL has taken a number of initiatives and interventions in the political and policy spheres, supported by various development partners, seeking a momentum to drive the low-carbon and sustainable development agendas forward. In particular, the updated NDCs with prioritized mitigation measures for implementation during the period 2021 and 2030 for a more ambitious climate commitment with net-zero carbon targets by 2050 provide clear guidance for responsible agencies and other stakeholders/ key supportive institutions to align their programmes to climate action. These measures have a high potential to reduce GHG emissions and are closely connected with the nation's SDGs. Further, while updated NDCs are formulated in consideration of several national and sectoal policies, the emphasis on climate action is reflected more in the recent revisions and development of related policies, strategies and plans. Some examples include: Climate Prosperity Plan (2022), National Environment Policy (2022), National Climate Change Policy (Under review), National Policy for Sustainable Development (Draft), National Policy for Sustainable Consumption & Production (2019), National Energy Policy & Strategies (2019), National Environment Action Plan 2022-2030 (NEAP) (2022), National Industry Policy (Draft), National Agriculture Policy (Draft), National Transport Policy (Draft). The aforementioned policy directives generally favor low-carbon and resource-efficient activities, circular economy concepts, and the promotion of GHG sinks by increasing forest/tree cover. Further, Sri Lanka has taken various proactive measures in recent years to access and mobilize finance to support a low-carbon pathway.

For instance, the power sector has facilitated private investment in RE using supportive legislative tools including feed-in tariffs, various roof-top solar power connecting schemes such as "net metering", "net accounting" and "net plus", etc. Energy efficiency (EE) is encouraged by high electricity consumer tariff rates that rationalize use, Time-of-Use (TOU) billing, etc., and is backed by financial incentives to promote the shift from incandescent bulbs to CFL and then to LED lighting. The amount of managed waste in metropolitan areas has significantly increased because of investments in waste-to-energy and waste composting programs in major municipalities. Large-scale waste producers, like hotels and livestock farms, have been compelled by legal requirements and environmental concerns to make investments in on-site waste management.

11 The World Bank. CO2 emissions (metric tons per capita) – Sri Lanka. Retrieved from https://data.worldbank.org/indicator/EN.ATM.CO2E.PC?locations=LK

The MoE has developed the NEAP covering the period from 2022 to 2030 under the theme 'pathway to sustainable development in Sri Lanka' based on the National Environmental Policy (NEP). The Ministry of Industries is in the process of introducing a National Industry Policy (pending Cabinet approval) through which there is a commitment to transform existing industrial parks to "Eco Industrial Parks" and to build all new industrial parks under "green or eco" themes. The industry has adopted concepts like circular economy, energy efficiency, and cleaner production. For sustainability and marketing advantages, some major industrial production facilities and some industrial sectors such as tea industry are increasingly aiming for "carbon neutrality".

With the middle-income development aspirations, the transport sector has seen a gradual modal shift from public to private transportation. In 2005, the contribution of public transport systems (buses and railways) to passenger transport was 70%, which has reduced by 50% in 2015 and 33% in 2021[12]. In 2021, cars, motorcycles, and three-wheelers contributed to about 85.5% of the active fleet of 5.53 million vehicles[13]. In the meantime, large investments are planned to modernize passenger transportation systems, including the aging railway and expressway network, electrification of railways, and encourage more private users to purchase hybrid and Electirc Vehicles (EVs). In particular, with the recent import restrictions imposed by the GoSL on internal combustion engine (ICE) vehicles, there is a renewed interest in EVs, including local manufacture and value addition. With the assistance of development partners, a number of pilot projects have been initiated for promoting EVs, including retrofit in ICE vehicles, and establishment of charging infrastructure.

The policy and political level emphasis on low-carbon development is also reflected in the recent interventions of the GoSL, including Climate Prosperity Plan, Net-zero Carbon Roadmap, and the proposal to establish an International Climate Change University. Nevertheless, the implementation of these policies and programmes has been hindered by the limitations in financing, which is aggravated further by the present economic crisis. In order to overcome these challenges, the GoSL is exploring opportunities to access climate financing and other sources. Some notable initiatives related to financing include the Sri Lanka Green Finance Taxonomy published by Central Bank of Sri Lanka (CBSL) in 2022 and SDG Investor Map (2022) formulated with the guidance of Sri Lanka Sustainable Development Council (SLSDC) and Board of Investment (BOI), which intend to provide conducive environment to unlock investments for low-carbon and sustainable developments. The MoE has recently appointed an expert committee to identify the country's potential of carbon trading and develop Carbon Trading Strategy of Sri Lanka.

12 National Transport Commission (NTC), National Transport Statistics 2022.
13 CBSL, Economic and Social Statistics of Sri Lanka 2022.

3.1.1 Unconditional and Conditional Policy Responses

Although committed by the GoSL, the successful implementation of NDCs depends on several factors, particularly on the availability of resources such as data, finance, technology, skills and expertise. Accordingly, some of the NDCs identified are relatively easier to implement, while others require more efforts and international supports from other parties and development partners. Thus, in general, NDCs are categorized as conditional and unconditional. The implementation of conditional NDCs require additional resources beyond the capabilities of the country and, in some cases, more conducive governance and legislative environment. For example, several conditional NDCs are restricted due to the technology's infancy and lack of market readiness (commercial viability) locally. These steps are crucial for a long-term shift in direction toward low-carbon routes in major sectors such as power, transport, industry, waste, forestry, agriculture, and livestock. These conditional NDC actions account for additional 10.5%[14] of GHG emissions reduction respective to the BAU scenario for the period 2021-2030, and account for the major component of the total amount of 14.5% reduction[15]. The unconditional NDCs are the actions that have been identified in national plans and programs, prioritised for national investments (public and private) which can be implemented with domestic capacity. These actions amount to 4.0%of GHG emissions reduction respective to the BAU scenario for the period 2021-2030. Table 3-1 includes the possible GHG emsission reduction (both unconditional and conditional) quantification of the mitigation sectors.

It should be noted that the real potential of GHG emissions reduction would be much higher than the amounts mentioned above as a wide range of co-benefits including the GHG emissions reduction of both mitigation and adaptation measures implemented in the country have not been assessed due to the unavailability of required data and related MRV systems.

Table 3-1Commitment of GHG emission reduction from mitigation sectors (adapted from Updated NDC, 2021)

Sector	Unconditional	Amount ($MTCO_2$ eq)	Conditional	Amount ($MTCO_2$ eq)	Total % ($MTCO_2$eq)
Power	5%	9,819,000	20%	39,274,000	25% (49,093,000)
Transport	1%	1,337,000	3%	4,011,000	4% (5,348,000)
Industry	4%	2,088,000	3%	1,482,000	7% (3,570,000)
Waste	8.5%	1,969,000	2.5%	580,000	11% (2,549,000)
Forestry	2%	705,000	5%	1,652,000	7% (2,357,000)
Agriculture (including livestock)	4%	2,477,400	3%	1,858,000	7% (4,335,400)
TOTAL	**4%**		**10.5%**		**14.5% (67,252,400)**

14 For the six sectors covered in this revision (power, transport, industry, waste, agriculture & livestoc forestry). Analysis excluding the emis sions & emissions reduction activities in certain sub sectors such as some land use categories.

15 Updated NDC Sri Lanka, 2021

3.2 Electricity (Power) Sector

In Sri Lanka, there are three main ways to generate electricity: thermal power (which uses fossil fuels like coal and oil), large hydropower, and other new RE sources (small hydro, solar, wind, and biomass) which are also referred to as nonconventional renewable energy (NCRE) or new renewable energy (NRE) resources. The nation's electrification rate for all potential customers is almost 100%. According to CEB[16] , the total installed capacity by 2021 was 4,186 MW, a 1.9% (79 MW) decline from the year 2020 because certain power plants owned by independent power producers were shut down due to their retirement. Furthermore, as shown in Figure 3-1, there has been a shift in the energy sources used to generate electricity that is more environmentally friendly (mainly NCRE sources such as solar and wind).

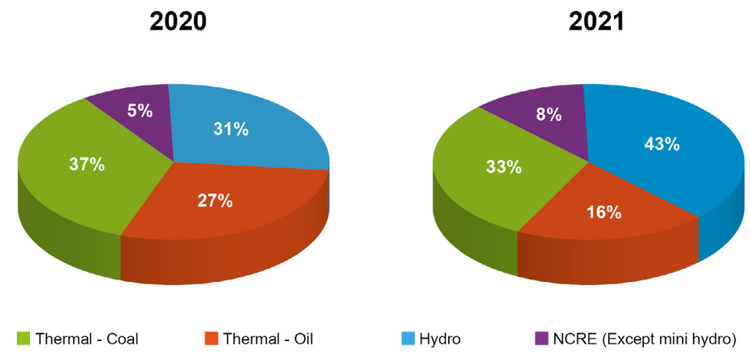


Figure 3-1 Share of generation source in 2020 and 2021[16]

Sri Lanka adopted a comprehensive approach while creating its National Energy Policy & Strategies (2019) to ensure the supply of energy is secure, equitable, and sustainable. The 10 pillars of this legislation direct the nation to maximise the development of domestic RE sources, diversify the generation mix, and reduce reliance on fossil fuel imports. With a target of reaching 70% electricity generation utilising RE sources by 2030, these initiatives are anticipated to advance RE-based power generation further.

16 CEB, Sales and Generation Handbook, 2021

According to the Sri Lanka Energy Balance (SLEB) published by SLSEA the demand for electricity was growing by around 5% annually during 2010 to 2020[17] . However, it only slightly decreased in 2020 due to the reduced economic activity brought on by the COVID-19 pandemic. Nevertheless, it is expected that long-term growth trends will continue to be followed by future expansion plans for electricity generation, regardless of any reduction in demand that may have occurred in the recent past or in the present due to import restrictions brought on by the depletion of foreign reserves, prolonged power outages, and scarcity of petroleum products. Figure 3-2 shows how well Sri Lanka's economic activities and electricity demand coupled. As a result, it is reasonable to expect that electricity demand will rise along with economic development. It has previously been predicted that, starting in 2026, the peak demand will move from the night to the day, reflecting greater industry activity[18] .

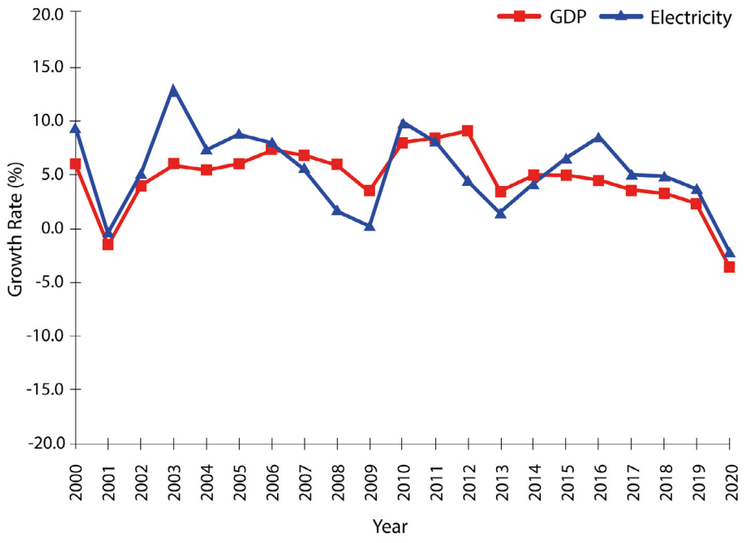


Figure 3-2 GDP growth rate and sales of electricity[18]

With the emphasis given by the GoSL for RE, significant progress has been seen in the capacity addition of renewable energy, particularly from wind, solar, hydro, and biomass. Among these, the most prominent development in the recent past is attributed to solar PV rooftop systems, reaching a total capacity close to 700 MW at the end of the year 2022. There are about 47,000 rooftop systems in domestic, commercial and industrial establishments, with capacities ranging from a few kW to a few MW, supported by over 470 technology suppliers. The development of solar PV rooftop sector is largely governed by the national programme titled "Battle for Solar Energy", with three different feed-in tariff schemes identified as net-metering, net- accounting and net-plus, allowing the electricity consumers to either bank the excess generation or sell the electricity to CEB. It is expected to add 1,000 MW of solar electricity to the national grid by 2025 and 1,500 MW by 2030 through this intervention[19].

17 SLSEA, Sri Lanka Energy Balance 2020
18 CEB, Long-Term Generation Expansion Plan 2022-2041
19 SLSEA, Soorya Bala Sangramaya (Battle for Solar Energy, https://www.energy.gov.lk/index.php/en/sooryabala-sangramaya sangramaya

Another area of intervention that attributed to further reduction of GHG emissions from the power sector is the ongoing Energy Efficiency Improvement & Conservation (EEI&C) programme. This area includes numerous Demand Side Management (DSM) initiatives as well as transmission and distribution loss reduction efforts. The key programmes implemented, particularly by SLSEA (and its predecessor Energy Conservation Fund), cover policies, regulations, codes, appliance labelling, guidelines, education/awareness and other promotional programmes. More recently, a major EEI&C effort has been initiated with the implementation of Operation DSM (ODSM) programme developed by Presidential Task Force on Energy Demand Side Management. It comprises of nine thrust areas: efficient lighting, efficient fans, efficient motors, efficient refrigerators, eliminating incandescent lamps, efficient air conditioning, smart homes, green buildings, and efficient pumps, targeting a total electricity demand of nearly 2,000 GWh during its implementation period of 2016 to 2020[20]. Currently, the programme generated by the Presidential Task Force is being carried forward by the SLSEA.

Further, the 'no further additions of coal power plants', conversion of current fuel oil-based combined cycle power plants to natural gas (NG) and the construction of new NG power plants will aid in the endeavour to reduce emissions and support the NDCs. The five NDCs shown in Table 3-2 are anticipated to significantly reduce the GHG emissions between 2021-2030 period and ultimately direct the country to achieve the net-zero carbon target by 2050 in the power sector.

Table 3-2 NDCs of Electricity (Power) Sector

NDC #	NDC
1	Enhance renewable energy contribution to the national electricity generation mix by increasing Solar PV, Wind, Hydro and Sustainable Biomass based electricity generations
2	Implement Demand Side Management (DSM) measures by promoting energy efficient equipment, technologies and system improvements in a national energy efficiency improvement and conservation (EEI&C) programme
3	Conversion of existing fuel oil-based combined cycle power plants to Natural Gas (NG) and establishment of new NG plants as conditional measures (once the necessary infrastructure is available)
4	Transmission and distribution network efficiency improvements (Loss reduction of 0.5% compared with BAU by 2030) as unconditional measures (Target – Approximately 1,848 GWh energy savings between 2021-2030)
5	Conduct R&D activities to implement pilot scale projects for NCRE sources that have not yet reached commercial maturity and develop other grid supporting infrastructures as conditional measures

20 SLSEA, Operation Demand Side Management, https://www.energy.gov.lk/ODSM/

As shown in Figure 3-3, it is anticipated that the implementation of NDCs will reduce GHG emissions in the electricity (power) sector by 25% compared to the BAU scenario (5% unconditionally and 20% conditionally), which equates to an estimated mitigation level of 9,819,000 MT unconditionally and 39,274,000 MT conditionally (totaling 49,093,000 MT) of carbon dioxide equivalent between 2021 and 2030. This estimation was done taking the Ceylon Electricity Board's Long Term Generation Expansion Plan (LTGEP) of 2013 as the baseline. LTGEP of 2022 which was introduced after updating the NDCs has provisions to accommodate more RE renewable based generation in the energy mix.

Figure 3-3 Power Sector GHG Emission Projection and Emission Reduction Targets

3.2.1 Gender Aspects in the Energy (Power) Sector

The National Energy Policy & Strategies 2019,[21] formulated in alignment with the current global trends in energy, Goal 7 of the SDGs ,[22] and other future aspirations of Sri Lanka, have declared to ensure that convenient and affordable energy services are available for equitable development of Sri Lanka using clean, safe, sustainable, reliable and economically feasible energy supply. Under the clause 'Providing Access to Energy Services', the policy aims to introduce strategies for new productive uses for electricity in agriculture, rural and primary industries with emphasis on empowerment of women and youth; and outlines that a home productivity improvement programme, with energy efficiency and conservation as the central theme will be launched to empower women. Women play a major role in mitigation. They are promoters of renewable energy. Clean cooking stoves, sustainable fuelwood, domestic solar and biogas are often managed by women. Efficient energy systems will benefit women by providing time for entrepreneurship and quality time with their families while building a low carbon footprint.

21 Ministry of Power, Energy and Business Development (August 2019). National Energy Policy and Strategies of Sri Lanka. Gazette Extraordinary 2135/61. https://www.energy.gov.lk/images/resources/downloads/nationalenergy- policy-2019-en.pdf

22 SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all

3.2.2 Recommendations for Gender Responsive NDC Planning and Implementation in the Energy (Power) Sector

In consideration of the above highlighted status of women with reference to the energy sector, it is important to facilitate, support and enhance the role of women from user, producer and entrepreneur perspectives through the NDC implementation, for more efficient and effective overall mitigation outcomes. The following recommendations are suggested for consideration:

I Overall:

1. NDC activity planning and implementation in the sector need to take into account the differential energy needs, and priorities of men and women, and gender-defined roles in energy production, distribution and utilisation at households, community and the market (through conducting a gender assessment and analysis for the Energy Sector, with specific attention to GHG mitigation aspects).
2. Take into consideration the role women play as (i) energy suppliers and (ii) energy consumers (currently invisible due to lack of disaggregated data, policy gaps and stereotypes), aiming for greater engagement of women in mitigation activities.
3. Promote and facilitate women's participation as technicians, professionals and managers in the energy sector: set targets to reach and maintain the share of women scientists, officials, technical officers at the national and local levels.
4. Include collection of sex disaggregated data, develop targets, indicators and KPIs to review gender responsive activities, mitigation outcomes, for the progress review and monitoring of the NDC plan.

II. Engagement of women in production and supply of sustainable energy options identified in the NDCs:

1. Proactively target and engage women in renewable energy production, supply and service provider programmes, as individual entreprenurs and as part of SMEs, (such as solar PV, sustainable biomass production and services).
2. Include and target women in providing training on sustainable energy technologies, and in providing credit, subsidies, to enhance their position as sustainable energy production entrepreneurs and users.

III. Enabling women to use clean energy sources for enterprices/livelihoods, for cooking and lighting:

1. Proactively promote the use of affordable, accessible, cleaner fuels and energy efficient technologies as a mitigation measure: introduce and promote clean energy options to minimize the use of fossil fuels, biogas, and biomass for cooking, clean energy sourced technologies for entrepreneurship/livelihood support activities. In fact, biomass is the only affordable and accessible energy source for a majority of the rural communities and micro, small and medium enterprises (MSMEs). The engagement of women is prominent in these sectors, throughout the entire value chain from generation of biomass to final usage.

(Please see Table 3.2.3 for specific actions for gender and socially inclusive implementation)

3.2.3 Electricity (Power) Sector NDC Implementation Plan

NDC 1 - Enhance renewable energy contribution to the national electricity generation mix by increasing Solar PV, Wind, Hydro and Sustainable Biomass based electricity generations (Target: Develop an additional capacity of 3,867 MW renewable energy over the RE capacity considered in Business-As-Usual scenario, out of which approximately 950 MW are on an unconditional basis and 2,917 MW on a conditional basis)

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1 Establish wind, solar (rooftop, small-scale and large solar PV), biomass, large and small hydro power plants	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.1.1 - Establish wind power plants	SLSEA, CEB	MoP&E, CEA, Private investors, Land custodians	MW installed		CEB statistical digest & SLEB	178 MW	Addition of 865 MW (Unconditional 128 MW, Conditional 737 MW)	√	√	√	√	√	√	√	√	√	√	7.2
1.1.2 – Establish rooftop and ground-mounted solar PV	SLSEA, CEB	MoP&E, LECO, Solar PV service providers, Private investors, CEA, Land custodians	MW installed		CEB statistical digest & SLEB	425 MW	Addition of 2,263 MW (Unconditional 335 MW, Conditional 1,928 MW)	√	√	√	√	√	√	√	√	√	√	7.2
1.1.2.1 Encourage and increase women in the rooftop solar PV installation programme	SLSEA	MoP&E, LECO, Solar PV service providers, Private investors, CEA, Land custodians	Number of women in the rooftop solar PV installation programme increased		CEB statistical digest & SLEB with data on women's engagement and numbers of women in the programme	Approximately 200 women out of 10,000 (2%)	Increase from 2% to 5%		√	√	√	√	√	√	√	√	√	5.a, 5.b, 5.c, 7.2, 13.1, 13.2
1.1.3 Power generation through sustainable biomass resources	SLSEA	MoP&E, MoE, MoLR, CEA, MASL, LAs, Land custodians	MW installed		CEB statistical digest & SLEB	50 MW	Addition of 65 MW (Unconditional 10 MW, Conditional 55 MW)	√	√	√	√	√	√	√	√	√	√	7.2

1.1.3.1 Encourage women in supplying sustainable biomass for power plants	SLSEA	MoP&E, MoE, MoLR, CEA, MASL, LAs, Land custodi-ans	No of women suppliers		CEB statistical digest & SLEB with data on women suppli-ers	Baseline to be pro-vided by SLSEA in 2023	Target to be set by SLSEA in 2023		√	√	√	√	√	√	√	√	√	7, 5
1.1.3.2 Establish an institutional mech-anism to enable the collection of sex disaggregated data	SLSEA	CEB, LECO	Sex disaggregated data collection institutional mechanism		CEB statistical digest & SLEB	0	Institutional mechanism for consistent collection of sex disaggregated data established			√									7, 5
1.1.4 Establish large and small hydro power plants	SLSEA, CEB	MoP&E, CEA, MASL, LAs, Land custodians	MW installed		CEB statistical digest & SLEB	410 MW	Addition of Large Hydro: Unconditional 31 MW. Mini Hydro: Uncon-ditional 20 MW, Conditional 110 MW (Total Mini Hydro 130 MW)	√	√	√	√	√	√	√	√	√	√	7.2
1.2 Develop the required transmission network infrastructure to enable integra-tion of renewable energy	CEB	MoP&E, CEB	Length of network infrastructure developed/ upgraded		CEB statistical digest	3,160 km	480 km. (Could be a very elabo-rate target under REDMAP)	√	√	√	√	√	√	√	√	√	√	7.b

NDC 2 - Implement Demand Side Management (DSM) measures by promoting energy efficient equipment, technologies, and system improvements in a national energy efficiency improvement and conservation (EEI&C) programme

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1 – Realize energy saving of 2,603 GWh by phasing out incandescent bulbs as an unconditional measure	SLSEA	CEB, MoP&E, SLSI	GWh saved		SLEB	14 GWh	2,603 GWh	√	√	√	√	√						7.3
2.2 – Realize energy saving of 5,189 GWh by introducing efficient lighting, fans, refrigerators, and chillers as a conditional measure	SLSEA	CEB, MoP&E, SLSI, EE service providers, Private sector	GWh saved		SLEB	724 GWh	5,189 GWh	√	√	√	√	√	√	√	√	√	√	7.3
2.3 - Implement energy efficiency building code on a mandatory basis	SLSEA	MoP&E, UDA, LAs, CIDA, Institute of Architects, IESL, GBCSL, Construction companies	Number of installations		SLSEA records of building applications	425 MW	5,189 GWh (2023-401) (2024-600) (2025-794) (2026-1,051) (2027-1,549) (2028-1,487) (2029-1,737) (2030-1,737)	√	√	√	√	√	√	√	√	√	√	7.3
2.4 – Promote High Efficiency Motors (HEM), Variable Frequency Drives (VFD), tri-generation, and other energy efficiency measures in the industrial sectors	SLSEA	CEB, MoP&E, MoI, EE service providers, Chambers of Commerce and Industry Associations (CC&IAs), Private Investors	GWh saved		SLEB / SLSEA statistical information	HEM - 775 GWh VFD - 590 GWh (Facilitated by Energy NAMA Project) Efficient Chillers - 1,300 GWh	466 GWh (2024-10) (2025-20) (2026-50) (2027-86) (2028-100) (2029-100) (2030-100)				√	√	√	√	√	√	√	7.3
2.5 Plan and implement specific and targeted activities to engage women service providers and energy users in the promotion of measures for demand side management (DSM)	SLSEA	CEB, MoP&E, SLSI	No of women focused/targeted specific activities conducted No of women befitted		Progress reports, Numbers of women service providers and energy users engaged/ reached	Baseline to be established through an industry census	100 women per year		√	√	√	√	√	√	√	√	√	5.8, 7, 5

NDC 3 – Conversion of existing fuel oil-based combined cycle power plants to Natural Gas (NG) and establishment of new NG plants as conditional measures (once the necessary infrastructure is available).

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1 – Conversion of existing 600 MW of fuel oil-based power plants to NG	CEB	MoP&E, MoE, MoF	MW converted		CEB statistical digest	0 MW	600 MW					√	√	√	√	√	√	13.1
3.2 – Establishment of new combined cycle power plants in place of anticipated coal power capacity additions in the BAU and gas turbines with approximately 700 MW of capacities to be operated from NG	CEB	MoP&E, MoE, MoF, Private sectors (IPPs)	MW established		CEB statistical digest	0 MW	830 MW					√	√	√	√	√	√	13.1

NDC 4 – Transmission and distribution network efficiency improvements (Loss reduction of 0.5% compared with BAU by 2030) as unconditional measures (Target – Approximately 1,848 GWh energy savings between 2021-2030)

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1 – Carry out developments in the transmission network, reconductoring of existing transmission lines and reactive power compensation activities	CEB	MoP&E, MoF	GWh saved		CEB statistical digest	302 GWh	1,848 GWh	√	√	√	√	√	√	√	√	√	√	7.b
4.2 – Carry out the conversion from bare conductors to bundled conductors, line maintenance, load balancing and reduction of line length by installation of transformers in the distribution system	CEB	MoP&E, MoF	GWh saved		CEB statistical digest	As reported above	GWh target shall be established through a loss reduction study	√	√	√	√	√	√	√	√	√	√	7.b

NDC 5 – Conduct R&D activities to implement pilot scale projects for NCRE sources that have not yet reached commercial maturity and develop other grid supporting infrastructures as conditional measures

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
5.1 – Conduct R&D activities to implement pilot scale projects for new renewable energy (NRE) sources (exotic technologies) like Geothermal Energy conversion, Ocean Thermal Energy Conversion (OTEC), Ocean Energy (Wave), etc. which have not yet reached commercial scale maturity	SLSEA	CEB, MoP&E, Academia	Number of exotic technologies researched and piloted		CEB statistical digest & SLEB	Initial studies are in progress.	5 technologies to be piloted	√	√	√	√	√	√	√	√	√	√	7.a
5.2 - Develop pumped storage hydro power plants and pilot scale storage systems such as Behind the Meter (BtM) and Grid Scale Battery Energy Storage (BES) solutions, to support the integration of intermittent renewable energy to the system	CEB, SLSEA	MoP&E, Academia, Private sector	Number of installations / MW installed, MWh storage capacity		CEB statistical digest & SLEB	Initial studies is conducted for pump storage.	600 MW PSPP installation, 100 MW BESS installation (for grid support services)	√	√	√	√	√	√	√	√	√	√	7.a
5.3 – Introduce ICT interventions such as Smart Grids Technologies to support integration of intermittent renewable energy to the system	SLSEA	CEB, MoP&E, Academia	Number of interventions		SLSEA annual report	One Smart Mini-grid in operation (in Galamuduna village (Knuckles)	4 new ICT interventions introduced	√	√	√	√	√	√	√	√	√	√	7.a

5.4 - Conduct a gender assessment and analysis for the Energy sector to identify main gender issues in the sector relevant for mitigation, and to set a baseline	MoP&E	SLSEA, CEB, PUCSL	Main gender issues in the sector identified Baseline for introducing/promoting gender responsive mitigation measures identified		Sector gender assessment document with recommendations for identifying and promoting gender responsive mitigation activities available	0	Gender assessment document on the energy sector with updated information.			√								5.a, 5.b, 5.c, 7.1, 7.2, 7.3, 13.1, 13.2
5.4.1 - Build awareness and capacities of the main planning and implementation teams/agencies on gender issues in the energy sector	MoP&E	International agencies	Gender awareness at the planning and decision-making level		No of Awareness and training programmes conducted on gender issues, on gender responsive planning &implementation No of officials trained	Partial awareness created	All agencies of MoP&E gender sensitized				√	√	√	√	√	√	√	5.a, 5.b, 5.c, 7.1, 7.2, 7.3, 13.1, 13.2

3.3 Transport Sector

Road vehicles dominate Sri Lanka's transportation sector, in both passenger and freight sectors, contributing more than 95% of passenger kilometers travelled and more than 99% of ton kilometers. The demand for passenger transportation peaked in 2019 at roughly 231.5 billion passenger kilometres, but due to travel limitations brought on by the COVID-19 pandemic, the demand fell to 185.5 billion passenger kilometres in 2020. This reduction was also associated with moving passengers away from public transport. In 2021, this was recovered to 191.8 billion passenger-km, which is still less than the 2020 value. In 2019, the public transport modes (buses and railways) had a total modal share of 40.6%, while it was only 36.3% in 2020 and 33.0% in 2021. The corresponding modal share in 2019, 2020, 2021 of motorcycles was: 8.0%, 9.1%, 9.1%, three-wheelers: 19.9%, 21.8%, 22.6% and motor cars 17.6%, 18.5%, 19.5%, respectively[23]. At the end of 2021, total vehicles registered was 8.33 million, while the active vehicle fleet (based on annual revenue license data) was around 5.53 million, of which 54.30% were motorcycles, 18.14% three-wheelers, 13.04% motor cars, and 0.94% buses[24].

In fact, a gradual deterioration of the public transport modes has seen over several years, for example about 70% modal share in 2005 and 50% modal share in 2015 in passenger transportation. Under the business-as-usual (BAU) scenario, the share of public transportation will decline further. Despite investments and attempts to improve public transportation options, the quality and availability of public transportation are below expectation. This and rising per capita income have resulted in a gradual decrease in passengers using public transportation and an increase in private vehicles. The transport sector is the main consumer of imported petroleum fuels. In 2021, the total crude oil imports was 1,182.000 metric tons (123.9 billion LKR) and the total refined products imports was 4,553,000 metric tons (564.7 billion LKR)[25] . Although Sri Lanka adopts Euro 4 emission standards and continues with the vehicle emission testing (VET) programme, the considerable share of inefficient vehicles in operation leads to higher GHG emissions.

The increase in private vehicle use in urban areas has increased traffic congestion, road accidents, and air pollution, and in turn impacted the economy, environment, and society. High dependence on road transport, as against railways or water-based transport modes, tend to increase total energy consumption and air pollution. Though Sri Lanka Railway (SLR) played a dominant role in the past, its share of passenger and freight transportation has shrunk over time (4.3% in 2015 to 1.1% in 2021). SLR has identified the potential to improve its services as a low-cost mass transportation mode for passengers and goods, and thereby reduce urban and suburban traffic congestion to a great extent. On the other hand, non-motorized transport share is very low in urban areas and is reducing in rural areas. Three-wheelers, school, and office vans are providing substantial services to communities that do not have direct access to buses or trains. Recent infrastructure developments in the sector such as expressways, park & ride facilities, multimodal transport hubs, etc. are expected to reduce the emission footprint while positively contributing to the environment and economy.

23 NTC, National Transport Statistics 2022, National Transport Commission (NTC), [Online]. Available: https://www.ntc.gov.lk/corporate/pdf/2022/statistics_Report/stat_2022_EN.pdf

24 CBSL, Chapter 2: Economic and Social Infrastructure, Economic and Social Statistics of Sri Lanka 2021, Volume XLIII, Central Bank of Sri Lanka (CBSL), July 2021, [Online]. Available: https://www.cbsl.gov.lk/sites/default/files/cbslweb_documents/publications/ess_2021_economic_and_social_infrastructure_e.pdf

25 CBSL, Chapter 1: National Output, Expenditure and Income, Economic and Social Statistics of Sri Lanka 2022, Central Bank of Sri Lanka (CBSL)

The present economic crisis too is having profound effects on the transport sector, with restricted importation and controlled issuance of petroleum fuel, and the banning of importation of ICE vehicles. Import relaxation and other promotional programmes of EVs, including retrofitting of electric drivetrains in existing ICE vehicles, are expected to have a significant shift towards electric mobility, with renewable energy integration for charging. There are about 60 fast charging stations in Sri Lanka, mostly located in Colombo and a few in other major cities. Around 7 of these are operated by the Ceylon Electricity Board (CEB), and others are operated by private sector organizations. However, there are no plans from the private sector to expand the network due to the lack of new EVs and the unviability of the existing fleet. Many previously functioning charging stations have either shut down or are functioning at a loss. Nevertheless, some local developers of charging stations have started exporting their products to neighbouring countries, having markets with more commercial potential. Meanwhile, SLSEA has developed a proposal to establish solar PV assisted EV charging stations, one in each district. However, this proposal is yet to be implemented due to lack of finance.

In the above context, the updated NDCs in the transport sector has been formulated under the overarching Avoid-Shift-Improve (A-S-I) conceptual framework, in a hierarchical order, with due consideration of local circumstances and policy priorities. Here, the Avoid element refers to organizing the land use, social and economic activities in such a way that the need for transport and the use of fossil fuels is reduced, Shift implies the use of environment-friendly modes like public transport and non-motorized transport (NMT) to reduce energy consumption per trip and Improve reflects the consumption of as little energy as possible per vehicle-km by using advanced technologies and cleaner fuels and by optimizing vehicle operation[26].

Accordingly, the updated NDCs are expected to enhance the transport sector system performance, trip performance and vehicle performance in an integrated manner, that will re-invigorate public transportation including railways, buses, and improve intermodal connectivity between rail, road, and water-based transportation, while improving energy efficiency/fuel economy to save foreign exchange contributing to the economy, local and global air pollution, apart from its contribution to GHG emissions reduction. Table 3-2 lists the key actions proposed to support transport sector emissions reduction, and the related GHG emission reduction projections are presented in Figure 3-4.

26 GIZ, "Sustainable Urban Transport: Avoid-Shift-Improve (A-S-I)", Transformative Urban Mobility Initiative (TUMI), German Corporation for International Cooperation GmbH (GIZ), March 2019, [Online]. Available: https://www.transformative-mobility.org/assets/publications/ASI_TUMI_SUTP_iNUA_No-9_April-2019.pdf

Table 3-3 NDCs of Transport Sector

NDC #	NDC
1	Transport sector system improvement
2	Promote public passenger transport
3	Shift freight to efficient modes
4	Rapid transit for passenger transport
5	Promote non-motorized transport modes
6	Introduce taxes and other instruments to promote public transport
7	Introduce inland water transport modes
8	Modernizing & upgrading of suburban railway
9	Promote electric mobility & hybrid vehicles
10	Improve vehicle fleet efficiency
11	Road infrastructure development
12	Reduce GHG emission from the marine sector
13	Supportive policy framework and activities

It is expected that the implementation of updated NDCs will result in GHG emissions reduction against BAU scenario by 4.0% in the transport sector (1.0% unconditionally and 3.0% conditionally) equivalent to an estimated mitigation level of 1,337,000 MT unconditionally and 4,011,000 MT conditionally (total of 5,348,000 MT) of carbon dioxide equivalent during the period of 2021-2030 (see Figure 3-4). It should be noted that there are additional emission reductions from various initiatives, which are difficult to account for as no systematic reporting/accounting arrangement is yet in place.

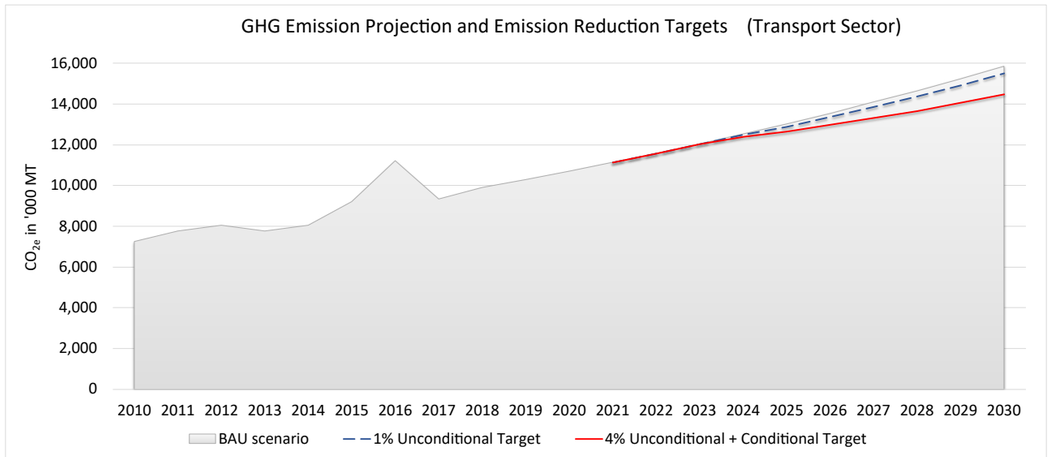


Figure 3-4 Transport Sector GHG Emission Projection and Emission Reduction Targets

The appraisal of the transport sector NDCs indicates the presence of constraints and limitations that have resulted in lack of progress and non-implementation of several activities and sub-activates. For example, the project on Light Rail Transport in Colombo city under NDC 4 Rapid transit for passenger transport has been cancelled. Though there are more recent discussions to re-initiate it, still there is no commitment for implementation. Some private sector organizations have initiated programmes to transport goods in a more efficient railway system. One case example is diversion of transportation of wheat flour from road to railway by Prima Ceylon Ltd (under NDC 3). Though this was done during few years, there are issues for continuation due to fee structure disagreement between the parties with the recent price hike of petroleum fuels.

Thus, in order to achieve the above targets in GHG mitigation, strategic interventions are required to be identified and implemented on an urgent basis.

3.3.1 Transport Sector NDC Implementation Plan

NDC 1 - Transport Sector System Improvement																					
Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)												Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1: Avoid the need to travel (through remote meetings, Information and communications technology (ICT) applications, Enterprise resource planning (ERP) systems, process automation, flexible time, work-from-home, etc.)	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.1.1: Promote e-shopping facilities Covering Lanka Sathosa retail outlets, Cooperative shops and supermarket chain, STC, Online platforms	MoTrad	MoF, STC, CAASL, CIAs, Lanka Sathosa, ICTA, ICT Service Providers, Private sector agencies	Percentage number of Business Entities having e-shopping facilities		Data sources: CBSL, Financing Institutions	Baseline to be established	Target to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 8.4, 11.6
1.1.2: Make arrangements for flexible work time, work-from-home (WFH), etc.	MoPA	MoL, Ministry in charge of Productivity, EFC	1. Number of organizations having WFH options 2. Percentage number of employees engaged in WFH		Respective ministries; CCC (representing the Private sector)	Baselines to be established	Targets to be established	-	-	-	-	-	√	√	√	√	√	3.6, 3.9, 8.4, 11.6
1.1.3: Introduce ICT applications for public sector institutions to promote (i) virtual meetings (ii) remote service delivery	ICTA	All relevant public sector institutions, Academia, Private IT service providers, TRC	1. Number and percentage of public sector institutions adopting ICT applications 2. Percentage number of meetings conducted online; 3. Number of services provided through remote mode		ICTA records	Baselines to be established	Targets to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 8.4, 11.6

1.2: Reducing commuting distances and travel time	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.2.1: Introduce urban rental residential facilities through relevant policy changes	UDA	MoUD&H, LAs, Private developers	Number of urban rental facilities available		Records of MoUD&H, UDA, LAs,	None	Target to be established	√	√	√	√	√	√	√	√	√	√	11.a
1.3: Improve traffic and Traffic light management	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.3.1: Introduce demand responsive signals such as sensor controlled adjustable traffic lights to avoid unnecessary waiting	RDA	MoT, SLP, SLR, SD&CC, LAs	1. Number of installations 2. Number of cities covered		Records of RDA, Academia	None	Target to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 11.6
1.3.2: Introduce signal synchronization	RDA	MoT, SLP, SD&CC, LAs	1. Number of installations; 2. Number of cities covered		Records of RDA, Academia	None	Target to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 11.7
1.3.3: Introduce area wide traffic controls	UDA	MoT, RDA, SLP, LAs	Number of area wide traffic controls introduced		Records of MoT, RDA, LAs	None	Target to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 11.7
1.4: Improve parking management	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.4.1: Introduce “Park & Ride” concept with the use of multi-transport hubs and low-floor busses	MoT	RDA, UDA, SLTrB, SLR, NTC, LAs, Private sector Public Transport Operators	1. Number of “Park & Ride” facilities introduced 2. Parking capacity in each facility 3. Number of users in each facility		Records of MoT, RDA, LAs	None	1. 7 by 2025 2. Target for parking capacity in each facility to be established 3. Target for number of users in each facility to be established	√	√	√	√	√						3.6, 3.9, 11.7

1.4.2: Construct multipurpose transport centers in main cities (Kottawa, Kadawatha, Anuradhapura)	MoT	RDA, UDA, SLTrB, SLR, NTC, LAs, Private sector Public Transport Operators	1. Number of multipurpose transport centers established 2. The Capacity in each center 3. Number of users in each center		Records of MoT, RDA, LAs	None	1. 3 multipurpose transport centers by 2025 2. The target for the capacity in each center to be established 3. The target for the number of users in each center to be established	√	√	√	√	√							3.6, 3.9, 11.7
1.4.3: Provide off-street parking	UDA	MoT, RDA, SLP, LAs	Capacity of off-street parking (in terms of space and/or number of vehicles provided) introduced		Records of UDA, LAs	Baseline to be established	Target to be established	√	√	√	√	√	√	√	√	√	√				3.6, 3.9, 11.7
1.4.4: Discourage road side parking through regulations, pricing	RDA	MoT, UDA, SLP, LAs	Number of km having roadside parking restrictions.		Records of RDA, UDA, LAs	Baseline to be established	Target to be established	√	√	√	√	√	√	√	√	√	√				3.6, 3.9, 11.7
1.5: Introduce Intelligent transport management systems	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.5.1: Introduce systems to track bus movements (such as GPS)	MoT	NTC, SLTrB, PRPTAs, Private sector Public Transport Operators	Number of busses fitted with tracking systems		Records of MoT, NTC, SLTrB, Private sector Public Transport Operators	1,400 (in 2020) This covers all Luxury and Super Luxury buses and 60% Semi Luxury buses	3,200 private buses and 4,000 SLTrB busses by 2025	√	√	√	√	√							9.1, 11.2

1.5.2: Provide seat reservation facilities including online systems	MoT	ICTA, SLTrB, SLR, NTC, Private sector Public Transport Operators	Number of bus stands having seat reservation facilities		Records of ICTA, SLTrB, SLR, Private sector Public Transport Operators	None	18 major bus stands by 2025	√	√	√	√	√									9.1, 11.2
1.5.3: Introduce integrated timetables for public & private transport	MoT	ICTA, SLTrB, SLR, NTC, Private sector Public Transport Operators	Number of routes using integrated time tables		Records of NTC, SLTrB, SLR	None	Whole country by 2030	√	√	√	√	√	√	√	√	√	√				9.1, 11.2
1.5.4: Introduce transit cards	MoT	ICTA, SLTrB, SLR, NTC, Private sector Public Transport Operators	1. Percentage coverage of bus fleet by transit card facility 2. Percentage coverage of railway fleet by transit card facility		Records of SLTrB, SLR, Private sector Public Transport Operators, Card issuers	None	1. 100% bus fleet by 2025 2. 100% railway fleet by 2025	√	√	√	√	√									9.1, 11.2
1.6: Improve Road architecture (road signs, signaling, signage, etc.)	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.6.1: Develop road infrastructure for bus priority lanes	RDA	MoT, UDA, LAs	1. Number of cities covered 2. Length of bus priority lanes in km		Records of RDA, UDA, LAs	None	1. All major cities by 2030 2. Target for the length to be established	√	√	√	√	√	√	√	√	√	√				3.6, 3.9, 9.1, 11.2, 11.6
1.6.2: Allocate space for bus bays	RDA	MoT, SLP, PRPTAs, LAs	Number of new bus bases established		Records of RDA, LAs	Baseline to be established	Target to be established	√	√	√	√	√	√	√	√	√	√				3.6, 3.9, 9.1, 11.2, 11.6

NDC 2 - Promote Public Passenger Transport

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1: Improve public road transport for reliability, affordability, accessibility, availability, comfort and safety	MoT	NTC, SLTrB, PRPTAs, Private sector Public Transport Operators	1. Number of modernized buses introduced 2. Model share of buses in passenger transport (%)		Records of MoT, NTC, Public, Transport Operators and academic publications	1. No modernized buses 2. 19.8% of passenger transport (of 158.6 billion Passenger-km)	1. 1,000 by 2025 2. Target for the model share to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 9.1, 11.2
2.2: Improve railway transport for reliability, affordability, accessibility, availability, comfort and safety	MoT	SLR, NTC	Passenger model share of rail transport (%)		Records of SLR, MoT, NTC, and academic publications	0.9% of passenger transport (of 185.5 billion Passenger-km)	Target to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 9.1, 11.2
2.3: Transport mode integration	MoT	ICTA, NTC, SLTrB, SLR, UDA, Private sector Public Transport Operators	Number of integrations in major locations (Rail and bus stations)		Records of MoT, NTC, SLTrB, SLR	10	Target to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 9.1, 11.2
2.4: Improve last mile connectivity	MoT	NTC, SLTrB, SLR, UDA, LAs, Private sector Public Transport Operators, Taxi Operators, Three Wheelers Associations,	Number of locations having organized last mile connectivity		Records of MoT, NTC, SLTrB, SLR	Informal arrangements	Target to be established	√	√	√	√	√						9.1, 11.2

NDC 3 - Shift Freight to Efficient Modes

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1: Switch back to rail from road transport	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.1.1: Divert transport of wheat flour from road to railway (Prima Ceylon Ltd.)	SLR	MoT, Prima Ceylon Ltd	1. Number of tons handled by railway 2. Number of prime movers replaced 3. Number of lorries replaced		Records of SLR	1. Baseline to be established 2. Prime movers replaced: 26 (up & down) during the year; 3. Lorries: None	1. Target to be established 2. Prime movers: 26 (up & down) during every two weeks by 2025; 3. Lorries: 1,144 from Trinco to Seeduwa in 2020, 200 from Trinco to Jaffna in 2022, 100 from Trinco to Colombo for export in 2025, 260 from Trinco to Galle in 2024	√	√	√	√	√	-	-	-	-	-	3.6, 3.9, 9.1, 11.6
3.1.2: Petroleum product transport by railway	SLR	MoT, CPC, CPSTL	1. Liters of petroleum products transported by railway 2. % volume of petroleum products transported by railways		Records of SLR and CPC; Reports of CPSTL	1. 872,651 kilo liters 2. 58.8%	Targets to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 9.1, 11.6
3.1.3: Other materials (cement, sand, etc.)	SLR	Product manufacturers and suppliers	Weight or volume of other materials (cement, sand, etc.) transported per year		Records of SLR	Baseline to estimated	Target to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 9.1, 11.6

3.2: Promote transporting petroleum products by pipeline	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.2.1: Jet fuel transport by pipe from Muthurajawela to BIA for aircrafts	CPC	CAASL	Number of bowsers avoided		Records of CPC, CAASL	None	Target to be established	√	√	√										3.6, 3.9, 9.1, 11.6
3.3: Introduce rail-based transport system with inland container depots	SLR	Private sector logistic partners	1. Number of 20' and 40' containers 2. Volume or weight handled per year		Records of SLR	None	Targets to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 9.1, 11.6

NDC 4 - Rapid Transport for Passenger Transport

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1: Introduce Light Rail Transport in Colombo city	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.1.1: PPP-based Western Region Megapolis LRT system (Three lines: Red, Green, Blue)	MoF	SLR, UDA, LAs	1. Distance covered by LRT 2. Passengers served by functioning LRT		Records of MoT	The project was at the feasibility study stage	1. Distance covered by LRT: Green line = 28.6 km; Red line = 32.4 km; Blue line = 21.5 km 2. Targets for the passengers served to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 9.1, 11.2, 11.6

NDC 4 - Rapid Transport for Passenger Transport																					
Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)												Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1: Introduce Light Rail Transport in Colombo city	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.1.1: PPP-based Western Region Megapolis LRT system (Three lines: Red, Green, Blue)	MoF	SLR, UDA, LAs	1. Distance covered by LRT 2. Passengers served by functioning LRT		Records of MoT	The project was at the feasibility study stage	1. Distance covered by LRT: Green line = 28.6 km; Red line = 32.4 km; Blue line = 21.5 km 2. Targets for the passengers served to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 9.1, 11.2, 11.6

NDC 5 - Promote non-Motorized Transport Modes																					
Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)												Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
5.1: Promote the use of bicycles	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.1.1: Introduce new bicycle lanes	UDA	MoPC&LG, RDA, LAs	1. Distance covered (km) by new bicycle lanes 2. Number of City Development Pans with integrated bicycle lanes implemented		Records of UDA, RDA, PCs, LAs, PRDAs	Bicycle lanes are introduced in some localities but the specific figures for the baselines to be estimated	1. Target to be established for distance; 2. 45 Cities by 2030	√	√	√	√	√	√	√	√	√	√	3.9, 9.1, 11.2, 11.6

5.1.2: Promote cycle renting facilities	Respective LAs	MoPC&LG, UDA, RDA	1. Number of cycle parking facility locations established 2. Total capacity 3. Number of cities covered		Records of UDA, RDA, PCs, LAs, PRDAs	None	1. Target to be established for the number of parking locations and total capacity 2. Target to be established for the total capacity 3. All major cities covered by 2030	√	√	√	√	√	√	√	√	√	√	3.9, 9.1, 11.2, 11.6
5.1.3: Replace school transports by bicycles in Jaffna MC	MC Jaffna	MoT, Northern Provincial Council & LA	1. Number of schools covered 2. % Number of students using bicycles		Records of MoT, Northern Provincial Council and MC Jaffna	Bicycles are used by school community on Jaffna MC, but specific number for the baselines to be estimated	Targets to be established	√	√	√								3.9, 9.1, 11.2, 11.6
5.2: Improve the facilities for pedestrian walkways	UDA	RDA, PRDAs, PCs, MCs and LAs	1. Number of locations having improved facilities for pedestrian walkways 2. Total length covered by improved pedestrian walkways 3. Number of cities covered		Records of UDA, PCs, MCs, LAs, PRDAs	Improve the facilities for pedestrian walkways are introduced in some localities but the specific figures for the baselines to be estimated	1. Target to be established for the number of locations 2. Target to be established for the total length; 3. 45 Cities by 2030	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 9.1, 11.2, 11.6

NDC 6 - Introduce taxes and other instruments to promote public transport

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
6.1: Change the existing vehicle emission charging system from the present vehicle based to vehicle type, fuel used and emission-based system plus the total km travel (Introduce emission tax based on vehicle emission performance and distance travelled)	DMT	MoF, MoT, MoE, CEA, SLVET Operators	Upgraded vehicle emission testing scheme		Records of DMT	Vehicle based system	Vehicle type, fuel used and emission-based system by 2023				√	√	√	√	√	√	√	3.6, 3.9, 9.1, 11.2, 11.6
6.2: Restrict the entry of individual modes of transport to sensitive areas and congested areas of major cities during peak hours through a levy	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.2.1: Introduce Corden based pricing mechanism to discourage poor performing vehicles entering to city limits	MoT	MoF, UDA, LAs	Percentage of reduction of vehicles entering into identified cities during restricted times		Records of MoT, UDA, LAs	Not estimated	Target to be established	√	√	√								3.6, 3.9, 9.1, 11.2, 11.6
6.3: Develop Park & Ride infrastructure developments combined with Corden based pricing mechanism	MoT	MoF, RDA, NTC, SLTrB, SLR, LAs	1. Number of Park & Ride infrastructure facilities developed that are combined with Corden based pricing mechanism; 2. Total capacity		Records of MoT, NTC, UDA, LAs,	Yet to be developed	1. Number of Park & Ride infrastructure facilities 5 by 2025 2. Target for the total capacity to be established	√	√	√	√	√						3.6, 3.9, 9.1, 11.2, 11.6

NDC 7 - Introduce Inland Water Transport Modes

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
7.1: Introduce canal-based water transport using diesel or grid electricity-powered boat service for selected canal routes	SLLDC	SLN, UDA, NTC	1. Number of km in canal transport 2. Number of boats in service 3. Number of passenger-km /year		Records of SLN, UDA & SLLDC	Not commenced	Targets to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 11.6
7.2: Introduce water transport system in Inland water bodies	ID	SLN, MASL, Private Operators	1. Number of km covered in Inland water bodies 2. Number of boats in service 3. Number of passenger-km /year		Records of ID, MASL and SLN	Not commenced	Targets to be established	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 11.6

NDC 8 - Modernizing & Upgrading of Suburban Railway

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
8.1: Electrification of railway lines	SLR	MoT, MoF, MoP&E, CEB,	Number of railway lines		SLR records	Not commenced	Five (05) – Colombo to Padukka; Colombo to Panadura; Colombo to Veyangoda; Colombo to Veyangoda; Puttalam line; Kandy suburban line By 2030	√	√	√	√	√	√	√	√	√	√	3.6, 3.9, 9.1, 11.2
8.2: Develop new railway lines and expansion of existing railway network	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
8.2.1: Develop new railway lines	SLR	MoT, MoF	1. Number of new railway lines introduced 2. Total km		SLR records	Not commenced	1. Two (02) by 2025 (Kurunegala to Habarana and Matara to Beliatta) 2. Total length = 105 km	√	√	√	√	√						3.6, 3.9, 9.1, 11.2
8.2.2: Introduce railway double lines	SLR	MoT, MoF	1. Number of railway double lines introduced 2. Total km		SLR records	None	1. One (01) by 2025 (Polgahawela to Kurunegal); 2. Total length = 20 km	√	√	√	√	√						3.6, 3.9, 9.1, 11.2
8.2.3 Extend railway lines	SLR	MoT, MoF	1. Number of railway lines extended 2. Total km		SLR records	Not commenced	1. One (01) by 2025 (Hambantota to Kataragama) 2. Total length = 40 km	√	√	√	√	√						3.6, 3.9, 9.1, 11.2

NDC 9 - Promote Electric Mobility & Hybrid Vehicles

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
9.1: Increase tax concessions for electric & hybrid vehicles	MoF	MoT, SLC	1. Tax concessions for electric & hybrid vehicles 2. % of new registration of EVs 3. % of new registration of hybrid vehicles		Gazette Records from MoF, SLC	1. No tax concession 2. EVs: 0.17% all vehicles categories; 0.37% of cars; 0.17% 2Ws, 0% 3Ws 3. Hybrids: 0.82% all vehicles categories; 7.85% of cars; 0% 2Ws, 0% 3Ws	Targets to be established	√	√	√								3.9, 7.3, 7.a, 11.6
9.2: Facilitate supportive infrastructure developments. Suh as charging stations, battery swapping & replacements	MoT	MoF, MoE, MoP&E, CEB, SLSEA, CEA, UDA, LAs	1. Number of charging stations 2. Number of battery swapping stations		Records of MoT	1. Changing stations: CEB – 7 and Private sector – 52 2. Battery swapping stations: None	1. CEB – Additional 10 by 2023 and SLSEA - 90 solar PV assisted charging stations by 2024 2. Target for battery swapping stations is to established	√	√	√								3.9, 7.3, 7.a, 11.6
9.3: Tax & Duty concessions for batteries used for electric and hybrid vehicles after introducing a specific HS code	MoF	MoT, MoE, SLC	Number of batteries import using new HS code		Records from MoF, SLC	HS Code was not established)	4,000 Electric car batteries by 2023	√	√	√								3.9, 7.3, 7.a, 11.6

NDC 10 - Improve Vehicle Fleet Efficiency

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
10.1: Improve efficiencies of existing vehicle fleet (e.g three-wheelers, passenger cars, buses)	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
10.1.1: Inspection & Maintenance	DMT	MoT, SMoT, SLTrB, Academia and Vocational Training Institutions, Private Service Providers	1. % No of vehicles disqualified at the pre-testing stage on SLVET 2. % No of vehicles failed at the first test of SLVET		Records of DMT, SLVET project office	1. Baseline to be established 2. 17%	1. Target to be established 2. 10% by 2025	√	√	√	√	√						7.3, 7.a
10.1.2: Vehicle Emission Testing (improvement to be suggested with further random on-road testing)	DMT	MoF, MoT, MoE, CEA, SLVET Operators	1. Upgraded vehicle emission testing scheme 2. Percentage of vehicles out of total vehicle fleet inspected annually through random road tests annually		Records of DMT, SLVET project office	1. Conventional no-load test 2. 0.06% annual random road tests	1. Introduction of a new emissions testing methodology (VET 2.0) by 2025 2. 1 % annual random road tests by 2025	√	√	√	√	√						3.9, 7.3, 7.a, 11.6
10.1.3: Introduction of road worthiness test	DMT	MoT, IRCSL, AAC, Insurance Agencies	No of vehicle classes covered under mandatory road worthiness test		Records of SLP, DMT, Insurance Records.	Only commercial vehicles	All vehicle classes by 2030	√	√	√	√	√	√	√	√	√	√	3.9, 7.3, 7.a, 11.6
10.1.4: Introduction of garage improvement programme	DMT	CEA, Academia and Vocational Training Institutions	Percentage of Accredited garages out of registered garages		Data sources: CEA, LAs for EPL	No accreditation programme of garages	25% accredited garages Island wide under garage accreditation programme by 2025	√	√	√	√	√						7.3, 7.a, 8.3
10.1.5: Introduction of criteria for disposal of inefficient (unworthy) vehicles (Vehicle scrappage programme)	DMT	MoF, MoT, MoE, CEA, IRCSL, Insurance Agencies	Number of vehicle classes covered under the scrappage programme		Records of DMT, SLVET project office	No programme	All vehicle classes by 2030	√	√	√	√	√	√	√	√	√	√	3.9, 7.3, 7.a, 11.6
10.2: Promote the import of fuel-efficient vehicles (e.g. light duty vehicles)																		
10.2.1: Introduce emission standards for vehicle importation	MoE	MoF, MoT, DoI&EC, SLC, DMT, CEA, SLSEA, CPC, SLSI, Academia	Emission standards for vehicle importation		MoF gazettes, Records of DMT	Already gazetted (in 2018)	Updates in every 5-years (next update in 2023)	√	√	√	√	√	√	√	√	√	√	3.9, 7.3, 7.a, 11.6

10.2.2: Introduce fuel economy labelling programme	SLSEA	MoT, MoE, SLSI, DMT, CEA,	Number of fuel economy labels introduced.		Records of SLSEA, SLSI	A baseline study has been initiated by CleanAirSL with the assistance of UNEP and GFEI	Six by 2025 (LDVs, HDVs, and EVs)	√	√	√	√	√								3.9, 7.3, 7.a, 11.6
10.2.3: Introduction of tax concessions for fuel efficient vehicle imports	MoF	MoT, MoE, DoI&EC, SLC, IRD, DMT, SLSEA, CPC, SLSI, Academia	Number of vehicle classes covered under tax concession scheme based on fuel economy.		MoF gazettes; Records of SLC	Conventional tax structure based on engine capacity (CC) and vehicle class but not based on fuel economy. However differential tax system in favour of EVs and hybrid vehicle in place	All vehicle classes by 2025	√	√	√	√	√								3.9, 7.3, 7.a, 11.6
10.3: Introduce programmes to change driver behaviours	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10.3.1: Improve driving licensing mechanism	DMT	MoT, SLP	1. Improved driving licensing mechanism/test incorporating evaluation criteria related to eco-driving 2. No of districts where simulators/ tracks are installed		Records of DMT	1. to be initiated 2. None	1. Improved driving licensing mechanism by 2023 2. All the districts having simulators/ tracks by 2025	√	√	√	√	√								3.6, 7.3, 8.3
10.3.2: Implement demerit programme for driving license	DMT	MoT, SLP	1. Effective demerit programme / penalty scheme for driving license 2. Number of cases reported annually		Records of DMT, SLP, Court records.	No programme/ scheme	1. Effective demerit programme /penalty scheme by 2024 2. Target for the number of cases to be established			√	√									3.6, 7.3

10.3.3: Introduce training on eco-driving	DMT	MoT, Driving license schools, SLP, Academia and Vocational Training Institutions	1. No. of awareness and training programmes for drivers and general public conducted per year 2. Module on eco-driving introduced to driver training institutions		Records of DMT	1, Some awareness programmes were conducted, but not under a structured plan 2. No module introduced	1. 20 programme per year from 2024; 2. Module on eco-driving introduced by 2024	√	√	√	√	√	√	√	√	√	√	3.6, 7.3

NDC 11 - Road infrastructure development

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
11.1: Development of provincial and rural road infrastructure for improved mobility	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
11.1.1: Resurface and modernize provincial and rural road network	RDA	Ministry in-Charge of RDA, Min in-Charge of Rural Roads, UDA, PCs, LAs, PDRAs,	Length of provincial and rural road network resurfaced and modernized		Records of RDA, PDRAs, PCs, LAs	None	iRoad – Rural Road - 6430km and 100,000 km developments by 2025; 7,411 km Road Lengths to be overlayed and 2,550 km of Road lengths to be widened & improved by 2030 and Inclusive connectivity and Development project (ICDP) 1200km	√	√	√	√	√						3.9, 7.3, 9.1, 11.2, 11.6

11.2: Expansion of expressway network	Min in-charge of highways	MoT, RDA, Private Investors/Develop-ers, Stakeholders of PPP Arrangements	Length of express-way roads devel-oped		Records of Min in-charge of hig ways, RDA	272 km (Four expressways: Kottawa-Mattala (E01); Colombo-Katunayaka (E03); Outer Circular Highway (E02) Kottawa-Kelawarapitiya; Andarawewa –Hambanthota). Port Access Expressway (New Kelani Bridge to church at port – 5.7km Elevated Expressway from New Kelani Bridge to Athurugiriya -16.4km Marine Drive Expressway from Port Access Expressway to Kollupitiya – 3.2km	529.5 (additional 257.5 km through Central Express-way; Ruwanpura; Expressway and Extension of Colombo-Katunayake Expressway up to Kochchikade – to be com-menced in 2025)	√	√	√	√	√	√	√	√	√	√	3.9, 7.3, 9.1, 11.2, 11.6

NDC 12 - Reduce GHG Emission from the Marine Sector

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
12.1: Ratification of Annex VI of MARPOL convention and promulgation of necessary legislation to enforce provisions of Annex VI in Sri Lanka	MEPA	Min in-charge of MEPA, MoPorts, MSS, SLPA	Annex VI of MARPOL convention ratified and regulations are implemented		Records of Ministries in-charge of Ports and Shipping, MEPA	Annex I to V of MARPOL Convention have been ratified, but Annex VI is not yet (discussion in progress)	Annex VI ratified	√	√	√	√	√						3.9, 7.3, 11.6
12.2: Study the impact of shipping on GHG emission (coastal traffic and ports) depending on evidence-based information and introduce measures to address the issues	MEPA	MoE, MoPorts, Min in-charge of MEPA, SLPA, MSS, CEA, Academia	Impact of shipping on GHG emission studied/published		Records of Min in-charge of Ports and Shipping, MEPA & MoE	None (No study or programme started, lack of access to data and limited collaborations with other stakeholders are barriers)	GHG Emission estimates are published by 2025	√	√	√	√	√						3.9, 7.3, 11.6, 12.4
12.3: Promote sea transportation	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
12.3.1: Introduce and promote coastal shipping for freight and passenger transport	MoPorts	MoT, Min in-charge of MEPA, MoD, SLPA, MSS, CSC, MEPA SLN, SLCG	1. Number of containers (20 or 40ft) transported per year, 2. Tonnage transported 3. Number of passengers transported		Records of SLPA	Baselines to be established	Targets to be established	√	√	√	√	√	√	√	√	√	√	3.9, 7.3, 11.6
12.4: Introduction of energy efficiency measures and fuel quality improvement programmes to coastal shipping and fishing boats & vessels	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-

12.4.1: Energy efficiency improvement programmes for Vessels & Boats	SLSEA	MoP&E, MoEn, MoPorts, MoFish, CPC, MEPA, SLPA, DoF, SLN, CC&CRMD, CSC, MSS, CEB, Academia	Number of awareness and training programmes conducted per year		Records of SLSEA, SLPA, MoFish, DoF, MSS	None	12 per year during 2023-2030	-	-	√	√	√	√	√	√	√	√	3.9, 7.3, 7.a, 11.6
12.4.2: Energy efficiency improvement programmes for ports/ port operations	SLSEA	MoP&E, MoE, MoFish, MoPorts, CPC, MEPA, SLPA,CSC, DoF, SLN, CC&CRMD, MSS, CEB, Academia	Number of awareness and training programmes conducted per year		Records of SLSEA, SLPA, MoFish, DoF, MSS	None	12 per year during 2023-2030			√	√	√	√	√	√	√	√	3.9, 7.3, 7.a, 11.6

NDC 13 - Supportive Policy Framework and Activities

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
13.1: Introduce new national policy or make amendments to relevant existing policies to promote electric mobility and hybrid vehicles	MoT	MoE, MoP&E, CPC, SLSEA, CEB, RDA, UDA, SLP, NTC, DMT, SLTrB, SLR, LAs, Private sector Transport Operators	National Transport policy		Gazette	Draft Policy	Approved policy by 2023	√	√	√								3.9, 7.3, 7.a, 11.6
13.2: Introduce fuel-based carbon tax	MoF	MoT, MoE, CPC, SLSEA, NTC, DMT	Fuel-based carbon tax		MoF gazettes	None	Fuel-based carbon tax introduced from 2025	-	-	-	-	-	√	√	√	√	√	3.9, 7.3, 11.6
13.3: Include climate change measures (adaptation & mitigation) in maritime policy making	MoPorts	MoE, MoD, SLPA, MEPA, SLN, CEA, MSC, SLCG	Climate change measures incorporated in maritime policy		Ministry of Ports & Shipping	Baseline to be established	Target to be established	√	√	√								11.6

3.3 Industry Sector

Industries play a pivotal role in economic growth, export drive, income generation, job creation, and poverty reduction. The industrial survey conducted in 2016 by the Department of Census and Statistics reported that there are 20,737 industrial establishments[27] in Sri Lanka, where manufacturing is the largest segment with 17,719 units. According to the Central Bank Annual Report 2019, industrial production is the second largest contributor to the GDP (26.4%) after the service sector (57.4%); it employs 27.6% of the country's workforce. Textile, apparel, and tea manufacturing are the most significant export-oriented sub-sectors.

As per the Energy Balance 2019 of Sri Lanka Sustainable Energy Authority, the energy required for the industry sector came from three key sources viz biomass (74.4%), fossil fuel - petroleum oil and coal (10.4%), and electricity (15.2%). Biomass is used in tea and rubber factories, bakeries, tile and brick industries, and other micro and small-scale industries. The primary use of fossil fuels is for operating boilers, ovens, and furnaces. The key industries contributing to GHG emissions include cement manufacturing, lime production (for the construction industry), and the industries using limestone and soda ash. However, compared to emissions from industrial energy consumption, industrial processes generate relatively low levels of GHG emissions.

As serious initiatives are underway by major economies to decarbonize their economies, integrating climate change and environmental considerations will be critical for Sri Lanka's industrial development strategy to be relevant and competitive in a rapidly changing global economy.

The GoSL is focusing on creating a globally competitive, high-value-added, innovative, technology- and knowledge-based industry with a minimal adverse impact on the environment that could boost investor confidence, ensure higher export revenues, and achieve sustainable development. Reflecting on this new direction, the Ministry of Industries is now formulating a National Policy for Industrial Development (NaPID) and a five-year Strategic Implementation Plan to operationalize the NaPID.

Alongside this, the Ministry of Industries is exploring the possibility of implementing the following industry sector NDCs (see Table 3-4) through the design and implementation of policy, as well as regulatory, technical & financial mechanisms, and tools to accelerate the deployment of RE, energy & resource-efficient technologies, and best practices.

These NDCs will enhance mitigation ambitions while embracing and incorporating resource efficiency, circular economy, and other internationally acclaimed concepts. It is noted that these NDCs are directly or indirectly addressing energy-consumption-based emissions as there are limited avenues and reliable data sources to account for Industrial Process and Product Use (IPPU) related actions.

27 Annual Survey of Industries (2018),Department of Census and Statistics.

Table 3-4 NDCs of Industry Sector

NDC #	NDC
1	Continue fuel-switching to sustainable biomass energy and improve user efficiency
2	Enhance the application of "Resource Efficient Cleaner Production" (RECP) practices
3	Establish Eco-industrial parks
4	Introduce "Circular Economy" concept
5	Introduce "Tri-generation" facilities
6	Incentivize GHG reduction of clinker production in the cement industry
7	Introduce generic enabling activities

It is expected that these NDCs for 2021 to 2030 will reduce GHG emissions against the BAU scenario by 7% in the industry sector (4% unconditionally and 3% conditionally) equivalent to an estimated mitigation level of 2,088,000 MT unconditionally and 1,482,000 MT conditionally (total of 3,570,000 MT) of carbon dioxide equivalent during that period (Figure 3-5). It should be noted that there are additional emission reductions from various initiatives which are difficult to account for as no systematic reporting/accounting arrangement is yet in place.

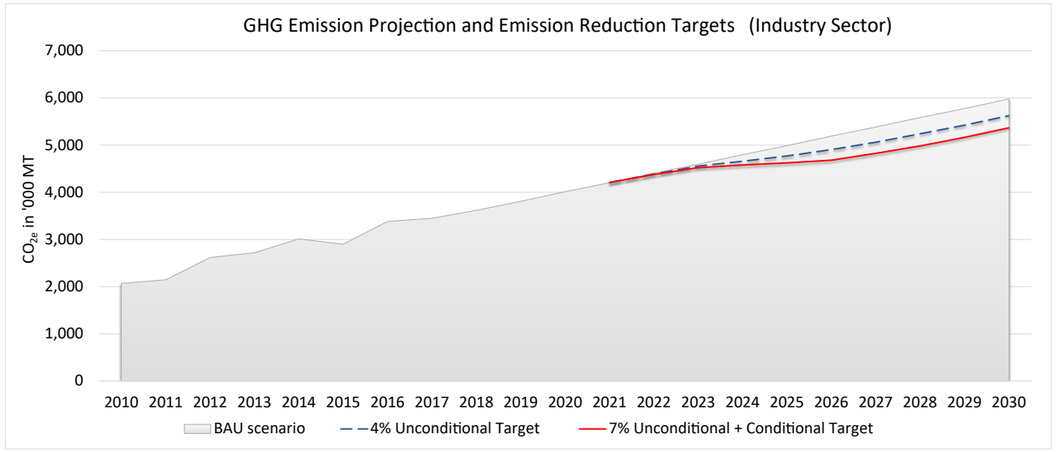


Figure 3-5 Industry Sector GHG Emission Projection and Emission Reduction Targets

3.4.1 Industry Sector NDC Implementation Plan

NDC 1 - Continue fuel switching to sustainable biomass energy & improve user efficiency in selected industrial subsectors such as tea, rubber, apparel, hotel & tourism, rice processing, etc.

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1: Conversion of industry furnaces to steam boilers and hot-water systems, and continued use of sustainable biomass energy in the industry	SLSEA	MoI MoP&E, SLTB, TRI, SLTDA, CIAs	Number of industrial boiler conversions		Through NEEA applications, ESCO & boiler supplier records	500	90	√	√	√	√	√	√	√	√	√	√	7.2
1.2: Biomass user efficiency improvement in industry (SMIs and Large) – Across industry sub sectors	SLSEA	MoI, MoP, SLTB, TRI, SLTDA, CIAs, SLSI	Number of improvements, Feed quality Standard		Through NEEA applications, ESCO & boiler supplier records	500	300	√	√	√	√	√	√	√	√	√	√	7.2 & 7.3
1.2.1: Improve biomass feedstock quality (type, size, dryness, storage, etc.) through standardization 1.2.2: Energy efficiency improvement by O&M and system design improvements (Including flue gas recirculation, Air preheaters)	Contributions of sub activities 1.2.1 to 1.2.2 are reflected in the main activity 1.2 and hence the details of sub activities are not provided in this implementation plan. However, stakeholder agency (in this case SLSEA) responsible for the same in line with its institutional framework.- for the implementation of these subactivities is expected to develop its own comprehensiveaction plans																	
1.3: Introduce biomass co-generation (heating & cooling) in industries	SLSEA	MoI, SLTDA, CIAs	Number of systems installed		SLSEA records	4	25	√	√	√	√	√	√	√	√	√	√	7.2 & 7.3
1.4: Switching fossil fuel fired thermal energy generators to biomass energy in government institutions for thermal energy requirements – Biomass fired hot water heaters in hospitals, prisons, arm forces, hostels, universities, etc.	SLSEA	MoH, MoD, MoEd	Number of hot water systems installed		SLSEA records	25	192	√	√	√	√	√	√	√	√	√	√	7.2

NDC 2 - Enhance the application of Resource Efficient Cleaner Production (RECP) practices in selected industrial sub sectors

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1: Conduct RECP and energy audits and develop baselines based on industry classifications & importance	MoI	NCPC, SLSEA, SLEMA, BOI, Service providers of SCP & EE	Percentage and number of industries CP & energy audits conducted		Records of MoI	300 (Out of 3,000 to 5,000 industries, Source - NCPC and CEA)	25% relevant industries (Around 500)	√		√	√	√						9.4
2.2: Adopt RECP practices including low carbon technologies and processes	MoI	MoPC&LG, NCPC, IDB, CDA, RRI, ITI, Service providers of WM, CIAs	Number of industries adopting RECP practices and acquiring low carbon technologies and processes		Records of MoI	250	400 out of 500 above targets	√		√	√	√	√	√	√	√	√	6.2, 6.3, 6.4, 7.2, 7.3, 8.4, 8.8, 9.4, 12.2, 12.4 & 12.5
2.3: Improve water use efficiency in selected industrial subsectors	MoI	MoPC&LG, NCPC, SLSEA, IDB, CDA, RRI, CIAs	Percentage of relevant industries engaged		Records of MoI	100	50% relevant industries (such as Agro based industries: Food & Beverages, dairy, fish processing, Dessicated Coconut, textile finishing, etc.)	√	√	√	√	√	√	√	√	√	√	6.4
2.4: Promote energy efficient appliances & technologies for selected industrial sub-sectors:	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.4.1: High-Efficient Motors (HEM) for water sector (focusing National Water Supply and Drainage Board)	NWSDB	SLSEA	Energy saving from High-Efficient Motors (HEM)		Records of NWSDB	775 GWh	18 GWh per year (2.25% reduction)	√	√	√	√	√	√	√	√	√	√	7.3
2.4.2: Variable Frequency Drives (VFD) for appropriate industries (focusing tea industry)	SLSEA	SLTB, TRI	Energy saving from Variable Frequency Drives (VFD)		ESCO records through SLSEA & MoI	590 GWh (Facilitated by Energy NAMA Project)	2,900 GWh	√	√	√	√	√	√	√	√	√	√	7.4
2.4.3: Efficient chillers & refrigeration technologies (replacement) for supermarkets, textile and apparel, hotel, dairy sectors	SLSEA	MoI, MoP&E, BOI, RISC, IDB, ISB, LINDEL, UDA, NCPC, NERDC, GBCSL, CIAs	Energy saving from efficient chillers & refrigeration technologies		ESCO records through SLSEA & MoI	1,300 GWh	170 GWh	√	√	√	√	√	√	√	√	√	√	7.5

2.5: Waste minimization, waste management, resource recovery & residual (sludge & sewage) processing while enhancing resource efficiency in selected industrial subsectors (such as coconut, food industry)	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.5.1: Promote wastewater treatment with optimum water reuse possibilities for Food & Beverage, dairy, rice, and other water-based industries	MoI	MoPC&LG,, NCPC, IDB, CDA, RRI, ITI, Service providers of WM, Relevant CIAs	Percentage of relevant industries engaged		Industrial database of CEA	1,500	50% relevant industries	√	√	√	√	√	√	√	√	√	√	9.4
2.5.2: Promote sewage treatment (with optimum water reuse possibilities) facilities for hotel, apartment complex, garment and apparel and other potential industries (on-site and centralized)	MoI	MoPC&LG NCPC, IDB, CDA, RRI, ITI, Service providers of WM, Relevant CIAs	Percentage of relevant industries engaged		Industrial database of CEA	Treatment plants including sewage Garment & Apparel – 715, Food & Beverage – 3,952, Hotels & Apartment complexes – 2,171 (From CEA EPL database)	50% relevant industries		√	√	√	√	√	√	√	√	√	9.4

2.5.3: Encourage biodegradable waste treatments (composting and biogas) where applicable	MoI	MoPC&LG, NCPC, IDB, CDA, RRI, ITI, NSWMSC, Service providers of WM, Relevant CIAs	Percentage of relevant industries engaged		EPL database of CEA	According to CEA, as at May 2019, 119 composting projects were in operation out of 137 composting projects assisted by the Pilisaru programme in Local Authorities No data available in the industry sector and hence baseline to be established	60% relevant industries	√	√	√	√	√	√	√	√	√	√	7.2 & 9.4
2.5.4: Minimizing packaging, raw material & rejections, etc.	MoI	NCPC, IDB, CDA, RRI, ITI, Service providers of WM, Relevant CIAs, SLIP	Percentage of relevant industries engaged		BOI, CEA, SLIP records	70% of BOI industries have already minimized packaging to the extent possible	70% relevant industries	√	√	√	√	√	√	√	√	√	√	9.4
2.5.5: Minimizing chemical use	MoI	NCPC, IDB, CDA, RRI, ITI, Service providers of WM, Relevant CIAs	Percentage of relevant industries engaged		CEA, BOI records	25% of BOI industries	70% relevant industries	√	√	√	√	√	√	√	√	√	√	12.4
2.5.6: Adopt low carbon technologies and processes for improved resource efficiency	MoI	Technology providers, Relevant CIAs	Percentage of relevant industries engaged		To be identified	Baseline to be established	70% relevant industries	√	√	√	√	√	√	√	√	√	√	9.4

2.5.7: Promote VOC emission controlling system for painting industry, tire factories & printing industries.	CEA	BOI, MoI, IDB, ISB, RISC, NCPC	Percentage of relevant industries engaged		CEA EPL database	No data available in the industry sector and hence baseline to be established	30% relevant industries	√	√	√	√	√	√	√	√	√	√	12.4
2.5.8: Introduce waste heat recovery systems for rice milling & textile finishing, ceramics	SLSEA	MoI, Service providers of Energy, Relevant CIAs	Number of systems installed		SLSEA records	Baseline to be established after carrying out a potential identification survey	Targets to be established after carrying out a potential identification survey	√	√	√	√	√	√	√	√	√	√	7.3

NDC 3 - Establish eco-industrial parks and eco-industrial villages

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1: Transform existing IPs, incorporating maximum possible green industrial concepts	BOI, MoI	RISC, IDB, ISB, LINDEL, UDA	Number of existing BOI EPZs transformed to eco IPs, Percentage of existing non-BOI IPs transformed to eco IPs		Records of IP operators	0	04 (BOI to upgrade existing infrastructure of waste water treatment plants in Seethawaka, Horana, Koggala & Mawathagama EPZs), 50% Non-BOI IPs	√	√	√	√	√	√	√	√	√	√	9.4
3.1.1: Conduct a survey of all existing IPs to assess the present level of resource efficiency and the adoption of SCP best practices	Contributions of sub activities 3.1.1 to 3.1.10 are reflected in the main activity 3.1 and hence the details of sub activities are not provided in this implementation plan. However, stakeholder agencies responsible for the implementation of these subactivities is expected to develop its own comprehensive action plans for the same in line with its institutional framework.--							-	-	-	-	-	-	-	-	-	-	-
3.1.2: Establish criteria for eco-industrial park establishment								-	-	-	-	-	-	-	-	-	-	-
3.1.3: Review and improve the existing designs and optimize guidelines for IPs, including environmental, economic, and social standards			-	-				-	-	-	-	-	-	-	-	-	-	-
3.1.4: Search & adapt innovative concepts of other countries (D4S, eco innovation, LCA, circular economy, eco-certification system and digital economy, etc.)			-	-				-	-	-	-	-	-	-	-	-	-	-
3.1.5: Design & implement improved energy, water and material efficiency, and circular economy measures for IPs which would engage SMIs			-	-				-	-	-	-	-	-	-	-	-	-	-

3.1.6: Introduce holistic waste management (Solid, liquid and gaseous) approach including minimization of waste generation								-	-	-	-	-	-	-	-	-	-	-				
3.1.7: Retrofit existing infrastructures of SMIs & redesigning processes aligned with SCP and Green Concepts	-	-	-					-	-	-	-	-	-	-	-	-	-	-				
3.1.8: Prepare SMIs for digital economy (networking between key stakeholders & SMIs through data sharing, self-certificate & monitoring)	-	-	-					-	-	-	-	-	-	-	-	-	-	-				
3.1.9: Assist the development of site-specific designing and planning based on experience of other countries for 1 or 2 Eco-IP sites earmarked by the government	-	-	-					-	-	-	-	-	-	-	-	-	-	-				
3.1.10: Establish pilot Eco-IP at suitable locations under the Ministry in charge of Industries,	-	-	-					-	-	-	-	-	-	-	-	-	-	-				
3.2: Introduce policy and regulatory regime, including guidelines to ensure all new IPs will be set up as Eco-IPs.																						
3.2.1: Develop standards and guidelines based on best international practices for setting up future Eco-IPS	MoI	MoE, CEA, BOI, RISC, IDB, ISB, UDA, LINDEL, CIAs	Policy package for Eco-IPs		Records of MoI	0	Policy package for Eco-IPs introduced	√	√	√	√											9.4

NDC 4 - Introduce Circular Economy concept to selected industrial subsectors or selected industrial zones

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1: Conduct a survey to identify and determine the potential subsectors to implement circular economy concept	MoI	BOI, RISC, IDB, NEDA, ISB, LINDEL, UDA, Service providers of SCP & WM, CIAs	Number of industries & sub sectors identified for circular economy		Records of MoI	No data available	All relevant industries	√	√									9.4, 12.4 & 12.5
4.2: introduce the life cycle approach for selected subsectors for greening the supply chain	MoI	NCPC, Service providers of SCP, CIAs	Percentage of sub sectors & industries engaged in greening the supply chain, Pilot demonstration project		Records of MoI, (NCPC, UoM, UoP, UoJP)	15 (Conducted by NCPC, UoM, UoP, UoJP)	100	√	√	√	√	√	√	√	√	√	√	12.4
4.3: Practice Industrial symbiosis concept in selected industrial parks or industrial subsectors (Agro-based, Apparel, Metal, etc.)	MoI	BOI, RISC, IDB, NEDA, ISB, UDA, LINDEL, Service provider of SCP & WM, Academia	Number of sub sectors & new IPs adopted industrial symbiosis		Records of MoI	Less than 10	All sub sectors & new IPs	√	√	√	√	√	√	√	√	√	√	9.4
4.4: Establish a pilot project on the zero-waste concept in selected industrial parks or industrial subsectors	MoI	BOI, RISC, IDB, NEDA, ISB, LINDEL, UDA, SCP & WM service providers, Academia	Number of zero waste pilots in sub sectors		Records of MoI	A few from apparel and hotel industries	10 industrial subsectors		√	√	√	√						9.4, 12.4 & 12.5
4.5: Adopt ISO standards for circular economy concept (ISO/TC 323)	SLSI	MoI, BOI, RISC, IDB, NEDA, ISB, LINDEL, UDA, Service providers of SCP & WM, CIAs	Percentage of industries adopted ISO/ITC 323		SLSI records	None	70% relevant industries	√	√	√	√	√	√	√	√	√	√	9.4, 12.4 & 12.5
4.6: Build industry capacity to adopt circular economy concept	MoI	NCPC, SCP & Service providers of WM, CIAs, Academia	Percentage of industries adopted circular economy concept		Records of MoI	10% of industries	70% relevant industries	√	√	√	√	√	√	√	√	√	√	9.4, 12.4 & 12.7

NDC 5 - Introduce Tri-generation facilities to selected industrial parks

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
5.1: Carry out a rapid assessment of tri-generation potential in 10 industrial parks	SLSEA	BOI, MoI, Academia	Number of rapid assessments completed		Records of SLSEA	1	9	√	√	√	√							7.2 & 7.3
5.2: Carry out a detailed assessment in one of the BoI industrial parks for piloting at Biyagama export processing zone - EPZ	SLSEA	BOI	Detailed assessment		Records of SLSEA	None	Detailed assessment completed	√	√									7.2 & 7.4
5.3: Develop business models and funding options	BOI	MoI, SLSEA	Business models and funding options		BOI records	None	3 Business models and funding options completed		√	√								7.2 & 7.5
5.4: Implement one tri-generation facility as a pilot project	BOI	SLSEA	Pilot tri- generation facility		BOI records	None	1 Pilot tri- generation facility established at Biyagama				√	√	√	√				7.2 & 7.6
5.5: Depending on the success of the pilot project, expand it into BoI and other industrial parks and other prospective applications	BOI	MoI, SLSEA, CIAs	Number of tri- generation facilities established		Records of MoI, SLSEA, CIAs	None	5								√	√	√	7.2 & 7.7
5.6: Make provisions through policy instruments to have tri-generation for new industrial zones	MoI	SLSEA, CIAs	Policy package		Records of MoI	None	Policy package introduced								√	√	√	7.2 & 7.8

NDC 6 - GHG reduction of clinker production in the Cement industry																				
Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)												Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
6.1: Make necessary amendments to SLSI standards for cement production enabling the increase of ash and other similar materials as substitutes for clinker in line with industry standards / trends worldwide (GHG reduction through the avoided production of clinker)	SLSI	Relevant cement industry, MoI, MoE, CEA	Introduction of relevant standards, GHG reduction		Records of SLSI, Relevant cement industry	Existing SLSI standard	Two relevant standards already introduced but the awareness of prospective users needs to be created. Percentage and absolute amount of GHG reduction	√										9.4, 12.2, 12.4 & 12.5

NDC 7- Introduce NDC Support Policy Tools and Instruments (Enabling generic activities)																				
Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)												Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
7.1: Facilitate industries in selected sub sectors to adopt relevant ISO systems having a focus on GHG emission reduction such as ISO 50001 & ISO 14064-1 (updated) (Subsectors: Tea, Garment and Apparel, Food processing, etc.)	MoI	SLSI, BOI, RISC, IDB, NEDA, ISB, UDA, LINDEL, NCPC, Service providers of EE, SCP & WM, CIAs	Percentage of industries adopting various ISO systems		NCPC records	100	25% relevant industries	√	√	√	√	√	√	√	√	√	√	7.3, 8.8, 9.4, 12.2, 12.4 & 12.5
7.2: Introduce and promote suitable tax incentives such as double deduction to promote the acquiring of sustainable technologies	MoI	MoF	Financial and non-financial incentives		MoI records	Baseline to be established	50% relevant industries	√	√	√	√							8.3 & 9.3

7.3: Facilitating the entry of environment related ISO certified companies to enter the Sustainable (Green) Public Procurement system of Sri Lanka	MoE (Env Planning & Economics Division)	MoI, MoF	Number & percentage of environment related ISO certified industries entering into Sustainable (Green) Public Procurement system		MoE & MoF records	None	Target to be established after introducing the Sustainable Public Procurement System	√	√	√	√	√	√	√	√	√	√	12.7
7.4: Facilitating transformational investment, favourable loans through financing institutions linking with green financing	MoI	MoF	Number & percentage of industries benefitting from green financing		MoI records	SMILE III Loan scheme – 2,997 projects and Rs 13,522.80 million from 2013 to 2020 E-Friends II Loan scheme – 96 projects and Rs 935.75 million from 2018 to 2020	SMILE III Loan scheme – Rs 1.5 billion per year E-Friends II Loan scheme – Rs 600 million per year	√	√	√	√	√	√	√	√	√	√	9.3
7.5: Introduce a national policy to address siting of industrial parks and stand-alone industries, new concepts like circular economy, industry ecology, RECPs, digitalization, etc.	MoI	MoE, CEA, Relevant CIAs, Academia	Policy package		MoI records	None	Policy package strengthen	√	√	√	√							8.3 & 9.4
7.6 Ensure the availability of sustainable biomass for industry use																					
7.6.1: Ensure the availability of sustainable biomass for industry use through necessary facilitation and coordination with relevant policy making and regulatory authorities by adopting policy tools such as SLSI 1551	SLSEA	FD , MoP&E, MASL	Percentage of Industries having access to sustainable biomass		SLSEA records	Baseline to be established after introducing a mandatory reporting system	100% relevant industries	√	√	√	√	√	√	√	√	√	√	7.2
7.7: Promote National Green Reporting System (NGRS) as an encouragement for industries to embrace low carbon initiatives	MoE (Env Planning & Economics Division)	MoI, CEA, SLSEA, BOI, RISC, IDB, NEDA, ISB, LINDEL, UDA, NCPC, CCC, ITI, CIAs	Number of Green Reporters registered and reported		MoE records	Approximately 178 registered to date out of which less than 10 annual report submissions in place	20% annual increase of registrations and 50% annual report submissions	√	√	√	√	√	√	√	√	√	√	12.6

3.5 Waste Sector

People who live in urban areas are more directly and aggressively impacted by the waste sector's multifaceted impacts on human life. The efficiency of waste management directly impacts the environment, biodiversity, public health, society, and the economy. The waste sector plays an important role in several SDGs, including SDG 3 (Good health and well-being), SDG 11 (Sustainable Cities and Communities), and SDG 12. (Responsible Consumption and Production). Waste has long been a global problem, and by 2025, the amount of Municipal Solid Waste (MSW) produced daily per person is expected to reach 1.42 kg. Therefore, 2.2 billion tonnes of MSW will be produced annually by the 4.3 billion people who live in metropolitan areas[28].

It has estimated that Sri Lanka generates around 8,000 to 9,000 MT of Municipal Solid Waste (MSW) per day (equivalent to about 0.41 kg/capita/day) with the Western Province accounting for 3,500 MT (43%) of mass. Waste collection by local authorities is about 60% in the Western Province and 30% in other provinces[29]. With population growth, fast development of infrastructure, rapid urbanization, industrial growth, increase of per capita income, rise in living standards, changing lifestyle, and economic conditions, the generation of municipal solid waste is expected to increase in the decade from 2021 to 2030. However, due to the present downward global economic condition and temporary shrinking of the country's economy, significant changes in the waste generation and collection have been noted, which will reflect on the progress of the GHG mitigations estimated during 2021 and 2022. This situation may prevail during 2023 too. The limited coverage of proper waste collection mechanisms, inadequate infrastructure facility for waste collection, treatment, and final disposal, inadequate public awareness and commitment to waste management, and practical difficulties in the application of 3R principles are some of the underlying issues of the current waste management practices. Technologies and methods used for waste management are well accepted, however innovative technologies and strategies are yet to be introduced to streamline and modernize existing waste management practices.

At the national level, Sri Lanka has an institutional and regulatory framework with environment-related policies, strategies, and guidelines on waste management. Referring to the future outlook & GHG emissions reduction potential in the waste sector, the prioritized objectives of the recently approved National Policy on Waste Management (2019) are waste avoidance and reduction. The next level of management recommends the adoption of waste recycling and other forms of environmentally-sound disposal; re-use of unavoidable waste to the most acceptable extent possible; maintaining hazardous substances in waste at the lowest possible level and guaranteeing an environmentally sound residual waste treatment and disposal underlining the gradual shift from a waste generating socio-cultural regime to a new paradigm in which waste disposal is minimized in favor of reuse and reduced consumption. The National Action Plan for Plastic Waste Management 2021-2030 has identified the facilitation of collection of segregated plastic waste and recycling of plastic waste as a profitable business to produce quality raw material for the plastic industry as a key activity of the plan.[30] The gazettes of 2006, 2017[31] and 2021[32] have highlighted the need to prohibit the use of polythene products less than 20 microns, single-use-plastics, open-burning of polythene etc. Further, along with other measures, awareness through education and attitude change among the public is required to realize a sustainable waste management system. A long-term solution that addresses the issue of open dumping and creates economic/fiscal disincentives for waste generation is needed.

28 Bhada-Tata, P.H.; Daniel, A. What a Waste? A global review of solid waste management (English). In Urban Development Series Knowledge Papers; No. 15; World Bank Group: Washington, DC, USA, 2012.
29 National Environment Action Plan 2022-2030 (NEAP)
30 https://ccet.jp/sites/default/files/2021-08/srilanka_report_web_fin_pw.pdf
31 Gazette No.2034/34 to 38 -2017.09.01
32 Gazette No.2211/51 of 2021.01.21

The Waste Management Authority of Western Province (WMA-WP) with the technical support of the JICA (Japan International Co-operation Agency) and with the consultation of other stakeholder institutes, the twenty-years (2022 to 2042) Master Plan for MSW management has been developed [33]. In the Master Plan, further reduction of waste generation by continually promoting the circular economy principles in waste management has been highlighted. Moreover, the targets have been fixed to optimize resource recovery by adopting technological options such as composting, recycling, and waste-to-energy. Hence, open burning and open dumping will be eliminated with the full implementation of the said Master Plan in the province. The guidelines for safe closure and rehabilitation of Municipal solid waste dumpsites in Sri Lanka (2021) further supports this effort[34].

In the Western Province, two private developers were granted permission for waste-to-energy generation projects with capacities of 700 and 500 MT/day. The first plant has been established at Kerawalapitity and it is in commercial operation at present, while the other project has been cancelled. Due to the operation of the first plant, 45% of collected burnable waste is used for energy recovery. However, there have been operational issues related to the quantity of waste available and electricity feed-in tariff that is not tagged to USD. Further, there are concerns on the impact of waste segregation and recycling, as the plant accepts mixed waste.

In addition to three large-scale compost facilities which are operated by the WMA-WP, there are 27 composting facilities in operation and their total design capacity is 300 MT/day. Presently, about 12% of collected waste is composted through the above facilities, and out of the total waste collection, the percentage recycled by the Local Authorities (formal sector) is around 2%. Further, the amount recycled by the informal sector is four or five-fold higher than that of the formal sector. However, still 40% of collected waste is openly dumped at 21 open dumpsites in the province.

In other provinces, recycling and composting are the main technologies adopted for material recovery in the daily waste stream. Among the composting facilities, there are nine (09) KAWASHIMA composting facilities with a capacity of 50 MT/day in each which are established by the Ministry of Local government.

The country faces challenges in the management of several other major waste streams such as electrical and electronic waste (e-waste), healthcare waste, construction and demolished waste, chemical and other hazardous waste due to lack of proper storage, treatment and disposal facilities. In the case of e-waste, CEA maintains a list of licensed E-waste collectors. Yet the processing capabilities to ensure complete management and safe disposal of E-waste is limited. INSEE Ecocycle Lanka (Private) Limited (formally M/s Holcim Geocycle), possesses the only facility in the country capable for safe management of hazardous waste, through cement kiln co-processing. However, it cannot meet the country's total demand for hazardous waste disposal. The facility has been used for the disposal of part of the obsolete POPs accumulated over the last few decades, pesticides and contaminated products, and PCBs containing oil. Further, many local authorities send their segregated burnable waste to INSEE for co-processing. In the case of healthcare waste, considerable efforts have been taken in the sector in promoting holistic waste management concepts. Though considerable progress is achieved in segregation of waste in majority of healthcare facilities, and introduction of treatment technologies (such as incineration and hybrid autoclave), there are issues related to proper operation of treatment facilities and disposal of residues/treated waste. The Ministry of Health, with the assistance of international development partners, has initiated healthcare waste management programmes to address these issues.

33 Government of Sri Lanka. (2023). Western Province Solid Waste Management Master Plan. Retrieved from https://wma.wp.gov.lk/notice/8
34 https://ccet.jp/publications/guidelines-safe-closure-and-rehabilitation-municipal-solid-waste-dumpsites-sri-lanka

The NDCs of the waste sector (given in Table 3-4) will enhance mitigation ambitions while embracing circular economy concepts spelt out in the national policies for Waste Management and Sustainable Consumption and Production (SCP).

Table 3-5 NDCs of Waste Sector

NDC #	NDC
1	Improve “Circular Economy” practices in all MSW generation sources
2	Manage biodegradable waste components through treatments
3	Introduce energy recovery using non-compostable non-recyclable waste which cannot be managed by other means
4	Use of sanitary landfill for the disposal of residues (non-compostable, non- recyclable, non-recoverable, and residues from waste to energy plants) will be increased from the current level of 5% to 100% on weight basis
5	Generic enabling activities

It is expected that the implementation of NDCs during the period of 2021 to 2030 will result in GHG emission reduction against the BAU scenario by 11% reduction in the waste sector (8.5% unconditionally and 2.5% conditionally) equivalent to an estimated GHG emissions reduction of 2,549,000 MT (1,969,000 MT unconditionally and 580,000 MT conditionally) of carbon dioxide equivalent during that period (see Figure 3-6).

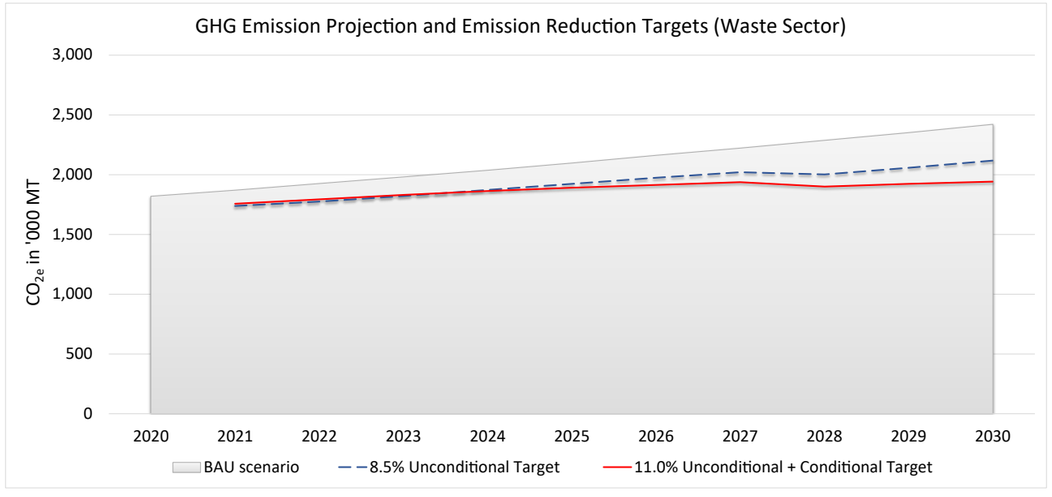


Figure 3-6 Waste Sector GHG Emission Projection and Reduction Targets

3.5.1 Waste Sector NDC Implementation Plan

NDC 1: Improve “Circular economy” practices in all MSW generation sources																					
Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)												Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1: Prevent, avoid or reduce MSW generation by reducing the growth rate by 10% and also total coverage for treatment and disposal of industry solid waste and effluents	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.1.1: Reduce MSW generation growth rate by 10 %	Ministry in Charge of PCs, and LAs	LAs, WP-WMA, NSWMSC, MoE, PCs	Reduction of waste generation growth rate		Derived from annual waste auditing - WP-WMA for WP, NSWMSC for other provinces	2% (The estimated MSW generation rate is around 7000MT/ day and the estimated annual generation growth rate is 2%)	1.8%	√	√	√	√	√	√	√	√	√	√	1.6, 3.9, 8.4, 12.2, 12.3, 12.5
1.1.2: Total coverage for treatment and disposal of industrial solid waste & effluent (Major industries; BOI Zones, non-BOI Industrial Parks, BOI approved standalone industries, other standalone industries and other SMEs)	MoI	MoE, BOI, IDB, RISC, UDA, ISB, LINDEL, CCC, CEA, LAs, NWPEA	The percentage covered of industrial solid waste & effluent treatment and disposal		Data Collection from CEA, BOI and other industry zone operator	**BOI** Solid waste generation rate in BOI zones are around 269 MT/ day and effluent generation is around 48,110 M3 /day **Others** Baseline to be identified	100% coverage of Solid waste and industrial effluent generated.	√	√	√	√	√	√	√	√	√	√	3.9, 8.4, 9.4, 11.6, 12.2, 12.3,12.5

1.2: Improve the segregation of MSW at source and increase number of segregation categories	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.2.1: Increase the level of waste segregation (perishable, non-perishables)	MoPC&LG	NSWMSC, LAs, PCs, WP-WMA	Percentage of waste segregation		Data source for WP - WP-WMA, Other Provinces NSWMSC	In the WP = 60% Other Provinces = 30% (average)	By 2025, WP=75% Other Provinces - 60% (average)	√	√	√	√	√									11.6, 12.3, 12.5
1.2.2: Increase number of waste segregation categories from 2 to 3 (perishable, potential recyclable, residual) at source	MoPC&LG	NSWMSC, WP-WMA, LAs,	Number of LAs those who have increased their waste segregation categories from 2 to 3		Data source for WP - WP-WMA Other Provinces -NSWMSC	In the WP = 30 number of LAs in 2020 In other Provinces = 60 number of LAs in 2020	All LAs by 2027	√	√	√	√	√	√	√							11.6, 12.4, 12.6
1.3: Improve MSW collection & transportation systems (With appropriate infrastructure facilities through investments in: Vehicles, Transfer stations, Collection centers, Technology: Route-planning, GPS monitoring, Capacity Building)	MoPC&LG	NSWMSC, LAs, PCs, WP-WMA, UDA	Percentage of Population covered by the waste collection services		WP – WP-WMA Other provinces - NSWMSC	WP = 60% (MC = 65%, UC = 72%, PS = 32%) Other provinces = 30%	WP = 75% Other Provinces = 60%														9.a, 11.6, 12.5
1.4: Improve waste recycling of LAs on collection basis	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.4.1: Increase current recycling percentage in Western Province (Trash reverse vending machines, New tech separators, etc. Streamline collections. Waste collection, segregation centers, etc.)	MoPC&LG	NSWMSC, Private Sector recyclers and collectors, Brand owners	Percentage of formal waste recycled by LAs (on collection basis) and the amount of recycling through the informal sector MT/day		Data bases of WP-WMA and CEA, CCC	Formal Recycling % =2% (32 MT/day) (LAs on-collection basis) Informal Recycling 40MT/day	Formal Recycling % = 7% (116 MT/day) Informal Recycling 150MT/day	√	√	√	√	√	√	√	√	√	√				3.9, 8.4, 12.2,12.5,
1.4.2: Increase recycling percentage of the rest of the country	MoPC&LG	MoE, CEA, NSWMSC, NWPEA, Private Sector recyclers and collectors, Brand owners	Percentage of formal waste recycled by LAs (on collection basis) and the amount of recycling through the informal sector in MT/day		Data bases of WP-WMA and CEA, CCC	Formal Recycling % = 1.0% (LAs on-collection basis) and the Informal Recycling 20 MT/day	Formal Recycling % = 5% (LAs on-collection basis) and the target for the Informal Recycling minimum 100MT/day	√	√	√	√	√	√	√	√	√	√				3.9, 8.4, 12.2,12.5

1.4.3: Ensure recycling of Polyethylene Terephthalate (PET) bottles	CEA	MoPC&LG, MoE, CCC, WP-WMA, NSWMSC, NWPEA	% of PET recovery by weight		CCC/CEA data bases	30% by weight	80% by weight	√	√	√	√	√	√	√	√	√	√	3.9, 8.4, 12.2,12.5
1.4.4: Ensure recycling of High Impact Polystyrene (HIPS) cups - (Collection of 960 MT per year)	CEA	MoPC&LG, MoE, CCC, WP-WMA, NSWMSC, NWPEA	% of HIPS recovery by weight		CCC/CEA data bases	3% by weight	15% by weight	√	√	√	√	√	√	√	√	√	√	3.9, 8.4, 12.2,12.5
1.4.5: Ensure recycling of Tetra packs, metallized films and other recyclable packaging materials	CEA	MoPC&LG, MoE, CCC, WP-WMA, NSWMSC, NWPEA	% of recovery by weight		CCC/CEA data bases	0.01% by weight	15% by weight	√	√	√	√	√	√	√	√	√	√	3.9, 8.4, 12.2,12.5
1.5: Implement regulatory framework to control high waste generating products	CEA	MoE, MoI, MoH, LAs, CCC, CAASL, SLSI,SLIP, ITI, Environment Police	Number of Products regulated		CEA	Number of products already regulated 7	By 2023 total number of products regulated 15	√	√	√								9.4,12.5

NDC 2: Manage Biodegradable waste components through biological treatments

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1: Apply composting as a priority treatment for the management of biodegradable wastes (increase the present level of compost preparation from 15% to 30% in WP and from 3% to 30% in other provinces by 2030)	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.1.1: Rehabilitate / restore or improve existing composting facilities for capacity & quality enhancement and for the adoption of new technologies	MoPC&LG, SLLDC	MoA, UDA, Fertilizer secretariat, NSWMSC, WP-WMA	Percentage of existing compost plants rehabilitated/restored, and the capacity enhanced in MT/ day		WP – WP-WMA Other provinces - NSWMSC	Total number of existing composting facilities 195	10% of the existing composting facilities rehabilitated/restored	√	√	√	√	√	√	√	√	√	√	2.4, 12.2, 12.3,12.5
2.1.2: Introduce new composting facilities for potential/prospective Local Authorities.	MoPC&LG	MoE, UDA, NSWMSC, WP-WMA	All LAs covered for composting		WP - WP-WMA Other provinces - NSWMSC	Existing composting facilities = 195 and capacity is around 1,000 MT/ day	By 2025 add ten numbers (10) of new facilities and the total capacity to be added to the existing capacity is 100MT/ day	√	√	√	√	√						2.4, 12.2, 12.3,12.5

2.1.3: Adopt new technologies to enhance the productivity of composting facilities	MoPC&LG, SLLDC	MoST, LAs, PCs, Academia, WP-WMA, NSWMSC	Productivity of composting facilities		WP – WP-WMA Other provinces - NSWMSC	WP = 53%, Other provinces = 5%	WP = 75% Other provinces = above 25%	√	√	√	√	√	√	√	√	√	√	3.9, 8.4, 12.2,12.5
2.1.4: Improve quality / maintenance and gradually upgrade them to SLSI standards	MoPC&LG, SLLDC	MoA, DoA, SLSI, Fertilizer secretariat, WP-WMA, NSWMSC, LAs, CEA	Number and percentage of compost plants registered in the Fertilizer Secretariat Number of plants that have received SLSI standard		WP- WP-WMA Other provinces - NSWMSC	WP= 0, (0%) Other Provinces = 01, (0.6%) SLSI standards = 0	WP =20 (80%) Other Provinces = 33 (20%) SLSI standards = 10%	√	√	√	√	√						12.2, 12.3, 12.4, 12.5
2.1.5: Establish compost yards complying with the Environment Regulations	MoPC&LG, SLLDC	WP-WMA, NSWMSC, LAs, PCs, CEA	Number and percentage of compost plants that have received EPL		Reports from CEA, WP-WMA, NSWMSC, LAs	WP = 11, (40%) Other Provinces = 8 (5%)	WP = 21 (80%) Other Provinces = 42 (25%)	√	√	√	√	√	√	√	√	√	√	2.4, 12.2, 12.3, 12.5
2.1.6: Promote household-level composting	MoPC&LG	LAs, PCs, WP-WMA, NSWMSC, NGOs, INGOs	Percentage of the households that do not depend on degradable waste disposal service offered by their respective LA		WP – WP-WMA Other provinces - NSWMSC	WP = 5% Other provinces 10%	WP = 10% Other provinces 30%	√	√	√	√	√	√	√	√	√	√	2.4, 12.2, 12.3, 12.5
2.2: Apply suitable treatment facilities for liquid waste	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.2.1: Introduce central (networked) sewage and wastewater treatment facilities for selected local authorities	NWSDB	MoPC&LG, MoE. MoWS, , CEA, LAs	Percentage of population covered by sewer networks		NWSDB Progress reports	Population connected to sewer networks 2.1%	Population connected to sewer networks increased to 4.4%	√	√	√	√	√	√	√	√	√	√	3.9, 6.2, 6.3, 9.4, 12.2, 12.4, 12.5
2.2.2: Introduce night soil treatment facilities for disposal of fecal sludge from septic tanks	MoPC&LG, NWSDB	LAs, WP-WMA, PCs	Percentage of safe sanitation coverage by facilitating safe disposal of fecal sludge from septic tanks		Reports from LAs, CEA - Database / receiving EPL	11.1%	57.4%	√	√	√	√	√	√	√	√	√	√	3.9, 6.2, 6.3, 9.4, 12.2, 12.4, 12.5,
2.2.3: Improvements for the treatment and appropriate disposal of industrial wastewater	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-

2.2.3.1: BOI Zones	BOI	MoI, NWSDB	Number of BOI zones subjected to improvement of their treatment and disposal facilities for industrial waste water		Reports form BOI	Total numbers of BOI Zones covered 01 (Total number of BOI zones = 16)	Total numbers of BOI Zones to be covered 05	√	√	√	√	√	√	√	√	√	√	3.9, 6.2, 6.3, 9.4, 12.2, 12.4, 12.5
2.2.3.2: Non-BOI Industrial Parks	MoI	CEA, NWSDB, Industry park operators, RISC, IDB, LINDEL, ISB, UDA	Percentage of non- BOI zones subjected to improvement of their treatment and disposal facilities for industrial waste water		CEA-Database, MoI and records of other industry parks operators	10% Around 3 (Ratmalana, Bataatha, LINDEL)	At least 20% of those that have no treatment and disposal facilities				√	√	√	√	√	√	√	√	3.9, 6.2, 6.3, 9.4, ,12.4, 12.5, 12.2
2.2.3.2.1: Establishing a data base for Non-BOI Industrial Parks for data gathering including industrial waste water generation and treatment	MoI,	BOI, UDA, LAs, CEA, NWPEA	Data base covering all industries		Report form CEA, NWPEA	Stand alone data bases	Live data base established	√	√	√									3.9, 6.2, 6.3, 9.4, 12.2, 12.4, 12.5
2.2.3.3: Stand alone industries acquiring EPL license	CEA	MoI, LAs, NWPEA	Percentage of BOI and standalone industries requiring EPL license		Data base on MoI and CEA & NWPEA	Over 80% of BOI approved enterprises have EPL (BOI – Total Licensed Enterprises - 2,407 Out of witch 361 are within the Zones) Around 70% of non-BOI enterprises have EPL	100% of enterprises obtained EPL license (that are required to obtain EPL)				√	√	√	√	√	√	√	3.9, 6.2, 6.3, ,9.4, 12.2, 12.4, 12.5

2.2.4: Enhance capacities of existing treatment plants or apply new technologies	Authority of respective Industry trial parks or respective operators	MoI, CEA, WM service providers	Percentage of treatment facilities enhanced their capacity with new technologies		Data from LAs, NSWMSC, CEA Database	BOI – Completed 01 (Koggala – 1,000 m3/day) Non BOI - Baseline to be identified	All existing treatment plants	√	√	√	√	√	√	√	√	√	√	3.9, 6.2, 6.3, 9.4, 12.2, 12.4, 12.5,
2.2.5: Establish treatment facilities with disposal for industrial sludge	Authority of respective Industry trial parks or respective operators	CEA, NWSDB, WM service providers	Numbers of treatment facilities enhanced to treat industrial sludge		Data from LAs, NSWMSC, CEA Database	BOI Zones = 04	All BOI zones	√	√	√	√	√	√	√	√	√	√	3.9, 6.2, 6.3, 9.4, 12.2, 12.4, 12.5,
2.2.6: Introduce pollution load-based pricing system for liquid waste	MoE, CEA	MoI, MoUD&H, NWSDB, CC&CRMD, BOI, ITI	Percentage of BOI zones introducing Pollution Load Based / Volume Based pricing system (gazetted and implemented)		Relevant gazette notification and CEA reports	0 (Act amendment is in progress)	At least 25% of Zones (Live and operate)	√	√	√	√	√	√	√	√	√	√	3.9, 6.2, 6.3, 9.4, 12.2, 12.4, 12.5
2.3: Where compositing is not practical, use biogas technology for the management and treatment of biodegradable solid waste with triple benefits (Methane management, energy recovery option and organic nutrients)	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.3.1: Facilitate biogas technology in selected sectors (mass scale commercial establishments and households)	In charge of respective selected sector	WP-WMA, CEA, SLSEA, Service providers	Number of institutions /establishments with biogas systems		Data sources from CEA. Private institution	20,000 number of individual units	40,000 number of individual units	√	√	√	√	√	√	√	√	√	√	3.9, 6.3, 7.2, 9.4, 12.2
2.3.2: Biogas cluster system for selected LAs	In charge of respective LAs, Private sector	CEA, SLSEA, Service providers/ Developers	Number of centralized biogas system in operation		Data sources from CEA, WP-WMA, NSWM-SC	No cluster-based biogas system established for LAs	Target to be set	√	√	√	√	√	√	√	√	√	√	3.9, 6.3, 7.2, 9.4, 12.2

NDC 3: Introduce energy recovery using non-compostable non-recyclable waste which cannot be managed by other means

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1: Establishment of already committed 2 waste-to-energy generation facilities for major/prospective municipalities. (Capacities 750MT/day and 500MT/day)	MoUD&H, Respective Developers	MoP&E, SLSEA, CEB, WP-WMA, CEA, CMC and LAs	Number of Waste-to-energy facilities in operation and the total capacity		Data sources from WP-WMA, CEA	One facility 750 MT/ day	Add one more facility to the baseline (500MT/day) (Two plants with 1250 MT/day)	√	√	√	√	√	√	√	√	√	√	3.9, 6.3, 7.2, 9.4, 12.2
3.2: Make policy instrument to clearly define the purpose of waste-to-energy and plan the phasing out of preferential feed-in-tariffs	MoUD&H, MoE	MoP&E, CEB,	Policy instrument		Records of MoUD&H	No policy instrument	By 2024 relevant Policy is in place	√	√	√	√							3.9, 6.3, 7.2, 9.4, 12.2
3.3: Formulation of regulations on controlling the disposal of non-compostable and non-recyclable waste through waste to energy facility	CEA	MoUD&H, MoE	Regulation in place		Data sources from MoE, CEA	No regulations	By 2025 relevant regulations are in place	√	√	√	√	√						7.2, 3.9, 6.3, 9.4, 12.2
3.4: Introduce other thermal treatment technologies particularly Pyrolysis technology	WP-WMA & NSWMSC	MoUD&H, Service providers, CEA, CPC	Total number other thermal treatment facilities (Pyrolysis, Gasification) are in operation and their capacity in MT/day		Data sources from WP-WMA and NSWMSC	Total numbers of plants - 05 (Tire pyrolysis = 4, total capacity 600MT/ day, Mixed plastic co-processing =1, capacity 150 MT/day)	Total numbers of plants - 7 By 2025 add two more plants for mixed plastic pyrolysis plants and total added capacity is 200 MT/day	√	√	√	√	√						7.2, 3.9, 6.3, 9.4, 12.2

NDC 4: Use of sanitary landfill for the disposal of residues (non-compostable, non-recyclable, non-recoverable, and residues from Waste to Energy plants) will be increased from the current level of 5% to 100% on weight basis

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1: Operationalize policy & regulation for siting (locating) and implementation of sanitary landfills (with Methane capturing) according to the waste generation and management forecasts	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.1.1: Identifying potential sites for new sanitary landfills	UDA	MoUD&H, MoE, MoPC&LG, CEA, WP-WMA, NSWMSC	Number of new site(s) identified and their design capacity		Site identification report by UDA, CEA (EIA/ER)	Identified – 09 sites for 09 Provinces by the UDA	Acquiring of all identified sites	√	√	√	√	√	√	√	√	√	√	9.a, 11.6, 12.5
4.1.2: Optimize the supply-chain utilization and management of available sanitary landfills	MoUD&H	LAs, WP-WMA, CEA, NSWMSC	Number of LAs connected with the supply chain and the total amount of Waste diverted		Data sources from NSWSC, WP-WMA, Facility operators	Aruwakkalu = 1,200MT/day & no LAs using the facility Dompe = 90MT/day & Two LAs + Industries	Aruwakkalu = 400MT/day & number of LAs could vary and Industries Dompe = 90 MT/day & one LA + Industries	√	√	√	√	√	√	√				9.a, 11.6, 12.5
4.1.3: Introduce transfer stations and transport infrastructure	MoUD&H	LAs, NSWMSC, WMA- WP, CEA	Total No of transfer stations in operation and their total capacity		Record of MoUD&H	No properly developed transfer stations are in operation	By 2026 two transfer stations and the capacity 450MT/day establshed (Kelaniya 400 MT/day, Pohorawatha, Kalutara 50 MT/day)		√	√	√	√						-

4.1.4: Introduce cluster-based sanitary landfill sites to unserved local authorities	MoUD&H	CEA, LAs, WP-WMA, NSWMSC, Donor agencies	Numbers of LAs connected to Aruwakkalu and Dompe sanitary landfills		Records of MoUD&H	Aruwakka-lu - 0 (Total number of LAs serviced is zero) Dompe – 02 LAs served	Aruwakkalu - 50 (Introduced the facility for minimum 50 numbers of LAs including WP and Other poten-tial Provinces) Dompe – 10 LAs (50MT/day)	√	√	√	√	√	√	√	√	√	√	9.a,11.6, 12.5
4.2: Rehabilitate (active and abandoned) existing waste dump sites (50% of 340 sites by 2030)	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.2.1: Preparation of technical manual for rehabilitation of dumpsite by 2021	MoE	WP-WMA, NSWM-SC, CEA, Academia	Published Techni-cal manual		MoE records	Draft manual for dumpsite manage-ment	Technical manu-al was published in 2021	√										9.a, 11.6, 12.5
4.2.2: Safe closure of dump sites by 2030	UDA	LAs, WP-WMA, NSWMSC, CEA	Number of dump-sites closed		Data source of WP-WMA and NSWMSC	WP = around 20 Other provinces 1 (Badulla dump site) (Total no of existing dump sites 339)	All open dumps closed		√	√	√	√	√	√	√	√	√	9.a, 11.6, 12.5
4.2.3: Reduce open dump burning	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.2.3.1: Develop Disaster Contingency Plans/ Preparedness Plan for Disaster Management	NSWNSC, WP-WMA	MoUD&H, DMC, CEA, NBRO	Numbers of high-risk dumps sites having contingen-cy plans		Data source of NSWMSC, WP-WMA	Three Dump sites (Karadi-yana dump site, Meethot-amulla dump site and Seethwa-ka dump site)	By 2026 all high-risk dump sites have contingen-cy plans	√	√	√	√	√	√					9.a, 11.6, 12.5

4.2.3.2: Develop & introduce proper management plans with a monitoring mechanism for open dumps	NSWMSC, WP-WMA	LAs, CEA, DMC, NBRO, UDA	No of open dumps having a management plan with a monitoring system		Data source of NSWMSC, WP-WMA	Three open dumps (Karadiyana dump site, Meethotamulla dump site and Seethawaka dump site)	By 2026 all high-risk dump sites have management plans with a monitoring mechanism	√	√	√	√	√	√					9.a, 11.6, 12.5
4.3: Introduce gas measurement and recovery systems for potential open dump sites (abandoned and existing)	MoUD&H	WP-WMA, NSWMSC, CEA, Service providers,	Number of dump sites rehabilitated with gas measurement and recovery systems		Data sources from MoUD&H, WP-WMA, NSWMSC	Potential sites to be identified	All potential dump sites	√	√	√	√	√	√	√	√	√	√	3.9, 6.3, 7.2, 9.4, 12.2

NDC 5: Generic enabling activities

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
5.1: Update or introduce the required legislations to facilitate and enforce the implementation of NDCs	CEA and all respective lead agencies	MoUD&H, MoE, MoPC&LG, MoI	Number of Legislations enforced		Data sources from CEA	CEA – 11 Legislations (by 2020 11 Regulations have been published for solid waste management)	CEA – 18 Legislations (By 2026 Seven more Legislation to be published and total legislation will be 18)	√	√	√	√	√	√					3.9, 6.3, 9.4, 11.6, 12.4, 12.5, 13.2
5.2: Introduce a mechanism for waste generation forecasting and a tracking system to monitor collection and disposal	MoPC&LG	MoE, NSWMSC, WP-WMA, CEA, ICT Service Providers	Number of LAs having tracking systems		Data sources from MoE WP-WMA NSWMSC	04 LAs have systems	By 2030 all MCs and UCs have tracking systems	√	√	√	√	√	√	√	√	√	√	9.c, 3.9, 6.3, 9.4, 17.18, 11.6, 12.4, 12.5

5.3: Introduce legislation to make segregation of waste at household level mandatory	CEA	MoPC&LG, MoE, NSWMSC, WP-WMA	Legislation		Data source of CEA	Western Province Waste Mgt Rule no 01 of 2008 and Directive given by the MoPC&LG	By 2024, regulation enforced for waste segregation	√	√	√	√										3.9, 6.3, 9.4, 11.6,13.2, 12.4, 12.5
5.4: Introduce or amend necessary legal framework and instruments to initiate Market-Based Instruments (MBIs) and non-market-based instruments to incentivize and promote sustainable production and consumption patterns	MoE	MoPC&LG , MoI, CEA, WP-WMA, NSWMSC	Market based instrument and non-market-based instruments		MoE records	EPR and PPP system are included to the amended waste management policy (2019)	Amending of existing market-based instrument on requirement basis	√	√	√	√	√	√	√	√	√	√				3.9, 6.3, 9.4, 11.6, 12.4, 12.5,13.2
5.5: Implement “Polluter Pays Principle” for mixed waste generators	MoPC&LG	MoE, CEA, LAs, PCs, WP-WMA, NSWMSC	Percentage of Local authorities introducing service charge system for commercial sector		WP-WMA, NSWMSC	WP: execution of service charging system for commercial places = 70% Other Provinces: 5%	WP = by 2025 all commercial places Other provinces - Target to be established	√	√	√	√	√									3.9, 6.3, 9.4, 11.6, 12.4, 12.5,13.2
5.6: Conduct awareness programs for behavioral changes of waste generators and capacity building programs for waste management personnel	MoPC&LG	WP-WMA, NSWMSC, LAs, MoE	Number of capacity building and awareness programs conducted annually		Western Province - WP-WMA, Other provinces - NSWMSC	Annual average capacity building programs = 150 and awareness programs = 500	Target to be established	√	√	√	√	√	√	√	√	√	√				3.9, 6.3, 9.4, 11.6, 12.4, 12.5,17.9
5.7: Introduce public-private-partnerships to finance waste management projects facilitating NDCs	MoE, MoPC&LG	LAs, WP-WMA, NSWMSC	Number of PPPs		WP-WP-WMA, Other provinces NSWMSC	In the Western Province: 03 PPPs in Waste to Energy	Target to be established	√	√	√	√	√	√	√	√	√	√				3.9, 6.3, 9.4, 11.6, 12.4, 12.5,17.17

3.6 Forestry Sector

Sri Lanka's forest cover includes savanna, mangroves, open, sparse, and dense forests, and it exhibits diversity and dispersion across the wet, dry, and intermediate climate zones of the country.The forest cover of the country decreased from 84% in 1881 to 29.2% in 2015. The total land area declared under the Forest Conservation Act in accordance with the FAO definition is 1.3 million ha (FSMP, 2023 draft obtained from ESCAMP).

The forestry sector in Sri Lanka plays a crucial role in providing various resources for the population as well as ensuring environmental balance. Some of these benefits include assisting agriculture, providing timber and non- timber resources, providing and regulating water, protecting soils and coastlines from erosion, and reducing GHG emissions.

A key document that supported the sector is the Forestry Sector Master Plan (FSMP) 1995-2020, a comprehensive long-term development framework, which provided the guidance to the forestry sector in sustainable management of forest resources of the country, while ensuring provision for eco-system services to the society. This had its foundation in the National Forestry Policy 1995. Based on this, many forestry related investment programmes were formulated, and several actions were successfully implemented. In order to further the initiatives taken, development of a new FSMP 2021-2030 has been initiated in 2021. This is expected to build on national policies, laws and regulations and international commitments and obligations to reflect new issues as well as trends.

The draft FSMP has incorporated to address climate change adaptation and mitigation in the Action Plan. It has further highlighted the importance of promoting Trees Outside Forests (TROF) for carbon sequestration. Further, the Outputs and Activities Plan has captured the progress of activities with global goals and commitments such as the NDCs and SDGs.

However, the sector faces numerous threats such as deforestation, land degradation, soil erosion, illegal logging, poaching, mining, forest fires, and the deterioration of coastal forests which cause the sector to contribute significantly to the country's greenhouse gas emissions.

To mitigate climate change and increase the country's forest cover, Sri Lanka's NDCs in forestry sector as listed in Table 3-5, focus on conserving existing forests, restoring degraded forests, establishing new forest plantations, and working with the business sector to improve commercial and utility forests. Encouraging home gardens and promoting the "tree outside forests" (TROF) with support from state and non-state actors can also help increase the forest cover.

In addtion, Sri Lanka leads the Action Group on Mangrove Ecosystems and Livelihoods under the Commonwealth Blue Charter initiative for ocean protection and economic development. Studies are being carried out to assess the blue carbon stocks in mangrove ecosystems, seagrass meadows and salt marshes and their potential in climate change mitigation[35] and also as investment potential as natural capital. However, degazetting and contradictory policies and gazettes in other sectors are barriers in securing carbon sequestration.

35 Gunathilaka et al, Blue Carbon Stocks; Distribution, Threats, and Conservation in Sri Lanka; Insight Towards Climate Change Mitigation, Rajarata University Journal, (2022), Vol 7 (1).

Table 3-6 NDCs of Forestry Sector

NDC #	NDC
1	Increase forest cover* of Sri Lanka up to 32%** by 2030
2	Improve the quality of growing stock of natural forest and plantations
3	Strengthen catchment protection of major rivers and cascade systems
4	Improve and increase of Trees Outside Forests (TROF)
5	Generic enabling activities

**As per the FAO definition of forests which includes forest plantations, natural forests including mangroves.*
*** 30.8% to be achieved through forest plantations and natural forests and the rest to be achieved through TROF.*

Figure 3-7 provides a graphical representation of this increase in carbon sequestration. These estimates are based on the conservation of existing forests, the enrichment and restoration of degraded forests, and the establishment of new forest plantations, as well as the promotion of the "tree outside forests" (TROF) and home gardens. The business sector will also be involved in improving commercial and utility forests.

It's worth noting that these estimates are subject to various uncertainties and assumptions, including the implementation of NDCs, land-use changes, and climate variability. However, achieving the anticipated increase in carbon sequestration through the forestry sector's NDCs can contribute to Sri Lanka's climate change mitigation efforts, while providing numerous benefits, such as protecting biodiversity, improving ecosystem services, and supporting rural livelihoods.

It is expected that the implementation of Sri Lanka's forestry sector's NDCs from 2021-2030 will improve the country's carbon sequestration capacity by 7% compared to the BAU scenario. This translates to an anticipated increase in the sequestration of carbon dioxide equivalent to 2,357,000 MT (705,000 MT unconditionally and 1,652,000 MT conditionally) during this period.

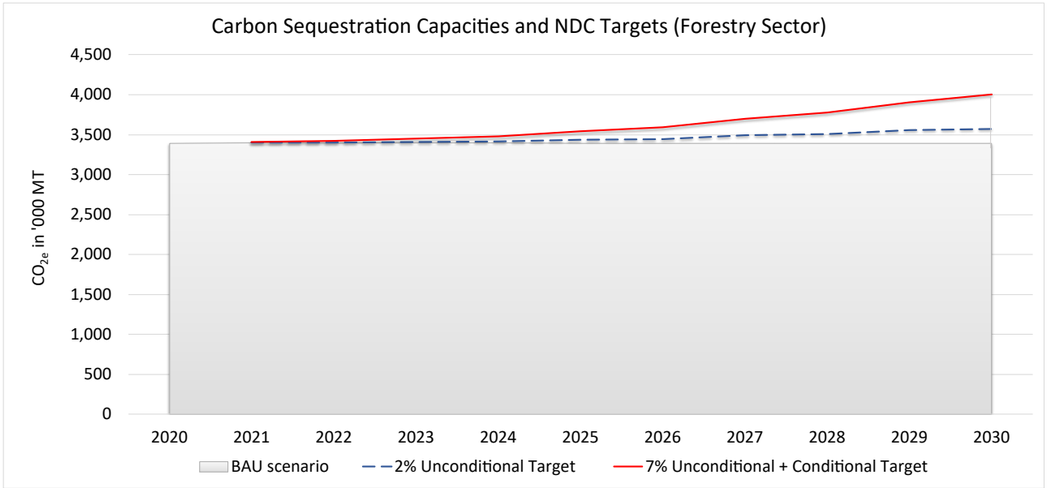


Figure 3-7 Carbon sequestration capacity projections in the forestry sector

3.6.1 Forestry Sector NDC Implementation Plan

NDC 1: Increase forest cover* of Sri Lanka up to 32% by 2030**

**As per the FAO definition of forests which includes forest plantations, natural forests including mangroves.*

*** 30.8% to be achieved through forest plantations and natural forests and the rest to be achieved through TROF.*

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1: Identify land for reforestation/forestation	FD	Ministry of Wildlife and Forest Conservation, MoPlant, RRI, Rubber Development Authority, LUPPD, MASL, Private sector, NGOs	Land area suitable for reforestation/ forest restoration Land use plan for DS Divisions		Maps of FD	From the Government funds FD annually, plants 2,000 ha of forests. Similarly, MASL plants 273 ha yearly while MoPlant have not planted on a regime	18,000 ha land coming under FD (2,000 ha per year from 2021 to 2029). 315 ha outside FD from MoPlant 2,735 ha from the MASL Land use plans prepared for all DS Divisions.	√	√	√	√	√	√	√	√	√		15.1
1.2: Develop forest management plans for natural forests to ensure sustainable management	FD	Ministry of Wildlife and Forest Conservation	Number of management plans prepared		Approved management plans of FD	70	500 (60 to 76 plans per year from 2021 to 2026)	√	√	√	√	√	√					15.2
1.3: Implement forest restoration programme (18,000+ ha of non-forest lands will be Reforested/Afforested including mangroves)	FD	CBOs, NGOs, Private sector organizations	Number of ha restored/planted		Reports of the FD	0	18,000 +	√	√	√	√	√	√	√	√	√	√	15.2

1.3.1: Reforestation/restoration of degraded state forest/lands. 1.3.1.1: Reforestation/restoration using government and external funds 1.3.1.2: Promote private and public sector companies to invest in environmental conservation projects through CSR programs. 1.3.2: Conversion of marginal tea lands in to forests with the participation of the Ministry responsible for the subject of plantation (315 ha - to be planted annually) 1.3.3: Reforestation of unproductive private lands (land extent above 0.5 ha @100 ha/year) 1.3.4: Mangroves restoration by Wildlife Department through PPP	MoPlant, FD, DWC, MASL, Private Sector, Individuals	CEA, SLLDC Chamber	Land area/extent reforested		Forest cover maps & 'plantation journal' of FD MoPlant's records including annual reports	From the Government funds FD annually, plants 2,000 ha of forests. Similarly, MASL plants 273 ha yearly while MoPlant have not planted on a regime 2059237 ha (FD)	18,000 ha (mangrove)land coming under FD 3,049 ha outside FD from MoPlant (273-316 ha per year from 2021 to 2030) 2,735 ha from the MASL 200 ha (100 ha In Anavilundawa and 100 ha in Vankalai in 2025) by DWC 1,000 ha by the private sector 2077237 ha (FD)	√	√	√	√	√	√	√	√	√	√	14, 15.1, 15.2

NDC 2 - Improve quality of growing stock of natural forests and plantations

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1: Improve quality of growing stock of natural forests (200,000 ha)	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.1.1: Preparation of a Degradation Index	FD		Degradation Index		FD Report	0	Degradation Index prepared	√	√	√								15.2
2.1.2: Identification of degraded forests	FD	Ministry of Wildlife and Forest Conservation, Academia	Extent of Degraded land areas (according to degree of DI)		FD Maps	0	200,000 ha (100,000 ha per year from 2023 to 2024)			√	√							15.2
2.1.3: Preparation of restoration plans covering 200,000 ha including FD and DWC areas	FD, DWC	Ministry of Wildlife and Forest Conservation, Academia	Land extent covered by the restoration plans		Restoration plans	0	25 plans to cover 200,000 ha (25plans of FD + 105 DWC=200,000ha) (This includes 105 Wildlife Management plans of Wildlife Department (which includes Habitat maintenance)			√	√	√							15.2
2.1.4: Implementation of restoration plans for identified 200,000 ha (25 plans)	FD, DWC	Ministry of Wildlife and Forest Conservation, Divisional Secretaries, Academia	Land extent/area covered by restoration plans		FD's progress reports (Annual)	0	200,000 ha (Around 30,000 ha per year from 2024 to 2030)				√	√	√	√	√	√	√	15.2
2.1.5: Completion of boundary demarcation of state-owned natural forests	FD, DWC	Ministry of Wildlife and Forest Conservation	Extent of natural forest land demarcated		FD's progress/ administrative reports (Annual)	500 km	9,840 km to cover 500,000 ha	√	√	√	√	√	√		√	√	√	15.2
2.1.6: Conservation to increase non-carbon benefits (to be reported as a co-benefit)	FD, DWC	MoE, CEA, Academia	Research to assess the savings from improvement of ecosystem services from forest conservation		Research reports of FD, DWC and Academia	Some studies have been carried out in areas like valuation	At least 1 research to be conducted	√	√	√	√	√	√		√	√	√	15.2

2.1.7: Declare all natural forests as protected areas (PAs) under the Forest Ordinance and flora and fauna ordinance	FD	Ministry of Wildlife and Forest Conservation	Area declared (ha)		Records of FD, DWC	The existing protected area extent (14.2% of the land area of the country)	200,000 ha (Around 40,000 Ha per year from 2021 to 2027) (Subjective to the concurrence of Divisional Secretaries with the GOSL new directive)	√		√	√	√	√	√				15.2
2.1.8: Sensitive areas that cannot be declared as PAs will be managed as Environmental Sensitive areas (ESA) under ESA policy	MoE	CEA, FD	Area declared (ha)		Annual reports of CEA	The existing extent of the ESAs under MoE (116.833 km^2 – in 10 EPAs)	All sensitive Areas No target but would declare based on the need	√	√	√	√	√	√	√				15.2
2.2: Improve quality of forest plantations (78,000 ha)	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.2.1: Demarcation of boundaries of state-owned plantation forests (5,000 km)	FD	MoE, MoPlant, Ministry of Wildlife and Forest Conservation	Area demarcated		FD maps	0	5,000 km	√	√	√	√	√	√					15.2
2.2.2: Develop plantation management plans to bring them in to sustainable management & implementation (four management plans – Teak, pine, Eucalyptus and Khaya) (Khaya species management plan to be developed. Others need to be updated)	FD	Ministry of Wildlife and Forest Conservation, MoPlant	Number of plans developed		FD's species management plan	1 (teak)	4 plans	√	√	√	√							15.2

NDC 3 - Strengthen catchment protection of major rivers and cascade systems of Sri Lanka

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3: Strengthen catchment protection of major rivers and cascade systems of Sri Lanka	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.1: Multi hazard prioritization of catchment/ river basins	MASL, ID	FD, DWC	Number of catchments in which multi hazards had been prioritized		MASL annual reports	0	4 plans			√	√	√	√	√				15.5
3.2: Strengthen lower catchment management / protection of 10 major rivers through tree planting	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.2.1: Preparation of catchment management plan/s (demarcation and protection of riverine vegetation, etc.)	MASL, ID	DoA, FD, DWC	No of catchment management plans prepared /demarcated extent in ha		Records of MASL, ID	0	10			√	√	√	√	√	√			6.6, 15.4, 15.5
3.2.2: Implementation of protective measures through community-based tree planting campaigns at selected locations of rivers	MASL, ID	DoA, DAD, FD, DWC	Number of plants		Records of MASL, ID	3,410 ha and 3.4 million trees from 2015 to 2020 (on the basis of 1 ha – 1,000 trees used by MASL)	1 million plants in 1,000 ha (Around 100 ha per year - 100,000 trees)	√	√	√	√	√	√		√	√	√	6.6, 15.4, 15.5
3.3: Strengthen upper catchment management / protection	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
3..3.1: Mahaweli (Upper catchment) - tree planting	MASL	DoA, FD, DWC	Extent in ha, Number of plants		Records of MASL, ID	3,211 ha and 3.2 million trees from 2015 to 2020 (on the basis of 1 ha – 1,000 trees used by MASL)	2 million plants in 2,000 ha (Around 200 ha per year - 200,000 trees)	√	√	√	√	√	√		√	√	√	6.6, 15.4, 15.5
3.3.2: Other major rivers (Upper catchment) - tree planting	ID	DoA, FD, DWC	Extent in ha, Number of plants		Records of ID	0	Target need to be set	√	√	√	√	√	√	√	√	√	√	6.6, 15.4, 15.5

3.3.3: Water streams running through plantations - tree planting	MoPlant	MoE, RPCs, DWC, FD, MASL	Number of ha developed		Annual progress reports of Mo-Plant	0	Target need to be set	√	√	√	√	√	√	√	√	√	√	6.6, 15.4, 15.5
3.3.4: Tree planting in riverine areas of all rivers	MASL	MoIrri, CEA, ID, RPCs, DWC, FD, LAs	1 Identification of riverine areas for tree planting (ha) 2 Areas planted in identified rivers		Annual progress reports of MASL	1 Tree planting in degraded areas and event-based planting pro-grammes according to annual plans 2 Around 500,000 trees per year	1 Riverine areas identified for tree planting (2025) (ha) 2 Tree planted in all identified ar-eas of 10 major rivers	√	√	√	√	√	√	√	√	√	√	6.6, 15.4, 15.5
3.4: Strengthen catchment manage-ment / protection of cascade systems & isolated tanks through tree planting	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.4.1: Preparation of catchment man-agement plan/s (demarcation and pro-tection of cascade systems & isolated tanks, etc.)	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
.3.4.1.1: Major tanks (Mahaweli - 19 excluding those in PAs, Other under ID - Major 73 & Medium - 160)	MoIrri,	ID, MASL, DWC, FD, DAD	Number of Plans		Records of MoIrri	3	4	√		√	√	√	√	√	√	√	√	6.6, 15.4, 15.5
3.4.1.2: Major & minor tanks under CEB (Kothmale, Kukulu, Samanala Wewa, Nillamba, /Castle ree, Canyon tanks) & NWSDB (3 tanks)	CEB, NWSDB	FD, DWC, MASL	Number of trees planted		Records of CEB and NWSDB	10,000	1,000,000 plants	√	√	√	√	√	√	√	√	√	√	6.6, 15.4, 15.5
3.4.1.3: Preparation of catchment man-agement plan/s within PAs	FD, DWC, CEA	ID, MASL, DAD	Number of Plans		Records of FD, DWC, CEA	3 plans available	4 (excluding the target in 3.4.1.1)	√	√	√								6.6, 15.4, 15.5
3.4.2: Implementation of protective measures	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.4.2.1: Major & minor tanks under CEB (6 tanks) & NWSDB (3 tanks)	CEB, NWSDB	FD, DWC, MASL	Number of trees planted		Records of CEB and NWSDB	22,000 trees in 6 tanks by CEB	1 million trees by CEB	√	√	√	√	√	√	√	√	√	√	6.6, 15.4, 15.5

3.4.2.2: Implementation of catchment management plan/s within PAs	FD, DWC, CEA	ID, MASL, DAD	Number of Plans		Records of FD, DWC, CEA	0	3					√	√	√	√	√	√	√	6.6, 15.4, 15.5
3.5 Continue the “Climate Resilience Multi-Phase Programmatic Approach” Project in lower Kelani river basin	ID					The project has been discontinued. May commence at a later date													

NDC 4 - Improvement and increase of Trees Outside Forests [TROF]

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4: Improve and increase of Trees Outside Forests (TROF) (tree planting along roadside, Urban forestry, religious lands, schools and other government lands, private lands, home gardens)	FD (District Secretaries and Divisional Secretaries will have to play a major role)	RDA, UDA, MASL, LAs, DoA, CBOs, NGOs, Individuals	The number of trees planted outside forests		Records of FD, RDA, UDA and other relevant organizations	100,000	1,000,000	√	√	√	√	√	√	√	√	√	√	9.4, 12.4 & 12.5
4.1: Adopt policy instruments and regulations supporting TROF (tree planting along roadside, Urban forestry, religious lands, schools and other government lands, private lands, home gardens)	Ministry of Wildlife and Forest Conservation	MoE, MoPlant, FD, Provincial councils, LAs, RDA, UDA, MASL, RPC, DoA, DAD	Policy instruments & regulations		Annual records of the stakeholder institutions	Forestry Master Plan In progress	Policy instruments and regulations supporting TROF established			√	√							11.6, 11.7
4.2: Establish an institutional setup and a mechanism to implement such programmes	Ministry of Wildlife and Forest Conservation	MoE, MoPlant, FD, Provincial councils, LAs, RDA, UDA, MASL, RPC, DoA, DAD	Institutional setup and a mechanism		Ministry in charge of Forestry and Wildlife	0	Institutional setup and a mechanism to implement such programme established			√								15.2

4.3: Conduct carbon stock assessment for TROF	FD	MoWL&FC, SLCF, Academia	The number of carbon stock evaluations conducted in TROF		The records of the evaluations done by the agencies, SLCF	Studies carried out and published by academics on selected areas including home gardens, mangroves, coconut plantations, tea lands, etc.	Carbon stock evaluations done in all the home gardens and other TROF	√	√	√	√	√	√	√	√	√	√	15.2
4.4: Implementation of TROF Programmes 4.4.1: Mobilizing public sector agencies to implement TROF Programmes. 4.4.2: Promote private companies to investment in TROF programmes through CSR programs.	FD, MoI	NCPC, SCP & WM Service providers of, CIAs, Academia	Percentage of industries invested in tree planting and the extent of trees planted by private sector		Records of MoI and other private sector companies who had invested in tree planting	500 ha/yr	At least 50% from public sector agencies to adopt tree planting 70% relevant industries adopting tree planting	√	√	√	√	√	√	√	√	√	√	15.2

NDC 5 - Generic enabling activities																					
Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)													Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
5.1: Develop and implement a MRV system for forestry sector NDCs	MoE (CCS)	MoPlant, FD, DWC	MRV system		Records of MoE	0	MRV system developed and established		√	√											15.1

3.7 Agriculture Sector

Since gaining independence in 1948, Sri Lanka has continued to grapple with the creation of a sustainable agriculture sector to generate healthy income levels while ensuring food security and efficient ecosystem management. The GDP contribution of the agriculture sector (primary production) in the years 2019, 2020, and 2021 was 7.3%, 8.1%, and 8.7%, respectively[36]. Further, the agriculture sector has considerably contributed to employment engaging about 27.3% of the country's workforce, particularly in rural areas. Figure 3-8 depicts the export revenue for the agricultural sector from 2009 to 2021, where the sector's average share of all foreign earnings was 23.7%[37]

The food crop segment dominates the agriculture sector of Sri Lanka, with rice being the major staple contributing to about 10% of the agricultural GDP[38]. Enhancing resource-productivity per unit area is considered as the main path for agricultural production to meet the major part of the food demand with limited availability of resources, and in a changing and variable climate. The food crop sector involves smallholders with an average extent of less than one hectare, but contributes heavily to achieving the overall food security of Sri Lanka. Due to the small-scale operations, there are problems with diseconomies of scale and difficulty of mechanization in light of rising wages and a labour shortage. Major obstacles include a high reliance on agriculture that is rain-fed, inadequacy of diversification into high-value marketable products, high production costs and low profitability, limited technology adoption and unfavorable market conditions, poor information dissemination, and poor value addition.

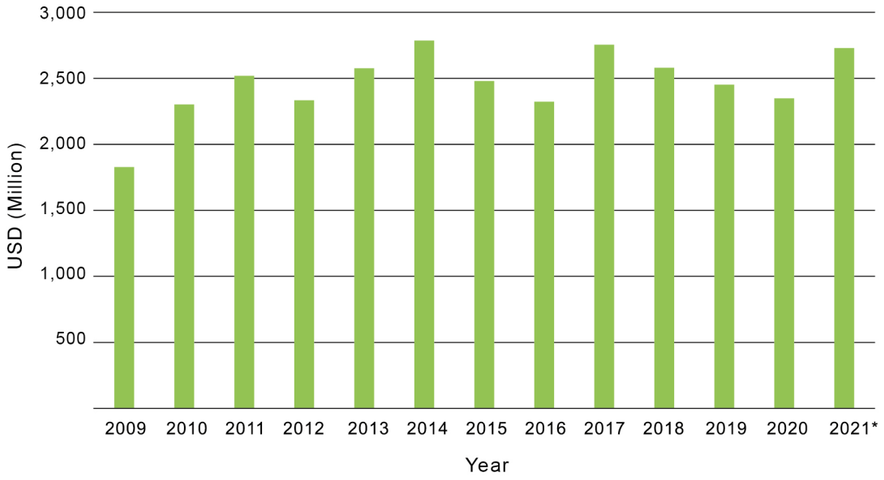


Figure 3-8 Export earnings by the agriculture sector (provisional) [Adopted from CBSL[25]]*

36 World Bank, https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?locations=LK
37 Central Bank of Sri Lanka; https://www.cbsl.gov.lk/en/statistics/statistical-tables/external-sector
38 Central Bank of Sri Lanka https://www.cbsl.gov.lk/sites/default/files/cbslweb_documents/publications/annual_report/2019/en/8_Chapter_04.pdf

In 2021, the GDP contribution of the livestock sector (including poultry) was about 1%. With 1.6 million cattle and production of 412 million liters of milk or approx. 38-40% of the country's milk requirement, cattle accounts for a significant portion of the livestock sector in Sri Lanka. The dairy sector possesses enormous potential which is still to be tapped effectively in meeting the demands of the country. The livestock sector is nonetheless constrained by poor breeding efforts and low productivity, limited technological adoption, limited grazing places, and excessive feed prices. Poor feeding practices, unproductive herds of cattle or buffalo, unsatisfactory animal welfare practices, and other factors have significantly increased the sector's GHG emissions. Biogas from livestock waste and residues is one of the main options available for mitigating GHG emissions in the sector. Though limited, this technology has been in practice for several decades. As biogas provides a renewable and environmentally friendly process that supports sustainable livestock industry, further interventions are needed to deploy modern and more efficient technologies and systems. In addition, there are other opportunities for the livestock sector to gain from the technology development in other RE sources, particularly biomass and solar. Biomass fired hot water generators and air dryers, solar-powered refrigerators and freezers, solar pumping for livestock watering, and solar lighting are some examples.

The post-harvest losses reported in Sri Lanka due to poor transport and storage/packing conditions of food crops is a serious concern. This has negatively affected the reach of high quality agricultural produce to the consumers. The food crops of perishable nature such as fruits have reports about 20-40%, post-harvest losses with the highest recorded for papaya, while it ranged between 20-46% for vegetables[39].

The NDCs, given in Table 3-6, focus on reducing the post-harvest losses, increasing productivity of the sector, adoption of RE through various activities spanned over a decade from 2021 to 2030.

Table 3-7 NDCs of Agriculture Sector (Inclusive of livestock)

NDC #	NDC
1	Reduce post-harvest losses and value addition of fruits and vegetables
2	Increase crop productivity
3	Improve adoption of renewable energy for crop farming/value addition
4	Improve dairy sector productivity by managing herd, herd health, feed and by improving animal comfort and welfare
5	Improve productivity of Monogastrics by improving genetic, feed efficiency, animal health, comfort and welfare
6	Adopt renewable energy for livestock applications

39 http://www.harti.gov.lk/images/download/reasearch_report/2018/217.pdf

In the agriculture and livestock sector, it is anticipated that the implementation of NDCs between 2021 and 2030 will reduce GHG emissions compared to the BAU scenario by 7% (4% unconditionally and 3% conditionally), which equates to an estimated mitigation level of 2,477,400 MT CO_2 unconditionally and 1,858,000 MT CO_2 conditionally (totaling 4,335,400 MT CO_2) of carbon dioxide equivalent during that period (Figure 3-9).

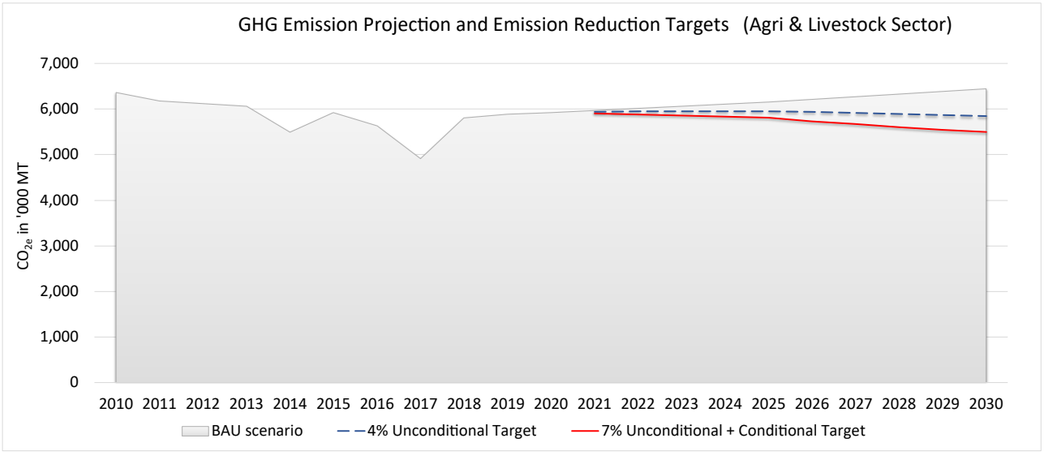


Figure 3-9 Agriculture Sector GHG Emission Projection and Emission reduction Targets

3.7.1 Agriculture Sector NDC Implementation Plan for Mitigation Sector (inclusive of livestock)

Agriculture

NDC 1 - Reduction of postharvest losses of fruits & vegetables and value addition																						
Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)													Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
1.1: Planning of cultivation management	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-				-
1.1.1: Strengthen the existing planning processes in agricultural operations to avoid seasonal gluts in production	MoA	DoA, DAD, ID, MD, PDoA, MASL, DS	Planning process to avoid seasonal gluts in production		Records of MoA, DoA, MASL, DAD, DAC meeting agenda and minutes	Existing planning process, but with limited emphasis on seasonal gluts in production	Process is adopted and implemented with frequent updated	√	√	√	√	√	√	√	√	√	√				2.a, 12.5
1.2: Improve post-harvest management	NIPHM	MoA, DoA. PDoAs, MASL, DAD, Academia	1. Percentage of Postharvest losses 2. Segregated estimates for fruits and vegs 3. Database for PH stats 4. Number of technologies disseminated through research 5. Number of beneficiaries of the technology transferred annually		Records of MoA, DoA, NIPHM, MASL, Private sector	1. On average 35% 2. No segregated data 3. Un-compiled data 4. To be identified 5. To be identified (approximately 5,000)	1. 20% 2. Segregated data by 2024 3. Database established by 2025 4. At least 10 5. At least 10,000	√	√	√	√	√	√	√	√	√	√				2.a, 12.3, 12.5
1.2.1: Recommend and implement improved post-harvest operations at all levels	DOA	PDoAs, HASL, MASL NIPHM	Percentage reduction of Postharvest losses relative to the baseline		Records of NIPHM	Baseline to be estimated	Postharvest losses reduced to less than 20%	√	√	√	√	√	√	√	√	√	√				2.a, 12.3, 12.5

1.3: Managing the excess production	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.3.1: Improve value additions and repurposing of excess productions	MoA	EDB, ITI, IDB, Private sector, NIPHM, Food Promotion Board, DoA	1. % excess production with value addition/repurposing 2. No of new technologies and processes popularized/adopted 3. No. of private/ public sector businesses / entrepreneurs established		Records of EDB, IDB, NIPHM, DoA	1. To be quantified 2. There are improved technologies developed, but the level of popularization to be identified 3. Same as above	1. 50% 2. To be established 3. To be established	√	√	√	√	√	-	-	-	-	-	2.3, 2.4, 2.a, 8.2, 12.3, 12.5
1.4: Product innovation	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.4.1: Introduce innovation for food processing industries	MoA	EDB, ITI, IDB, Private sector, NERDC, NIPHM DoA, Academia	1. Number of innovative technologies developed 2. % No. of innovations transferred		Records of MoA, DoA, NIPHM, EDB, ITI, IDB, NERDC, NIPO	1. To be identified 2. To be identified	1. To be identified 2. To be identified	√	√	√	√	√	√	√	√	√	√	2.a, 12.3, 12.5
1.5: Monitoring of post-harvest management process	MoA	MoTrad, ICTA, SLT, DAD Economic centres, DCS, DSS, Economic centres, Private Communication systems	1. Mechanism to meȃsure PH losses 2. Digitized supply & value chain		Records of MoA	1. Present mechanism with limited scope 2. Main supermarket chains	1.Mechanism in place 2. Extended to major supply/value chains	√	√	√	√	√	√	√	√	√	√	12.3
1.6: Introduce policy and other support instruments	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.6.1: Operationalize the existing national policy elements related to minimizing post-harvest losses	MoA	MoE, MoTrad, DoA, NIPHM, CARP, MASL	National Agriculture Policy		Policy, Records of MoA	Draft developed	Policy enacted by 2023, and operationalized	√	√	√	√	√	√	√	√	√	√	2.4
1.6.2: Build awareness and capacity of value-chain actors	MoA	NIPHM, MoTrad	Number of personnel trained		Records of MoA, NIPHM, MoTrad	Baseline number trained to be obtained	Target to be established	√	√	√	√	√	√	√	√	√	√	2.4
1.6.3: Set and implement strategies to reduce postharvest losses in line with the national obligation to fulfil SDG target 12.3	MoA	MoE, Ministry of Trade, CARP NIPHM	Percentage of Reduction of PH losses		CARP, Records of NIPHM, HARTI	40%	Reduce up to 15%	√	√	√	√	√	√	√	√	√	√	2.4

NDC 2 - Increase agriculture productivity of crops

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1: Identify crops with high productivity improvement potentials	DoA	MoA, MoPlant, PMoA	List of crop-species and varieties with high productivity identified and promoted		DoA data sources	Available list	Continuously updated list (Annually)	√	√	√	√	√	√	√	√	√	√	2.3, 12.2
2.2: Adopt Good Agricultural Practices as a mandatory requirement in productivity enhancement programs of food crops	MoA	DoA, MoPlant, MASL, PDoA	1. Production per unit area 2. No of farmers certified for GAP 3. Land extend under GAP 4. No of programmes		Annual performance reports and other records of MoA, DoA, PDoA, DSC, AGSTAT	1. Present productivity levels (AGSTAT 2020) 2. Present certified farmers 3. Present land extent 4. Present programmes	1. To be established 2. 5% of the farmer community 3. To be established 4. At least 25 programmes per year	√	√	√	√	√	√	√	√	√	√	2.3, 12.2
2.3: Increase rice / paddy sector land-productivity (national average paddy yield tons/ha) by 15% unconditionally and 5% conditionally	DoA	MoA, ID, MASL, PDoA, RRDI, DAD	Average paddy productivity/yield (tons/ha sown)		DoA data sources	4,670 kg/ha	20% increase (5,604 kg/ha)	√	√	√	√	√	√	√	√	√	√	2.3, 2.a
2.4: Improve fertilizer use-efficiency by 10% unconditionally and 5% conditionally	MoA	DoA, National Fertilizer Sec (NFS), ID, PDoA, Private sector, MASL	1. No. of farmers adapt site-specific fertilizer applications 2. Percentage improvement in Fertilizer usage efficiencies (Production per kg of fertilizer use)		DoA data source	1. To be identified 2. To be identified	1. To be established 2. 15%	√	√	√	√	√	√	√	√	√	√	2.3, 2.a
2.5: Improvement of water use efficiency	DoA	MoA, MoIrri (IMD), ID, PDoA, MASL Private sector	Increase water productivity in all crops (ton/m3)		Data sources of DoA, ID. MoIrri (IMD), PDoA, MASL	To be identified	To be established	√	√	√	√	√	√	√	√	√	√	6.4
2.5.1 Adopt water-saving techniques (Timely cultivation, shared cultivation, cultivation of drought tolerant varieties without significantly compromising the yield, use of drip & other micro irrigation practices, rainwater harvesting)	DoA	MoA, MASL, ID, PDoA, DADS	% of the Extent with technologies		Data sources of DoA, ID	40%	80%	√	√	√	√	√	√	√	√	√	√	6.4

2.5.2: Reduce conveyance losses of irrigation water in major & minor tanks systems	Major: ID, Minor: DADS	MoA, DoA, MASL, PDoA	Percentage reduction of conveyance losses		Data sources of ID, DADS	40%	75%	√	√	√	√	√	√	√	√	√	√	6.4
2.6: Promote precision agriculture	DoA	MoA, PDOAs MASL, Academia, Private sector	1. Promotional programmes conducted 2. No of capacity building programmes conducted 3. Characterization of technologies 4. Introduce the concepts into formal educational programmes 5. Number of pilot demonstration projects implemented		Data sources of DoA, MoA, DAD, MASL	Baselines to be identified	Targets to be established	√	√	√	√	√	√	√	√	√	√	√	√	2.3, 2.4, 2.a, 6.4, 8.2, 12.2, 12.4, 12.5, 14.1
2.6.1: Adopt labour saving and/or cost effective agricultural practices/techniques for selected crops (hydroponics, green houses, poly tunnels, rain shelters, etc.)	DoA	MoA, PDoA	% number of farmers with hydroponics tech at commercial scale		Data records of MoA, DoA	15%	60%	√	√	√	√	√	√	√	√	√	√	2.3, 2.4, 2.a, 6.4, 8.2, 12.2, 12.4, 14.1
2.6.2: Popularize farm mechanization in paddy (land preparation, pesticides & fertilizer application, harvesting)	DoA	MoA, DAD, MASL, Private sector	% Land extends cultivated with mechanizations		Data sources of DoA, MoA, DAD, MASL	70%	100%	√	√	√	√	√	√	√	√	√	√	2.3, 2.a, 6.4, 12.4, 12.5

NDC 3 - Improve adoption of renewable energy for crop farming/value addition

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1- Application of solar and wind energy (or hybrid) for agriculture practices	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.1.1 Promote water pumping applications (solar and/or wind)	MoA	DoA, SLSEA, CEB, MASL, DAD, PDoA, Private sector	Percentage of solar PV powered water pumps		SLSEA, DoA data sources	2% of farmers	20% of farmers	√	√	√	√	√	√	√	√	√	√	7.2
3.1.2 : Promote solar & wind power use in place of fossil fuel driven engine powered pumps	MoA	DoA, SLSEA, CEB, MASL, DAD, PDoA, Private sector	Percentage of farms converted to CEB grid applications		CEB data sources	1% of farmers	10% of farmers	√	√	√	√	√	√	√	√	√	√	7.2, 7.3
3.2: Renewable energy powered mini-grid for clustered agriculture farming in vulnerable areas (as a pilot)	SLSEA	MoA, PDoA	Pilot scale study		SLSEA data sources	None	One pilot scale study completed	√	√	√	√	√						7.2
3.3: Explore the potential to develop small hydro power potential (low flow high head) in irrigation water canals for agriculture purposes	ID	MoA, SLSEA, CEB, DoA, MASL	Report on potential with recommendations		SLSEA data sources	None	Report on potential with recommendations completed	√	√	√	√	√						7.2

Livestock

NDC 4 - Improve the productivity of dairy sector (Target: 40% increase of milk yield per cattle from 3.2 to 4.5 Ltrs/day by 2030 and further improve up to 5 Ltrs/day (55%) on conditional basis. Increase productive milking cow percentage of the herd up to 60% on conditional basis)

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1: Improve herd management	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.1.1: Rational management of non-productive animals to increase the percentage of productive animals (In-milk and dry animals divided by total animal population)	DAPH	PDAPHs, NLDB, LAs, MASL, Academia, Private Sector	Percentage increase of productive animals		Records of DAPH	45% productive animals (end 2020)	Above 60% productive animals	√	√	√	√	√	√	√	√	√	√	2.3, 8.2, 8,3, 8.4, 12.2
4.1.2: Genetic improvement (Breeding)	DAPH	PDAPHs, NLDB, MASL, Academia, Private Sector	Increase of milk production per animal Decrease number of AI per conception		Records of DAPH	3.2 litre 3.5 AI rate	5 Litre 2.5 AI rate	√	√	√	√	√	√	√	√	√	√	2.3, 8.2, 8,3, 8.4, 12.2
4.1.3: Introduce heat resistance breeds	DAPH	PDAPHs, NLDB, MASL, Academia, Private Sector	Number of new breeds introduced		Records of DAPH	1 new breed (Sahiwal)	3 new breeds introduced	√	√	√	√	√	√	√	√	√	√	2.3, 8.2, 8,3, 8.4, 12.2
4.2: Improve feed management	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.2.1: Introduce improved good quality forages varieties	DAPH	PDAPHs, NLDB, MASL, Academia, Private Sector	Extent (ha) with improved varieties Number of varieties		Records of DAPH	10,000 ha 3-4 varieties	20,000 ha 3 new varieties	√	√	√	√	√	√	√	√	√	√	2.3, 8.2
4.2.2: Improve feeding systems (well balanced ration)	DAPH	PDAPHs, NLDB, MASL, Academia, Private Sector	Percentage increase of farmers adopting improved feeding systems (TMR - Total mixed ration)		Records of DAPH	Baseline to be established in 2023	Double the percentage of farmers adopting improved feeding systems	√	√	√	√	√	√	√	√	√	√	2.3, 8.2
4.2.3: Preservation/conservation of forages	DAPH	PDAPHs, NLDB, MASL, Academia, Private Sector	Quantity of preserved forages Number of farmers engaged		Records of DAPH	Baseline to be established in 2023	Double the baseline values	√	√	√	√	√	√	√	√	√	√	2.3, 8.2

4.3: Herd health management	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.3.1: Improve udder health management	DAPH	PDAPHs, NLDB, MASL, Academia, Private Sector	Percentage reduction of incidences of Mastitis reported		Records of DAPH	Percentage of incidences reported - 25%	Reduction of incidences from 25% to 10 %	√	√	√	√	√	√	√	√	√	√	2.3, 8.2
4.3.2: Prevention and control of contagious diseases	DAPH	PDAPHs, VRI, NLDB, Academia, Private Sector	Reduction of number of cases of contagious diseases (FMD - Foot & Mouth, HS, BQ) Reduction of mortality rate for contagious disease Number of vaccinations done		Records of DAPH	Number of cases; **FMD** – 4,975, **HS** – 147, **BQ** – 25 Mortality rate; **FMD** – 133, **HS** – 79, **BQ** – 21 Vaccinations (Annual average of 10 years) **FMD** – 614,136, **HS** – 223,324, **BQ** – 163,995	Number of cases; FMD - 0, HS - 0, BQ – 0 Mortality rate; FMD - 0, HS - 0, BQ – 0	√	√	√	√	√	√	√	√	√	√	2.3, 8.2
4.4: Improve animal comfort and animal welfare	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.4.1: Improve micro environment quality of housing (ventilation, heat stress management, etc.)	DAPH	PDAPHs, NLDB, Academia, Private Sector	Increase of number of improved sheds		Records of DAPH	Baseline to be established in 2023	Double the baseline value	√	√	√	√	√	√	√	√	√	√	2.3, 8.2

NDC 5 - Improve the productivity of Monogastrics

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
5.1: Genetic improvement	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.1.1: Introduce improved genetic (pigs and poultry – broilers and layers)	DAPH	PDAPHs, NLDB, MASL, Academia, Private Sector	Increase of carcass weight Increase of hen house (egg) production Increase of feed conversion efficiency		Records of DAPH	Carcass weight; Broilers -1.2 kg, Pig - 60 kg Hen house production; 60% Feed conversion efficiency; Broilers – 1.85	Carcass weight; Broilers - 1.5 kg, Pig - 70 kg Hen house production; 70% Feed conversion efficiency; Broilers – 1.7	√	√	√	√	√	√	√	√	√	√	2.3, 8.2
5.2: Improve feed quality	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.2.1: Improve feed conversion efficiency through feed quality improvement	DAPH	PDAPHs, NLDB, MASL, Academia, Private Sector	Percentage of Registered Feed manufactures Percentage of registered animal feed quantity from the total		Through field level sample surveys under the animal feed Act	Baseline to be established	Number of Registered Feed manufactures – 90% Percentage of registered animal feed quantity from the total - 95%	√	√	√	√	√	√	√	√	√	√	2.3, 8.2
5.3: Animal health management	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-

5.3.1: Disease control	DAPH	PDAPHs, VRI, Academia, Private sector	Reduction of number of cases (ND & IBD for poultry, Pasturellosis for Swine) Reduction of mortality rate for major disease Number of vaccinations done (with local NDV)		Records of DAPH	ND cases – 90,356 Mortality - 5,418 Vaccination -4,052,769 IBD cases – 54,192 Mortality - 2,069 Pasturellosis - cases – 1,065 Mortality- 120	Zero Targets for ND, IBD and Pasturellosis by 2030	√	√	√	√	√	√	√	√	√	√	√	2.3, 8.2
5.3.2: Improve bio-security	DAPH	PDAPHs, NLDB, Private sector	Reduction of number of disease outbreaks (over 5% mortality per week per batch in poultry breeder farms)		Records of DAPH	Zero	Maintain at zero	√	√	√	√	√	√	√	√	√	√	√	2.3, 8.2
5.4: Improve animal comfort and animal welfare	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.4.1: Improve micro environment quality of housing (ventilation, heat stress management, etc.)	DAPH	PDAPHs, NLDB, Academia, Private sector	Percentage increase of birds under environmentally controlled housing		Records of DAPH	60%	90%	√	√	√	√	√	√	√	√	√	√	√	2.3, 8.2

NDC 6 - Adoption of renewable energy for livestock applications

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
6.1: Introduce small-scale solar-powered refrigeration facilities to increase the milk storage facilities. Introduce Solar PV Powered Can Coolers for Milk Producers [already commenced by MILCO]	DAPH	DAPH, PDAPHs, SLSEA, Private sector,	Adoptive rate of the intervention Increase of milk quality and quanti-ty collected		Records of DAPH, SLSEA, CEB	Baseline to be estab-lished in 2023 in consulta-tion with SLSEA	Target to be set in 2023 in consultation with SLSEA	√	√	√	√	√	√	√	√	√	√	2.3, 7.2, 8.2, 8,3, 8.4, 12.2
6.2: Introduce Solar PV energy for milk collection & chilling centres	SLSEA	DAPH, PDAPHs, CEB, Milk proces-sors, Solar power suppliers, Financiers	kW of solar PV installed Number of instal-lations Number of installa-tions with full grid independence Increase of milk collection		Records of SLSEA	Baseline to be estab-lished in 2023 in consulta-tion with SLSEA	Target to be set in 2023 in consultation with SLSEA	√	√	√	√	√	√	√	√	√	√	2.3, 7.2, 8.2, 8,3, 8.4, 12.2
6.3: Introducing solar energy for farm operation and processing	SLSEA	DAPH, PDAPHs, CEB, Milk proces-sors, Solar power suppliers, Financiers	kW of solar PV installed Number of instal-lations Increase of milk collection		Records of SLSEA	Baseline to be estab-lished in 2023 in consulta-tion with SLSEA	Target to be set in 2023 in consultation with SLSEA	√	√	√	√	√	√	√	√	√	√	2.3, 7.2, 8.2, 8,3, 8.4, 12.2
6.4: Introduce generation of biogas in large scale livestock & poultry, dairy processing, and abattoirs	SLSEA	DAPH, PDAPHs, CEB, CEA, LAs, Private sector (Livestock & poultry producers & processors, Biogas service providers), Financiers	Capacity (m3) of biogas plants established Number of installations		Records of SLSEA	Baseline to be estab-lished in 2023 in consulta-tion with SLSEA	Target to be set in 2023 in consultation with SLSEA	√	√	√	√	√	√	√	√	√	√	7.2

6.4.1: Methane emission management from livestock/dairy manure	DAPH	MoE, VRI, Academia,	Methane generation in livestock sector		Records of DAPH	Isolated initiatives	Methane generation assessment in 2023-2025 and periodic update in different systems and in different climatic zones			√	√	√	√	√	√	√	√	12.4
6.4.2: On-site manure to energy conversions (biogas for thermal heating or electricity generation)	SLSEA	DAPH, PDAPHs, CEB, CEA, LAs, Private sector (Livestock & poultry producers & processors, Biogas service providers), Financiers	Biogas generation (utilization and potential) kWh electricity generated per year		Records of SLSEA, CEB	Baseline to be established in 2023 in consultation with SLSEA	Biogas generation (utilization and potential) assessment in 2023 kWh electricity generation per year target to be set in consultation with SLSEA			√	√	√	√	√	√	√	√	7.2

4. NDC IMPLEMENTATION – ADAPTATION

4.1 Overview

Climate change poses a serious threat to economic growth and erodes development gains. Sri Lanka ranks 100th in terms of readiness for climate change adaptation and 60th in terms of climate change vulnerability[40]. Sri Lanka's ND-GAIN index (1995-2020) has varied around an average value of 103, with the index for 2020 being 104[41], proving the nation's vulnerability to climate change and emphasizing the urgent need for climate adaptation. As seen in Figure 4-1, Sri Lanka has been witnessing the negative effects of climate change for several decades in the form of yearly natural catastrophes that affect hundreds of thousands of people[42]. Although floods have been the most common natural disaster, the overall damage has also been severely impacted by droughts, landslides, and storms. Additionally, analysis has revealed probable long-term adjustments in ecological limits and rainfall distribution, adding to already noticeable changes in the bimodal monsoon pattern, rainfall intensities, dry periods, temperature rise, increased exposure to climate changes, and sea level rise.

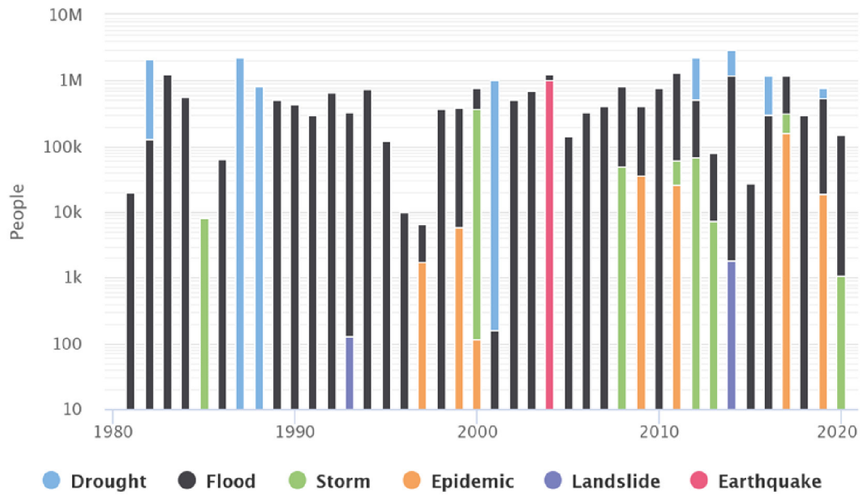


Figure 4-1Number of people affected by key natural hazards statistics between 1980 and 2020 (Data [41])

Agriculture, biodiversity, coastal and marine environments, fisheries, health, livestock, tourism, and recreation, urban planning and human settlements, and water are the most crucial sectors impacted by these changes. As a result, these nine sectors have been recognized in NDCs to prioritize adaptation measures by related governmental agencies, specialists, and other stakeholders in each vulnerable sector.

40 University of Notre Dame, USA, Notre Dame Global Adaptation Initiative https://gain-new.crc.nd.edu/country/sri-lanka (this initiative ranks the climate adaptation performance for 177 countries)
41 https://gain-new.crc.nd.edu/country/sri-lanka
42 World Bank, Climate Change Knowledge Portal, https://climateknowledgeportal.worldbank.org/country/sri-lanka/vulnerability

Sri Lanka's long-term policy objective is to safeguard the nation against the harmful effects of climate change. The goal is to promote sustainable development in each sector while safeguarding the natural resource base on which many of these livelihoods depend. This will support ongoing economic growth and high levels of human development.

There are many adaptation projects funded by development partners being implemented in Sri Lanka. Nevertheless, the monitoring of project activities and the long-term sustainability after the project is terminated needs to be ensured.

Priorities for adaptation share underlying conditions that must be met for implementation to be successful. In this respect, the active engagement of local government stakeholders becomes essential. The absence of data and the lack of accessible localized modeling tools for decision-making are two major obstacles that adaptation measures must overcome. In order to make precise, risk-aware investments, many industries and regions do in fact need more readily available data at a local level. An example is the level of accuracy of the information available to make predictions on sea-level rise in Sri Lanka. Risk assessments for developing sectoral strategies (e.g. tourism) and for spatial development (e.g. urban centers) are currently unavailable at the required resolution, therefore, have been mentioned as priority adaptation actions. The availability of risk and vulnerability data at the province, river-basin, or divisional levels to support decision-making is currently limited. However, the GCF funded National Adaptation Plan Readiness Support Project implemented by the Global Green Growth Institute is in the process of revising the National Adaptation Plan and preparing Provincial Adaptation Plans (PAPs).

4.2 Agriculture Sector

Approximately 38% of the world's land is agriculture of which one-third is used for crops while the rest is used for grazing livestock. Agriculture and forestry are responsible for 23% of global GHG s emissions[43]. Changes are needed to manage the land while safeguarding the food and farmers' livelihoods. Poor policy decisions, exploitation of natural resources and negative impacts of climate change have threatened the food security of Sri Lanka. For a sizeable portion of Sri Lanka's population, especially in rural areas, the agriculture sector provides prospects for a living. Some farmers are abstaining from agriculture in favour of alternative sources of income due to climate concerns and low revenue. This downfall occurred over the decades as evident from International Labour Organization (ILO) data[44] (Figure 4-2). However, it is also noteworthy that Sri Lanka's employment share in the agriculture sector has declined below the world average but with an increase in productivity of many crops such as rice and maize, signaling a potential shift to mechanization and adoption of other new technologies due to the efforts made by Sri Lanka to modernize the agriculture sector.

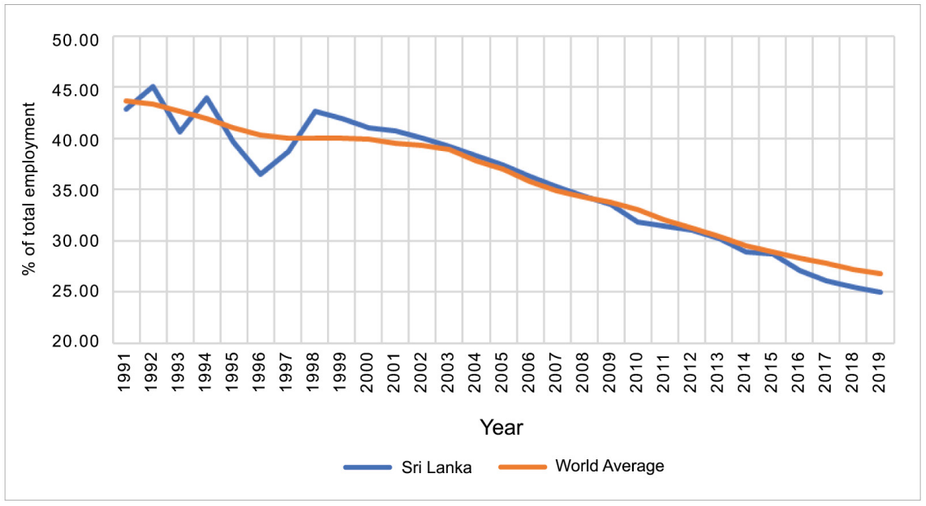


Figure 4-2 Variation of agriculture sector employment over the years in Sri Lanka and global average (Adopted from ILO[28])

43 Organisation for Economic Co-operation and Development (OECD): https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=COM/TAD/CA/ENV/EPOC(2020)3/FINAL&docLanguage=En#:~:text=Executive%20summary-,The%20Agriculture%2C%20Forestry%20and%20Other%20Land%20Use%20(AFOLU)%20 sector,share%20is%20likely%20to%20grow.

44 International Labour Organization. "ILO modelled estimates database" ILOSTAT

Agriculture sector in Sri Lanka is among the most vulnerable to climate change because of its reliance on weather patterns and natural resources. Farmers and other important players in the sector are faced with a completely new set of issues as a result of climate change. It will affect the nation's food and nutritional security, economy, sustainable development initiatives, and many other elements if farmers, who are the primary food producers, lack resilience and adaptive capacities. Sri Lanka has pledged to help the agriculture sector to strengthen its resilience and adapt to the effects of climate change. Ample evidence for this point is provided by the National Climate Change Policy of 2012 (currently being updated), the National Adaptation Plan for Climate Change Impacts of 2016–2025, National Action Programme for Combatting Land degradation in Sri Lanka (2015-2024), and Soil Conservation Act No. 25 of 1951 and subsequent amendments.

The active participation and effective contribution of all the stakeholders are important for adaptation. Therefore, to comprehend the effects of a changing climate and manage the main dangers, the GoSL is collaborating with communities and enterprises. As the scientific understanding of the effects and consequences of climate variability and change improves, agricultural producers are searching for ways to apply this information to planning and decision making and put it into action.

The diversity of the 46 Agro-ecological Regions (AERs) in the nation, both in terms of climate and the agricultural products produced, suggests that different locations and commodities will have different reactions to climate change and variability. Agricultural producers need to continuously adjust to changing conditions (i.e. market price fluctuations, increasing input costs, new neighbors, labor shortages, pest invasions, and adverse weather conditions). Climate change adaptation can help to reduce the risks from climate variability and change, increase the resilience of systems to potential disruptions, and even alter systems to be better able to take advantage of future conditions. The adaptation measures often provide co-benefits towards a number of objectives, such as improving soil health, safeguarding water quality, managing wildlife habitats, or reducing GHG emissions. For example, one notable initiative taken with the leadership of Sri Lanka is the Colombo Declaration for Sustainable Nitrogen Management in 2019 (and the related UN resolutions) to tackle the global nitrogen challenge by significantly reducing its wastage. It is apparent that the transformative adaptation processes in response to climate change could generate more resilient agricultural systems together with improvements in sector governance.

In order to reduce the climate change risks and enhance disaster risk resilience of farmers, the GoSL has implemented a number of programmes, including installation of early warning systems for the sector and launching of the Agro-met Advisory Service and a centralized online database 'GeoGoviya'. The Agro-met Advisory, which provides information on weather and guidance for crop cultivation, is compiled by DoA on the basis of the seasonal climate forecast issued by the Department of Meteorology (MD), in consultation with experts and other stakeholder institutions, The GeoGoviya is a cloud-based smart farming platform that facilitates the idea of advancing digital solutions using a cost-effective ICT tool to monitor and track crop performance. It enables larger system capabilities for the GoSL to measure, monitor and report on farm-level data, which can also be used for better coordination among different agencies to facilitate larger agricultural reforms such as providing bundled insurance solutions to farmers.

Another effective intervention could be attributed to the series of progammes and activities conducted by the Extension Division of the Extension & Training Center in the DoA. This division continuously disseminates the agricultural technologies to all stakeholders related to agriculture through different extension approaches in major irrigation schemes. There are sub-units in extension division for coordinating extension and development activities covering paddy, other field crops, fruits & vegetables, plant protection, women agriculture extension, young farmers club, plant nutrition & organic fertilizer, climate sustainable agriculture and irrigation management.

The NDCs present in Table 4-1 presents an opportunity for Sri Lanka to consider and communicate its acknowledgment of the need to plan for more significant changes over the long term with the particular emphasis on climate smart agriculture while supporting near-term changes needed to address urgent issues. Significantly enhanced support across the entire agriculture sector will be essential to improve resilience and protect the lives and livelihoods of farmers and their communities.

Table 4-1 NDCs of Agriculture Sector in Adaptation

NDC #	NDC
1	Climate change considerations mainstreamed into agriculture in Sri Lanka
2	Promote Integrated Pest Management (IPM) and Integrated Plant and Nutrition Systems (IPNS) in most vulnerable areas/districts/crops
3	Develop/introduce varieties resistant/tolerant to biotic and abiotic stresses targeting most vulnerable agricultural crops to climate change
4	Revisit the Agro Ecological Regions (AERs) maps of Sri Lanka with current and future climate scenarios and recommend appropriate crops for different regions to reduce vulnerability to climate change impacts
5	Enhance sustainable land and water management practices in areas where anticipated climate vulnerability is severe
6	Enhanced early warning and risk management mechanisms introduced to reduce climate change vulnerability

4.2.1 Agriculture Sector NDC Implementation Plan (Adaptation)

NDC 1 - Climate change considerations mainstreamed into Agriculture in Sri Lanka (2022)																				
Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)											Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1 Enhance Adaptation of Climate Smart Agriculture (CSA) Technologies in Sri Lanka	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.1.1 Develop National Guidelines on Climate Smart Agriculture (CSA) Technologies and promote implementation.	DoA	MoIrri, LUPPD, MASL, DAD, TSH-DA, PDoA, ID & TRI, RRI, CRI, CCB, SRI, PRI	KPI: National Guideline on CSA published, Implementation - Launched		Data Sources of DoA and other state agencies. DoA and other state agencies.	Guideline on CSA available	100%	√	√	√									2, 7, 12,13 (SDG targets to be identified)
1.1.2 Develop and publish inventory of CSA Technologies for Sri Lanka	DoA	MoIrri, LUPPD, MASL, DAD, TSH-DA, PDoA, ID & TRI, RRI, CRI, CCB, SRI, PRI	Inventory of CSA Technologies developed and published		Annual Reports,	Information on CSA Technologies available with different agencies	100%		√		√								2, 7, 12,13 (SDG targets to be identified)
1.1.3 Mainstream CSA technologies through Good Agriculture Practices (SL GAP) program.	DoA	PDoA, DEA, MASL	KPI: updated SL GAP including CR.		DoA and other state agencies.	LGAP Guidelines available SLGAP standards established	100%	√	√	√	√	√	√	√	√	√	√		2, 7, 12,13 (SDG targets to be identified)
1.2 Minimize climate (change) impact/ risk in agriculture through climate forecast based agro-advisories	DoA	MET PDoA, DEA, MASL, Plantation	Upgraded climate based agri-advisory system exists, No of advisories issued		Annual Reports,	Spatial/ temporal accuracy and resolution of available system need to be further improved	100%	√		√	√	√	√	√	√	√	√		2, 7, 12,1, 13 (SDG targets to be identified)3

1.3 Promote appropriate crop-livestock integrated farming systems in climate vulnerable regions.	DoA & DAPH	PoDA, PDAPH, DAD, MASL, NLDB, Private Sector including RPCs, Academia	KPI: (I) Extents covered (ha) or % increase. (II) Number of farmers covered; (II) Number of integrated farming systems/models introduced		Data Sources: DoA, DAPH and other state agencies.	10%	40%	√	√	√	√	√							2, 7, 12,13 (SDG targets to be identified)
1.4 Promote home gardens as small-scale production systems with value addition and establishment of market channels.	DoA & DAPH	DEA, MASL, DAD, DAPH, PDAPH, PDoA, Private sector entities and farmer organizations UDA	(i) Number of farmer markets established (ii) Number of forward contracts established (iii) Number of home garden models identified		Data Sources: DoA, DAPH and other state agencies, project evaluations	Home gardening guide books available	75%	√	√	√	√	√							2, 13 (SDG targets to be identified)

NDC 2 - Promote Integrated Pest Management (IPM) and Integrated Plant and Nutrition Systems (IPNS) in agricultural areas of most vulnerable area/districts/crops

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1 Develop approaches for rapid Identification of areas vulnerable to resurgence and emergence of pests/disease, weeds and wild animal attacks due to climate change.	DoA	DAD, DWC, MET, DoMC, PDoA, Academia, MASL, DEA, HARTI, HBASL '	KPI: Priority areas are identified (ii) Survey and data analysis reports (iii) Indicators for vulnerabilities		Data sources and survey reports of state agencies	To a certain extent analysis and vulnerable site identification is done	50%	√	√	√	√							13 (SDG targets to be identified)
2.2 Develop and introduce appropriate IPM and IPNS programmes for selected crops in vulnerable areas	DoA,	DAD, DWC, MET, DoMC, PDoA, Academia, HARTI, MASL, DEA, HBASL '	KPI: (i) Number of IPMs (ii) IPNS packages introduced, (iii) Number of farmers adopting these packages		Data sources of DoA and state agencies.	IPM packages are already implemented for rice and vegetables	40%	√	√	√	√	√						2, 13 (SDG targets to be identified)
2.3 Increase SL GAP Certified products by 25% from areas which are highly vulnerable to climate change.	DoA	DAD, DWC, MET,-DodMC, PDoA, Academia, HARTI, MASL, DEA, Trade agencies such as supermarket chains, dedicated economic centers, and private sector, farmer markets, 'Hadhabima'	(i) Number of GAP certified farmers, (ii) Number of markets for GAP certified products, (iii) Quantities s of GAP certified products marketed (iv) Number of promotional materials developed		Data sources of DoA and state agencies.	5%	Achieve expected KPI levels for each	√	√	√	√	√						2, 13 (SDG targets to be identified)

NDC 3 - Develop/introduce varieties resistant/tolerant to biotic and abiotic stresses targeting most vulnerable agricultural crops to climate change

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1 Develop, introduce/promote heat tolerant varieties.	DoA	PDoA, MASL, DAD Academia	% number of heat tolerant varieties introduced from those developed		Variety release committee reports, reports of the socio-economic and planning centre, performance reports of state agencies	30%	100%		√	√	√	√	√	√	√	√	√	2, 12 (SDG targets to be identified)
3.2 Develop, introduce/promote drought tolerant/escape varieties.	DoA	PDoA, MASL, DAD Academia	% number of drought tolerant/ escape varieties introduced from those developed			25%	100%		√	√	√	√	√	√	√	√	√	2, 7, 12 (SDG targets to be identified)
3.3 Develop, introduce/promote excess soil moisture/flood tolerant varieties.	DoA	PDoA, MASL, DAD Academia	% number of excess soil moisture/flood tolerant varieties introduced from those developed			10%	100%		√	√	√	√	√	√	√	√	√	2, 7, 12 (SDG targets to be identified)
3.4 Develop, introduce /promote salt tolerant varieties.	DoA	PDoA, MASL, DAD Academia	% number of salt tolerant varieties introduced from those developed			30%	100%		√	√	√	√	√	√	√	√	√	2, 7, 12 (SDG targets to be identified)
3.5 Develop and promote pest and disease resistance /tolerant varieties.	DoA	PDoA, MASL, DAD Academia	% number of pest and disease resistance /tolerant introduced from those developed			80%	100%		√	√	√	√	√		√	√	√	2, 7, 12, 13 (SDG targets to be identified)
3.6 Develop, introduce fodder varieties that withstand extreme climatic conditions.	DoA, DAPH	PDoA, PDAPH, Academia	% number of fodder varieties that withstand extreme climatic conditions introduced from those developed			Baseline to be identified	Target to be established		√	√	√	√	√	√	√	√	√	SDG targets to be identified

NDC 4 - Revisit the Agro Ecological Regions (AERs) maps of Sri Lanka with current and future climate scenarios and recommend appropriate crops for different regions to reduce vulnerability to climate change impacts

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1 Expanding the Argo-met observation network to cover the most vulnerable AER to climate change.	DoA	MET, PDoA, MASL, ID, DAD	AER zones covered		Performance reports	40%	100%		√	√	√	√	√	√	√	√	√	2, 7, 12, 13 (SDG targets to be identified)
4.2 Conduct studies related to soil moisture regimes covering most vulnerable AER to climate change.	DoA	DAD, MASL, ID, MET, WRB	5 studies		Study reports, performance reports	25%	100%		√	√	√	√	√	√	√			2, 7, 12, 13 (SDG targets to be identified)
4.3 Most vulnerable AERs are re-demarcated into sub zones to make recommendations for specific crops.	DoA, MET	PDoA, MASL, ID, DAD	AER Map		Available reports	25%	100%		√	√	√	√	√	√	√	√	√	2, 7, 12, 13 (SDG targets to be identified)

NDC 5 - Enhance sustainable land and water management practices in areas where anticipated climate vulnerability is severe

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
5.1 Promote input efficient farming methods / systems covering the target area by 50% in 2025 and 100% by 2030.	DoA	MASL, PDoA, DAD, ID, HASL, TRI, DoEA, CCB	Input efficient farming systems established		Performance reports	30%	100%	√	√	√	√	√	√	√	√	√	√	2, 12, 13 (SDG targets to be identified)
5.2 Promote farm rainwater harvesting to cover the target area by 75%.	DoA	FCRDI, HORDI, FRDI	Rainwater harvesting mechanisms established		Performance reports	30%	75%	√	√	√	√	√						2, 12, 13 (SDG targets to be identified)
5.3 Promote storm water management in 25% of the target area.	DoA	LUPPD, PDoAs, HADABIMA, MASL	Area covered		Performance reports	5%	25%	√	√	√	√	√						2, 12, 13 (SDG targets to be identified)
5.4 Promote crop diversification with input efficient and climate change tolerant varieties in 50% of the target area.	DoA	PDoA, MASL	Crop divarication packages established under irrigation schemes		Performance reports	25%	50%	√	√	√	√	√	√	√	√	√	√	2, 12, 13 (SDG targets to be identified)

5.5 Restoration of small tank cascades and individual tanks to cover the entire target area (links to water sector.	DAD	DoA, PDoA, ID	Small tank irrigation systems restored		Performance reports	30%	70%	√	√	√	√	√	√	√	√	√	√	2, 12, 13 (SDG targets to be identified)
5.6 Promote and apply soil conservation measures in 50% of the target area.	DoA	PDoA, HBASL, , MASL, TSHDA	Soil conservation measures established		Performance reports	25%	50%		√	√	√	√	√	√	√			2, 12, 13 (SDG targets to be identified)

NDC6 - Enhanced early warning and risk management mechanisms introduced to reduce climate change vulnerability

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
6.1 Improved seasonal climate forecasting for Maha and Yala.	MET	NRMC	Improved Seasonal Forecast Launched		Performance reports	25%	75%	√	√	√	√							2, 12, 13 (SDG targets to be identified)
6.2 Promote provision of simplified and timely climate forecast-base advisory communication to farmers and field-level officials in agriculture.	DoA	NAICC, PDoAs MET, NRMC	Communication network established and operational		Performance reports	40%	75%		√	√	√	√						2, 12, 13 (SDG targets to be identified)
6.3 Strengthen risk management and risk transfer mechanisms in agriculture.	AAIB	SEPC, NRMC	Agriculture Insurance mechanism in place and operational; Increased number of farmers enrolled in the process		Performance reports	40%	100%		√	√	√	√						2, 12, 13 (SDG targets to be identified)
6.4 Strengthen early warning systems/ advisory for climate hazards and pest and disease risks.	DoA	NRMC MET, RRDI, HORDI, FCRDI, PDOA	Mechanism in place and operational; Number of farmers using early warning advisory		Performance reports	25%	50%		√	√	√	√						2, 12, 13 (SDG targets to be identified)
6.5 Introduce climate related crop forecasting to reduce post-harvest losses.	DoA	SEPC, NRMC, RRDI, MASL, PDoA	MOSAICC based Crop forecasting done		Performance reports	15%	100%		√	√	√	√						2, 12, 13 (SDG targets to be identified)
6.6 Promote protected agriculture and other technologies for climate risk management.	FMRC, HORDI	;PAEA Other Private Sector entities, Academia	Area under protected agriculture		Performance reports	20%	50%			√	√	√	√	√				2, 12, 13 (SDG targets to be identified)

4.3 Fisheries Sector

The nation's fisheries resource base includes a 517,000 sq km exclusive economic zone (EEZ), a 21,500 sq km territorial sea, 1,580 sq km of internal waters made up of lagoons and estuaries, and 5,200 sq km of artificial reservoirs. The resource foundation for the growth of aquaculture is made up of bays, lagoons, reservoirs, and certain lands situated in coastal and reservoir areas[45].

Fisheries play a key role in the nation's economy and food security. Fish provides over 50% of the animal protein consumed in Sri Lanka, which is three times the average for the world. According to the "Industry Capacity Report of the Export Development Board (EDB) for the Fisheries Sector", around 8,500,000 people were actively engaged in the seafood and aquaculture industry in 2019. The key stakeholders are fisherman, breeders, processors, logistics, cold chain, packing and other service suppliers. Each and every step in the Seafood and Aquaculture industry generates more and more employment opportunities while uplifting livelihood of fisheries communities' mainly in coastal area. Furthermore, the fisheries sector earned 1.5% of the foreign revenue in 2019 while making direct, indirect, and induced contributions totaling 1.9% to the GDP.

The production of fish in the country is heavily influenced by the coastal and marine sectors. The major contribution to the nation's fish production is made by marine fish production, which includes both coastal and deep-sea fisheries (Figure 4-5). From the years 2014 to 2021, the percentage of marine fish output in the total fish production was 86%, 87%, 86%, 85%, 83%, 82%, 76%, and 76%, respectively[46].

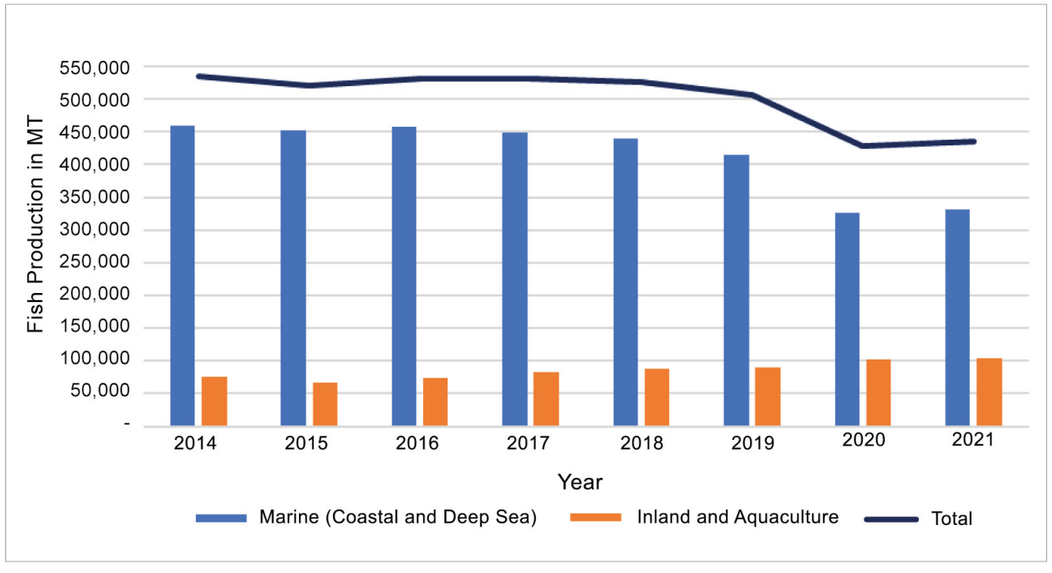


Figure 4-3 National fish production (Data: Department of Census and Statistics[47])

45 The National Fisheries and Aquaculture Policy, Sri Lanka (2018)

46 Statistical Pocket Handbook of Sri Lanka, 2022 Available at http://www.statistics.gov.lk/Publication/PocketBook

However, the sector has recently seen a decline in catch for every unit of labor and has been exposed to extreme weather events. Additionally, the COVID-19 pandemic has caused a 20% decline in fish catch and a 26% decline in exports by 2020, significantly affecting the lives of already vulnerable coastal fishing communities[47]. Aggravating the situation, present economic crisis has crippled the livelihoods of the fishermen due to the shortages and high prices of fuel and electricity creating difficulties in operating fishing boats, making ice for preservation of fish catch and transporting to marketplaces from fishing harbours.

Under SDG 14 - Life Under Water, the sector had set three targets for 2021 viz 372,472 Mt of marine fish production, 109,500 Mt of inland and aquaculture fish production, and 48 g per day per capita fish consumption, and 89%, 94.8%, and 77.3%, respectively, of these targets, have been achieved by the year 2021 [48]. Despite the successful achievement of targets, the sector faces major challenges to fully exploit its potential in a sustainable manner; the challenges include (i) unlawful fishing operation by South Indian fishers in Sri Lankan waters using harmful bottom trawling methods, (ii) growth of illegal, unreported, and unregulated fishing operations, and (iii) increasing marine pollution and increase in invasive alien species due to increase in marine traffic in sea lanes around Sri Lanka. GoSL has developed a comprehensive legal, policy and institutional framework for managing coastal and marine resource and has made significant efforts to increase the fish supply from marine sources as evident from the sector performance in the year 2021 as indicated above. These legal interventions are undertaken by the Department of Fisheries Aquatic Resources (DFAR) under the provisions of Fisheries and Aquatic Resources Act 2 of 1996. The draft National Fisheries and Aquaculture Policy (2018)[49] has included a section on Environment, Climate and Natural Disasters. It highlights the need to develop a strategy to address the environmental and climate change challenges and impact of natural disasters. It further hghlights steps needed to be taken to prevent marine pollution, assistance to communities impacted by climatic impacts and development of coping capacity.

Furthermore, the mangrove and seagrass habitats, which serve as spawning sites for fish species with commercial viability, will be impacted by climate change. Additional effects of climate change on the fisheries industry include the loss of wetlands in coastal areas and changes in the salinity of lagoons and estuaries that influence fish and shellfish. Temperature variations, droughts, precipitation, runoff, and floods on freshwater ecosystems are threats to inland fisheries. Reduced rainfall anticipated during the North-East Monsoon would increase the risk to inland fisheries. An increase in natural catastrophes including storm surges, strong winds, and cyclones will harm the reef, aggravating coastal erosion, increasing soil salinity, and contaminating freshwater sources. Aggressive adaptation strategies are necessary due to the many detrimental effects of climate change on the fishing sector.

The seven NDCs (Table 4-2) that comprise the adaptation strategy include adopting ecosystem-based approaches to fisheries management, increasing aquaculture and culture-based fisheries for improved food security, breeding species for aquaculture to withstand adverse climatic conditions, improving safety at sea, better early warning for managing climate risk, diversifying livelihoods, and specialised research on the effects of climate change on fisheries.

47 World Bank, Priorities for Sustainably Managing Sri Lanka's Marine Fisheries, Coastal Aquaculture, and the Ecosystems that Support Them (2021).

48 State Ministry of Ornamental Fish, Inland Fish & Prawn Farming, Fishery Harbour Development, Multiday Fishing Activities and Fish Exports, Annual Performance Report, 2021

49 Ministry of Fisheries and Aquatic Resources Development and Rural Economy (2018) National Fishereis and Aquaculture Policy

Table 4-2 NDCs of Fisheries Sector

NDC #	NDC
1	Ecosystem-based approach to fisheries management (EAFM) adopted in areas of high climate vulnerability to enhance resilience
2	Expand aquaculture and culture-based fisheries to address food security issues relating to climate change
3	Breeding of climate change resilient and commercially important aquatic resources
4	Increase the production capabilities of fisheries, aquatic resources in 30 lagoons that are highly vulnerable to climate change
5	Enhanced safety at sea against climate change influenced extreme conditions
6	Diversification of livelihoods of fisherfolk to build resilience to climate change
7	Conduct fisheries and aquatic resources research to build resilience to climate change

4.3.1 Key Gender Aspects and Challenges in the Fisheries Sector

The Fisheries Statistics (2020) document that there were 224,610 active fisher women and men in the marince fisheries sector and 70,715 active fisher women and men in the inland fisheries sector in 2019. Out of this, 4,371 women are employed in the inland fisheries and aquaculture trade. The draft Fisheries and Aquaculture Policy (2018) has identified the need to promote equal opportunities for women's participation in the activities of the sector. It has recognized the need to mainstream gender in small scale fisheries development strategies; create conditions for both male and females to have equal access to resources and benefits and encourage both men and women to participate jointly in finding solutions to problems.

In general, fish catching is male dominated. In artisanal fishing communities, women often manage smaller boats and canoes. Women are mostly responsible for onshore tasks such as making and mending nets, processing and marketing catches, and collecting molluscs such as clams, oysters and mussels.

Fisheries practices and fish availability is dependant on weather patterns. Hence, fishing is seasonal and fishing communities have diversified their livelihoods. Climate change impacts trigger vulnerabilities in coastal communities and temporaray migration is seen by both men and women who travel inland for jobs as construction workers, domestic help and labourers.

4.3.2 Recommendations for Gender Responsive NDC Planning and Implementation

In consideration of the above detailed status of women engaged in the fisheries sector, it is important to facilitate, support and upgrade their role through the NDCs, for more efficient and effective overall NDC outcomes. The following recommendations are suggested for consideration:

(a) NDC activity planning and implementation in the sector need to take into account the division of labour and the significant contribution women provide to the fisheries sector, which is a resource to the sector, and complementary to the role of men.
(b) NDC activity planning and implementation in the sector need to take a gender responsive approach to ensure due recognition of the activities carried out by women in the sector (currently invisible due to lack of disaggregated data, policy gaps and stereotypes). This will lead to overall benefits and improved productivity in the sector.
(c) Incorporate activities to encourage and promote women's engagement and potential in the fisheries sector, to be active in community activities (through the fisheries cooperatives and rural development organisations, and through training and capacity building programmes implemented under the NDC actions.
(d) Identify main baseline criteria for the role and functions carried out by women, include targets and KPIs into the NDC monitoring plan of the fisheries sector.
(e) Incorporate programmes into the NDC activity plans to enhance and upgrade the activities that come under women's responsibilities (such as lagoon fishing, fish gutting, cleaning and drying).
(f) Use specific strategies to include/target female-headed households Ex. Government owned land can be leased for aquaculture activities.
(g) Include and target women in providing training for value addition, technology and machinery, credit, subsidies, places for fish drying, and in finding high value markets to enhance their position in the fish value chain.
(h) Include and target women and the specific functions they carry out in the sector in the programmes for diversification of livelihoods of the vulnerable fisherfolk.
(i) Ensure equitable access to programmes conducted under the NDC action plan for upgrading skills related to technology, management, marketing, transport and developing networks.
(j) Introduce improved technologies and methods to ease women's burdens and increase their efficiency.
(k) Provide income-generating opportunities such as microfinance services, credit facilities to the needs of different clients.
(l) Design projects to support women's work within their households (e.g providing water, wood supplies, day-care, etc).
(m) Set targets to reach and maintain the share of women scientists, officials, technical officers, and those in the local level committees.
(n) Include collection of sex disaggregated data, develop KPIs, to review gender responsive activities, and outcomes, in the progress review and monitoring of the NDC plans.

4.3.3 Fisheries Sector NDC Implementation Plan

NDC 1 - Ecosystem-based Approach to Fisheries Management (EAFM) adopted in areas of high climate vulnerability to enhance resilience

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1 Identify priority limits and define fisheries management areas based on ecological principals	DFAR	NARA, CC&CRMD, MEPA	Number of fisheries management units identified		Records of the DFAR	Not Commenced	05 priority areas selected			√								5.c, 14.2, 14.b, 14.c
1.2: Develop 5 EAFM plans	DFAR	MoFish, NARA, CC&CRMD, MEPA	Number of EAFM plans developed in gender responsive manner as appropriate		Published plans of DFAR	Not Commenced	5 EAFM Plans developed			√	√	√						5.c, 14.2, 14.b, 14.c
1.3: Conduct survey/s to estimate women's participation / contribution in the Fishery sector	MoFish (Statistical unit)	MoWCSD, NARA, CC&CRMD-MEPA, NAQDA, DFAR, Academia	1. Initial Surveys 2. Number of updates of the surveys		Survey reports	Not Commenced	1. Initial surveys conducted by 2023 2. two updated per year			√	√	√	√	√	√	√	√	5.1, 5.2, 5.5, 5.a, 5.c, 14.2
1.4: Incorporate EAFM into 5 prioritized existing fisheries management areas declared under Fisheries and Aquatic Resources Act	DFAR	NARA, CC&CRMD, MEPA, MoPC&LG, NAQDA, FD, SLCG, DS	Number of EAFM incorporated fisheries management areas		Records of the DFAR including sex disaggregated data	Not Commenced	05 existing fisheries management areas incorporated with EAFM		√	√	√	√	√	√	√	√	√	5.c, 14.2, 14.b, 14.c
1.5: Build awareness and capacities of all key stakeholder agencies on gender issues in the sector	DFAR	MoWCSD, International agencies	1. Number of awareness rogrammes conducted 2. Number of participants received awareness training		Reports on the awareness and training programmes on gender issues, gender responsive planning & implementation for climate resilience	Some work initiated, but awareness programme not conducted	Targets of the two indicators to be established			√	√	√	√	√	√	√	√	5.5, 14.2

1.6: Amend existing legislative framework, where necessary to enable gender integration	MoFish, DFAR	All relevant institutions	Legislative framework enabling gender inclusion		Approved policy and amended legislative framework	Draft policy pending Cabinet approval Pension scheme established to include fisher spouses & dependents	Amended legislative framework where necessary			√	√	√	√	√	√	√	√	5.5
1.7: Implement 5 EAFM plans	DFAR	MoPC&LG, NARA, CC&CRMD, MEPA, DS	Number of EAFM Plans Implementated		Minutes of Progress review meetings, with sex disaggregated data	Not commenced	05 EAFM Plans implemented			√	√	√	√	√	√	√	√	14.2
1.8: Target an appropriate percentage of women in introducing climate change responsive new technologies and systems	DFAR	MoE, MoWCSD, NARA, ITI, NERDC, NGOs, INGOs	% of the women participation Programmes for the introduction of climate change responsive new technologies and systems		DFAR Progress reports with sex disaggregated data	Above 10%	Not less than 25% of women reached out/ included in promoting climate resilient programmes			√	√	√	√	√	√	√	√	5.1, 5.2, 5.5, 5.a, 5.c, 14.2

NDC 2 - Expand aquaculture and culture-based fisheries to address food security issues relating to climate change

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1: Promote an appropriate fish fingerling stocking programme for enhancement of culture-based inland fisheries	NAQDA	MoFish, DFAR, DAD, NARA, MASL, CC&CRMD, ID, DWC, CEA, Chambers of Commerce, Academia	1. No of fingerling stock 2. Annual inland fish production		Records of MoFish, NAQDA	1. 110 million fingerling stock 2. 104,000 MT	1. 500 million fingerling stock 2. Target for inland fish production to be established	√	√	√	√	√						8.1, 8.4, 13.b, 14.2, 14.7
2.2: Establish fish barricade devices for 50 perennial reservoirs impacted with frequent floods to prevent fish escape, in consultation with Irrigation Department	NAQDA	ID, MASL, NARA, DWC, Farmer Organizations	No of tanks covered		Records of MoFish, NAQDA	None	Target to be established	√	√									2.4, 13.1, 14.2, 14.7

2.3: Promote culture of species appropriate for changing climate	NAQDA	DFAR, NARA, CC&CRMD, CEA, Private Sector (for promotion and applications), Academia	Number of species of fish		Records of NAQDA	01	At least 2 new fish species by 2030	√	√	√	√	√	√	√	√	√	√	2.4, 13.1, 14.2, 14.
2.4: Conduct survey/s to estimate women's participation/contribution in the aquaculture Fishery sector	NAQDA	MoWCSD, NARA, CC&CRMD, MEPA, DFAR, Academia	1. Initial Surveys 2. Number of updates of the surveys		Survey reports	Not Commenced	1. Initial surveys conducted by 2023 2. two updated per year			√	√	√	√	√	√	√	√	√	5.5

NDC 3 - Breeding of climate change resilient and commercially important aquatic resources

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1: Cryopreservation facility in Dambulla expanded for stocking fish sperms for artificial breeding of species where effective spawning affected due to climate induced changes	NAQDA	NARA, Academia, Private sector for PPP to promote facilities	Number of samples preserved		Records of NAQDA	300 samples preserved	Annually 300 samples	√	√	√	√	√	√	√	√	√	√	8.2, 13.1, 14.2, 14.4, 14.7
3.2: Convert 52 numbers of existing open breeding facilities into indoor facilities and design constructions enabling controlling temperature and salinity for breeding tolerant strains of selected species	NAQDA	NARA, Academia, Private sector	Number of hatcheries developed/ improved		Records of NAQDA	5	52	√	√	√	√	√	√	√	√	√	√	8.2, 13.1, 14.2, 14.4, 14.7

NDC 4 - Increase the production capabilities of fisheries, aquatic resources in 30 lagoons which are highly vulnerable to climate change (2030)

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1: Identify vulnerable lagoons (by 2022) and prepare lagoon profiles for 30 lagoons	NARA	MoFish, DFAR	1. Number of vulnerable lagoons identified 2. Number of lagoon profiles developed		Records of MoFish, DFAR, NARA	5 lagoon profiles up to 2020 Data collected for 07 lagoons (05 in 2017 and 02 in 2019)	30 lagoon profiles developed		√	√	√	√	√	√	√	√	√	14.2, 14.7
4.2: Carrying capacity assessment of 30 lagoons	NARA	MoFish, DFAR, NAQDA, CC&CRMD, MEPA, SLTDA, CEA, Academia	No of carrying capacity assessments completed		Records of NARA	None	15			√	√	√	√	√	√	√	√	14.2, 14.7
4.3: Declaring and managing 10 lagoons as Co-managed Fishery Management Areas (FMAs)	DFAR	SD, NARA, CC&CRMD, DS, Approximately 23 agencies including fisheries committees at divisional level	1. No of Lagoons gazetted/ declared 2. No of co-management groups established 3. No of management and development plans prepared and implemented		Records of DFAR (Management Plans)	1. 36 Gazetted (by 2017) 2. None 3. None	1. Additional 10 lagoons 2. Target to be established 3. Target to be established		√	√	√	√	√	√	√	√	√	13.2 14.2
4.4: Minimize aquatic pollution in above 10 lagoons mentioned in 4.3	MoFish	NARA, DFAR, CC&CRMD, NGO, MEPA, CEA, LAs	No of lagoons where aquatic pollution minimized		Records of DFAR & NARA (for water quality)	Feasibility studies in 4 lagoons in progress (Arugambay, Nandikadal, Nayaru, Lanka Patuna)	10	√	√	√	√	√	√	√	√	√	√	14.1
4.5 Promoting aquaculture of selected climate change resilient, high value food species in selected lagoons	NAQDA	NARA, DFAR, CEA, LAs	No of species identified as climate resilient		Records of NAQDA and DFAR	Feasibility studies being conducted	5	√	√	√	√	√	√	√	√	√	√	14.2

NDC 5 - Enhanced safety at sea against climate change influenced extreme conditions

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
5.1: Promote applicable measures to enhance safety at sea	DFAR	MoFish, DMC, MoD, MED	1. Number of applicable measures identified 2. Number of incidents reported		1. List of applicable measures in DFAR records (Communication equipment for multi-day fishing vessels) 2. MCS records	1. Some guidance on applicable measures are provided in the Act. 2, Number of incidences to be identified	1. Identify the exact applicable measures at least by 2023 2. Target to be established (% reduction of incidences)	√	√	√	√	√	√	√	√	√	√	8.8, 13.1, 14
5.2: Enhance effective early warning transmission systems for fishers (including small boats and traditional crafts) and insurance schemes	DFAR	MoFish, MD,DMC, MoD, SLN, MRCC Telecom service providers, Private & Government Insurance Companies	50% of the coastal fishers using effective early warning transmitting system such as CDMA		MOU between MoFish and Telecom service provider	Current systems are not effective	At least 50% of the coastal fishers use effective early warning transmission systems	√	√	√	√	√	√	√	√	√	√	8.3, 8.8
5.3: Establishment of an efficient weather information management and communication system (WIMS) including satellite-based vessel monitoring system to ensure safety at sea	DFAR	SLPA, SLN, DMC, SLCG	1. % of multiday boats equipped with VMS 2. % of multiday boats equipped with AIS		Amended regulation; Records of DFAR	1. WIMS older version 2. Few boats with AIS	1. Establishment of an efficient weather information management and communication system including satellite-based vessel monitoring system to ensure safety at sea. 2. 100% by 2025			√	√	√	√	√	√	√	√	8.8

NDC 6 - Diversification of livelihoods of fisherfolk to build resilience to climate change

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
6.1: Enhance access to credit, inputs training for diversification of livelihoods of the vulnerable fisherfolk	DFAR	MoFish, MoSD&VT, NARA, ITI, Banks, Insurance companies	1. Number of schemes for livelihood diversification 2. Number of fisherfolk who had diversified their livelihoods		Progress reports of relevant agencies	1. None 2. None	1. Target to be set 2. Target to be set	√	√	√	√	√	√	√	√	√	√	8.2, 8.3, 14.b
6.2: Allocate a percentage for women fisherfolk in carrying out knowledge transfer activities, training sessions, extension programmes, providing credit facilities, production inputs, etc.	DFAR	MoSD&VT, MoWCSD, Women's Bureau, NARA, ITI, Banks, Insurance companies	1. Percentage of women fisherfolk included in carrying out knowledge transfer activities, training sessions, extension programmes, providing credit facilities, production inputs, etc s 2. Number of women accessing credit, production inputs		DFAR progress reports with information on women fisherfolk reached, accessing the facilities	1. Not recorded 2. Not recorded Activities have been conducted but gender disaggregated data not recorded	To be decided			√	√	√	√	√	√	√	√	√	1.4, 5.5, 5.a, 5.b, 8.5, 14.b
6.3: Assist finding high value markets to deal with reduced yields	DFAR	MoFish, MoSD&VT, NARA, Banks, Insurance companies	Number of high-value markets established		Records of DFAR	None	Target to be established			√	√	√	√	√	√	√	√	2.3, 9.3, 14.b
6.4: Facilitate value additions through diversification of fisheries related products (fish oil, fish sauce and other value-added products)	DFAR	NARA, ITI, BOI, EDB	Number of value-added products introduced annually		Progress reports of relevant agencies	No specific products introduced	Target to be established			√	√	√	√	√	√	√	√	2.3, 9.3, 14.b

NDC 7- Conduct fisheries and aquatic resources research targeting building resilience to climate change

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
7.1: Assess climate impacts on fisheries and aquatic resources	NARA	Academia	1. Number of assessments conducted annually 2. Number of areas covered in Climate impact assessments (Fisheries - Marine, Aquaculture & Inland fisheries, Aquatic resources - Habitats, Coral reefs, Mangroves, Sea grass, Salt marsh)		Records of relevant agencies	Research and data collection have been done, but not specifically focus on CC impact and data is not comprehensive enough to do the assessments. Two proposals particularly related to CC have been developed but could not implemented due to non-availability of funding.	Targets to be established	√	√	√	√	√	√	√	√	√	14.2, 14.3

7.2: Develop reef monitoring systems to provide early warning alerts of bleaching events	NARA	Academia	Number of Reef monitoring systems		NARA records	Monitored 02 reefs annually for the reef status Four data loggers are available (but not real-time monitoring, which is essential for a reef monitoring systems)	04 automated real-time data monitoring systems (02 each for West coast and East coast). 02 by 2025 and 04 by 2030	√	√	√	√	√	√	√	√	√	√	14.2, 14.3
7.3: Identify adaptation measures in fisheries for ocean acidification related impacts	NARA	Academia	1. Number of Automated monitoring systems for ocean acidification measurements 2. Number of Adaptation measure/s for ocean pacification		NARA records	Ocean acidification measurement is done in two selected locations (East coast and west coast), but the measurement process is manual	04 Automated monitoring	√	√	√	√	√	√	√	√	√	√	14.2, 14.3
7.4: Installation of artificial reefs where substrate for settlement of corals larvae is minimal	NARA	CWC, CC&CRMD	Number of artificial reefs installed		NARA records	Small-scale artificial reefs were piloted in 04 locations (Polhena, Galle, Sinnapaduand Weligama)	At least four locations	√	√	√	√	√	√	√	√	√	√	14.2, 14.3, 14.5

7.5: Deployment of fish aggregating devices in identified areas	NARA	CWC, CC&CRMDD	1. Studies to identify number of locations 2. Deployment NAQDA		NARA records	1. Studies conducted in four locations to identify the feasibility for deployment 2. None	1. Comprehensive assessment by 2025 2. 05	√	√	√	√	√									14.4
7.6: Reduce capital, operation and other costs in fisheries and aquaculture by introducing and promoting fuel efficient technologies in response to declining yield and productivity in a changing climate	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.6.1: Introduce solar panel systems to multiday fishing vessels and fish processing factories	DFAR	CEB, SLSEA	Number of multiday fishing vessels installed with solar panels		NAQDA and DoF records	None	All multiday fishing vessels installed with solar panels (approximately 5,500)			√	√	√	√	√	√	√	√	√	√	√	2.4

4.4 Livestock Sector

The livestock sector plays a significant role in agricultural development that supports poverty reduction and food security. With more than 600,000 registered livestock farms, the majority of which are small-scale, the livestock sector (including poultry) is crucial to the food systems and livelihoods of rural communities in Sri Lanka. However, one of the nation's economic sectors that is most susceptible to the effects of climate change is livestock. Developing the livestock industry is a must for ensuring the nation's food security. This is true not only for improved soil fertility for higher crop output but also for enhanced availability of livestock produce.

In Sri Lanka, livestock husbandry is often maintained on a small scale while giving rural agricultural households additional revenue and support for their way of life by utilizing extra labor, underutilized agricultural byproducts, and marginal lands. As depicted in Figure 4-4, the livestock with the largest population, next to poultry, is cattle. The cattle population remains almost steady over the past 5-year period averaging around 1.1 million. The number of goats and buffaloes remains nearly the same yet substantially small compared to cattle, while sheep are the lowest in number. There is a sharp increase in poultry numbers between 2019 and 2020, as shown in Table 4-3. *M*eanwhile, egg production fluctuated around 2 billion eggs during the period concerned.

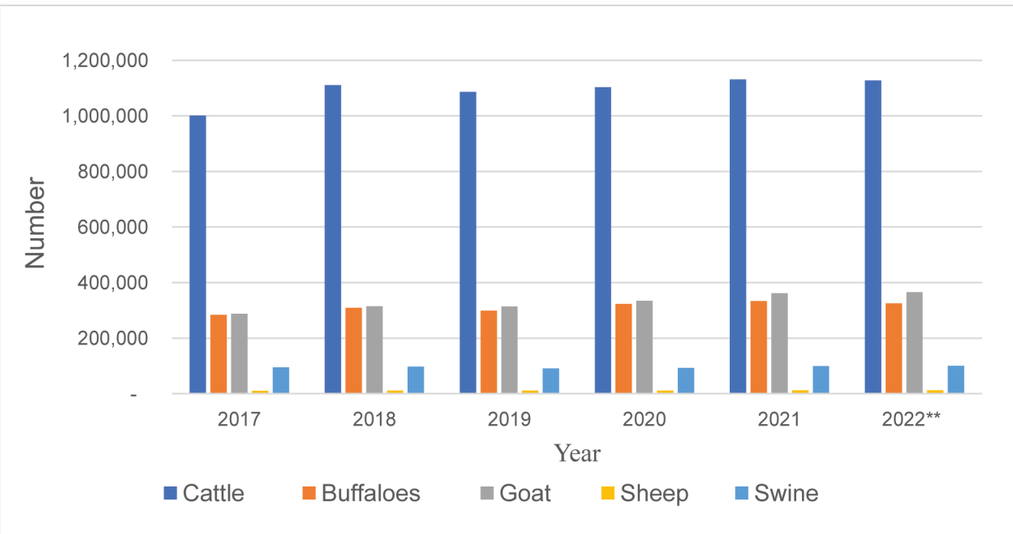


*Figure 4-4 Livestock numbers (excluding poultry[32]) (** provisional)*

*Table 4-3 Poultry, milk, and egg production[50] (**provisional)*

Year	Poultry (numbers)	Milk (million Liters)	Eggs (millions)
2017	21,275,820	397.92	2072.87
2018	20,531,000	467.69	1972.21
2019	20,411,050	447.58	2084.21
2020	24,277,830	491.54	1869.69
2021	24,310,690	513.31	1953.71
2022**	22,766,750	506.45	1848.60

The livestock sector is seen to be seriously threatened by climate change. Droughts, floods, and heat stress are just a few examples of the extreme weather occurrences and climate variabilities that are predicted to be brought on by the unpredictable rainfall and warming temperatures caused by global climate change. For instance, the Northern province suffered greatly because of the cold wave that swept across the country in December 2022, which killed over a thousand livestock. In addition to these direct consequences, there are also significant secondary effects, such as implications on forage crop growth, pasture availability, waterlogging, disease risk from emerging infections, and reduced production and quality of feed crops.

Policy direction for the industry is provided by the National Livestock Development Policy (NLDP) (2007) and the Livestock Master Plan - A Strategy for Livestock Development Toward Self-sufficiency (2011). NLDP focuses on four sub sectors viz (i) dairy, (ii) poultry, (iii) meat, and (iv) animal feed resources. It aims to serve three objectives namely, (i) Spell out clearly the development goals of the livestock sector and the role of the public sector in livestock development activities in the country, (ii) facilitate the private sector and other interested agents to identify the scope and possibilities for their activities in production, processing and marketing of livestock and livestock produce, and (iii) rationalise investments on livestock sector provided from the consolidated fund through the national budget and avoid crowding-out of private sector investment[49].

Draft National Agriculture Policy which is to be submitted soon for Cabinet approval has the vision of achieving "sustainable food security to achieve national prosperity" and the mission to create a "socially-acceptable and sustainable food system in Sri Lanka through a globally competitive agricultural production, processing and marketing mechanism". The draft policy has 10 thematic areas; Crop Production and Productivity, Input Management, Advanced Technologies, Food Safety and Quality Management, Eco-friendly Operations, Agri-Entrepreneurship and Markets, Producer Empowerment, Climate resilience and other risk management, Knowledge Management and Agricultural Extension, and Governance and Operations Management. This policy is also expected to provide the policy framework for all key agriculture sector institutions; including crop, livestock, inland fishery, crop processing, and allied services such as irrigation, agrarian development and environment.

With the other agencies under the Ministry of Agriculture, (MoA) the Department of Animal Production and Health (DAPH) takes the lead in improving the livestock sector development in Sri Lanka. National Livestock Breeding Policy Guidelines and Strategy for Sri Lanka, (2010) has been the main guidance for livestock breeding.

50 http://www.vri.lk/nnn3/ldp.php

Priorities for the livestock sector's adaptation are included under three NDCs (*Table 4-5*), which address strengthening climate resilience in ruminant livestock farming techniques, managing swine and poultry farms, and sector-wide research and development, training, and capacity building.

Table 4-4 NDCs of Livestock Sector

NDC #	NDC
1	Introduce adaptation measures to address adverse impacts of climate change on ruminant livestock
2	Introduce technological innovations and interventions to build resilience in poultry and swine farming
3	Improve research, education, awareness and, capacity building for climate change adaptation

4.4.1 Gender Aspects in the Livestock Sector

Most rural communities manage livestock as an income generating scheme. In general, men are responsible for larger animals (mainly cattle), while women tend to engage in animal care and milking. Women are responsible for managing smaller animals such as goats and poultry. Heat stress, drought, floods create more hardship for women who have to provide food and water to maintain the livestock. Maintenance of animal pens and coops in the face of floods and droughts is also a challenge. International organizations in collaboration with the Ministry of Agriculture has taken several initiatives to provide training and involve women in micro entrepreneurships. Several banks in Sri Lanka have taken steps to provide loan schemes to women entrepreneurs who are engaged in animal husbandry, and market dairy products.

4.4.1 Recommendations for Gender Responsive NDC Planning and Implementation

As the analysis of the secondary sources indicate, despite many constraints, women make a significant contribution to the livestock sector. It is therefore important to facilitate, support, and enhance their role through the NDCs, for more efficient and effective overall NDC outcomes. The following recommendations are suggested for consideration:

(a) NDC activity planning and implementation in the sector need to take into account the division of labour and the significant contribution women provide to the livestock sector, which is a resource to the sector, and complementary to the role men play in the sector.

(b) Incorporate activities to encourage and promote women's engagement and potential in the livestock sector, to be active in community activities (through dairy cooperatives, Rural Development Organisations, and through training and capacity building programmes implemented under the NDC actions).

(c) Include and target women in providing training for adaptation measures, technological innovations and resilient farming systems, machinery, subsidies, to enhance their position in the value chains.

(d) Include collection of sex disaggregated data to review gender responsive activities, and outcomes in the progress review and monitoring of the NDC plans. (Please see Table 4.4.3 for specific actions for gender and socially inclusive implementation)

4.4.3 Livestock Sector NDC Implementation Plan

NDC 1 - Introduce adaptation measures to address adverse impacts of climate change on ruminant livestock

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1: Identify and promote appropriate adaptation measures, technological innovations and resilient farming systems including heat stress management	DAPH	MoA, PDAPHs, NLDB, VRI, Academia, Milk Processing agencies, Related NGOs	Recommended adaptation measures Number of technological innovations adopted		Reports of DAPH	0 (for all the activities)	In 50% of the existing farms having adaptation measures using technological innovations			√		√	√	√	√	√	√	2.3, 2.4, 8.2, 12.2, 13
1.2: Promote integration of rainwater harvesting ponds into medium and large farms	DAPH	PDAPHs, MASL, Milk collecting agencies	Number of ponds adapted by medium and large-scale farms		Quarterly progress reports, Annual reports of the DAPH	0	Established in 50% of the farms in the dry zone			√	√	√	√					2.3, 2.4, 6.b, 12.2, 13.3
1.3: Introduce adaptation measures such as forage conservation, modification of feeding systems to respond to early warnings on extreme weather events	DAPH	MoA, PDAPHs, NLDB, VRI, Academia, Milk Processing agencies, Related NGOs	Number of farmers adapting these technologies, by sex disaggregated data		Records of DAPH, VRI and Feed Registrar's office records	0	Number of farmers – 50%			√	√	√						2.3, 2.4, 13.3
1.4: Introduce/ develop high yielding and climate adaptable new forage and feed resources	DAPH, VRI	MoA, PDAPHs, NLDB, MASL, Academia, Milk Processing agencies, Related NGOs	Number of varieties & feed resources promoted and adopted		Reports of DAPH and VRI	3	2 new varieties	√	√	√	√	√						2.3, 2.4, 12.2, 13.3
1.5: Continuous monitoring/ improved surveillance by veterinary services to detect and respond to new/re-emerging (Leptospirosis, Tick-borne, etc.) climate related diseases	DAPH	PDAPHs, VRI, VICs	Surveillance of new and re-emerging diseases or outbreaks		Reports of DAPH	0	Annual surveillance				√	√	√	√	√	√	√	2.3, 2.4, 13.3

NDC 2 - Introduce technological innovations and interventions to build resilience in poultry and swine farming

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1: Facilitate small-scale operators to adopt climate-resilient housing and management practices to reduce heat stress	DAPH	PDAPHs, VRI, Academia, Related NGOs, Private sector	Number of training sessions conducted Sex disaggregated data of participants Facilitation of uptake recommended adaptation measures Number of improved animal housing		Annual reports and statistical bulletin, indicating women farmers included in training	Awareness programmes being carried out but not in a planned manner	Target need to be set for the number of training sessions 50% of existing farms adopting adaptation measures to reduce heat stress % of women farmers adopting (out of the above 50%)			√	√	√	√					2.3, 2.4, 8.2, 12.2, 13
2.2: Continuous monitoring/ improved surveillance by veterinary services to detect and respond to new/re-emerging climate related diseases in poultry and swine	DAPH	VRI, VIC, PDAPHs	Surveillance of new and re-emerging diseases or outbreaks		Epidemiological bulletin of DAPH	0	In all the farms			√	√	√	√					2.3, 2.4, 13.3
2.3: Promote expansion of existing adaptation measures such as modification of feeding systems to manage available feed in responding to early warning systems on extreme conditions	DAPH	VRI, Academia, Private sector	Number of modifications / formulations		VRI reports DAPH Annual report, Feed Registrar's Office records	0	2				√	√	√	√				2.3, 2.4, 13.3

NDC 3 - Improve research, education awareness, and capacity building for climate change adaptation

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1: Technology and knowledge transfer to implement adaptation measures, considering gender sensitivity in livestock sector	DAPH	PDAPHs, VRI, NLDB, Academia	Technology and transfer assessment Knowledge and technology transfer packages are developed & delivered for relevant target groups (with gender and youth components) Sex disaggregated data indicating numbers of women farmers reached with technology and knowledge transfer		Finalized Assessment report of DAPH Research papers	0	Overall technology and transfer assessment conducted (by 2024) Knowledge transferred to not less than 50% livestock farmers				√	√	√	√	√	√	√	√	5.b, 13.3
3.1.1: Conduct a gender assessment and analysis for the livestock sector to identify main gender issues in the sector relevant for adaptation, and to set a baseline	DAPH, HARTI	MoA, MoWCSD, PDAPH, Academia, Processing agencies	Sector gender assessment (Women's involvement in the sector, related gender issues, barriers and challenges)		DAPH reports	Some studies available, scattered information	Updated sector gender assessment		√	√									5.b, 13.3, 13.b
3.1.2: Incorporate gender issues identified in activity 3.1.1 in identifying, developing and promoting technological innovations, adaptation measures, resilient farming systems	DAPH	MoA, MoWCSD, PDAPH, VRI NLDB, Academia, Processing agencies	Gender responsive adaptation measures, technological innovations		Progress reports/Bulletins of DAPH	Gender issues not emphasised	Gender issues incorporated			√	√	√	√	√	√	√	√	√	2.3, 2.4, 5.b,13.3, 13.b
3.1.3: Plan and implement activities to engage and target women livestock producers in the promotion of all adaptation measures in the NDC action plan (technological developments, resilient farming systems, forage conservation, feeding systems, processing and marketing mechanisms etc.)	DAPH	MoA, PDAPHs, NLDB, VRI, Academia, Milk Processing agencies, related NGOs,	Women livestock producer engagement		Reports/records of DAPH	Not emphasised	Not less than 30 % of women livestock producers engaged			√		√	√	√	√	√	√	√	2.3, 2.4, 5.b,13.3, 13.b

3.1.4: Encourage women scientists/ researchers/technicians/Extension Officers, in developing and introducing adaptation measures recommended in the NDC action plan for the livestock sector in planning and decision-making positions	DAPH, PDAPHs	NLDB, VRI, Implementing partner organisations, Academia	Percentage of women scientists/ researchers/technicians in planning/ decision making		DAPH reports include sex disaggregated data	Not emphasised	Not less than 40%			√	√	√	√	√	√	√	√	2.3, 2.4, 5.5, 5.a, 5.b,13.3,13.b
3.2: Conduct awareness and educational programmes on climate resilience in livestock activities	DAPH	PDAPHs, NGOs, Farmer Organizations, DAD, Private sector	Number of local level extension Officers trained by DAPH (ToT) No of livestock farmers trained by PDAPHs		Records of the P DAPHs. Attendance with sex disaggregated data indicating women livestock farmers/extension officers participation	Not emphasised	25 per year 800 per year				√	√	√	√	√	√	√	2.3, 2.4, 13.3
3.3: Capacity building of all service providing institutions in the livestock sector to promote resilience building measures discussed in NDC 1 and 2	DAPH	PDAPHs, DAD, NLDB, VRI, MASL, Private sector, Processing agencies	No of trainings received by each institution Capacity building material/modules incorporate gender issues No of women participants attended		DAPH reports	Not emphasised	One training per institution per year			√	√	√	√	√	√	√	√	2.3, 2.4, 12.8, 13.3
3.4: Access to risk management and financing to support adaptation to climate risks and changes	Agriculture and Agrarian Insurance Development Board(,AAIB) and other insurance companies	VRI, DAPH, PDAPHs, DMC, Farmer Managed Societies, Private sector	Number of farmers registered for insurance Number of women farmers registered		Annual reports of, AAIB, Farmer Managed Societies, DAPH reports with sex disaggregated information	Less than 10%	Over 60% livestock farmers have access to insurance schemes	√		√	√	√	√	√	√	√	√	13.1, 13.3,13.a
3.5: Review and revise existing training curricular in universities offering veterinary and animal production-related degree programmes and in the Department of Animal Production and Health in addressing climate vulnerability	UGC, Academia, DAPH	VRI, PDAPHs, Private sector	Number of modules/courses addressing climate vulnerabilities Number of modules/courses addressing gender issues in climate vulnerabilities on adaptations in the livestock sector		Curriculum/ modules	0	The integration of climate change into all the curricula in veterinary medicine and animal production			√	√	√	√	√	√	√	√	4.7, 13.3

3.5.1: Collect sex disaggregated data for all relevant activities in the adaptations NDCs	DAPH	PDAPHs, NLDB, Milk processing companies	Formats for collection and analysis of sex disaggregated data developed and introduced		DAPH reports, bulletins reporting with sex disaggregated information	0	Practice of collection and analysis of sex disaggregated information enabling gender responsive NDC implementation			√	√	√	√	√	√	√	√	2,5,13
3.6: Research and development to identify climate-resilient breeds/varieties and new technologies for livestock management	DAPH	VRI, PDAPHs, NLDB, Academia, Private sector breeder farms	Climate resilient breeds and fodder varieties identified Technologies developed		Number of communications regarding the research and technologies	Work in progress	2 new breeds 3 new fodder varieties 3 New Technologies	√	√	√	√	√	√	√	√	√	√	2.3, 2.4, 12.2, 13.3

4.5 Water Sector

Southwest and Northeastern winds can bring heavy rain to Sri Lanka. The island's water resources in the South-central region are primarily determined by the topography (the highland massif), as well as by its location across the path of monsoonal winds. The central region's hills block these moisture-laden monsoonal winds, resulting in a distinctive pattern of rainfall. Yet, more than half of the nation's rainfall finally ends up in the sea without any productive usage. Further, the country has many locations where water is scarce, and a sizable portion of it occasionally experiences droughts that last for many months. On the other hand, flooding from the highlands frequently inundates the coastal regions. Further, when using groundwater in some dry zone regions, there is a risk of seawater intrusion.

There are 103 major rivers in Sri Lanka. About 20 of these river basins are perennial, and the remaining rivers are seasonal. Depending on the extent, which ranged from 10 to 10,000 km^2, the size of the river basins varies. Geographically, river basins make up around 90% of the land. Despite the absence of sizable natural reservoirs, Sri Lanka has a vast number of man-made tanks and an irrigation canal system, where some of those tanks were built centuries ago and have since been restored to their current state. The Dry Zone has roughly 14,000 tanks, which range in size from 1 to 6,500 hectares. However, most of these cover less than 300 hectares. A crucial component of conserving water resources is the cascade irrigation system in the Dry Zone. However, majority of river basins send 60–70% of their water to the sea; it is these basins that frequently flood[51].

Another important source of water in Sri Lanka is spring water, of which there are approximately 1,544 springs in the districts of Nuwara Eliya, 204 in Kandy, 319 in Kurunegala, 210 in Monaragala, and 288 in Matale. Overall, there are around 3,540 spring water resources nationwide[52].

The Mahaweli Water Security Improvement Programme, the Climate Resilience Improvement Project (CRIP), the Climate Resilient Integrated Water Management Project (CRIWMP), the Strengthening Climate Resilience for Communities in Vulnerable River Basins, Watershed areas and downstream of the Knuckles Mountain Range, and "Surakimu Ganga" (protect our rivers) are just a few of the notable government initiatives to improve water security and management. Authorities are taking Integrated River Basin Management (IRBM) strategies more seriously to improve water security and strike a balance between competing water use demands. For instance, the Integrated Watershed and Water Resources Management Project (IWWRMP) provided access to water for 700,000 people in 7 districts.

The National Water Resource Policy and Institutional Arrangement (2020) serves the objective of ensuring the use of water resources in an effective, efficient, and equitable manner, consistent with the social, economic, and environmental needs of the present and future generations. Further, the National Agriculture Policy (Draft) will also provide specific guidance on irrigation water use and efficiency.

Water supplies for agriculture, energy production, human health, and human settlements are all anticipated to suffer because of climate change's overall effects on the water security. Availability of comprehensive data/ information base is fundamental to understand the impacts on water security and thereby implement relevant interventions to address the issues. In fact, the degree of uncertainty and lack of spatial specificity associated with any water-related estimates is a significant barrier to efficient water governance and planning.

51 Colombo Development Dialogue 2, Water Security and Climate Vulnerability, 2018

52 National Policy on Protection and Conservation of Water Sources, their Catchments and Reservations in Sri Lanka (2014).

The sector has ten NDCs (Table 4-6) which includes one overarching NDC covering IRBM; five NDCs on domestic water use including groundwater monitoring, climate-resilient water supply schemes (WSSs), promoting the use of wastewater, managing salinity at water intakes, capacity building for climate change adaptation; and four NDCs on irrigation water use including restoration, rehabilitation, and augmentation of irrigation systems, the introduction of alternative water sources, improving irrigation efficiency and early warning for river flooding.

Table 4-5 NDCs of Water Sector

NDC #	NDC
1	Integrate River Basin Management (IRBM) adopted in 15 prioritised river basins in Sri Lanka
2	Ground and surface water monitoring in the northern, North-Central and North-Western provinces and other areas of high drinking water vulnerability to drought
3	Promote climate-resilient water supply schemes
4	Promote the use of wastewater for gardening, sanitary, construction, and other purposes to reduce demand for treated water
5	Establish salinity barriers in 3 rivers where intakes are subjected to climate change influenced saline water intrusion during the drought season
6	Capacity building for water sector personnel and public awareness on building resilience to climate change
7	Restore, rehabilitate, and augment 25 major/ medium reservoirs and 300 minor irrigation systems and 200 km length of irrigation canals of Sri Lanka for enhancing climate resilience in the agriculture sector
8	Introduce or promote alternative water resources as a climate change resilience building intervention for domestic and supplementary irrigation
9	Enhance water management in 40 irrigation schemes
10	Assess river floods and mitigation measures and early warning systems for possible flash floods for five priority basins

4.5.1 Gender Aspects in the Water Sector

There is a gendered division of labour in water resource management, i.e., gender-differentiated roles, responsibilities, and corresponding needs and access, which are different for men and women.

Women require access to water to manage domestic water requirements (drinking, cooking, cleaning, sanitation) as well as for production purposes as farmers, workers, and entrepreneurs.

Women traditionally manage household water, family gardens and livestock and are in the frontline of managing impacts of reduced water availability and disaster impacts[53]. Women therefore have a major stake in all matters related to water resource management.

53 Green Climate Fund. Gender Assessment, FP016: Strengthening the Resilience of Smallholder Farmers in the Dry Zone to Climate Variability and Extreme Events through an Integrated Approach to Water Management (the three target river basin locations are Yan Oya, Malwathu Oya, and Mi Oya).

4.5.2 Recommendations for Gender Responsive Planning and Implementation of NDC s in the Water Sector

In consideration of the role and contribution of women in the water sector, it is important to facilitate, support and enhance their role through the NDC implementation process, for more efficient and effective overall NDC outcomes. The following recommendations are suggested for consideration:

i. NDC activity planning and implementation need to account for gender differences in how water resources are accessed, used, and managed both for production related functions and for household functions.

ii. Identify women's, as well as men's roles, status, resources, needs and priorities in relation to water as a basis for defining interventions and planning.

iii. Recognise women's role and stakes, technical knowledge, and capacity to contribute to water management issues in domestic and production spheres.

iv. Ensure women agriculture producers are included in promoting practices introduced through the NDCs (such as rainwater harvesting, water conservation), in training and capacity building programmes by setting a percentage target.

v. Include/consult Women Farmer Organisations (i.e., ''Sithamu''- introduced by the Department of Agrarian Development), women members of the CBOs working with community-based water supply projects at planning stages of proposed activities/sub activities.

vi. Carry out activities to encourage and promote women's engagement and potential in the water sector (through community water use organisations, rural development organisations, and through training and capacity building programmes implemented under the NDC actions).

vii. Include collection of sex disaggregated data to review gender responsive activities and outcomes in the progress review and monitoring of the NDC plans.

4.5.3 Water Sector NDC Implementation Plan

Water Sector Wide IRBM

NDC 1 - Integrated River Basin Management (IRBM) approach adopted in 15 prioritized river basins in Sri Lanka

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1 River basin wide vulnerability, risks and capacity assessments carried out in 15 river basins in Sri Lanka.	MoIrri	MoWS, ID, MASL, PIDs, DoA, DAD, WRB, FD, DWC, NWSDB, CEB, LUP-PD, BOI Academia & Research Agencies, NGOs, INGOs	Number of Assessments completed in river basins		Completed Assessments Reports and other records of MoIrri	10 completed under CRIP	15	√	√	√	√	√	-	-	-	-	-	6.6, 13.1
1.2 Climate change adaptation considerations built into integrated river basin management planning initiatives of Sri Lanka	MoIrri	MoWS, ID, MASL, PIDs, DoA, DAD, WRB, FD, DWC, NWSDB, CEB, LUP-PD, BOI Academia & Research Agencies, NGOs, INGOs	Number of integrated plans		Prepared plans and other records of MoIrri	6 completed under CRIP	15	√		√	√	√	√	-	-	-	-	6.5, 13.2, 15.1
1.3 Water resource development and management plans for the selected 15 river basins are prepared.	MoIrri	MoWS, ID, NWSDB, DCWS, Provincial Authorities, DAD, DoA, MD, WRB	Number of water resource development and management plans		Prepared plans and other records of MoIrri	6 completed under CRIP	15	√	√	√	√	√	√	√	√	√	√	6.5, 6.6, 13.1
1.4 Integrated River Basin Management (IRBM) plans are prepared (by 2025) for at least five critical river basins and implemented. (Five basins identified are Kelani, Attanagalu, Mahaweli, Malwathu, Gin)	MoIrri	MoWS, ID, LUPPD, MoE, NPPD, DAD, MASL, NWS&DB	1. Number of IRBM plans prepared 2. Number of IRBM plans implemented		Approved plans, progress reports and other records of MoIrri	1. None 2. None	1. Five (5) by 2025 2. Five (5)	√	√	√	√	√	√	√	√	√	√	6.5, 13.1, 15.1
1.5 Establish water flow and sediment load monitoring systems in five priority basins	ID	MorrIl, MoWS, MASL, LUPPD, NPPD	1. Number of systems established for water flow 2. Number of systems established for sediment load		Updated data base at ID	1. None 2. None	1. Five (5) 2. Five (5)	-	-	-	√	√	√	-	-	-	-	6.4, 6.5, 13.1

1.6 Harness excess water in selected river basins to storage facilities elsewhere through trans-basin diversions	ID	MoIrri, MASL, CEA, IWMI, FD, DWC, DAD, NWS&DB, CEB, Academia, IUCN	Number of feasibility studies		Feasibility Reports and other records of ID and MASL	Upper Elahera canal & Wayamba Ela (NWP diversion) under MWSIP in progress, Uma oya diversion to Kirindi oya in progress	Three (3)	√	√	√	√	√	√	√	-	-	-	6.5, 12.2, 13.1
1.7 Enhancement of water retention/recharge in catchments using appropriate measures such as ecosystem restoration, tree planting, small ponds, check dams to enhance climate resilience	MoIrri	MoWS, MoA, MCWS, MASL, DCWS, ID, DAD, FD, WRB, IMD, NGOs, MASL, NWS&DB, CBOs, Academia, International Org	Number of initiatives		Annual reports and other records of MoIrri, MoWS, MoA, MASL	None	Target to be established (5 priority basins are there)	-	-	√	√	√	-	-	-	-	-	6.6, 13.1, 15.1
1.8 Implementation of the five plans addressing climate vulnerability	ID	MoIrri, MoWS, MASL, PIDs, DoA, DAD, WRB, FD, DWC, NWSDB, CEB, LUPPD, BOI Academia & Research Agencies - local and international, NGOs	Number of plans implemented		Records / annual reports of MoIrri, MoWS, MoA, MASL	None	Five (5)	-	-	-	-	-	√	√	√	√	√	13.1, 13.2
1.9 Prepare remaining 10-climate inclusive river basin development plans. Ten basins identified are Kala Oya, Ma Oya, Gal Oya, Deduru Oya, Mundeni Aru, Mi Oya, Yan oya, Kalu Ganga, Nilwala and Kirindi Oya	MoIrri	MoWS, ID, LUPPD, MoE, NPPD, DAD,	Number of IRBM plans		Approved IRBM plans and other records of MoIrri, ID	None	Ten (10)	-	-	-	-	-	√	√	√	√	√	6.5, 6.6, 13.2

Domestic Water Supply Sub Sector

NDC 2 - Ground and surface water monitoring in the Northern, North Central and North Western provinces and other areas of high drinking water vulnerability to drought

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1 Conduct risk assessments and contingency plans for all new drinking water projects in priority areas	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.1.1 New drinking water projects	NWSDB	MoWS, WRB, LA, CEA, DoI, DNCWS, MASL	Number of new projects with risk assessments and contingency plans		Progress reports of Corporate Plan of NWSDB	18 (out of 44 A1 projects)	143	√	√	√	√	√	√	√	√	√	√	6.1, 6.4, 6.6, 13.1
2.1.2 New community-based drinking water projects	DNCWS	MoWS, WRB, LA, CEA, DoI, NWSDB	Number of new Community based Water projects with risk assessments and contingency plans		Water safety plans, National survey report from Dep of Census and Statistics	23	4000		√	√	√	√	√	√	√	√	√	6.1, 6.4, 6.6, 13.1
2.2 Seek new water sources and options (i.e. rainwater harvesting and sub surface water) to augment water supply in areas where supply is scarce	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.2.1 Seek new water sources and options – Surface and sub surface water	NWSDB	WRB, DNCWS, DAD, ID, DoA, MASL, Plantation Sector Co,	1. Number of Ground Water Sources approved 2. Number of Surface Water Sources approved		Ground water and surface source approvals (Databases of ID, MASL, NWSDB), Corporate plan of NWSDB, and Study reports / Annual reports of WRB, DNCWS, ID, MASL,	1. None 2. 165	1. 6 2. 253	√	√	√	√	√	√	√	√	√	√	6.1, 6.4, 6.5, 6.6, 13.1
2.2.2 Seek new water sources and options – Promote rainwater harvesting (RWH)	DNCWS	LRWHF, NWSDB Plantation Sector Co, DAD, ID, DoA	1. Number of Rainwater harvesting systems (RWHSs) installed 2. Number of RWHS with well water recharging systems installed		Study Reports/ Annual reports of DNCWS, LRWHF	1. 48,000 (cumulative) by SLRWHF 2. 800 (cumulative) by LRWHF	1. Additional 20,000 (10,000 by DNCWS and 10,000 by LRWHF with further external funding) 2. Additional 5,000 (by LRWHF)	√	√	√	√	√	√	√	√	√	√	6.1, 6.4, 6.5, 6.6, 13.1

2.3 Mitigation of drought impact by establishing “Provisional” (Standby) deep wells on risk prone districts	WRB	NWSDB, DNCWS, LAs, DS	1. No of investigation reports of provincial sources (new and existing wells) in identified areas 2. No of provisional wells established (constructed/ rehabilitated) within the risk prone areas		NWSDB Groundwater Investigation reports, Disaster mitigation reports of WRB, NWSDB, DMC & other stakeholder agencies working on the drought mitigation	1. 100 reports 2. 50 wells	1. Additional 2,000 reports 2. 1,000 wells	√		√	√	√	√	√	√	√	√	6.1, 6.6, 13.1
2.4 Identify and implement appropriate groundwater recharge systems of the water deficit areas	WRB	NWSDB, DNCWS, IWMI, LRWHF, NGOs, CBOs, LAs	1. No. of areas feasible for implementing groundwater recharge systems 2. No. of large-scale groundwater recharge systems installed		Study Reports of WRB, Reports of the NWSDB	1. One area 2. One (Wariyapola)	1. 10 areas 2. Additional 10 = One per year (Cumulative 11)	√	√	√	√	√	√	√	√	√	√	6.5, 6.6, 13.1
2.5 Ensure water security at all times with the required quality and quantity of water	NWSDB	WRB, DNCWS, DCS, DS, NGOs, CBOs, LAs, DS	1. % No of samples tested satisfied for microbiology and physical parameters against no of samples tested 2. Total quantity (MCM/day) produced and delivered per day (pipe borne), 3. Number of well-head protection established, 4. Total no. of new schemes with required quality (SLS 614, based WHO guidelines), 5. % of Rural water Supply Schemes (RWSSs) Rehabilitated to ensure required water quality (SLS 614 WHO guidelines)		MIS Reports of NWSDB by Central Lab and Regional Labs, Progress of the Corporate Plan of NWSDB, Groundwater investigation reports of NWSDB, Annual action plan of DNCWS,	1. 99% 2. 2.14 MCM/day, 3. 0, 4. None, 5. Baseline to be established.	1. 100%, 2. 3.00 MCM/day, 3. 45, 4. 1,000 new schemes (under PrajaJalaAbimani 1000 village programme implemented by DNCWS), 5. 100% (Note: DNCWS will rehabilitate 4,000 registered community water schemes)	√	√	√	√	√	√	√	√	√	√	6.1, 6.6, 13.1

2.5.1. Climate resilient Water safety plans for WSSs	MoWS	NWSDB, DNCWS, MASL, DoI. PCs & LAs, MoH, MoE, UNICEF	No of scheme specific Water Safety plans		Records of WSP audits (Internal Formal Audits)-NWSDB, DNCWS	28 by NWSDB and DNCWS	344 WSSs (NWSDB) and 4,000 Community water schemes (DNCWS)	√	√	√	√	√	√	√	√	√	√	6.1, 6.6, 13.1
2.6 Establish sustainable extraction levels of ground water in at least three river basins and expand coverage by further three river basins	WRB	DNCWS, IWMI	No of ground water resources tested for extraction commercial & industrial scale)		Records of WRB, Regulation reports of the ground water resources of a particular river basin (management reports)	None	At least 3 by 2025 and further 05 by 2030 (Total 8)	-	-	√	√	√	√	√	√	√	√	6.4, 6.5, 6.6, 13.1

NDC 3 - Promote climate-resilient water supply schemes

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1 Establish new technology in real-time measurement of water quality and level on major water sources in a collaborative manner with water sector institutions	MoWS	NWSDB, DNCWS, CEA, UDA, LAs, IWMI, WRB, MoH	1. A System for real-time measurement of water quality and level on major water sources 2. No of real time monitoring stations for water quality measurement 3. A central database		Publish report by responsible agencies (MoWS, NWSDB,DNCWS & WRB), Real time monitoring database / report from NWSDB (Quality and river water level),	1. Some systems available at agency level, without central coordination 2. One (Kelani river at Ambatale) 3. Not available	1. Established system (by 2025) 2. Three by 2028 (Two additionally - Kalu Ganga and CHICO plant at Kelani River) 3. Established Central database (by 2028)	√	√	√	√	√	√	√	√	-	-	6.3, 6.a
3.1.1 Promote RWH for domestic use with regular testing and monitoring	MoWS	LRWHF, LAs, WRB, NWSDB, DNCWS, NGOs, CBOs, UDA	1. A System for monitoring and measurement of water quality of domestic RWHSs 2. No of household having RWHSs		Records of MoWS, LRWHF, DNCWS	1. Some monitoring 2. About 50,000 (include 48,000 systems installed by LRWHF)	1. Established system by 2025 2. Additional 20,000 (10,000 by DNCWS and 10,000 by LRWHF)	√	√	√	√	√	√	√	√	√	√	6.1, 6.4, 6.5, 6.6, 13.1

3.2 Device mechanisms to supply of safe drinking water during floods, droughts and during saltwater intrusion for all water supply schemes vulnerable to floods, droughts and saltwater intrusion.	MoWS	NWSDB, DNCWS, DMC, MD,, DoI, LAs, DS, UNICEF and other development partners	1. WASH Cluster coordinating mechanism, 2. Infrastructure for emergency water supply during disasters (such as drought, salt water inclusion and floods) – Mobile treatment facilities, Bowsers, water bottles, treated water units 3. Emergency response plans under Water Safety Plans (WSPs) by NWSDB 4. Institutional Disaster Management Plan		Water safety plans of MoWS, NWSDB, DNCWS, WASH Strategy for emergency response, reports and minutes of DMC, Disaster Management Plans.	1. Not fully operational 2. Limited infrastructure and facilities 3. 28 (Internal Formal Audits) and 14 (External Formal Audits) 4. Not commenced	1. Re-activated and fully operational WASH Cluster coordinating mechanism by 2025 2. Target is to be established 3. 208 (Internal Formal Audits) and 84 (External Formal Audits) by 2024 4. Adopted plan by 2024	-	√	√	√	√	√	√	√	√	√	5.5, 6.1, 6.5, 13.1
3.3 Strengthen interagency coordination for early warning on climate and weather-related disasters and health emergencies with timely disaster response	DMC	MoWS, DoI, NBRO, MD, DMC, MoH	Effective inter-agency coordinating mechanism		Records of DMC	Existing coordinating mechanism	Existing inter-agency coordination system strengthened	√	√	√	√	√	-	-	-	-	-	5.5, 6.1, 13.1
3.4 Innovative approaches such as Payment for Ecosystem Services (PES) to be explored for catchment protection in vulnerable regions	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.4.1 Develop innovative approaches for catchment protection in vulnerable regions	MoE	MoWS, FD, DWC, CEA, DoA, Pvt sector, NGOs, CBOs, IUCN	1. Number of innovative approaches/ tools introduced 2. Number of projects implemented with innovative approaches		Records of MoE, MoWS, FD, Water Safety Plan, Progress reports from MoWS (WASIP)	1. None 2. None	1. At least two innovative approaches/tools by 2024 2. The target number of projects to be established	-	-	√	√	√	√	√	√	√	√	12.2, 15.9

3.5 Establish desalination or RWH facilities in most vulnerable areas with inadequate other sources of potable water	MoWS,	NWSDB, LAs, LRWHF, Private Sector	1. No of desalination plants completed against planned 2. No. of RWHSs installed		Progress reports of the MoWS, NWSDB and DNCWS, Records of LRWHF	1. Two (2) Desalination plants (Nainathivu & Delft – 1000 m3/ day) 2. About 50,000	1. Four (4) (Additional two desalination plants: Jaffna Tallaiadd by 2024i -20,000 m3/day and Kalpitiya – 10,000 m3/day by 2030) 2. Additional 20,000 by 2030	√	√	√	√	√	√	√	√	√	√	6.1
3.6 Minimize the level of Non-revenue Water (NRW) as a water conservation / efficiency improvement measure in all water supply schemes.	MoWS	NWSDB, DNCWS, LAs	NRW percentage		MIS report of NWSDB	24.63%	15%	√	√	√	√	√	√	√	√	√	√	6.1, 6.5

NDC 4 - Promote the use of wastewater for gardening, sanitary, construction and other purposes to reduce demand for treated water

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1 Some policy initiatives at the national level for use of treated water for other purposes piloting in industries, industrial parks and apartment buildings	MoWS	CEA, BOI, NWSDB, LAs, MSc, Academia, Research Agencies including IWMI, LRWHF	Policy and legislative instruments and instructional setup: 1. Amendments to the Act 2. National Policy on Sanitation 3. National Level Integrated water resource management (IWRM) policy 4. Improved organizational setup for IWRM		Published Amended Act and policies, Meeting minutes and other records of MoWS and other stakeholder agencies	Not commenced	Conducive Policy and legislative instruments and instructional setup in place 1. Amended Act 2. Approved National Policy on Sanitation 3. Approved National Level IWRM policy 4. New organizational setup for IWRM	-	√	√	√	√	√	-	-	-	-	6.3, 6.a

4.2 Promotion of most appropriate mechanisms of water conservation / reusing / recycling for different purposes	MoWS	MoI, MoE, MoH, Chambers, UDA, LA, NWSDB, SLLDC, LRWHF, DNCWS, Tourism sector agencies, Construction Co (high rises), high water consuming industries,	1. Number of promotional programme conducted per year 2. Different purposes having potential for water conservation / reusing / recycling 3. % of institutions having appropriate mechanisms 4. Quantity reused/ recycled		MI Reports, report related to the domestic waste water monitoring NWSDB Reports – Quantity reused or recycled	Baselines to be identified	1. To be established 2. To be identified by 2024 3. Target to be established 4. 13,300 m3/ day of treated wastewater for Agriculture purposes in Jaffna district by 2030 and Reusing 20 m3/ day of treated wastewater for Vehicle washing in Rathmalana, Colombo District by 2025	√	√	√	√	√	√	√	√	√	√	6.4, 6.a
4.2.1 Implement regulatory measures for water fittings	NWSDB	SLSI, MoWS,	1. Number of appliance categories covered 2. Testing facility		Published regulations, Minutes of expert consultation meetings; Records of SLSI, NWSDB, MoWS	1. Not commenced 2. Not commenced	1. Six categories (Float operated valves – metal, Float operated valves - PVC, all valves – metal, all valves – PVC, ceramic commodes, cisterns) by 2024 2. Established Water fittings testing units at SLSI & testing of fittings	√	√	√	√	-	-	-	-	-	-	6.4, 6.a
4.2.2 Establishment of interagency coordination mechanism for Activity 4.2	MoWS	MoH, UDA, LAs, NWSDB, SLLDC, LRWHF, DNCWS, WRB, CEA	Interagency coordination mechanism and organizational setup for water conservation/ reusing/recycling		Records of MoWS, Consultation meeting records, Meeting minutes	There was a water and sanitation platform, which could reactivated to implement this activity	Interagency coordination mechanism and organizational setup enacted by 2024 and operationalized	-	-	√	√	√	√	√	√	√	√	17.20

4.3 Introduce by-laws and building codes to introduce reuse of wastewater in new industrial constructions including areas under industrial estates	MoUD&H, MoWS	USDA, UDA, LAs, MoI, BOI, NWSDB, Tourism sector agencies, CEA, SMEs, SL-SEA, Academia	1. Number of legal instruments (such as by-laws and codes) enforced 2. Number of final green building certifications issued		Records on legislations, regulations, codes enacted/ published	National Green Building Regulations (Blue Green SL) enforced by UDA (incorporating marks for wastewater reuse, buildings above 1,000 m2 – mandatory, industrial sector not covered at present)	Targets to be established	-	-	√	√	√	-	-	-	-	-	6.3, 12.5
4.4 Introduce market mechanisms for promoting above.	MoWS	MoE, MoF, CBSL, CIDA, BOI, SMEs, NWSDB USDA, UDA, Academia	Market mechanisms		Records of MoWS	In related policies (e.g. NEP), regulations (e.g. EPR) and action plans (e.g. NEAP), need for this has been identified	Market mechanisms established	-	-	√	√	√	-	-	-	-	-	12.8
4.5 Public awareness-raising on private and social benefits of wastewater management	MoWS	MoH, MoE, NWSDB, CEA, DoGI	No of public awareness programs on benefits of reusing waste water developed and conducted per year		Records of MoE, Progress reports, Annual reports	Some awareness programmes were conducted under projects implemented with the assistance of Development partners (NWSDB)	At least 10	√	√	√	√	√	√	√	√	√	√	6.b, 12.8

4.5.1 Introduce policy initiatives at the national level for use of treated water for other purposes piloting in industries, industrial parks and apartment buildings	MoWS	CEA, BOI, NWSDB, LAs, MSc, Academia, Research Agencies including IWMI, LRWHF	Policy and legislative instruments and instructional setup: 1. Amendments to the Act 2. National Policy on Sanitation 3. National Level Integrated water resource management (IWRM) policy 4. Improved organizational setup for IWRM		Published Amended Act and policies, Meeting minutes and other records of MoWS and other stakeholder agencies	Not commenced	Conducive Policy and legislative instruments and instructional setup in place 1. Amended Act 2. Approved National Policy on Sanitation 3. Approved National Level IWRM policy 4. New organizational setup for IWRM	-	√	√	√	√	√	-	-	-	-	6.3, 6.a

NDC 5 - Establish salinity barriers in 03 rivers where intakes are subjected to climate change influenced saline water intrusion during the drought season (covering Kelani Ganga, , Kalu Ganga, and Malwathu Oya)

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
5.1 Identify best solutions (covering technical and financial) for salinity barriers for each case	NWSDB	ID, IWMI, CEA, LHI, Academia	1. No of Salinity barriers having identified best solutions including water quality, quantity and water flow to identify the salinity intrusion 2. Number of Feasibility reports		Preliminary Study Completion reports (including feasibility reports and EIAs), Records of NWSDB and ID on feasibility assessments	1. Three (Completed in 2020 - At Gin Ganga, Nilwala Ganga and Walawe Ganga)	1. Five (Additional two at Ambathale and Kalu ganga) 2. Five (Additional two feasibility studies at Ambathale and Kalu ganga)	√	√	√	√	-	-	-	-	-	-	6.5, 6.6, 6.a

						2. Three feasibility Studies for salinity barriers at Gin Ganga, Nilwala Ganga and Walawe Ganga were completed														
5.2 Establish salinity barriers at each critical river identified	NWSDB	ID, CEA, Academia	Number of salinity barriers installed			Records of NWSDB and ID, Project Completion reports	Two (At Gin Ganga and Walawe Ganga)	Five (Additional three at Kalani Ganga -Ambatalae, Kalu Ganga and Nilwala Ganga)	√	√	√	√	√	√	√	√	-	-	6.1, 6.6, 6.a
5.3 Assess and establish regulatory mechanisms to manage ground water extraction in areas with salinity intrusion issue	WRB	ID, NWSDB, IWMI	No of sources been regulated by the established mechanisms			Management , regulation or technical reports (Annual Study reports on the coastal areas included with the possible recommendations)	100	410	√	√	√	√	√	√	√	√	√	√	√	6.1, 6.6, 6.a
5.4 Monitoring and recording of saline water intrusion into drinking water sources especially during drought periods	NWSDB	MoWS, WRB, DNCWS, Academia	Frequency of Water quality Monitoring			Management Information (MI) Reports	Daily reports	Daily reports	√	√	√	√	√	√	√	√	√	√	√	6.1, 6.6, 6.a
5.5 Strengthening interagency coordination in early warning of salinity intrusion and allocation of water for flushing as a priority when needed	MoWS	MoD, MoE, DoI, DoA, CEB, MASL, NWSDB, DNCWS, NPPD	1. Interagency coordination framework 2. Frequency of meetings			Water Panel Meeting minutes	1. Present interagency coordination with limited river basin coverage, 2. Weekly meetings.	1. Interagency coordination strengthened 2. Maintain the weekly meetings	-	-	√	√	√	√	√	√	√	√	√	6.6, 6.a, 13.1, 17.20
			Number of salinity barriers installed			Records of NWSDB and ID, Project Completion reports	Two (At Gin Ganga and Walawe Ganga)	Five (Additional three at Kalani Ganga -Ambatalae, Kalu Ganga and Nilwala Ganga)	√	√	√	√	√	√	√	√	-	-	6.1, 6.6, 6.a

NDC 6 - Capacity building for water sector personnel and public awareness on building resilience to climate change

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
6.1 Capacity needs assessment of the water sector institutions and the personnel on climate resilience building	MoWS	NWSDB DNCWS, WRB, CCS, IWMI, UNICEFF, Provincial Authorities, s, DAD, Academia	1. Main capacity gaps on climate change impact facts that to be adapted to any situation identified number of participants 2. Number of Staff trained on Climate- resilient water safety planning (CRWSP) 3. Number of Staff trained under DNCWS Training Plan		Need Assessment Reports and post Evaluation reports, Post Evaluation reports (outcome base) training on CRWSP, DNCWs Training Plan	1. Limited information on capacity gaps 2. 120 (NWSDB) 3. Baseline to be identified	1. Main capacity gaps on climate change impact facts that to be adapted to any situation identified by 2024 2. 1,350 3. 468 Annually	√	√	√	√	√	√	√	√	√	√	6.a, 13.1
6.1.1 Include gender awareness and gender issues in climate change with specific reference to water sector in the above capacity needs assessment	MoWS	NWSDB DNCWS, WRB, CCS, IWMI, UNICEFF, Provincial Authorities, , DAD, Academia	1. Main capacity gaps for gender responsive planning and implementation identified and equal gender participation 2. Number of training programmes on gender responsive CRWSP conducted 3. Number of Staff trained on gender responsive CRWSP		Need Assessment Reports inclusive of gender aspects in CC and water sector post Evaluation report training on CRWSP	1. Limited information on capacity gaps for gender responsive planning and implementation 2. Baseline to be identified 3. Baseline to be identified	1. Main capacity gaps for gender responsive planning and implementation identified 2. Target to be established 3. Target to be established	-	√	√	√	√	√	√	√	√	√	5.5, 6.5, 13.1

6.2 Prepare plans for building capacity in each institution to effectively implement the sector NDCs including that of community water supply schemes	MoWS	NWSDB, DNCWS, CCS, IWMI, UNDP, UNICEFF, DNCWS, DoA, LAs, DAD, Academia, LRWHF, NGOs	1. Monitoring and evaluation (M&E) system for capacity building initiative 2. Number of training programmes for effective implementation of the sector NDCs conducted 3. Number of Staff trained for effective implementation of the sector NDCs		Records of the training programmes, Post Evaluation reports	1. Not in place 2. None 3. None	1. Operational M&E system by 2025 2. 8 programmes (one per year) by NWSDB 2. 60 annually by NWSDB	-	-	√	√	√	√	√	√	√	√	6.a, 13.1
6.2.1 Capacity building in drinking water - Community water supply sector	DNCWS	MoWS, NWSDB, WRB, CCS, IWMI, UNICEFF, LAs, Academia	1. Number of capacity building programmes conducted 2. Number of participants/ trainees		Records on capacity building programmes (MoWS, DNCWS, NWSDB)	Baselines to be identified	1. 40 programmes for officers, 500 for CBOs 2. Target to be established	√	√	√	√	√	√	√	√	√	√	6.1, 6.a
6.2.2 Capacity building in the RWH sector	DNCWS	LRWHF, MoWS, CCS, IWMI, UNICEFF, LAs, Academia	1. Number of capacity building programmes conducted 2. Number of participants/ trainees		Records on capacity building programmes (MoWS, LRWHF, DNCWS)	Baselines to be identified	1. One per year, Eight in total (2 programs for government official on RWH in Badulla and Mullativu. 6 training program for construction of RWHS conducted in Badulla, Monneragala, Mulaltivu, Mannar, and Anuradhapura by LRWHF). This is in addition to the five programmes conducted in 2021 and 2022.	√	√	√	√	√	√	√	√	√	√	6.1, 6.a

6.2.3 Incorporate gender aspects in climate change adaptation in the domestic water use sector in the capacity building plans	MoWS	NWSDB DNCWS, CCS, IWMI, UNDP, UNICEF, DCWS, DoA, LAs, DAD, Academia, NGOs, LRWHF	1. Capacity building plans incorporating gender aspects in CC and water sector 2. Number of capacity building programmes incorporating gender aspects in CC and water sector conducted 3. Percentage of participation by gender		Capacity building plans and completion report	1. Not formulated 2. Five training programmes on CR-WSP &SP conducted 3. Baseline to be identified	1. Capacity building plans formulated 2. Target to be established 3. Fair % of gender participation	√	√	√	√	√	√	√	√	√	√	5.5, 6.b, 13.1
6.3 Awareness raising and behavioral change campaigns for the public towards sustainable use of water as a climate resilience building for water security	NWSDB	MoWS, DNCWS, ID, MASL, NGOs, UNICEFF, UNDP, Research Org, GWP, NGOs, CBOs	Number of awareness programmes conducted by NWSDB and DNCWS		Water Safety Plans (WSP) documents	28 by NWSDB, Awareness programmes conducted by DNCWS to be obtained	208 by NWSDB Target for DNCWS to be obtained	√	√	√	√	√	√	√	√	√	√	6.b, 6.5., 13.3
6.4 Capacity development in communities and Community Based Organizations (CBOs) in addressing climate resilience in water resources	DNCWS	NWSDB, Academia, International Organizations, NGOs, CBOs, Private Sector including Plantation Companies	1. Number of capacity development programmes conducted 2. Number of participants		DNCWs Progress Report	Baselines to be identified	1. Target to be established 2. 32,000 participants	√	√	√	√	√	√	√	√	√	√	6.b, 13.3
6.4.1 Incorporate gender responsiveness into the capacity development programmes, allocate a share/a percentage for women participants in the programmes	DNCWS	NWSDB, Academia, International Organizations, NGOs, CBOs, Private Sector including Plantation Companies	- 1. Incorporation of gender aspects in Training modules 2. Percentage of women participation		Progress reports, Training modules	Not initiated	1. Training modules have incorporated gender issues 2. Target to be established	-	-	√	√	√	√	√	√	√	√	5.5, 6.b, 13.3

6.5 Demand-side management and promotion of 3R amongst water users in most vulnerable areas for climate change	MoWS	MoI, NWSDB, DNCWS, ID, CEA, BOI, IWMI, Academia, NGOs	1. Number of promotional / awareness programmes conducted 2. Number of programmes for School children		Progress reports, Attendance records	None	1. Target to be established 2. 250 for School children	-	-	√	√	√	√	√	√	√	√	5.5, 6.5, 13.3
6.6 Establish accreditation schemes for water sector technicians/plumbers with awareness on climate change vulnerabilities	NWSDB	CIDA, VTA	1. Accreditation schemes 2. Number of personnel accredited		Records on the accreditation schemes and on Number of certificates issued	Accreditation scheme under development	1. Accreditation schemes established 2. 50 annually by NWSDB	-	-	√	√	√	√	√	√	√	√	5.5, 6.5, 13.3

Irrigation Water Sub Sector

NDC 7 - Restore, rehabilitate and augment 25 major /medium reservoirs and 300 minor irrigation systems and 200 km length of irrigation canals of Sri Lanka for enhancing climate resilience in the agriculture sector

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
7.1 Prioritize abandoned tanks (including small tank cascade systems) and canals to be rehabilitated in the most critical areas of climate change vulnerability paying attention to productivity gains in restoration	MoIrri	DAD, ID, PIDs	Prioritized List		Reports of ID	None	Prioritized List prepared	√	-	-	-	-	-	-	-	-	-	6.5, 13.1
7.2 Prepare indicative cost estimations, means of implementation with national capacity and international support needed for the priorities for restoration	MoIrri	DAD, ID, PIDs	Cost estimation of prioritized list		Reports of ID	Cost estimation of a few major / medium tanks available	Cost estimation of prioritized list completed	√	-	-	-	-	-	-	-	-	-	17.20

7.3 Restoration / rehabilitation of 50 tanks and canals of 100km length	MoIrri	DAD, ID, PIDs	Prioritized minor tanks restored / rehabilitated Prioritized canals rehabilitated		Reports of ID	Ongoing activity	50 tanks out of prioritized minor tanks restored / rehabilitated 100 km out of 200 km of prioritized canals rehabilitated	√	√	√	√	√	√	√	√	√	√	6.5
7.4 Augment capacity of irrigation tanks to enhance climate change resilience covering 25 major/medium reservoirs	MoIrri	ID	Prioritized major/ medium tanks augmented		Reports of ID	Ongoing activity	25 tanks out of prioritized major/ medium tanks augmented	√	√	√	√	√	√	√	√	√	√	6.5, 13.1
7.4.1 Construction of upstream reservoirs for drinking water	NWSDB	MoWS, MoIrri	Number of tanks constructed		Feasibility studies and other records of NWSDB	2	4	√	√	√	√	√	√	√	√	√	√	6.5

NDC 8 - Introduce or promote alternative water resources as a climate change resilience building intervention for domestic and supplementary irrigation

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
8.1 Carryout feasibility studies for use of alternative sources of water for irrigation and ground water recharge for building climate resilience	DoI	LRWHF, WRB, NWSDB, DNCWS, MASL	Feasibility studies conducted		Records of DoI, MASL, NWSDB	0	One feasibility study conducted as a pilot	√	√	√	√	√	-	-	-	-	-	6.5, 13.1
8.1.1 Promote appropriate alternative sources of irrigation according to above study findings	DoI	LRWHF, WRB, NWSDB, DNCWS, MASL	1. No of proposals prepared 2. No. of RWHS for irrigation in-stalled 3. % no of women targeted/participat-ed in promotion of alternative sources of irrigation		Records of ID, DAD, PIDs, MASL	1. None 2. To be updated – infor-mation available at HARTI 3. None	1. Target to be set 2. LRWHF target : 250 RWH ponds for irriga-tion 3. Target to be set	-	-	-	-	-		√	√	√	√	5.b, 5.5, 13.3
8.1.2 Conduct gender assessment and analysis for the Irrigation sector to identify main gender issues in the sector relevant for adaptation with external assistance	MoIrri	ID, DAD, PIDs, LR-WHF, WRB, MASL	Assessment		Records of ID Sector gender assessment document with recommen-dations for identifying and promoting gender respon-sive adaptation measures in the Irrigation sector; Records of communication of the findings	None	Main gender issues in the irrigation sector documented and shared amongst sector institu-tions	-	-	√	√	-	-	-	-	-	-	5.5, 6.5
8.1.3 Build awareness and capacities of the main planning and implementation agencies in irrigation sector on gender issues related to climate change and access and use of irrigation water	MoIrri	Ministry in charge of Women affairs, International Devel-opment agencies	Number of Aware-ness building programmes con-ducted on gender issues in climate adaptation at the planning and deci-sion-making level Number of agen-cies covered per year		MoIrri Reports on awareness and training programmes on gender issues in climate adapta-tion, on gender responsive planning &im-plementation	None so far	10 (One Pro-gramme per year covering all relevant agen-cies)	-	-	√	√	√	√	√	√	√	√	5.b, 6.5

8.1.4 Ensure women participation in promoting technology and knowledge transfer activities, training sessions, extension programmes, demonstration, etc. in promoting climate adaptation activities in the irrigation sector	MoIrri	MoWS, ID, MASL, NWSDB, DCWS, Provincial Authorities, DAD, DoA, MD, WRB	% of women targeted and reached		ID and MASL reports indicating women's engagement/ participation	Not assessed	Not less than 15% of women included in the climate adaptation activities in the irrigation sector	-	-	-	√	√	√	√	√	√	√	5.b, 13.3
8.2 Assessment & identify priority domestic water supply and priority supplementary irrigation schemes to be supported by groundwater resources (by means of tube wells/deep wells) as a climate change resilience building intervention	WRB	NWSDB, LRWHF, ID, DCWS, UNICEF	Prioritized list		Records of NWSDB, WRB, ID	None	Prioritized list completed	√	√	√												6.4, 6.5, 13.1
8.2.1 Include consultations with women at the local level and their participation in the assessment & identifying priority domestic water supply and priority supplementary irrigation schemes as a climate change resilience building interventions (activity 8.2)	MoI rri	MoWS, NWSDB, WRB, LRWHF, DCWS, ID, MASL, UNICEF	1. No of women's organizations consulted 2. No of women consulted.		Assessment reports from MoIrri, MoWS, NWSDB, LRWHF WRB indicating women's inputs to the process.	1. None 2. None	1. Target to be established 2. Target to be established	-	-	-	√	√	√	√	√	√	√	5.5, 6.5, 13.3
8.3 Regulate provision of groundwater through Agro wells for irrigation based on water availability and safe abstraction levels.	WRB	DCWS, DAD, NWSDB	Level of enforcement of the Regulations		WRB	Regulation in place	Target need to be set	√	√	√	√	√	√	√	√	√	√	6.5, 15.1
8.3.1 Include gender expertise in the PMUs and Planning teams	MoWS	MoIrri , NWSDB, WRB, DAD	Percentage of PMUs and planning teams equipped with gender expertise, as reflected by the gender analysis related to the projects implemented		Records of MoWS and MoI (Reports with gender analysis related to irrigation water sector; Sex disaggregated data on the relevant climate change resilience building interventions	None	All PUM's and Planning teams by 2030	-	-	√	√	√	√	√	√	√	√	5.5, 13.1

NDC 9 - Enhance water management in 40 irrigation schemes

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
9.1 Increase system water use efficiency in irrigation schemes by 10% to cover at least 45,000 ha of irrigated land	MoIrri	ID, MASL	Number of schemes and extent covered		Records of ID and MASL	Current water duty (Acre feet per acre) of different schemes ranging from 4 – 7 feet (Average 5.5 feet)	30 schemes in ID Balance 10 schemes in MASL	√	√	√	√	√	√	√	√	√	√	2.4, 6.5
9.2 Introduce water-saving applications like micro- irrigation system (sprinklers) and low water intensive crops	DoA	PDoA, DAD, Private Sector	1. Number of micro irrigation systems introduced 2. Number of types of crops introduced		Records of D0A, PDoA	None	14 by 2025	√	√	√	√	√						2.4, 6.5
9.3 Farmer training and awareness on water saving applications	MoIrri	IMD, ID, MASL, DAD	1. Number of Programmes conducted; 2. % of programmes attendance of women farmers participated		Records of IMD, ID, MASL Attendance disaggregated by sex	Ongoing activity	1. Not less than 40 programmes per year 2. Not less than 10% of programmes from the above, where attendance of women farmers participated	√	√	√	√	√	√	√	√	√	√	5.b, 6.b
9.4 Introduce efficient distribution of water among farmer organizations through better water allocation mechanisms	MoIrri	DoA, ID, DAD, PDoI	Pilot study		Feasibility reports	Not commenced	Completed pilot study by 2025	-	-	√	√	√						2.4, 6.5
9.5 Promote market-based instruments for the adoption of new irrigation technologies (water Subsidy schemes and tax reliefs)	DoA	DAD, PDoI	Number of pilot studies		Feasibility reports	None	Target to be set	-	-	√	√	√	√	√	√	√	√	12.8, 6.5

NDC 10 - Assess river floods and mitigation measures and early warning systems for possible flash floods for five priority basins (covering Kelani Ganga, Attanagalu Oya, Kalu Ganga, Kirindi Oya and Malwathu Oya on pilot basis)

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
10.1. Install rivers and reservoir gauges and collect rainfall data and river flow data for the five priority basins	ID	MD, NBRO	Basins covered with adequate hydro meteorological data network		Reports of ID	16 stations in all 5 basins covered with hydro meteorological data network	All 5 basins covered with enhanced hydro meteorological data network	√	√	√	√	√	√	√	√	√	√	6.6, 13.1, 13.3
10.2 Prepare digital elevation maps / models for all priority basins and establish automated early warning systems	ID	, MD, NBRO, DMC	Digital elevation models (DEMs) for priority river basins Early warning systems for priority river basins		Records of ID	Digital elevation models (DEMs) for 2 priority basins available (Kalani and Attanagalu) Manual early warning systems for all 5 priority river basins available	Digital elevation models (DEMs) for flood prone areas for 3 priority basins prepared Early warning systems for 5 priority river basins upgraded	-	-	√	√	√						13.3
10.3 Conduct capacity building programs for newly established early warning systems associated technological applications and dissemination	ID	,MD, NBRO, DMC	1. Number of capacity building programmes conducted 2. Sex disaggregated numbers of participants in the capacity building programmes indicating % of women participated		Records of ID	Average level of competency of relevant staff for the existing systems	1. Capacity building of all relevant agencies	-	-	√	√	√						5.b, 6.5, 13.3

10.3.1 Reach out to communities effectively using mobile Applications on river flooding.	ID	MD, , NBRO, DMC	1. Mobile app 2. % of women targeted/included in introducing the app		Records of ID disaggregated by sex	1. Not available 2. App is yet to be introduced	1. App introduced 2. Not less than 50% of women reached with the app	-	-	√	√	√								5.b, 6.5, 13.3
10.4 Introduce flood mitigation structures to handle climate change influence risks	ID	LUPPD, MD, , DMC	Flood mitigation structures		Records of ID	Existing structures in 2 river basins (Kalani, Kalu)	Existing structures enhanced where necessary and 2 suitable structures introduced (Ambatale salinity barrier, Wee oya reservoir)	√	√	√	√	√	√	√	√	√	√				13.1, 13.3

4.6 Biodiversity Sector

Sri Lanka exhibits remarkable biological diversity distributed in a wide array of ecosystems and habitats covering different bioclimatic zones. The country has diverse ecosystems, terrestrial, and aquatic (freshwater, marine, and brackish water), despite having a comparatively small amount of land (65,610 km^2). Specific forest types, such as rainforests, mountain cloud forests, dry zone monsoon forests, and arid thorn scrub forests, are indicative of the various climatic zones that occur in the nation. Numerous species of flora and animals can thrive in most places due to the country's ecological, climatic, soil, and topographical diversity. Based on the high degree of endemism and exposure to threats, Sri Lanka together with the Western Ghats has been identified as one of the biodiversity hotspots out of the 36. Sri Lanka records the threatened status of its flora and fauna in its National Red List.

The primary threats to Sri Lanka's biodiversity are habitat loss, fragmentation, and degradation; overexploitation of biological resources; extinction of traditional crop and livestock varieties, and breeds; pollution; conflicts between people and wildlife; the rapid spread of alien invasive species; and rising human population density. Land use changes in forests, ad hoc wetlands reclamation, uncontrolled use of coastal areas, landfills in wetlands, and deforestation all contribute to habitat loss. Other grave concerns include alteration of coastal habitats, destructive fishing methods, ship pollution, and negative effects from land-based activities that lead to generation of waste ends up in the sea.

Sri Lanka has implemented a number of legislative, strategic, regulatory, and operational actions to protect the nation's biodiversity. The Ministry of Environment is the Focal Point for the Convention of Biological Diversity. The status of Sri Lanka's biodiversity is reported in it's 6th National Report (6thNR) of 2019[54]. Under the direction of the Biodiversity Secretariat of the MoE, Sri Lanka's overall policy for protecting biodiversity is outlined in the National Biodiversity Strategic Action Plan (NBSAP) 2016–2022[55]. Other government agencies with biodiversity conservation as the core-function include the Department of Wildlife Conservation (DWC), Department of Forest Conservation (FD), and Ministry in charge of the subjects of Wildlife and Forest Conservation. The national policy framework commits to biodiversity conservation, including the planned and systematic integration of biodiversity conservation into tourism, education, and cultural activities, as well as the restoration and rehabilitation of degraded ecosystems.

The National Forestry Policy of 1995, the National Wildlife Policy of 2000, the National Environmental Policy of 2022, and the National Policy on Invasive Alien Species (IAS) in Sri Lanka of 2016, National Environmentally Sensitive Areas Policy of 2022, are some of the major policies pertaining to biodiversity conservation in Sri Lanka. The primary pieces of legislation that support the DWC and FD, respectively, in the conservation of biodiversity in Sri Lanka are the Fauna and Flora Protection Ordinance No. 22, as revised in 2009, and the Forest Conservation Ordinance No. 65, as amended in 2009, Forest Conservation Ordinance No 16 of 1907, the National Heritage Wilderness Areas Act No 03 of 1988, the National Environmental Act No. 47 of 1980 and it's amendments, Soil Conservation Act No. 25 of 1951, and Marine Pollution Prevention Act No. 59 of 1981 forms the basic Sri Lankan legal framework in protecting the biodiversity. Another key document that supported the sector is the Forestry Sector Master Plan (FSMP) 1995-2020 with an update taking place for 2021-2030

54 MoE (2019) Sri Lanka's Sixth National Report: Biodiversity Profile - Sri Lanka to the Convention on Biological Diversity

55 MoMD&E (2016). National Biodiversity Strategic Action Plan 2016-2022. Colombo, Sri Lanka: Biodiversity Secretariat, Ministry of Mahaweli Development and Environment. xxi + 284 pp

The draft FSMP has integrated some NDC activities of the Biodiversity Sector into the plan. The need to conserve sensitive areas outside the PAs, the linking of ecological corridors and landscapes to increase climate resilience and management of IAS are some of the outputs highlighted in the plan.

The nation sees rapid deforestation throughout time as a result of the economic pressures that the government and industry are under, making room for large-scale construction projects, expansive plantations, and resettlement initiatives that promote economic growth. The habitat that many ecosystems depend on is destroyed by this deforestation, which has a negative impact on carbon sequestration. The climatic conditions in ecosystems will change as a result of climate change, and invasive plant species will flourish as a result of rising temperatures and shifting rainfall patterns. The possibility of extinction of domestic plant species, which some animals depend on for their individual food cycles, could result from this unfavorable effect of climate change, upsetting the ecological balance of ecosystems. Due to the depletion and deterioration of water resources brought on by several anthropogenic activities, Sri Lanka also faces many challenges in combating water pollution, which harms biodiversity. The endangerment of marine life and coastal ecosystems has been greatly exacerbated by inadequate management and control of domestic sewage, irrigation, ship oil spills, garbage disposal, and coral and sand mining.

Resilience-building actions for biodiversity are presented under five NDCs (Table 4-6) covering management of climate-sensitive areas and restoration of degraded areas within and outside the PAs, increased connectivity for species migration to accommodate climate-driven changes, possible expansion of PAs to build the resilience of biodiversity as a system of PAs, strengthening ex-situ conservation of fauna and flora and effective management of Invasive Alien Species (IAS). Some of the mitigation co-benefits of biodiversity including carbon sequestration are captured under Forestry Sector under the mitigation NDCs.

Table 4-6 NDCs of Biodiversity Sector

NDC #	NDC
1	Management of climate-sensitive areas and restoration of degraded areas inside and outside the Protected Areas (PAs) network to conserve habitats that are highly vulnerable to climate change
2	Increase connectivity in the zones that will be subjected to climate-driven changes according to current predictions through landscape approaches
3	Expansion of PA extent to enhance the ability of the PA network to function as a buffer for climate change
4	Strengthen ex-situ conservation programmes covering climate-vulnerable taxa and regions
5	Effective management of the spread of Invasive Alien Species (IAS) triggered by favorable climate conditions

4.6.1 Biodiversity Sector NDC Implementation Plan

NDC 1 - Management of climate-sensitive areas and restoration of degraded areas inside and outside the protected areas (PAs) network to conserve habitats that are highly vulnerable to climate change

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1 Identify habitats using existing maps that are most vulnerable to climate change-driven changes and adaptive measures taken in response to climate change to inform priority sites that need to be restored or rehabilitated both within and outside PAs	MoE (BDS & CCS), DNBG	FD, DWC, CC&CRMD, CEA, MEPA, MASL, MD, DMC, NARA, NWPEA, Academia & researchers, NGOs	1.No of Habitats identified which are vulnerable to climate change 2. No of habitats thus identified in which appropriate adaptive measures taken Number of existing PAs and ESAs		Records of BDS	105 PAs under DWC 875 PAs under the FD 10 EPAs under the CEA 14 Special Management Areas under CC&CMD 5 Environment Sensitive Areas 3 NWPEA (these have been declared based on their Ecological importance not climate vulnerability)	1. Identification of habitats which are most vulnerable to climate change in the entire country 2. Appropriate adaptation measures taken to increase their resilience At least 500 (PAs and ESAs) identified/ declared/ gazette/ co-managed			√	√	√	√	√	√	√	√	13.1, 15.1, 15.4

1.2 Prepare maps indicating terrestrial wetland landscapes, coastal and marine areas such as mangroves, seagrass beds, fog-interception area, villus, etc. that should be the focus of priority actions identified above in order to enhance their resilience	MoWL&FC, DNBG	MoE, FD, DWC, CC&CRMD, CEA, MEPA, MASL, MD, DMC, NARA, SD, NWPEA, , Academia & reserchers, NGOs	No. of Maps prepared		Maps prepared	Maps on mangroves and other PAs are available , maps are prepared by the DWC which indicates areas that contain IAS, degraded habitats, mangrove degraded areas) ESA maps Base line – 89 forests (18959. 72ha)	500 maps prepared to include all the identified vulnerable ecosystems			√	√	√	√	√	√	√	√	13.1, 14.2, 14.5 15.1, 15.4
1.3 Identification of species of fauna and flora that are highly vulnerable to climate change	MoE, DNBG,	MoWL&FC,FD, DWC, CC&CRMD, CEA, MEPA, DNM, Academia, Private Sector, NGOs, CBOs	Updated list of species vulnerable to climate change identified through scientific methods		MoE (BDS) report on species (fauna & flora) vulnerable for climate change	Existing National Redlist	Comprehensive list of fauna and flora which are affected by climate change prepared	√	√	√	√	√	√	√	√	√	√	13.1, 14.2, 15.1
1.4 Encourage research and studies on most vulnerable species and habitats identified in 1.1 and 1.3	MoWL&FC, DNBG	MoE, DWC, FD, NRC, NSF, CARP, NARA, MoSTR, Academia, Independent research groups	Number of scientific communications, research projects		Published research papers, recovery plans	Research work scattered on these aspects ie. 3 projects-DNBG +2 recovery plans DNBG and also by academia but not collated under the umbrella of climate change	Long term research projects done in the identified vulnerable ecosystems	√	√	√	√	√	√	√	√	√	√	13.1, 14.2, 15.1, 15.4

1.5: Establish long-term monitoring plots and mechanisms in climate sensitive areas to identify climate change driven changes in species and habitats	MoWL&FC, DNBG	MOE (CCS, BDS), FD, DWC, CC&CRMD, CEA, MEPA, NARA, Academia, Research institutes, & Private sector organizations	1. Number of monitoring plans for climate vulnerable species 2.Number of long-term monitoring plots with appropriate mechanisms		Records of MoWL&FC	3 Sinharaja- Prof Gunatilleke, Prof Singhakum ara-Pitakele, Walankanda Endana Estate, 4500 plots demarcated by FD -need to identify climate vulner abilities for future research, Hambantota NBG-Mirijjawila Research station regene ration plot	Long-term monitoring plots with appropriate mechanisms are established to cover all the climate zones in the country	√	√	√	√	√	√	√	√	√	√	13.1, 14.2, 15.1, 15.4
1.6 Restoration of at least 25% each of degraded terrestrial and wetland landscapes including coastal & marine habitats identified above (1.2) and based on current extent and prioritized according to biodiversity value, ecosystem values and climate change vulnerability	MoWL&FC	MoE (CCS, BDS), FD, DWC, CC&CRMD, CEA, MEPA, NWPEA, Academia, Research institutes & Private sector, IUCN, UN agencies	% of restored extent		Monitoring and progress reports of MoWD&FC	This will be stated after completion of 1.1 and 1.2.	At least 25% of the identified extents under activity 1.1 & 1.2 restored	√	√	√	√	√	√	√	√	√	√	13.1, 14.2, 14.5, 15.1, 15.4
1.7 Restore the natural ecosystem in fog interception zones at least by 25%	MoWL&FC	MoE, FD, DWC, RPCs, Academia, Research institutes	% of restored extent		Progress reports, M&E and other records of DWC, FD,	This will be stated after completion of identification of degraded fog intercepted land-scapes (ESA maps-ongoing, vulnerability maps) Ulex removed from 19.5 ha	At least 25% of the identified extents from 1.1 and 1.2	√	√	√	√	√	√	√	√	√	√	15.1, 15.4

NDC 2 - Increase connectivity in the zones that will be subjected to climate driven changes according to current predictions through landscape approaches

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1: Conduct a feasibility assessment (based on 1.2 above) to identify connectivity corridors on a landscape/Seascape level using the river basins located in the climate sensitive areas	LUPPD	MoE (CCS & BDS), FD, DWC, NARA, DAAD, SD, NWSDB, ID, Academia, Research institutes	Feasibility assessments of landscape and seascape		Validated reports and maps adopted for 2.2 – 2.3	Feasibility studies on corridors had been done but not exclusively taking climate vulnerability into account	Feasibility assessments conducted on all the identified vulnerable ecosystems in 1.2			√	√							14.2, 14.5, 15.1, 15.4
2.2: Restore climate-vulnerable riparian and instream areas that can act as corridors based on the above feasibility study covering at least 25% of identified areas	ID, MASL, FD	FD, DWC, CEA, LAs and the Private sector	% of restored extent		Progress reports of ID, MASL, FD	0 (Will be done after the completion of 2.1) Restoration by DWC for North of Wilpattu Mollikulam at Kal Aru and Hungamala Elephant Corridor	At least 25% of the identified areas restored					√	√	√	√	√	√	13, 14.2, 15.1, 15.2, 15.4
2.3: Monitor such corridors for their efficacy to serve as biodiversity corridors and making adaptive changes to enhance movement	ID, MASL, FD	DWC, Academia, Research institutes, & the private sector	Monitoring of identified corridors also the species and numbers of fauna which uses the corridors		M&E biodiversity reports and recommendations Records of FD, DWC	0	All identified corridors are continuously monitored					√	√	√	√	√	√	13, 14.2, 15.1, 15.2, 15.4

NDC 3 - Expansion of Protected Area (PA) extent to enhance the ability of the PA network to function as a buffer for climate change

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1: Identify ecologically/ environmentally sensitive areas (based on 1.2) within the climate sensitive areas that can be annexed (included) to existing PAs	MoWL&FC, CEA, NWPEA	MoE (BDS, Env Eco), FD, DWC, NWPEA, LUPPD, LRC, SD, CC&CRMD, Academia, Research institutes, Private sector, NGOs, CBOs	The extent of areas identified to be included in the existing PA network		Assessment reports	5 ESAs identified already including 18,000 ha of mangroves	All areas thus identified will be made PAs					√	√	√	√			13.1, 14.2, 15.1, 15.4
3.2: Identified areas to existing PAs / to be declared as new PAs under mandated agencies	MoWL&FC, CEA, NWPEA	MoE (BDS, Env Eco), FD, DWC, LUPPD, LRC, SD, CC&CRMD, Academia, Research institutes, Private sector, NGOs, CBOs	Gazette notification of the declared sites		Reports of FD, DWC, CC&CRMD	0	All Identified areas declared The number cannot be stated here as this will be done based on the need. There would not be large ones on land but those adjoining the Mirissa, Thalawila Sanctuaries will be declared in the future by DWC					√	√	√	√	√	√	13.1, 14.2, 15.1, 15.4, 15.9

NDC 4 - Strengthen ex-situ conservation programmes covering climate vulnerable taxa and regions

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1: At least two facilities to be established for ex-situ conservation of flora in the climate vulnerable region (botanical gardens and arboreta) within 5 years	DNBG	FD, DWC, LAs, LRC, PGRC, Arboreta	Botanical gardens established		Records of DNBG	6 facilities existing (Peradeniya, Hakgala, Gampaha,Awissawela, Hambanthota, Ganewaththa) (Pinnaduwa-land acquisition progressed) 1 Medicinal Plant Garden	2 facilities for ex situ conservation for flora established					√						13.1, 14.2, 15.1, 15.4
4.2: At least two facilities to be established for ex-situ conservation of fauna in the climate vulnerable regions (ex-situ conservation centres) within 5 years	DNZG	MoWL&FC, DWC, Academia, Research institutions	Ex-situ facilities		Records of DNZG, DWC	3 (Safari Parks -Ridiyagama, Gonapala Farm, Dehiwala, Pinnawala Conservation Centre)	2 ex situ facilities established (montane +intermediate)					√	√					13.1, 14.2, 15.1, 15.4

4.3: Establishing a mechanism to assist translocation/reintroduction of climate sensitive or threatened fauna and flora	MoWL&FC	DWC, FD DNZG, NARA, DNBG, MASL, ID, IUCN, Academia, Research institutions	Mechanism to assist translocation/ reintroduction of climate sensitive or threatened fauna and flora		Records of DWC, DNBG	Relocation of climate sensitive or threatened species not done but work done based on their conservation status especially related to development projects *Alphonsea hortensis* reintroduced to suitable habitats under FD Done in Moragahakanda Project by DWC Threatened/near extinction species are being reintroduced by the FD (approximately 3/ year), Yan Oya, NWP Canal Project, Upper Kotmale (Ravana), Upper Elahera	Mechanism established			√	√	√	√	√				13.1, 14.2, 15.1, 15.4

4.4: Introduction of three new number of Veterinary/ Epidemiology facilities for Ex-situ Conservation Centers	DWC, VRI, DNZG	DWC, NARA, DAPH, Academia, Research institutions,	Facilities introduced		Annual reports of VRI, DWC, DNZG	Giritale, Hiyare Rescue centre, DWC (Bellanwila) 3 zoos have new hospitals	3 facilities introduced			√	√	√	√	√	√	√	√	√	13.1, 14.2, 15.1, 15.4
4.5: Develop Gene Banks in National Zoological Gardens (NZGs) and National Botanical Gardens (NBGs) and Plant Genetic Resources Center (PGRC)	DNBG, DNZG, VRI	PGRC, NARA, Academia, Research institutions	Gene banks (Flora and fauna) Number of accessions Number of species, sub-species		Data bases of PGRC, DNBG, DNZG	DNA Bank Initiated -Herbarium, PGRC	Gene banks in NZGs and NBGs and Plant Genetic Resources Center (PGRC) developed / upgraded							√	√	√	13, 14.2, 15.1, 15.4

NDC 5 - Effective management of spread of Invasive Alien Species (IAS) triggered by favorable climatic conditions

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
5.1: Conduct a desk assessment based on the available distribution maps of IAS to identify IAS that are likely to undergo range expansion or whose range expansion can be facilitated by climate change and anthropogenic activities	MoE (BDS)	DoA, National HerbariumNH), FD, DWC, NARA, MEPA, Academia, Research institutions	Assessment report		Assessment report of MoE (BDS)	Distribution maps available with BDS	Desk assessment completed			√	√								13.1, 14.2, 15.1, 15.4, 15.8
5.2: Implement programs in critical areas as identified in 5.1 to enhance the resilience of ecological & economical systems towards possible biological invasions triggered by climate change	MoE (BDS)	MoSTR, DoA, FD, DWC, LAs, CEA, NWPEA, Academia, Research institutions	Number of programmes conducted		Progress reports of the activities of MoE (BDS)	0	Programmes conducted in all (as defined by 5.1) critical areas				√	√	√	√	√	√	√	√	13.1, 14.2, 15.1, 15.4,

4.7 Coastal and Marine Sector

Sri Lanka's coastal zone plays an important role in the social, environmental, cultural, and economic development of the country. The coastline stretches over nearly 1,790 km, and it provides 230,000 km^2 of the marine economic zone[56]. A unique ecology and biologically diverse coastal environment are provided by the coastline. The most significant ecosystems, including mangroves, salt marshes, sand dunes, beaches, and coastal marshy wetlands, are found in this coastal area. The negative effects of climate change exacerbated by anthropogenic activities, such as inundation, shoreline erosion, coastal floods, and salinity of estuaries and aquifers, which endanger the biological balance and coastal infrastructures, are likely to influence all these ecosystems to varied degrees. Along with fisheries, coastal beach tourism is essential to the country's economy. Tourism at coastal beaches includes activities like deep-sea sport fishing, watching marine mammals, sailing, various sorts of diving, boating, and recreational sports, as well as sunbathing and turtle watching in the shallower reef waters. According to estimates, beach tourism generates close to 60% of the sector's overall sales and offers a wide range of value-added goods. Over 25% of the population resides in the coastal region, which covers roughly 23% of the nation's total land area and is located about 50 kilometers inland from the ocean. A significant portion of the nation's industries and tourism attractions are located in the coastal region, which also accounts for about 40% of the country's GDP[57].

The Coastal Zone Management Plan of 1997 was revised and updated in 2004, 2016 and 2018 which is the foundation and guiding principles for coastal zone management. It focuses on shoreline management, coastal pollution control, management and conservation of coastal habitats, special management areas and regulatory mechanism.

The main legal framework for coast conservation is provided by the Fisheries and Aquatic Resources Act No. 2 of 2016 and its regulations, the Coast Conservation Act No. 57 of 1981 and amendments/ Coast Conservation Regulations, the Marine Pollution Prevention Act No. 35 of 2008 and amendments, and the Marine Environmental Protection Authority Regulations. In 2011, the Coast Conservation Act was amended and renamed as the Coast Conservation and Coastal Resources Management Act.

In accordance with the United Nations Convention on the Law of the Sea, Sri Lanka is currently in the process of claiming a sizable amount of extra seabed area. This will increase the country's economic opportunities.

The cargo vessel "X-press Pearl" maritime disaster in Sri lanka in 2021 was responsible for the single worst incident of plastic marine pollution in the world, according to a committee assessing the damages from the disaster. Not having a baseline of the environmental conditions has been one of the biggest challenges in doing this environmental assessment. This is a major drawback for not receiving the due compensation to Sri Lanka yet for this disaster.[58]

56 Department of Census and Statistics, Sri Lanka, http://www.statistics.gov.lk/abstract2021/CHAP1
57 Annual Report 2021, Central Bank, Sri Lanka
58 https://news.mongabay.com/2022/06/a-year-since-x-press-pearl-sinking-sri-lanka-is-still-waiting-for-compen sation/ (Accessed on 2 April 2023)

Priorities for coastal and marine sector adaptation have been established under four NDCs (Table 4-7), primarily involving the development of technical skills and mechanisms for observing and addressing climate change and variability. These include developing a reliable method for predicting sea level rise, updating vulnerability and risk maps, stepping up shoreline management efforts, and protecting special natural areas in exposed coastal locations. Restoration of mangroves, for example, has adaptation benefits relating to the Biodiversity Sector as well as mitigation benefits under the Forestry Sector.

Table 4-7 NDCs of Coastal and Marine Sector

NDC #	NDC
1	Establish an accurate sea level rise forecasting system for Sri Lanka
2	Prepare updated vulnerability and risk maps for the coastal belt of Sri Lanka
3	Adopt optimal shoreline management works/measures covering affected length of shoreline using a combination of hard and soft solutions to prevent coastal erosion in the areas most vulnerable to SLR
4	Identify and declare coastal and marine natural areas of high priority for building resilience for climate change impacts

4.7.1 Coastal and Marine Sector NDC Implementation Plan

NDC 1 - Establish an accurate sea level rise forecasting system for Sri Lanka

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1. Establish the required database with historical tidal level data	NARA	CC&CRMD, SD, DMC, MD, SLN, SLPA	Number of years for which the database is established		Records of NARA	No national level database in operation (However there were data in scattered form with different agencies)	Tidal Database with historical tidal level data up to year 2022 to be published by 2023 and update yearly	√	√	√	√	√	√	√	√	√	√	11.5, 11.b, 13.1, 14,a
1.2. Measure and record present Mean Sea Level (MSL) and assess and publish sea level rise measurements	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.2.1. Measure and record present Mean Sea Level (MSL)	SD	CC&CRMD, DMC, MD, SLPA, SLN, NARA	% number of locations w*ere the present MSL is measured and recorded		Records of SD	0% (However, earlier version of the MSL are available)	100% (All the locations with revised MSL)	√	√	√								11.5, 11.b, 13.1, 14,a
1.2.2. Assess and publish sea level rise measurements	CC&CRMD,	SD, DMC, MD, SLPA, SLN, NARA	% number of locations where the present MSL is accessed and published		Records of CC&CRMD,	0% (However, earlier versions of sea level rise records and maps are available)	100% (All the -locations with revised sea level rise				√	√	√	√	√	√	√	11.5, 11.b, 13.1, 14,a
1.3. Establish additional sea level measurement stations in identified locations, to cover the coastline of Sri Lanka in addition to the existing stations	NARA	CC&CRMD, SD, DMC, MD, SLN, SLPA	Number of additional /backup tidal measurement stations		Records of CC&CRMD, SLPA and SLN	Present stations (07)	Three new automated stations with backups and 07 backups for all existing stations	√	√	√	√	√						11.5, 11.b, 13.1, 14,a

1.4. Estimate sea level rise predictions for Sri Lanka using global best practices	NARA	CC&CRMD, SD, DMC, MD, SLPA, SLN, Academia	Number of locations for which the sea level rise is estimated		IPCC annual reports	Since 2016, sea level rise has been estimated by NARA, which continues to date	10			√	√	√	√					11.5, 11.b, 13.1, 14,a

NDC 2 - Prepare updated vulnerability and risk maps for the coastal belt of Sri Lanka																				
Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)												Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1. Update inundation maps covering coastal area according to the sea level rise forecast Based on 1.1	CC&CRMD	NARA, SD, DMC, UDA, ID, DS, Academia	% of the coastline covered by the inundation maps		DMC Filed data and LAs field records	0%	100%			√	√	√						11.5, 11.b, 13.1, 14,a
2.2. Identification of areas vulnerable to sea level rise	CC&CRMD	NARA, SD, DMC, UDA, ID, DS, Academia	Number of DS divisions covered		Data and maps of DMC	None	All 74 DS divisions	√	√	√	√							11.5, 11.b, 13.1, 14,a
2.2.1. Identify locations where vulnerable communities are present and take action to reduce them	DS	NARA, SD, DMC, UDA, ID, NPPD, CC&CRMD, Academia	1. Number of locations by GN divisions 2. % of relocations of families who are vulnerable		Records of CC&CRMD and DMC	Baselines to be obtained	Targets to be established	√	√	√	√	√						11.5, 11.b, 13.1
2.2.2. Prevent the establishment of new settlements in vulnerable areas	NPPD	LAs, UDA, NARA, SD, DMC, DS, CC&CRMD	1. Regulation to prevent new settlements 2. Number of interventions conducted to prevent new settlements		Records of NPPD, CC&CRMD and DMC	1. No regulation in place 2. No interventions	1. Enacted regulation to prevent new settlements 2. Target to be established			√	√	√						11.5, 11.b, 13.1
2.3. Prepare sea level rise influenced risk maps for the coastal zone with 0.5m contour intervals and take appropriate actions	DMC	SD, NARA, UDA, ID, DS, CC& CRMD, Academia	% area covered by risk maps		Maps of SD, DMC	Some hazard maps available, but not validated	100%					√	√	√				13.1, 13.2

2.3.1. Prepare vulnerability databases for the coastal zone with 0.5m contour intervals.	SD	NARA, DMC, UDA, ID, DS. CC & CRMD, Academia	% coastal zones covered by vulnerability databases		Records of relevant institutions	No database, but some information/ data available on vulnerability	100% (Databases cover the entire coastal zone)				√	√								13.1, 13.2
2.3.2. Establish Digital Elevation Model (DEM) for the entire coastal zone	SD	NARA, DMC, UDA, ID, DS, CC& CRMD, Academia	% coastal zones covered by DEM		Records of relevant institutions	0% (No DEM)	100% (DEM covers the entire coastal zone)				√	√								13.1, 13.2
2.4. Use findings in 2.3 to update the existing coastal development setbacks	CC&CRMD	NARA, SD, DMC, UDA, ID, DS, Academia	% of updated setbacks defined incorporating sea level rise in the Coastal Zone Management Plan (CZMP)		Records of CC&CRMD	0% (Updated setbacks yet to be incorporated in the CZMP)	100% (All setbacks are updated incorporatingsea level rise covering the entire coastal zone)						√							11.5, 11.b, 13.1, 13.2

NDC 3 - Adopt optimal shoreline management works/measures covering affected length of shoreline using a combination of hard and soft solutions to prevent coastal erosion in areas most vulnerable to sea level rise

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1. Long term data collection programmes, including wave measurements and a sediment transport study	CC&CRMD	NARA, SLPA, SLN, Academia	Number of programmes/studies		Records of CC&CRMD	Not commenced	Wave measurements and a sediment transport study completed		√	√	√	√	√					13.1, 13.2
3.2. Update the erosion management plan	CC&CRMD	NARA, Academia	Erosion management plan updated		Records of CC&CRMD	Existing erosion mgt plan - 1986	Updated erosion management plan	√		√	√	√	√					13.1, 13.2

3.3. Establish programs (in collaboration with universities and other research agencies) for monitoring of coastal erosion and collect related data/information on: coastal erosion trends and status, scientific investigations of sediment balances and assessments of sediment sources, threats to dwellings, land use and critical habitats from erosion, bathymetric & hydrologic conditions	CC&CRMD	GSMB, NARA, SD, SLN CEA, Academia	1. Number of research areas covered 2. Number of collaboration/studies initiated per year		Records of CC&CRMD and other relevant agencies	1. None 2. None	1. Five research areas (Coastal erosion trends and status; Sediment balances and assessments of sediment sources; Threats to dwellings; Land use and critical habitats from erosion: Bathymetric & hydrologic conditions) 2. Two per year	√	√	√	√	√	√	√	√	√	√	13.1, 13.3, 13b, 14.2, 14a
3.4. Restoration of coastal ecosystems including mangroves covering 1,000ha. (this action linked to action 1.6 of the Biodiversity Sector NDC 1)	CC&CRMD	LAs, NGOs, FD, DWC, CEA, MEPA, Private sector, NGOs, CBOs	No of hectares of coastal ecosystems restored		Records of CC&CRMD	100 ha	1,000 ha of mangrove coverage		√	√	√	√	√	√	√	√	√	√	13.1

NDC 4 - Identify and declare coastal and marine natural areas of high priority for building resilience for climate change impacts

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1. Prepare appropriate criteria and list of candidate sites to be declared as high priority natural areas	CC&CRMD	MEPA, NARA, CEA, UDA, DWC, Academia	Number of candidate sites declared		Records of CC&CRMD	Two sites (Established before 2020)	Additional ten (10) sites	√	√	√	√	√						13.1, 13.2, 14.5, 14c
4.2. Declare and manage high priority natural areas as required through gazette notifications	CC&CRMD	MEPA, NARA, CEA, UDA, DWC, Academia	1. No of new sites gazetted 2. Number of new management plans prepared		Records of CC&CRMD	Activity not commenced	Targets to be established	√	√	√	√	√	√	√	√			13.1, 13.2, 14.5, 14c

4.8 Health Sector

The Sri Lankan healthcare system includes a variety of medical practices, including acupuncture, homeopathy, ayurveda, unani, siddha, conventional western medicine, and more. Western or allopathic medicine is the dominant subset of these, serving the requirements of the vast majority. GoSL maintains a universal health care system that extends free healthcare to all citizens, which has been a national priority. In addition, a large number of private hospitals and other healthcare facilities have appeared in the country due to the rising income of people and demand for private services. The public health sector is divided into two parallel streams: (i) community health services, which emphasize health promotion and prevention, and (ii) curative care services, which range from primary care that is not specialized to specialist care and are provided by a variety of institutions[59].

The primary organization overseeing the development and regulation of health services is the Ministry of Health of the central government. Additionally, it oversees providing resources for the health sector, including qualified human resources, a medicine supply, and significant investments in infrastructure. The provision of healthcare in the public sector is decentralized, and the provincial health authorities oversee primary care at select specialized Allopathic institutions.

Figure 4-5 shows the variation in number of medical doctors and nurses and midwives per 1,000 population from 2004 to 2019 (data source[60]). Figure 4-6 (a) shows the source of health expenditure and (b) shows the average per capita health expenditure and the total health expenditure as a share of the GDP.

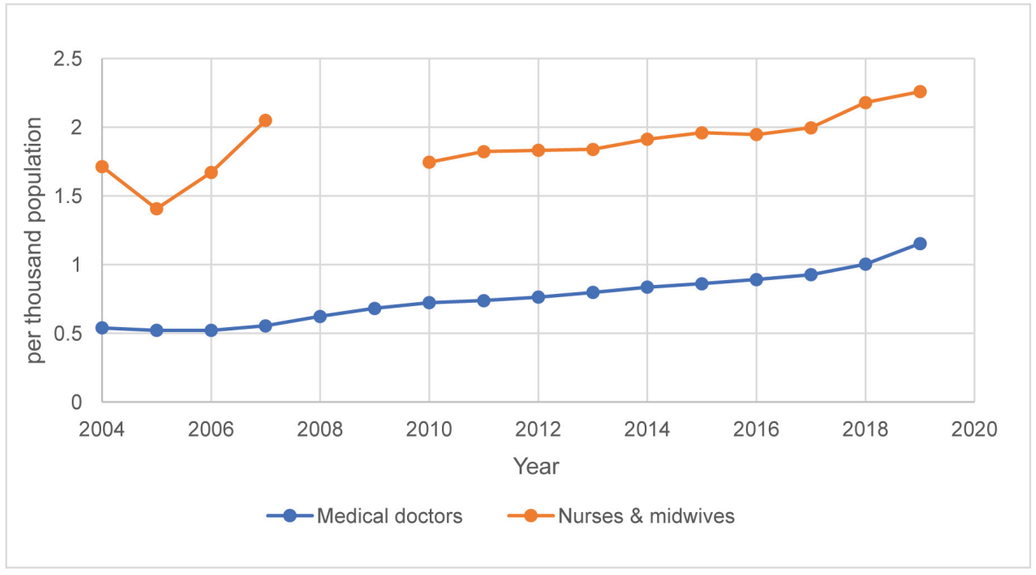
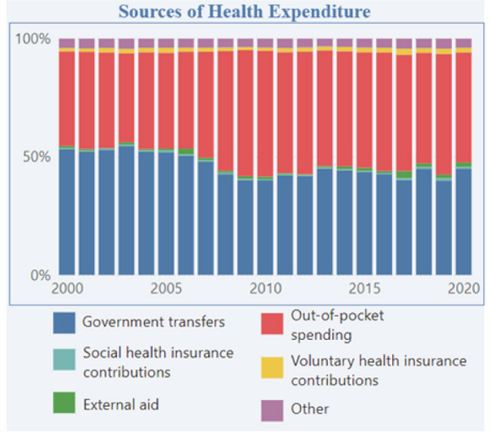


Figure 4-5 Ratio of health workforce per 1000 population[51]

59 Annual Health Bulletin (2019), Ministry of Health, Sri Lanka
60 WHO, Global Health Expenditure Database: https://apps.who.int/nha/database/country_profile/Index/en

Sri Lanka has a well-advanced healthcare system. Sri Lanka performed well in its efforts to attain the health-related Millennium Development Goals (MDGs). As per the latest statistics (2019), the country has 643 state-owned hospitals and 86,589 beds in these hospitals. The average number of hospital beds per 1,000 population is 4, where Mannar district recorded the highest ratio of 7.6 while three districts, namely, Gampaha, Kaluthara, and Puttlam recorded the lowest ratio 2.5[61].



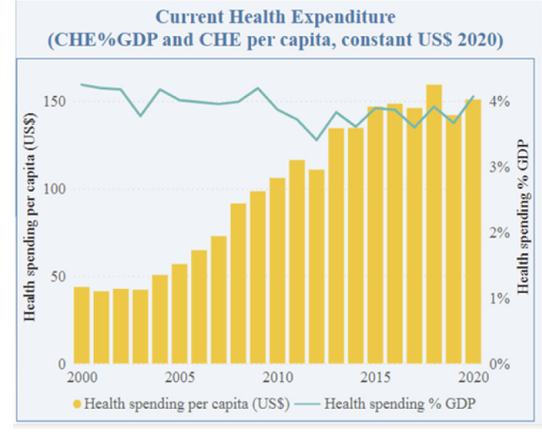


Figure 4-6 (a) Source of health expenditure and (b) Per capita health expenditure (Source: WHO)[3]

Despite having a robust healthcare system, Sri Lanka has a surprisingly high rate of malnutrition among children and women. Major issues include underweight infants (6.4%), low birth weight neonates (almost 12%), pregnant women with low BMI on or before 12 weeks of pregnancy (15%), young children aged 1-2 (12%), and aged 2-5 (19%) might be highlighted [61] . Vector borne diseases are influenced greatly by the monsoons. A high incidence of dengue cases has shown an increase from 2022 to 2023 however, there is a decline in the number of deaths reported [62] . A high number of leptospirosis cases are reported each year. The number of deaths increased during the COVID 19 pandemic since more people took to agriculture and more focus was on the pandemic[63].

61 Department of Census and Statistics, Sri Lanka http://sis.statistics.gov.lk/statHtml/statHtml.do?orgId=144&tblId=DT_HEA_ANN_117&conn_path=I2
62 https://cdn.who.int/media/docs/default-source/sri-lanka-documents/dengue-sit-rep-1-12.05.2023-v2.pdf?sfvrsn=80da2b2d_1
63 https://www.e-epih.org/upload/pdf/epih-44-e2022015.pdf

People's health and well-being are negatively impacted by climate change, and as a result, the health sector will unavoidably suffer. Six NDCs present adaptation targets for the health sector (Table 4-8). These cover policy-level initiatives to mainstream targeted climate resilience actions, improved capacity to manage climate-influenced health and disease conditions, address the health impacts of air pollution, and reduce morbidity and mortality from climate-induced disasters,

Table 4-8 NDCs of Health Sector

NDC #	NDC
1	Policy initiatives for enhancing the climate resilience of the health sector promoted and integrated to all related sectors
2	Improved capacity to manage non-communicable diseases (NCD) and heath conditions directly attributable to climate change
3	Manage the worsening of under-nutrition and malnutrition due to climate change
4	Strengthen surveillance and management of climate-sensitive vector and rodent borne disease (dengue, malaria, filaria, leishmaniasis and leptospirosis)
5	Reduce morbidity and mortality from extreme weather/climate events (floods, droughts, landslides, and other climate-related emergencies)

4.8.1 Health Sector NDC Implementation Plan

NDC 1 - Policy initiatives for enhancing climate resilience of the health sector promoted and integrated to all related sectors																				
Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)												Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1: Development and implementation of the Heat – Health Action Plan (HHAP) for Sri Lanka	Environmental health, Occupational health and Food safety (EOH) Directorate of MoH)	MoH (Other relevant units), MoE, CEA,MD, Provincial Health Authorities, LAs, Academia	HHAP		Published HHAP, Progress monitoring meeting minutes	Draft HHAP in place	Heat Health Action Plan finalized by 2023 and implemented	√	√	√	√	√	√	√	√	√	√	3.9, 13.2
1.2: Development and implementation of the National Strategic Plan for Health, Environment and Climate Change (NHSPEC)	EOH Directorate of MoH	MoH (Other relevant units), MoE, CEA, MET, MoPC&LG, MoF, NBRO, DMC, Academia, UN agencies, CBOs	NHSPEC		Published NHSPEC, Progress monitoring meetings minutes	Not commenced	NHSPEC developed and implemented.	-	-	√	√	√	√	√	√	√	√	3.9, 13.2
1.3: Development and implementation of guidelines and standards to make Green and Healthy Hospitals	EOH Directorate of MoH	MoE, MoF, MoH (Other relevant units - Health Care Quality Unit, DPRD), DMC, UDA, SLSEA, CEA, LAs, Academia, GBCSL	1. Guidelines and standards 2. % of certified Green & Healthy Hospitals, 3. Green , Healthy & Safe Hospital Index		Guidelines and standards, Green, Healthy & Safe Hospital Audits	1. Not commenced 2. Two pilot projects on safe hospitals initiated 3. Not commenced	1. Guidelines and standards to make Green and Healthy Hospitals developed by 2024 and implemented. 2. At least 5% 3. Finalized Healthy & Safe Hospital Index	√	√	√	√	√	√	√	√	√	√	3.9, 11.7, 13.2

1.4: Health action plan prepared to reduce the disease burden due to air pollution and implementation commenced	EOH Directorate of MoH	MoH (Other relevant units), MoE, CEA, MD, , Academia	1. Health Action Plan for reduction of disease burden due to air pollution 2. Surveillance system to monitor disease burden due to air pollution		The action plan, Published records of MoH, Progress monitoring meetings minutes	Not commenced	1. Health action plan prepared to reduce the disease burden due to air pollution developed and implemented 2. Operational Surveillance system to monitor disease burden due to air pollution	-	-	√	√	√	√	√	√	√	√	3.9, 13.2

NDC 2 - Improved capacity to manage Non-communicable Diseases (NCD) and health conditions directly attributable to climate change

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1: Identify diseases and health conditions expected to aggravate due to climate change	EOH Directorate of MoH)	MoH NCD Bureau and other related units), MoE (CCS, NOU), Relevant Professional Colleges, SLMA, Academia	Coverage of the assessment of diseases & health conditions expected to aggravate due to climate change		Publications, Disease survey reports and bulletin, Records and registers	Not commenced	Diseases & health conditions expected to aggravate due to climate change identified and recorded	-	-	√	√							3.9, 13.b
2.2: Develop management guidelines for the prioritized diseases and health conditions including clinical and preventive guidelines	EOH Directorate of MoH	MoH, NCD Bureau and other related units), MoE (CCS, NOU), Relevant Professional Colleges	The guidelines		MoH records on the development of guidelines	Not commenced	Guidelines for the prioritized diseases and health conditions including clinical and preventive guidelines developed	-	√	√	√	√						3.c
2.3: Capacity building of health system in addressing climate change influenced diseases and health conditions.	EOH Directorate of MoH	MoH, NCD Bureau and other related units), MoE (CCS, NOU), Relevant Professional Colleges	1. Number of programmes held 2. No of staff trained		MoH records of funds allocated and utilized, Attendance records, Progress reports	Specific capacity building programmes not commenced	1. 5 programmes per annum 2. 250 health workers trained per annum	-	-	√		√	√	√	√	√	√	3.9, 13.b

2.4: Identify potential at-risk categories/ vulnerable groups (elderly, children, vulnerable worker groups and any other vulnerable categories) and to develop a road map in managing climate change induced non-communicable diseases (NCDs)	EOH Directorate of MoH	MoH, NCD Bureau and other related units), MoE (CCS, NOU, MoEd, Relevant Professional Colleges	Roadmap in managing climate change induced NCDs for different vulnerable groups		MoH progress reports	Vulnerable communities identified but not specifically related to climate change	Finalized roadmap	-	-	√	√	√	√					3.2
2.5: Strengthen research capacity on generating evidence on climate change and health impacts	MoH	MoSTR MoEd, MoF, NSF, UN Agencies, IFS, IPS, Academia	1. Research agenda developed 2. Number of research activities conducted & published		Publications, Information from repositories	1. Research agenda development not commenced 2. Number of the existing research reports on the topic is to be identified	1. Research agenda published 2. At least one research completed per annum	√	√	√	√	√	√	√	√	√	√	13.2

NDC 3 - Manage worsening of nutrition related health impacts due to climate change

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1: Develop a mechanism to receive and analyze food availability related early warning to minimize nutrition-associated health issues	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-

3.1.1: Provide nutrition status data to relevant agencies to develop surveillance system for food and nutrition security in Sri Lanka	MoH (DDG PHS 2)	MoH MoH (EOH Directorate , Nutrition Division, DPRD, FHB,),NCD Unit), SMoWCP&P MRI , DCS; MoEd, MoA, DoA, MD , UN agencies, FAO, Academia	Nutrition status data provided		Records of FHB, Nutrition Division, MRI (nutrition unit)	Limited information nutrition status	Comprehensive nutrition status data is collected and communicated			√	√	√						2.1, 13.3
3.2: Social welfare systems strengthened to cover vulnerable groups including families below the poverty line, elderly, disabled people, nursing mothers and young children in Medical Officer of Health (MOH) areas identified as vulnerable to food insecurity	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.2.1: Develop and implement programmes to improve nutrition among vulnerable groups (differently abled persons, elderly etc)	MoH (Nutrition Division)	MoH (FHB, YEDD, MoH (EOH Directorate ,Food Safety Unit), MoEd, MRI, Provincial Secretariat, DS, Social services	Programmes to improve nutrition among vulnerable groups		Reports, guidelines and food regulations	No specific programmes developed	Programmes to improve nutrition among vulnerable groups developed and implemented	-	-	√	√	√	√	√	√	√	√	3.3, 13.3
3.3: Strengthen public health system to intervene early in climate related nutrition issues	MoH (Nutrition Division)	MoH (EOH Directorate (Food control unit), NCD Unit), MoEd, MoA, SMoWCP&P, MRI (nutrition unit), DCS; DoA, MD, , UN agencies, FAO, Academia	Integration of climate related nutrition aspects in public health system		Records of MoH, FHB	The issues identified and interventions initiated	Climate related nutrition issues identified and addressed. (Under 5 malnutrition, micro nutrient deficiency)	√	√	√	√	√	√					2.1, 13.3

NDC 4 - Strengthen surveillance and management of climate sensitive vector and rodent borne diseases (Dengue, Malaria, Filaria, Leishmaniasis and Leptospirosis)

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1: Strengthen disease surveillance system for climate sensitive vector borne diseases	DDG Public Health Services	MoH (Epidemiology Unit), National Dengue Control Programme, Anti Malaria Campaign, Anti Filariasis Campaign, LAs	Climate sensitive vector borne surveillance system		Records of National Dengue Control Unit, Anti Malaria Campaign monthly review reporting system, Filariasis quarterly reviews, data base of the Epidemiological unit	A surveillance system for Dengue, Malaria, Filariasis, and Leishmaniaisis in place	Well-functioning vector borne surveillance system,	√	√	√	√	√	√					3.3, 13.3
4.2: Develop early warning systems at MOH level based on rainfall/temperature forecast for each climate sensitive vector borne disease	DDG Public Health Services 1	MoH (Epidemiology Unit), National Dengue Control Programme, Anti Malaria Campaign, Anti Filariasis Campaign, DMC, MD,	% coverage of MOH level improved early warning system for vector borne diseases		Records of Dengue surveillance system, Malaria Campaign monthly review reporting system, Filaria monthly reviews, data base of the Epidemiological unit	20%	100%	√	√	√	√							3.3, 3.d, 13.3
4.3: Capacity building of the public health system, local authorities and other stakeholders in prevention of occurrence of outbreaks and to rapidly respond to early warnings through effective interventions in prevention and control infectious diseases	MoH (DDG Public Health Services 1)	MoH (Epidemiology Unit), National Dengue Control Programme, Anti Malaria Campaign, Anti Filariasis Campaign, LAs, Provincial Ministries of Health	1. Number of capacity building programmes 2. Number and sectors trained 3. Training manuals		Records of Provincial Secretary's office	1. A few programmes are conducted yearly 2. Number and sectors trained to be identified 3. Training manuals yet to be published	1. Five programmes per annum 2. (i) 250 public health staff trained per year (ii) 50 Local government and community based organization members trained per year 3. Training manuals published	√	√	√	√	√	√	√	√	√	√	3.3, 3.d, 13.3

4.4: Strengthen public health risk communication regarding vector borne disease control during predicted outbreaks	DDG Public Health Services 1 &2	MoH (Media unit), MoE (CCS), HPB, National Dengue Control Programme, Anti Malaria Campaign, Anti Filariasis Campaign, DMC, DoGI,	1. Plan for public health risk communication regarding vector borne disease control during predicted outbreaks 2. Communication as per the plan during predicted outbreaks		Records of HPB, Dengue Control Programme, Anti Malaria Campaign, Anti Filariasis Campaign, Epidemiology Unit	1, Existing plan 2. Existing communications during predicted outbreaks	1, Improved plan 2. Improved communications during predicted outbreaks	√	√	√	√							3.3, 3.d, 13.3
4.5: Inter-sectoral coordination and information system linked to the surveillance system for coordination with public health, local authorities and other stakeholders	DDG PHS 1	MoH (DPRD, Epidemiology Unit) MoEd, MoE (CCS), MoFish, MoD, MoUD&H, MoEd, MoPC&LG, Ministries in charge of Technology and Research, MoMM, CEA, MD,, Dengue Control Programme, Anti Malaria Campaign, Anti Filaria Campaign, Provincial Ministries of Health	1. Number of Inter-sectoral committees and frequency of reporting 2. Information sharing (ICT) platform		Minutes of the committee meetings, ICT platform	1. About 40% coverage 2. Not established	1. Inter-sectoral committees for each disease and reported every quarter 2. Information sharing platform established	√	√	√	√	√	√	√	√	√	√	3.c, 13.2

NDC 5 - Reduce morbidity and mortality from extreme weather/climate events (floods, drought, landslides and other climate related emergencies)

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
5.1: Strengthening timely and accurate early warning receipt and dissemination to health sector on possible extreme events or rainfall variability and linking them to national, regional, MOH and village level interventions	MoH (DPRD)	DMC, DS, PMoH, RDHS	A system for receipt dissemination of information on disasters and early warning		Records of DPRD	Existing system covering all major events (but not comprehensive enough to cover national, regional, MOH and village level)	Comprehensive system for receipt dissemination of information on disasters and early warning in place	√	√	√	√	√	√	√	√	√	√	3.c, 13.3
5.2: Risk assessments for all hazards including climate-related events for the health sector	EOH Directorate of MoH	MoH (DPRD, Epidemiology unit, Vector/ food/water borne/ viral disease control units) PDHS, RDHS, DMC, MD, MRI	Rsk assessment maps		Records of DPRD, PDHS, RDHS, MRI, Epidemiology Unit, maps	In progress covering four provinces	Risk assessments maps covering all the provinces			√	√	√	√					3.c, 13.3
5.3: Improved health preparedness for all hazards including climate-related disaster events at national, subnational, MOH and village level both in curative and preventive sectors	MoH (DPRD)	RDHS, DMC, PDHS, MD,, DMC	Health preparedness plans at national, provincial and district level		Annual reports of DPRD	Plans for four provinces	Health preparedness plans at national, provincial and district level established	√	√	√	√	√						3.c, 3.9, 13.3
5.4: Public awareness on health impacts of climate change and promotion of resilience designed and disseminated through traditional, electronic and social media on how to address immediate disaster risks	MoH (HPB),	MoH (DPRD, E&OH, Epidemiology Unit, FHB, Nutrition Division, EOH), MoE (CCS), DMC, DoGI, Dengue Control Programme, Anti Malaria campaign, Anti Filaria campaign,	No of awareness programmes and promotions conducted per year		Records of HPB, DPRD, E&OH	Ongoing, the number of the programmes conducted to be estimated	Target is to be established	√	√	√	√	√	√	√	√	√	√	3.c, 13.3

4.9 Urban Planning and Human Settlement Sector

According to the definition of urban population, which includes those residing in designated Municipal Councils (MCs) and Urban Councils (UCs), Sri Lanka's urban population is 18.7%, with a projected population share of 21% by 2030. Urbanization has become a rapidly growing force, as an increasing number of people have begun to move to towns and cities. This situation has led to a number of problems, including a rise in service demand, increased traffic congestion and its effects from pollution and natural disasters, health risks, unsuitable housing, the urban heat island effect, and low living standards for the urban poor (growth of slums). The GoSL places a strong emphasis on rural development and evenly distributes infrastructure and services between the urban and rural regions. The idea of de-urbanization through agro-industrialization has been put out, and the GoSL has started several initiatives to close the infrastructural and service gap. The policies for urban development are established by the Ministry of Urban Development and Housing. The overall framework and rules for spatial planning are provided by the updated National Physical Planning Policy and Plan 2048. The Urban Development Authority (UDA) is given the authority to carry out urban planning and land distribution by the Urban Development Authority Act (Amended) No. 36 of 2007 and related UDA Planning and Building Regulations. Further, Regional Physical Plans have been developed for five provinces (Uva, Sabaragamuwa, Southern, Eastern and North Central) that provide the Provincial and Local Level Authorities with necessary framework for the translation of national level policies and development programmes into local level action projects as well as to reformulate and regulate the local development initiatives in harmony with those at national level.

The emphasis given to this sector also become apparent with the inclusion of environment management in cities and human settlements (C&HSs) as one of the eight thematic areas in the NEAP. It highlights that, though C&HSs in urban areas are dynamic and vital parts of the human society are the main engines of social, economic and technological development, there are numerous challenges and threats as a consequence of urbanization and poor urban planning, particularly the adverse impacts on surrounding ecosystems and local environmental issues such as inefficient water management and sanitation, air quality degradation, solid waste and health impacts, among others. The NEAP includes nine strategies and 60 actions to meet sustainability objectives in this sector.

As climatic hazards grow, it is anticipated that outmigration in villages dependent on agriculture would cause cities to overpopulate. This can result in the growth of haphazard, low-income settlements in metropolitan areas, which have several risks. Climate change poses two different and evident challenges to human settlements: (i) rising temperatures will make urban and suburban regions across the nation uninhabitable; and (ii) urban heat islands will increase the effects of heat waves in cities. Temperature increases during the day and at night will affect how much energy is used for cooling. Water shortages will occur in the Dry Zone due to increased temperatures, high evaporation rates, and extended dry periods. Water constraints resulting from the drought are already noticeable in places with higher watersheds, such as Nuwara Eliya and Badulla. Similar issues could arise in the Wet Zone's developing urban centers as demand increases due to urban growth. The increased frequency of weather-related disasters, as well as the increased risk of flood, drought, and landslides, represent the second risk of the climate to human settlements. Towns in the southwest of the country that are already at risk of flooding may face increased hazards, according to positive rainfall anomalies for the Wet Zone. In the hill region, plantation workers' homes are particularly vulnerable to landslides, and this susceptibility is increased by their substandard housing and precarious economic situation. The coastline region of Sri Lanka is heavily inhabited, particularly in the western and southern regions. Drinking water systems in coastal areas are particularly sensitive to saline intrusion and sea level rise, and therefore represent a key adverse impact of climate change.

Four NDCs make up the adaptation measures (Table 4-9) in the urban planning and human settlement sector. They highlight the need for better planning, incorporating disaster risk reduction and impending climate risks, boosting built-environment climate resilience, and reducing the effects of slow-onset climate change events. Further, some of the strategies proposed under mitigation NDCs, such as urban forestry, eco-friendly transportation, and green buildings, will provide co-benefits to improve adaptation.

Table 4-9 NDCs of Urban Planning and Human Settlement Sector

NDC #	NDC
1	Enhance the resilience of human settlements and infrastructure through mainstreaming climate change adaptation into national, sub-national and local level physical planning
2	Incorporate Disaster Risk Reduction (DRR) into the urban and human settlement planning/implementation in areas of high vulnerability to climate change risks
3	Establish a climate-resilient built environment
4	Minimize the impact of slow onset events (sea-level rise) on coastal settlements and infrastructure

4.9.1 Urban Planning and Human Settlement Sector NDC Implementation Plan

NDC 1 - Enhance the resilience of human settlements and infrastructure through mainstreaming climate change adaptation into national, sub-national and local level physical planning

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1: Integrate most current climate change risk and vulnerability into physical planning at all levels	NPPD	MoUD&H, MoP-C&LG, MoH, UDA, ID, SLLDC, NBRO, LAs	1. NPPD - the updated National Physical Plan (NPP) 2. The level of adherence to the items in the NPP by stakeholders		Climate change integrated National Physical Plans of NPPD, NBRO reports	1. Updating of National Physical Plan including climate change risk and commenced 2. NPP-2019 (the latest version by then) adhered with by all stakeholders (however, there are challenges in ensuring full adherence)	1. Updated National Physical Plan published (2023) 2. Full adherence by the stakeholders		√	√								13.2
1.2: Prepare the sub-national and local plans considering climate risks and vulnerability based on the recommendations of the National Physical Plan (NPP)	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.2.1: Prepare Regional (Provincial) Physical Plans considering climate risks and vulnerability based on the recommendations of the National Physical Plan (NPP)	NPPD	MoUD&H, MoP-C&LG, MoH, ID, UDA, CEA, SLLDC, NBRO, LAs,	The number of Regional Physical Plans prepared incorporating climate risks and vulnerabilities.		Records of NPPD, NBRO, UDA	Identification and preparation of Regional physical Plans in progress	Four regional Physical Plans (Eastern, Central, UVA, Central fragile zone)	√	√	√	√							13.2

1.2.2: Prepare Local Development Plans in UDA declared areas	UDA	MoUD&H, MoP-C&LG, MoH, ID, NPPD, CEA, SLLDC, NBRO, LAs	The number of Local Physical Plans prepared incorporating climate risks and vulnerabilities in UDA declared areas.		Records of UDA, NBRO, NPPD	Twenty (20) Local Physical Plans in UDA declared areas	All MCs, UCs and PSs (in UDA declared areas)	√		√	√	√						13.2
1.2.3: Prepare Local Development Plans in LA areas	LAs	MoUD&H, MoP-C&LG, MoH, ID, UDA, NPPD, CEA, SLLDC, NBRO, LAs	The number of Local Physical Plans prepared incorporating climate risks and vulnerabilities		Records of respective LAs, UDA, NPPD, NBRO	Identification of areas for Local Physical Plans in progress	275 Local Development Plans prepared	√	√	√	√	√	√					13.2
1.3 Adhere to the guidelines prescribed by the NPPD and UDA in all urban infrastructure projects and programmes	Project Approving Agencies (PAAs)	UDA, USDA, NBRO. DMC, SLLDC, CEA, CC&CRMD, DWC	Degree of Adherence		Records of PAAs (Compliance reports, Planning committee clearance)	The criteria and evaluation methodology for the Degree of Adherence are not established	100% (All projects adhered to the NPP and UDA guidelines)	√	√	√	√	√						11.3 11.5 11.6 11.b
1.4: Introduce adaptation measures such as urban zoning incorporating disaster risk, forest parks, ground water recharge, air passages/wind corridors, wise-use of wetlands and roadside planting into urban planning, bio engineering technologies, nature - based solutions, etc. to build resilience to climate change	UDA	DMC, SLLDC, ID, NBRO, LAs	Number of Local/ Urban Development Plans prepared with integration of climate change adaptation measures		Records of respective LAs, UDA, DMC, NBRO, Respective LAs	Incorporated in gazetted 21 Development plans of the UDA	275 Local Development Plans	√	√	√	√	√						11.3 11.5 11.6 11.b
1.5: Integrate and adhere to the Guideline for Climate Resilient Human Settlement and Infrastructure developed by the Climate Change Secretariat (CCS)	MoE	CCS, DMC, SLLDC, ID, NBRO, LAs	1. Number of awareness and capacity building programmes conducted 2. Degree of Adherence		Records of MoE and other stakeholder agencies	1. No programmes planned and conducted 2. The criteria and evaluation methodology for the Degree of Adherence are not established	All housing and settlement projects adhere to climate resilient guidelines of CCS	√	√	√	√	√						11.3 11.5 11.6 11.b

NDC 2 - Incorporate Disaster Risk Reduction (DRR) into urban and human settlement planning / implementation in areas of high vulnerability to climate change risks

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1: Develop Guidelines on Climate Change influenced Disaster Risk Management (DRM) for urban and human settlement planning	DMC	NBRO, UDA, NHDA, USDA, CCS, ID, SLLDC, NPPD	1. Number of guidelines prepared 2. Areas of coverage in the guidelines 3. Effectiveness of the guidelines		Annual reports of DMC and other stakeholders	1. Key Agencies have developed several guidelines (e.g. UDA – Wetland Conservation Development Plan for Western Province) 2. Baseline to be established 3. Baseline to be established	1. Target for the number of guidelines to be established 2. Target for the areas of coverage to be established 3. Incorporation of DRR into urban and human settlement planning based on the guidelines developed by key agencies.		√	√								13.2
2.1.1: Review and revise Urban & Human settlement planning legislation to incorporate climate change influenced disaster risk management aspects	MoUD&H	MoE, USDA, DMC, Attorney General Department (AGD), CCS	1. Urban Settlement Policy formulation incorporating climate change influenced disaster risk management aspects 2. Specific legislations for the implementation of the Urban Settlement Policy		Records of MoUD&H, USDA, DMC, AGDs, MoE	1. Policy formulation not commenced 2. Specific legislations not developed	1. Urban Settlement Policy incorporating climate change influenced disaster risk management aspects by 2023 2. Enacted specific legislations by 2025	√	√	√	√	√						13.2
2.2: Design, Implementation & maintain infrastructure giving due consideration to the runoff system/drainage and flooding	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-

2.2.1: Design of infrastructure giving due consideration to the runoff system/drainage and flooding	ID	MoPC&LG, RDA, CEA, NBRO, UDA, SLLDC	1. Number of river basins covered in the designs 2. Area coverage of Urban/ local floods designs		Records of DoI and other related agencies	1. Three (03) - (Kelani, Gin; Nilwala river basins) 2. No coverage of Urban/ Local floods	1. 05 Additional river basing covered 2, Target to be established		√	√	√	√	√	√	√	√	√	11.3 11.5 11.6 11.b
2.2.2: Implementation & maintenance of infrastructure giving due consideration to the runoff system/ drainage and flooding (in accordance with the Design in 2.2.1)	LAs	ID, RDA, CEA, NBRO, MoPC&LG, UDA, SLLDC	1. Number of river basins covered in the implementation and maintenance 2. Area coverage in the implementation and maintenance of Urban/ local flood control		Records of LAs, DoI and other related agencies	Not implemented	1. Implementation and maintenance of 08 river basins 2. Target to be established	√	√	√	√	√	√	√	√	√	√	SDG 11.3 11.5 11.6 11.b
2.3: Incorporate slope stability and soil conservation measures in developing infrastructure in hilly areas	NBRO	DS, LUPPD, NPPD, Ministry in charge of Estate Housing/ Infrastructure Development, PHDT, NRMC of the DoA	1. % No of plans rejected due to slope instability in hilly areas; 2. % of districts covered		NBRO Database, Records of LIPPD and NPPD	Baselines to be identified(Implemented in some areas, but % is to be estimated)	1. Up-to-date information on % No of plans rejected 2. 100% (Implemented in all the hilly areas)	√	√	√	√							11.3 11.5 11.6 11.b
2.4: Assess landslide / flood risk to human settlement and infrastructure and introduce measures to reduce the vulnerability in high risk areas	DMC	Ministry in charge of Estate housing/Infrastructure Development, PHDT, NBRO, SLLDC, ID, DS, LUPPD,	% of districts covered		NBRO reports, Records of DMC, ID	Baseline needs to be established (Maps available on the Landslide risk to human settlements and infrastructure)	100% (Implemented in all districts)	√	√	√	√	√	√	√	√	√	√	11.3 11.5 11.6 11.b
2.5: Assess drought risk to human settlement and introduce measures to reduce vulnerability in high risk areas	DMC	MD, DSs, LAs	% of districts covered by the drought risk assessment and plans introduced		Records on by relevant agencies	Some assessment done, but not very comprehensive	100% (Assessment covering all high risk areas)	√	√	√	√							11.3 11.5 11.6 11.b

NDC 3 - Establish climate resilient built environment (2030)

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1: Integrate climate risk projections into climate resilient built environment strategies implemented by respective stakeholder institutions	UDA	MoUD&H, MD, NBRO, GSMB, DMC, CEA, NHDA, DCS, NRMC, Academia	Number of UDA development plans which has incorporated climate resilient concerns		Records of UDA	Baseline to be established (this is done in planning, but need to identify the level of incorporation)	Climate risk projection are integrated to all the plans	√	√	√	√	√						11.3 11.5 11.6 11.b
3.2: Review and update climate resilient design strategies to address emerging climate risks	UDA	MoUD&H, CEA, CCS, DArch. ., NPPD, LUPPD, USDA, CIDA, NBRO, FD, CC&CRMD, DWC, MASL	Number of climate resilient design strategies and guidelines developed, updated and incorporated		Review and updated reports, updated climate resilient design strategies, green building codes incorporated into development plans of UDA and other stakeholder agencies	There are related design and guidelines – for example Blue Green Sri Lanka-National Green Building standards integrated to UDA Gazetted regulations in 2019)	Target to be established (one example is Green Building Certifications to be issued under UDA building approval process in the country)	√	√	√	√	√	√	√	√	√	√	11.3 11.5 11.6 11.b
3.3: Amend and gazette existing human settlement plans integrating climate resilient strategies 3.2	MoUD&H	UDA, CEA, CCS, DArch, NPPD, LUPPD, USDA, CIDA, NBRO, FD, CC&CRMD, DWC	The number of existing human settlement plans integrating climate resilient strategies		Published amended gazettes, human settlement plans and other records of UDA and relevant PAAs	20 Plans	275 Plans	√	√	√	√	√						11.3 13.2

3.4: Review, update and enforce existing rules and regulations to prevent built environments in areas highly vulnerable to climate change	UDA	CEA, CCS NPPD, LUPPD, BOI USDA, RDA, DArch CIDA, NBRO, FD, CC&CRMD, DWC, PRDA	1. Number of rules and regulations reviewed, updated and enforced 2. Level of enforcement		Consultations, rules and regulations incorporated climate vulnerability, projects/ plans adhered to cc built environment rules and regulations, projects approved by NPD according to rules and regulations of CC vulnerability aspects, M & E plans for the enforcement of rules and regulations of UDA and other relevant PAAs	1. The existing rules and regulations are enforced 2. The criteria and evaluation methodology for the Level of enforcement are not available	1. Target to be established 2. All applications for built environment are aligned to the applicable rules and regulations	√	√	√	√	√	√	√	√	√	√	11.3 13.2
3.5: Include sustainable built environment concepts into Architecture and Engineering curricula	UGC	SLSEA, Professional Org, GBCSL, Academia, Technical Colleges,	List of degree /professional training programs having green building concept incorporated in the curricula		Curricula of relevant institutions/ programmes	Baseline to be established (Presently, there are 37 UG/PG degrees/ diplomas offered by Engineering and Architecture disciplines)	Target to be established (e.g. Introduced the sustainable built environment concepts to all Architecture and Engineering curricula)	√	√	√	√	√						11.3 13.2

3.5.1: Introduce sustainable built environment concepts to capacity building	MoUD&H	MoE- Planing division, Institute of Architects, Town & country planning Dept of Universities, SLSEA, SLEMA, SLIDA	List of Awareness and Training Programmes initiated with sustainable built environment concepts		Training curricula and manuals of the relevant institutions	Presently, there are a range of continuous professional development programmes conducted by different institutions, where the sustainable built environment concepts are covered)	Target to be established (e.g. Introduced the sustainable built environment concepts to all relevant CPD programmes)	√	√	√	√	√	√	√	√	√	√	11.3 13.3 13.b
3.6: Promote vertical housing solutions, where appropriate to communities living in high climate risk areas	MoUD&H	USDA, NBRO, MD, Condominium Management Authority, NHDA, UDA LUPPD, Banks, NPPD	No of vertical housing projects introduced to communities living in high climate risk areas		Project reports, Cooperate plans, Performance report, Mixed used projects, strategic plans of USDA, UDA	Projects are Implemented but not specifically in high climate risk areas	Vertical housing solutions in place to all communities living in high climate risk areas	√	√	√	√	√	√	√	√	√	√	11.3 11.5 11.a 11.b

NDC 4 - Minimize the impact of slow onset events (sea level rise) on coastal settlements and infrastructure

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1 Design coastal settlements and associated infrastructure considering future sea level rise	UDA	MoUD&H, NPPD, NHDA, CC&CRMD, SLTDA, USDA, NWSDB, CEB, SLLRDA. LUPPD, , NARA, RDA, , LAs	1. Updating of Coastal Zone Management Plan (CZMP) 2. Number of Local Area Development Plans of UDA		Progress report, annual reports of UDA and other related agencies	1. CZMP 2018 in effect for UDA declared areas 2. Base-line to be identified	1. Updated CZMP for UDA declared areas by 2023 2. Target to be established	√	√	√	√	√	√	√	√	√	√	11.3 11.5 11.a 11.b
4.2 Demarcate protection areas from sea level rise to facilitate for shifting urban densification inward	CC&CRMD	Ministry in-charge of Resettlement, SD, UDA DMC, LAs, DS, UDA	Number of maps prepared		Existing inundation maps of CC&CRMD, Vulnerability assessments, Survey maps , DMC maps	2011 Version (Climate Change Vulnerability Database) in effect	Updated inundation maps, demarcate protection areas from sea level rise			√	√	√	√	√	√	√	√	11.3 11.5 11.a 11.b
4.3 Prepare and commence implementation of risk management plans (RMPs) for existing coastal infrastructure and settlements	DMC	CC&CRMD, DS, LAs SLTDA, SLCG, SLN	1. Number of (RMPs 2. Level of implementation of RMPs		RMPs and other records of DMC, Records of other stakeholder agencies	1. Previous versions RMPs were available 2. Level of implementation is to be identified.	1. RMPs prepared for all the existing coastal infrastructure and settlements 2. The target for the level of implementation will be identified through an established methodology and criteria			√		√						11.b

4.10 Tourism and Recreation Sector

Tourism has traditionally been the third largest foreign exchange earner and an important income generator for Sri Lanka. Sri Lanka ranked 74th out of 141 countries in the Travel & Tourism Competitiveness Report 2021 of the World Economic Forum. As illustrated in Figure 4-7 the tourism sector has been steadily growing between 2012 and 2018, contributing to the country's economy. However, the Easter attack in 2019, followed by the COVID-19 pandemic, has shrunken the sector, reversing its economic developments to a decade back in history. The tourism sector created nearly 400,000 direct and indirect employment in 2019, while the amount dropped to approximately 350,000 in 2020 and 2021[64].

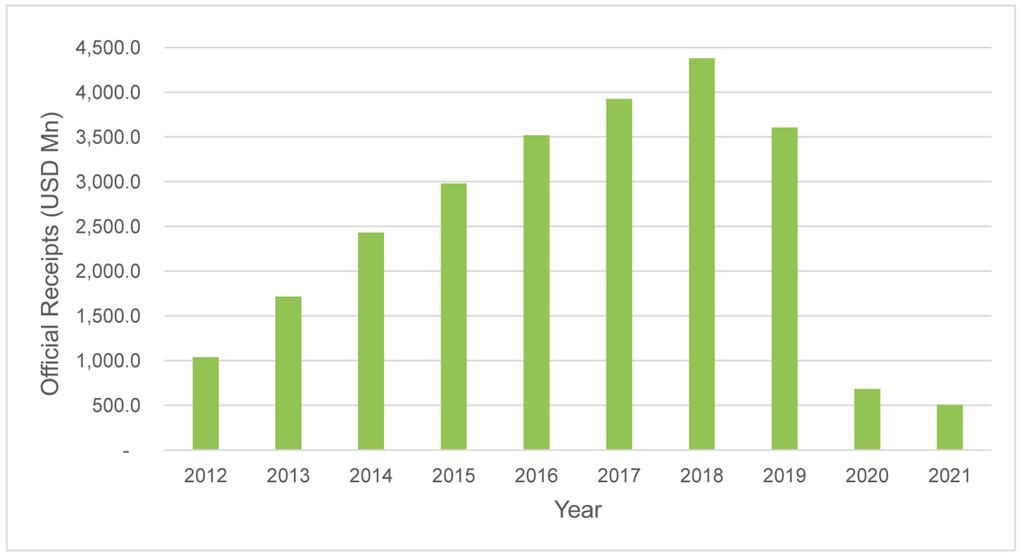


Figure 4-7 Tourism sector foreign exchange earnings (Data: Statistical pocketbook, 2022)

Although the majority of visitors are now primarily interested in leisure travel, Sri Lanka has a lot of potential to attract travelers interested in community-based travel and the expanding health tourism subsector. The Sri Lanka Strategic Plan for Tourism 2022–2025 was created to revive the industry from its current state of decline brought on by the pandemic. The plan identifies issues and opportunities to focus on and provides a structured rationale for the actions proposed. Its purpose is to set an agenda for the recovery and future resilience of the tourism sector. There are several areas of opportunities for the diversification of tourism sector, for example, ayurveda, meditation, kite surfing, speleology, adventure, and palaeobiodiversity.

Tourism has already been impacted by global warming. Extreme heat, floods, storms, the loss of beaches, and the depletion of coral reef resources will all exacerbate the risks associated with tourism operations in tropical and subtropical areas.

64 Department of Census and Statics, Statistical Pocket Book, 2022

About 60% of Sri Lanka's tourist spots are found along the coast, where the height is less than two meters above sea level. The monsoons are a definitive factor in the choice of tourism destinations for the tourists. There are seasons and areas for beach, bird watching, whalewatching, adventure etc. Hence, tourism zones are infromally demarcated based on annual climate.

Most of the inland tourism destinations are situated in highly scenic but vulnerable locations. Unplanned and unauthorized constructions create excessive risk-taking in the face of climate disasters. High density tourism areas create water shortages during the drought and are impacted by contaminated water during floods. Infrastructure is also impacted by climate change leading to unsuitable conditions for the tourists. The tourism sector provides mitigation co-benefits through decarbonization activities such as energy efficiency, waste management, and reforestation landscaping, etc making this sector a key sector to increase Sri Lanka's foreign revenue, increase climate change resilience while following a low carbon development pathway.

Three NDCs addressing sustainable tourism practices, sector risk reduction, and resilience building measures embracing the green building concept are provided as adaptation targets for the tourism sector (Table 4-10). Energy efficiency, green building, and landscaping-related activities are among the NDCs for the tourism sector, all of which will have a mitigating effect.

Table 4-10 NDCs of Tourism and Recreation Sector

NDC #	NDC
1	Build resilience through sustainable tourism practices and improved risk preparedness in destinations of high climate change vulnerability
2	Introduce risk reduction and risk transfer mechanisms for climate-induced disaster affecting tourism
3	Promote climate resilience in the tourism sector by introducing green building design to all new constructions and refurbishments

4.10.1 Tourism and Recreation Sector NDC Implementation Plan

NDC 1 - Build resilience through sustainable tourism practices and improved risk preparedness in destinations of highest climate change vulnerability

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1: Undertake studies to assess climate impacts on tourism, carrying capacity studies and identification of tourism facilities in areas which are vulnerable to climate change	Ministry of Tourism and Lands	MoE, MoPC&LG, SLTDA, UDA, CEA, MEPA, , CC&CRMD,, NARA, SLSDC, CCF, DWC, FD, DMC, NBRO, MD	1 - Studies on climate impacts on tourism in most vulnerable sites 2 - Carrying capacity studies and identification of tourism facilities in critical sites		Records and reports of Ministry of Tourism and Lands	1 – 0 2 - 0	1 - Studies on climate impacts on tourism in 5 most vulnerable sites completed 2 - Carrying capacity studies and identification of tourism facilities in 8 Nos of critical sites completed including Kalpitiya and Hikkaduwa	√	√	√	√	√						14.1, 14.2, 14.5, 15.9
1.2: Identification and promotion of adaptation measures in the destinations identified in 1.1	Ministry of Tourism and Lands	MoPC&LG, SLTDA, UDA, CEA, MEPA, CC&CRMD, NARA, SLSDC, CCF, DWC, FD, DMC, NBRO, MD	Number of destinations covered		Reports and records of Ministry of Tourism and Lands	Partially taken into account in the Master plan	5 destinations covered				√	√						14.1, 14.2, 14.5, 15.9
1.3: Advocate diversified tourist attractions and products (e.g: Cultural, Adventure, Lifestyle, Festivals and Marine Tourism, etc.) as alternatives to identified vulnerable destinations	SLTDA	Ministry of Tourism and Lands, MoE, SLINTGL, DWC, FD, CC&CRMD, CEA, Provincial Councils, CCF, International Bureau of Education	Alternative measures for vulnerable areas		Reports and records of Ministry of Tourism and Lands	0	Alternative measures identified for all vulnerable areas	√	√	√	√	√						14.1, 14.2, 14.5, 15.9

1.4: Inclusion of guidelines/principles for sustainable tourism practices relevant to different stakeholders	SLTDA	Ministry of Tourism and Lands, SLSDC, GSTC, SLAITO, THASL, ASMET	GSTC guidelines covering destination, accommodation & tour operation		Guidelines of the SLTDA for different sectors	Globally available accommodation guidelines (2019) & destination guidelines (2020) localized Tour operator guidelines completed	Guidelines on sustainable tourism including tour operator guidelines to different stakeholders developed	√	√	√	√	√								11.b, 12.b
1.5: Increased number of tourism establishments and destinations certified under the National Sustainable Tourism Certification Scheme by SLTDA in collaboration with Global Sustainable Tourism Council (GSTC)	SLTDA	Ministry of Tourism and Lands, Provincial Councils, UNDP, IUCN Private sector tourism associations, Civil society partners	Number of certified destinations and accommodation establishments & tour operators/ travel agencies		SLTDA annual reports	1 – 0 2 - 37 accommodation establishments certified in 2019	1 - 9 destinations in 9 Provinces certified 2 - 75 Accommodations/ establishments certified	√	√	√	√									12.b

NDC 2 - Introduce risk reduction and risk transfer mechanisms for climate- induced disasters affecting tourism

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1: Strengthen early warning systems and capacity building in most vulnerable tourism destinations	SLTDA	DMC, MD, NBRO, CC&CRMD, ID	1 - Strengthened early warning systems in vulnerable destinations 2 - Capacities of stakeholders of vulnerable areas		SLTDA records and reports	Early warning systems exists but not specifically targeting on vulnerable tourism destinations	1 - All 5 vulnerable areas covered with strengthened early warning systems 2 - Capacities of stakeholders of all 5 vulnerable areas built			√	√	√							13.1, 13.3
2.2: Implement coastal rehabilitation and protection measures	CC&CRMD	Ministry of Tourism and Lands, SLTDA, MEPA, FD, DWC	Coastal areas (if any) of all 5 vulnerable areas		CC&CRMD records	Ongoing main task of CC& CRMD	Coastal areas (if any) of all 5 vulnerable areas covered	√	√	√	√	√	√					14.1, 14.2, 14.5, 15.9
2.3: Expand development of coastal tourism zonal planning	SLTDA	, CC&CRMD, UDA, MEPA, CEA, BOI	Expanded zonal plans for vulnerable coastal areas		1.Gazetted master plans 2. Report on expanded tourism zones	Zonal plans are available for Passikuda, Yala, Bentotota	Expanded zonal plans for vulnerable coastal areas developed and gazetted	√	√	√	√	√						14.1, 14.2, 14.5, 15.9
2.4: Develop climate inclusive insurance scheme for risk management in tourism	Ministry of Tourism and Lands	SLTDA, National Insurance Trust Fund, Insurance Companies	Climate inclusive insurance scheme in line with international risk transfer mechanism		Annual Report of the National Insurance Trust Fund	0	Climate inclusive insurance scheme developed			√	√	√						11.b

NDC3: Promote climate resilience in the tourism sector by introducing green building design to all new constructions and refurbishments

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1: Review and update existing Green Building Guidelines (GBG) specific to tourism to include climate change and ecological aspects	UDA	Ministry of Tourism and Lands, MoE, SLTDA, GBCSL, SLSEA, Tourism Advisory Committee, SLIA, SLIE	GBG specific to tourism industry		Green Building Guidelines of UDA	Existing GBG	GBG reviewed and updated	√	√	√								6.3, 6.4, 7.2, 7.3, 11.b, 12.8
3.2: Legalize GBG specific to tourism	UDA	Ministry of Tourism and Lands, MoE, SLTDA, SL-SEA	New gazette		New gazette	UDA had prepared the document	Updated GBG gazetted			√	√	√						6.3, 6.4, 7.2, 7.3, 11.b, 12.8
3.3: Dissemination of Green Building Code on tourism with planning committees of the relevant local authorities	UDA	SLTDA, LAs	Number of LAs that have incorporated the guidelines		Records of UDA, LAs SLTDA	0	All LAs covered				√	√						6.3, 6.4, 7.2, 7.3, 11.b, 12.8
3.4: Initiate awareness programmes for the Architects and Engineers responsible for designing tourism related structures through their respective professional associations on the Green Building Codes on tourism	SLTDA	GBCSL, SLIA, SLIE, IEPSL Academia, Professional bodies	Awareness of All relevant stakeholders		Curricula of professional courses on GB offered by professional associations	Curricula of existing professional courses on GB not specifically focusing on tourism industry offered by professional associations	Awareness of All relevant stakeholders created			√	√	√	√	√	√	√	√	6.3, 6.4, 7.2, 7.3, 11.b, 12.8
3.5: Enforce above GB guidelines for all new constructions and refurbishments in the tourism sector	SLTDA	UDA, LAs, CC&CRMD, CEA, MEPA, NBRO	Updated SLTDA approval system		SLTDA reports and records	SLTDA existing approval system does not have GB guidelines for new constructions and refurbishments	GB Guidelines for all new constructions and refurbishments included in SLTDA approval system						√					6.3, 6.4, 7.2, 7.3, 11.b, 12.8

5. NDC IMPLEMENTATION – LOSS & DAMAGE

5.1 Overview

Sri Lanka has faced a number of large-scale disaster events including devasting droughts, floods and landslides during the past two decades. These impacted food security, livelihoods, infrastructure and incurred reconstruction needs estimated at over USD 790 million. The government's contingent obligation for 2017 was LKR 23.8 billion (US$ 149 million), or around 1% of all expenditure[65]. Potential effects of climate change are projected to reduce yearly GDP by 1.2% by 2050. Further, it is estimated that Sri Lanka could face housing/roads losses and relief needs related to natural disasters of more than LKR 237 billion (US$ 1.8 billion) once every 100 years. These estimates do not account for long-term losses brought on by economic turmoil, effects on poverty levels, social security, effects on health, education, gender, and other social concerns, or consequences on social security. Furthermore, these figures do not take into account the erosion of natural resources such as watersheds, historical sites, tourist attractions and beaches. Flood frequency and severity are on the rise, according to historical data. In addition, Sri Lanka must deal with climate risks that develop slowly, such as desertification, sea-level rise, and salinization, which have the potential to have serious negative effects on the country's food and water security, agriculture, biodiversity, and habitats.

The Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts (Loss and Damage Mechanism), was established to address loss and damage associated with impacts of climate change, including extreme events and slow onset events, in developing countries that are particularly vulnerable to the adverse effects of climate change. This was established at COP 19 (November 2013) in Warsaw, Poland. Subsequently, Article 8 of the Paris Agreement enshrines the importance of averting, minimizing and addressing loss and damage and the role of sustainable development in reducing the risk of loss and damage.

The Loss and Damage Mechanism promotes approaches to address loss and damage associated with the adverse effects of climate change in a comprehensive, integrated and coherent manner by undertaking the following functions[66]:

1. Enhancing knowledge and understanding of comprehensive risk management approaches to address loss and damage associated with the adverse effects of climate change, including slow onset impacts, by facilitating and promoting:

- Action to address gaps in the understanding of and expertise in approaches to address loss and damage associated with the adverse effects of climate change, including, inter alia, the areas outlined in decision 3/CP.18, paragraph 7(a);
- Collection, sharing, management and use of relevant data and information, including gender-disaggregated data;
- Provision of overviews of best practices, challenges, experiences and lessons learned in undertaking approaches to address loss and damage.

65 World Bank, Contingent Liabilities from Natural Disasters Sri Lanka, 2018
66 unfccc.int

2. Strengthening dialogue, coordination, coherence and synergies among relevant stakeholders by:

- Providing leadership and coordination and, as and where appropriate, oversight under the Convention, on the assessment and implementation of approaches to address loss and damage associated with the impacts of climate change from extreme events and slow onset events associated with the adverse effects of climate change;
- Fostering dialogue, coordination, coherence and synergies among all relevant stakeholders, institutions, bodies, processes and initiatives outside the Convention, with a view to promoting cooperation and collaboration across relevant work and activities at all levels.

3. Enhancing action and support, including finance, technology and capacity-building, to address loss and damage associated with the adverse effects of climate change, to enable countries to undertake actions, pursuant to 3/CP.18 (para. 6) including by:

- Providing technical support and guidance on approaches to address loss and damage associated with climate change impacts, including extreme events and slow onset events;
- Providing information and recommendations for consideration by the Conference of the Parties when providing guidance relevant to reducing the risks of loss and damage and, where necessary, addressing loss and damage, including to the operating entities of the financial mechanism of the Convention, as appropriate;
- Facilitating the mobilization and securing of expertise, and enhancement of support, including finance, technology and capacity-building, to strengthen existing approaches and, where necessary, facilitate the development and implementation of additional approaches to address loss and damage associated with climate change impacts, including extreme weather events and slow onset events.

A need to streamline the disaster management infrastructure, policies frameworks and plans under shared objectives, all aligned with the Sustainable Development Goals, Climate action and the Sendai Framework for Disaster Risk Reduction has been identified. The current institutional challenges arise from the many policies, overlapping responsibilities and resulting confusion of roles, especially in the phases of response. Furthermore, the implementation of policies at the local levels has been an issue due to lack of resources, human capacity and technical know-how. Figure 5-1 illustrates the analysis of existing policy landscape between disaster risk reduction and climate change at various levels, while good practices are documented and disseminated[67].

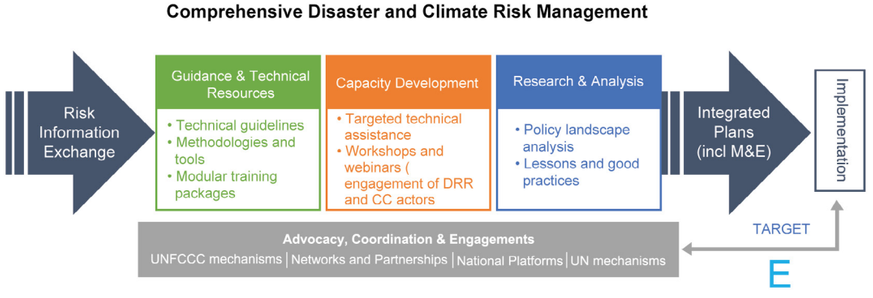


Figure 5-1 Comprehensive Disaster and Climate Risk Management

67 https://www.undrr.org/comprehensive-disaster-and-climate-risk-management-crm

At COP 27 in Sharm-el-Sheik, Egypt, an agreement was made to establish a fund for vulenerable countries exposed to floods droughts and other climate disasters. In the broadest understanding, all efforts being taken to curb the global average temperature increase and to adapt to the adverse effects of climate change can contribute to preventing or reducing the risks of loss and damage associated with climate change borne by societies and individuals.

The NDCs of Sri Lanka are based on institutional and coordination mechanisms that operationalozes the Sendai Framework for Disaster Risk Reduction (2015-2030) and the Warsaw International Mechanism. It is related in Table 5-1.

Table 5-1 NDCs of Loss and Damage Sector

NDC #	NDC
1	Conduct a gap analysis to assess the current status and understanding of L&D
2	Strengthen the existing weather and climate forecasting system
3	Improve data management systems to record losses and damages per sector
4	Establish an overarching, nationally appropriate, functional institutional mechanism for L&D
5	Develop a Comprehensive Risk Management Framework

5.1.1 Loss and Damage Sector NDC Implementation Plan

NDC 1 - Conduct a gap analysis to assess the current status and understanding of L&D: This includes weather and climate related extreme events, slow-onset disasters and natural processes attributed to climate change. The analysis would cover; i) awareness and capacity on L&D ii) data collection and analysis and iii) policy, institutional arrangements and mandates

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
1.1: Design and carry out a study to identify the existing institutional mechanisms to assess and record disaster Loss and Damage (L&D) taking the national requirements and the requirements of the Warsaw International Mechanism (WIM) as criteria of analysis.	MoDM	MoE, DMC, MD, NBRO, NDRSC, Other relevant sectoral agencies	Study to identify the existing institutional mechanisms		Study report of MoDM	Isolated & standalone initiatives by different agencies	Study report prepared		√	√	√								1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
1.2: Establish methodology and agree on the required definitions to estimate the L&D (economic, non-economic) by sectors.	MoDM	MoE, DMC, Selected Sectoral agencies	Methodology definitions		Data sources from MoDM and DMC	Not available	Methodology developed and definitions agreed	√	√	√								1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
1.3: Design a methodology for post disaster assessment of L&D for climate induced disasters in the categories of extreme events such as: drought, high wind, Lightening, tropical cyclone, storm surge, flood, landslide, heatwave.	MoDM	MoE, MoH, MoWS, DMC, MD, NBRO, NDRSC, ID, MASL, DoA, DoF, Other relevant sectoral agencies	Methodology for post disaster assessment of extreme events		MoDM records	Different methodologies by different agencies	Methodology for post disaster assessment of extreme events established	√	√	√	√							1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
1.4: Design a methodology for post disaster assessment of L&D for climate induced disasters in the categories of slow onset events and processes such as: sea level rise, salinization, ocean acidification, desertification, land and forest degradation, increasing temperatures, loss of biodiversity,	MoE	MoDM, MoH, MoWS, DMC, MD, NBRO, NDRSC, ID, MASL, NARA, DoA, DoF, Other relevant sectoral agencies	Methodology for post disaster assessment of slow onset events		Records of Ministries in charge of relevant adaptation and mitigation sectors	Different methodologies by different agencies	Methodology for post disaster assessment of slow onset events established	√	√	√	√							1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
1.5: Design a methodology for pre-disaster assessment of L&D for climate induced disasters in the categories of extreme events	MoDM	MoE, MoH, MoWS, DMC, MD, NBRO, NDRSC, ID, MASL, DoA, DoF, Other relevant sectoral agencies	Methodology for pre-disaster assessment of extreme events		MoDM records	Different methodologies by different agencies	Methodology for pre-disaster assessment of extreme events established	√	√	√	√							1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3

1.6: Design a methodology for pre-disaster assessment of L&D for climate induced disasters in the categories of slow onset events and processes	MoE	MoDM, MoH, MoWS, DMC, MD, NBRO, NDRSC, ID, MASL, DoA, DoF, Other relevant sectoral agencies	Methodology for pre-disaster assessment of slow onset events		Records of Ministries in charge of relevant adaptation and mitigation sectors	Different methodologies by different agencies	Methodology for pre-disaster assessment of slow onset events established	√	√	√	√									1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
1.7: Based on the above activities, establish a system to assess, analyze and report L&D from climate change induced extreme events (economic, non-economic) for selected main sectors taking 2015 as the base year.	MoDM	MoE, MoH, MoWS, DMC, MD, NBRO, NDRSC, ID, MASL, DoA, DoF, Other relevant sectoral agencies	System to assess, analyze and report		MoDM records	Different methodologies by different agencies	System to assess, analyze and report established				√	√									1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
1.8: Based on the above activities, establish a system to assess, analyze and report L&D from climate change induced slow onset events/processes (economic, non-economic) for selected main sectors taking 2015 as the base year.	MoE	MoDM, MoH, MoWS, DMC, MD, NBRO, NDRSC, ID, MASL, NARA, DoA, DoF, Other relevant sectoral agencies	System to assess, analyze and report		Records of Ministries in charge of relevant adaptation and mitigation sectors	Different methodologies by different agencies	System to assess, analyze and report established				√	√									1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
1.9: Obtain legal provisions to bind the relevant Ministries and sector agencies to provide the L&D data (by establishing a data sharing mechanism through MoUs between Ministry of DM and the relevant authorizes)	MoDM	MoE	Legal provisions		MoDM records	None	Legal provisions made				√	√	√								1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3

NDC 2 - Strengthen the existing weather and climate forecasting system: i) to improve early warning and user services; ii) to improve capabilities to predict and record damages and losses for weather and climate related extreme events, slow-onset disasters and natural processes attributed to climate change iii) to determine losses and damages attributable to climate change.

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
2.1: Review/take stock of the status and capability of current weather and climate monitoring and forecasting systems and early warning systems to assess technical capacities, equipment, communication mechanisms required to improve forecasting, early warning and user services of extreme events	MoDM	MoE, MoH, MoWS, MoA, MoPlant, MD, NBRO, DMC, NARA, MEPA, ID, MASL, DoF, Agencies who use weather and climate monitoring information	Study report on existing forecasting, early warning systems and evacuation		MoDM records	Existing forecasting, early warning systems and evacuation	Gaps identified	√	√	√	√							1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
2.2: Review/take stock of the status and capability of current weather and climate monitoring and forecasting systems and early warning systems to assess technical capacities, equipment, communication mechanisms required to improve forecasting, early warning and user services of slow on set events	MoE	MoDM, MoH, MoWS, MoA, MoPlant, MD, NBRO, DMC, NARA, MEPA, ID, MASL, DoF, Agencies who use weather and climate monitoring information	Study report on existing forecasting, early warning systems and evacuation		MoE records	Existing forecasting, early warning systems and evacuation	Gaps identified	√	√	√	√							1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
2.3: Address the gaps identified in actions 2.1 and 2.2.	MD, MoH, NBRO, DMC, NARA, MEPA, ID, MASL, MASL, DoF, Agencies who use weather and climate monitoring information	MoDM, MoE	Sendai indicators A & B; (A-1 to A-3, B-1, B-2) – Affected people and deaths		"DesInventra" database of DMC	187,250 affected people in 2015 151 deaths in 2015	Affected people and deaths reduced by 50% in 2030		√		√	√	√	√	√	√	√	1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3

NDC 3 - Improve data management systems to record losses and damages per sector: This involves taking 2015 as the base year, to assess and quantify both economic and non-economic losses and to inform disaster and climate risk management strategies and national development planning process

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
3.1: Develop technical capacities at the national and sectoral level to assess and document L&D associated with climate induced events, adverse effects of climate change (economic, non-economic).	MoDM, MoE, DCS	All relevant agencies	Number of staffs trained in L&D data handling Centralized database for L&D		DMC records	Trained staff only at institutional level "DesInventra" database, Disaster related statistical framework (DRSF)	Technical capacities of 100 (Around 5 from each key agency) developed Either "DesInventra" database for L&D information enhanced or a new database set up			√	√	√							1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
3.2: Assess and record the recovery / compensation programmes implemented under the main sectors with respect to the defined major climate induced events since 2017	MoDM	MoE, MoH, MoWS, MoA, MoPC&LG, NPD, NDRSC, Adaptation and Mitigation sectoral agencies	Recovery and compensation expenditure		From sectoral agencies	Available only at institutional level	Recovery and compensation expenditure estimated			√	√								1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
3.3: Conduct the estimates at regular intervals (aligned with the planning cycles) to inform and use for sectoral and national planning with the objective of reducing the L&D (and for budget allocations).	MoDM	MoE, MoH, MoWS, MoA MoPC&LG, NPD, NDRSC, Adaptation and Mitigation sectoral agencies	Estimate of recovery and compensation and actual expenditure		Annual budget report(s)	Available only at institutional level	Recovery and compensation and actual expenditure estimated annually		√	√	√	√	√	√	√	√	√	1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3

NDC 4 - Establish an overarching, nationally appropriate, functional institutional mechanism for L&D in line with the 'Warsaw International Mechanism for Loss and Damage' (based on the Gap analysis – NDC 1). This institutional mechanism will have the mandate to coordinate with multiple sector entities, in addition to monitoring functions, it will have financial and budgetary authority.

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
4.1: Establish institutional mechanism with technical capacities and overarching advisory capacity to interact with the Warsaw International Mechanism or any other mechanism for L&D for national positioning, to maintain dialogue and to negotiate common considerations and benefits.	MoE, MoDM	MoF, NPD, DMC, MD, NBRO, NARA, NDRSC, ID, MASL, DoA, DoF, Other relevant sectoral agencies	Institutional mechanism		MoE, MoDM records	National Disaster Management Co-ordinating Committee Meeting NECCC Adaptation, NECCC Mitigation	Institutional mechanism established			√								1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
4.2: Strengthen coordination, coherence and synergies among relevant sector agencies to assess the L&D due to climate induced events, including economic and non -economic aspects of L&D	MoE, MoDM	DMC, MD, NBRO, NDRSC, ID, MASL, DoA, DoF, Other relevant sectoral agencies, Relevant academia, NGOs & INGOs	Coordinating mechanism		MoE, MoDM records	National Disaster Management Co-ordinating Committee Meeting NECCC Adaptation, NECCC Mitigation	Effective coordinating mechanism established			√	√	√	√	√	√	√	√	1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
4.3: Utilize the L&D assessment information for national gains/benefits connecting with national and sectoral planning, budget allocation and monitoring functions	MoF (NPD, Dept of national budget – NBD)	MoDM, MoE, MoWS, DMC, Sectoral agencies, MD, NBRO, NDRSC, ID, MASL, DoA, DoF, Other relevant sectoral agencies	Funds allocation		Data sources of Sectoral budgets and plans	Available at institutional level	Funds (budget allocation from consolidated fund and or from external sources) available			√	√	√	√	√	√	√	√	1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
4.4: Utilize the L&D assessment information to facilitate relevant sectoral agencies to obtain compensation from international funding mechanisms	MoF (NPD, ERD, NBD)	MoDM, MoE, MoWS, DMC, MD, NBRO, NDRSC, ID, MASL, DoA, DoF, Other relevant sectoral agencies	Funds allocation		Data sources of Sectoral budgets and plans	Available at institutional level	Funds (budget allocation from consolidated fund and or from external sources) available			√	√	√	√	√	√	√	√	1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3

NDC 5 - Develop a Comprehensive Risk Management Framework founded on the provisions of the 2005 Disaster Management Act but expanded to include the entire spectrum of climate related extreme events, slow-onset disasters and natural processes attributed to climate change and anticipated future losses and damage.

This will support mainstreaming of disaster management strategies/ adaptation plans implemented nationally and locally by all relevant sectoral agencies (i) as a basis to minimize L&D, (ii) to enable and ensure development investments are risk sensitive and to recover residual L&D by incorporating appropriate mechanisms for risk transfer (Social protection, Risk retention, economic options such as insurance, contingency/emergency funds

Activities / Sub Activities	Implementation Responsibility		Key Performance Indicator (KPI)		Means & Source of Verification	Baseline	Target	Time Frame (2021-2030)										Relevant SDG Target
	Lead Agency	Other Key Agencies						2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
5.1: Develop a national level comprehensive Risk Management Framework based on the provisions of Disaster Management Act 13 -2005 to establish greater coordination between Disaster Risk Management, Climate Risk Management and development.	DMC	MoDM, MoE, NPD, All relevant line ministries and sector agencies	National level comprehensive Risk management framework		MoDM, DMC records	National Disaster Management Plan (2013-2017) Sri Lanka Comprehensive Disaster Management Programme (2014-2018)	National level comprehensive Risk Management Framework developed	√	√	√								1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
5.2: Enhance understanding and knowledge of the disaster, climate and development sector officials involved in planning on comprehensive risk management approaches to address L&D associated with disasters and adverse effects of climate change, as an essential development approach (as recommended in Sendai Framework, WIM and SDGs).	MoDM	MoE, Other relevant ministries and agencies	Number of programmes Number of officials		MoDM records	None, except individuals trained at institutional level	At least 100 officials trained per year through around 5 programmes per year			√		√	√	√	√	√	√	1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
5.3: Assess the national and local level L&D requirement in the context of risk transfer (based on NDC 1)	MoF, MoDM	MoE, NPD, DMC, NDRSC, Relevant sectoral agencies,	Assessment		Assessment report of MoDM/ NPD	Isolated programs at some institutional level	Assessment conducted		√	√	√	√	√	√	√	√	√	1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3

5.4: Review the existing insurance policies and policy instruments for addressing L&D. (based on NDC 1)	MoF, MoDM	Insurance Regulatory Commission of Sri Lanka (IRCSL), MoF, MoE, NDRSC, MoA, Sri Lanka Export Credit Insurance Corporation (SLECIC), Social Security Board, Relevant ministries and agencies of adaptation and mitigation sectors	Insurance policies review report		IRCSL records	Existing policies	Existing insurance policies reviewed		√	√	√	√						1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
5.5: Strengthen available insurance schemes to enable recovering L&D from adverse impacts of disasters and climate change	MoF, MoDM	MoE, DMC, NDRC, SLECIC, Insurance agencies (public and private)	Effective insurance schemes		IRCSL records	Existing insurance schemes	Available insurance schemes strengthened					√	√							1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3
5.6: Enhance knowledge and understanding on approaches such as Social protection, Risk retention, Contingency/ emergency funds to apply to managing the L&D as relevant.	MoF (NPD), MoDM	MoE, DMC, SLECIC, Relevant sectoral agencies	Number of officials of relevant agencies trained Number of programmes conducted for vulnerable communities		MoDM and relevant sectoral agencies records	Isolated programs at some institutional level	10 officials of relevant agencies trained per year 30 programmes for vulnerable communities per year conducted		√	√	√	√	√	√	√	√	√	1.5, 3.9, 3.d, 11.5, 13.1, 13.2, 13.3

6. MEANS OF IMPLEMENTATION

6.1 Overview

In order to achieve the long-term temperature goal, set out in Article 2 of the Paris Agreement on Climate Change, developed country parties shall provide financial assistance (Article 9), technology development and transfer assistance (Article 10) and capacity building assistance (Article 11) to the developing countries like Sri Lanka under the “means of implementation”.

Sri Lanka’s requirements for the successful implementation of its “conditional” NDCs are briefly discussed in this section. The technological and capacity-building requirements are addressed first, followed by the financial implications, and required external financial support. The subsequent sections describe and explore in detail the important elements of SDG alignment, gender responsiveness, and social inclusivity. Finally, a brief presentation of the NDCs’ implementation procedures is made.

6.2 Technology Transfer and Capacity Building Needs

6.2.1 Technology Transfer:

Technologies that we use to address climate change are known as climate technologies. Some technologies help us to mitigate GHG emissions while other technologies help us to adapt to the adverse effects of climate change (increase resilience). As set out in Article 10 of the Paris Agreement on Climate Change, developing and transferring technologies is an essential element. It also urges developed country Parties to take all practicable steps to promote, facilitate and finance the transfer of, or access to, climate technologies to other Parties, particularly to developing countries. The extent to which Sri Lanka could effectively implement its commitments will depend on the effective implementation by developed country Parties of their commitments related to financial resources and transfer of technology. By gaining access to climate technologies, Sri Lanka could move away from technologies that are dependent on fossil fuels and advancing towards a low-carbon economy. Some technology needs already identified are; climate-smart agriculture, contemporary crop management techniques, climate forecasting and early warning, water supply and irrigation infrastructure, climate-smart cities, and tourism infrastructure, energy generation (new renewable energy technologies-NRE), and energy storage facilities, low-carbon transport and urban infrastructure, coastal resilience improvement, and cutting-edge technologies.

6.2.2 Capacity Building:

The capacity-building elements of the Paris Agreement must be successfully implemented in order for developing countries to more effectively adopt and monitor NDCs. To fully implement Sri Lanka’s mitigation and adaptation measures and L & D actions, further technology transfer and capacity building are needed. *Table 6-1* lists a few critical capacity-building requirements in the adaptation and mitigation sectors. To deliver the NDCs, the following general capacity-building requirements must be met:

a. Institutional development and strengthening, especially for overall coordination, monitoring and reporting;
b. Developing human resources through education, training, and research;
c. Networking, partnerships, and sharing of experiences across sectors and beyond;
d. Web-based tools/ICT applications/online courses to improve technical understanding and new knowledge.

Building capacity is also necessary for the private sector and national institutions to access climate finance. It is crucial to increase capabilities within Sri Lanka’s government and non-government organisations in order to design, cost, review, and monitor climate actions that will increase resilience. It is urgently necessary to build up the basic competencies within the governance structure described below to promote climate change-related awareness and communication, evaluate initiatives, collect and disseminate data, track the development of the NDC, and effectively communicate country-specific information, data, as relevant.

Table 6-1Urgent capacity building needs in mitigation and adaptation sectors (Source [68])

Capacity needs for mitigation actions	Capacity needs for adaptation actions
Industry knowledge and applications on offshore wind resource development, smart grid, energy storage including pumped hydro technology, tri-generation, modern transport-sector infrastructure developments such as LRT, BRT systems, circular economy practices, eco-industry park concepts, Design for Sustainability (D4S), Life Cycle Approach (LCA), circular economy, and digital economy, precision agriculture and mechanization, value addition and modern recycling technologies, advance composting and waste thermal treatment (e.g pyrolysis technology for energy recovery), Land-fill Gas technology, and centralized sewage treatment, etc.	Establishing baselines, acquiring climate data, and monitoring for adaptive activities are all important aspects of developing climate forecasting and early warning systems, vulnerability analysis, and modifying development investments for climate resilience.
Baseline assessments, certification, and standard settings: eco-certification system, minimum performance and energy efficiency labelling programmes, green building & Building Management System (BMS), site-specific designing and planning for eco-industrial parks including baseline assessments, fuel economy labelling, transport sector baseline settings, MRVing of most technology-applications.	Establish sectoral databases, establish baselines, create climate information systems, set up long-term monitoring plots, and strengthen the public health system's capacity to treat diseases and health conditions brought on by climate change.
R&D and knowledge transfer: Precision agriculture, genetic enhancement of herds/breeds of animals, energy storage (grid and behind the meter), renewable energy resource development activities, labelling of vehicle performance and fuel economy	Increased crop yield through research and development of novel cultivars, agrotechnology, climate-resilient urban and coastal development, naturally based responses to climatic hazards, preservation of land and marine biodiversity, etc.

For all sectors to execute mitigation, adaptation, and L&D -related measures, data generation and management capacity improvement is crucial. Planning and implementation of development projects are generally hampered by a lack of timely, well refined, and standardised data. Recent studies of climate change and disasters show a dearth of data on critical indices for estimating losses and damages, susceptibility and capacity for adaptation, sensitivity to climatic parameters, etc.

68 Updated Nationally Determined Contributions, Sri Lanka

Building capacity in MRV of climate change actions and M&E systems that support the L&D, adaptation, and mitigation sectors is a major opportunity. To effectively and efficiently deliver the 10-year NDC implementation and monitoring plans, this is essential. Strong MRV systems will boost investor trust and provide chances for resource mobilisation. The following are a few of the capacity requirements, as identified in the updated NDCs of Sri Lanka, particular to MRV/ M&E systems and resource mobilisation:

a. Developing local climate vulnerability/resilience assessments using data and analytical tools;
b. Tools and analysis to differentiate between BAU development scenarios vs climate change impacts and forecasted impacts;
c. BAU emissions scenario and potential GHG emission reduction pathways for some mitigation sectors and mitigation actions;
d. Putting in place procedures to facilitate data availability to measure the impact (to measure change through time).

The extensive consultation and engagement of sectoral stakeholders during the development of NDC implementation plans has resulted in a better understanding of NDC activities and created the necessary ownership and momentum to accelerate climate actions. To maintain this momentum, sectoral stakeholders should integrate NDCs into their regular sectoral development plans and develop detailed action plans for each NDC activity by assigning implementation responsibilities to relevant officials / institutions. The MoE is responsible for capacity building to sustain the momentum of accelerating climate actions. The Ministry has already conducted a capacity building program, with the assistance of the Climate Promise project of UNDP, targeting the “2050 Carbon Neutrality” initiative of the GoSL. To ensure effective capacity building, local experience and indigenous knowledge should be utilized, and cross-learning between climate change experts and sectoral specialists should be promoted.

6.3 Cost Implications and External Financial Support Needed

The GoSL allocates public funds to promote certain climate initiatives that are in line with priorities for the country’s development. However, the nation needs external financial support to expand ambition beyond this. To meet the stated mitigation and adaptation targets, increased funding for adaptation and low-carbon development are necessary.

Preliminary assessment through a rapid consultation was conducted as part of the NDC revision process to generate cost projections for conditional and unconditional mitigation measures through 2021 and 2030[69]. This assessment was limited to 6 mitigation sectors as required data of 9 adaptation sectors and the L&D sector were not available at the time of assessment. The analysis found that as of 2021, the expected face value of the mitigations sectors’ overall expenses is US$10.85 billion. Methodology adopted for the assessment is indicated in the report mentioned before[70] .The estimate needs appropriate adjustments to account for the implications of the on-going economic crisis. Table 6-2 shows the estimated cost for the mitigation sector. Table 6-3 shows the sector-wise and NDC-wise breakdown of indicative cost estimate.

69 This task was conducted by Mr Ranga Pallawala under the Climate Promise Project of UNDP and the draft report (unpublisged) is avialble at the CCS of MoE. “Final Report – Investment & Financing Strategy for Nationally Determined Contributions of Sri Lanka – December 2021”

70 Assessment was done under 3 options; Option 1 – Using already costed estimates at policy level with required adjustments for inflation / exchange rate deviations along with expert views, Opotion 2 – Based on secondary research and expert knowledge, scaling partially costed activities when unit or project cost is partially known, Option 3 – As no costing basis avialble locally, it will have to be generated through expert consultations and validation

Table 6-2 Mitigation Sector NDC Indicative Cost Summary

NDC Sector	Lower Range Cost US$ millions	Upper Range Limit Cost US$ millions
Power	10,733,541.11	10,733,548.61
Industries	538.49	
Transport	114,247.36	114,272.36
Waste Management	1,677.13	N/A
Forestry	234.00	289.82
Agriculture & Livestock	216.20	N/A
Total	**10,850,454.30**	**10,850,542.62**

Table 6-3 Breakdown of Indicative Cost Estimate

Mitigation Sector	NDC	Lower range cost (USD Millions)	Upper range cost (USD Millions)
Agriculture Sector	NDC1	76.51	N/A
	NDC2	77.3	N/A
	NDC3	4.61	N/A
	NDC4	50.86	N/A
	NDC5	6.92	N/A
	NDC6	Captured under other NDCs	N/A
Energy (Power) Sector	NDC 1	10,729,049.61	N/A
	NDC 2	17.70	N/A
	NDC 3	2,223.90	N/A
	NDC4	851.10	N/A
	NDC5	1,398.80	N/A
Industry Sector	NDC1	25.86	N/A
	NDC2	312.40	N/A
	NDC3	20.51	N/A
	NDC4	1.64	N/A
	NDC5	170.00	N/A
	NDC6	8.08	N/A
Forestry Sector	NDC1	51.712	N/A
	NDC2	108.372	164.192
	NDC3	24.64	N/A
	NDC4	49.28	N/A
Transport Sector	NDC1	1,076.70	N/A
	NDC2	1,661.50	N/A
	NDC3	239.48	264.48
	NDC4	4,200.00	N/A
	NDC5	102.88	N/A
	NDC6	138.90	N/A
	NDC7	61.50	N/A
	NDC8	3,058.85	N/A
	NDC9	0.50	N/A
	NDC10	1.50	N/A
	NDC11	103,690.00	N/A
	NDC12	12.55	N/A
	NDC13	3.00	N/A
Waste Sector	NDC1	86.5	N/A
	NDC2	919.31	N/A
	NDC3	165	N/A
	NDC4	502	N/A
	NDC5	4.321	N/A

Sri Lanka must raise significant climate finance through institutions established by the UNFCCC, the Paris Agreement, and leverage bilateral agreements for low-carbon development in order to satisfy its conditional contribution. The Green Climate Fund (GCF)-supported NAP Readiness Project, which will create a long-term pipeline of adaptation priorities for technical and financial assistance, will update Sri Lanka's National Adaptation Plan (NAP).

There are eight (8) strategic directions identified to mobilize financial resources to achieve the NDC targets[71] as listed in *Table 6-4*.

Table 6-4 Strategic Directions to Mobilize Funds

Strategic Direction 1	Integrated Project Development
Strategic Direction 2	Establishing and Strengthening Partnerships & Alliances
Strategic Direction 3	Promoting Private Sector Investments
Strategic Direction 4	Strengthen and Expand the Initiatives with the Specialized Climate Funds
Strategic Direction 5	Monitoring, Reporting and Verification (MRV) of Climate Finance
Strategic Direction 6	Enhance Local Capacities to access and mobilize Climate Investments
Strategic Direction 7	Exploring other Innovative Climate Finance Tools – Debt-swap-for Climate, Blue Bonds, Green Bonds
Strategic Direction 8	Exploring the potential to capitalize on Carbon Asset Based and Market Based Financing Options

6.4 NDC-SDG Alignment Assessment

6.4.1 The Rationale

It is evident that the challenges focused on by the 2030 Agenda for Sustainable Development SDGs and the Paris Agreement on Climate Change and NDCs are fundamentally similar. The two agendas are not only deeply intertwined at the international level, but their interconnectedness also extends down to specific actions at national, sub-national, and local levels. The fundamental interconnectedness of SDGs implies that Climate Action (SDG-13) is related to specific policy targets of all other goals in an integrated and indivisible manner while balancing the three dimensions of sustainable development: the economy, the society, and the environment, taking into the account national, sub-national, and local contexts.

Although NDCs primarily reflect specific climate actions the country commits to, their identification, selection, and prioritization need to take into account the national realities and priorities, while recognizing that GHG mitigation actions may lead to both positive and negative impacts on development goals. Accordingly, the emphasis has been given to better understand the concept of co-benefits of NDCs and ensuring positive relationships between climate goals and resilience-building through social, economic, and environmental objectives wherever possible.

The underlying characteristics of SDGs and NDCs signify that each agenda acknowledges the importance of the other, while demonstrating a clear cohesion. In turn, the full achievement of the SDGs will not be possible without successful action on climate change, as identified in the NDCs, and vice versa.

71 Final Report – Investment & Financing Strategy for Nationally Determined Contributions of Sri Lanka, UNDP- Sri Lanka

6.4.2 Methodology

There have been many attempts to rationalize these interconnectedness and interdependence SDGs and NDCs in a holistic way, and much progress has been achieved to establishing them at conceptual levels with models for mappings of linkages. Some tools used to understand and address NDCs-SDGs interactions, as well as establish the interlinkages between them include Network analyses that can help to promote policy integration in areas that may be traditionally sectoral (or thinking in silos); and Matrix approaches that combine scientific evidence, expert opinions and participative policymaking processes to appraise the interactions. In general, the interlinkages could also be assessed as potential synergies or trade-offs with different levels of significance (scale). One such example entails scoring SDGs and NDCs according to the positive, negative or neutral relationship between each other. In this framework, a seven-point scale is developed based on scientific evidence and expert judgement of fundamental and functional relations between the SDGs and their targets. When the targets are anticipated to have synergetic effects contributing to each other's achievement, they are scored either +1 (enabling), +2 (reinforcing) or +3 (indivisible). Targets that demonstrate trade-offs are scored -1 (constraining), -2 (counteracting) or -3 (cancelling). Neutral relations are scored 0.

A similar approach for the appraisal of the interlinkages captures fundamental and functional relations of NDCs actions and targets with SDGs, as reflected through targets and indicators therein, with a scale to indicate the nature and extent of the interactions as:

- **Indivisible**: Strongest form of positive interaction, where the NDC activity directly contributes to the achievements of the particular SDG and targets therein (and vice versa).
- **Contributing**: Moderate form of positive interaction, where the NDC activity directly creates conditions that contribute to the achievement of the particular SDG and targets therein (& vice versa).
- **Enabling**: Mild form of positive interaction, in which the NDC activity creates a favourable environment for the achievement of the particular SDG and targets therein (& vice versa).
- **Unrelated**: Neutral form of interaction, in which the NDC activity does not create a notable contribution, and deemed to be neither positive nor negative, for the achievement of the particular SDG and targets therein (& vice versa).
- **Constraining**: Form of negative interaction (trade-off), where the NDC activity deteriorates, counteracts or creates an unfavourable environment for the achievement of the particular SDG and targets therein (& vice versa).

Here the positive interaction means a correlation in which improvement of one area will lead to improvement in the other, while deterioration of one area will result in deterioration in the other. The negative interaction means an inverse relationship of a situation where improvement of one area will lead to deterioration of the other (and vice versa).

The main steps used in the mapping of interlinkages are presented in the Figure 6 1.

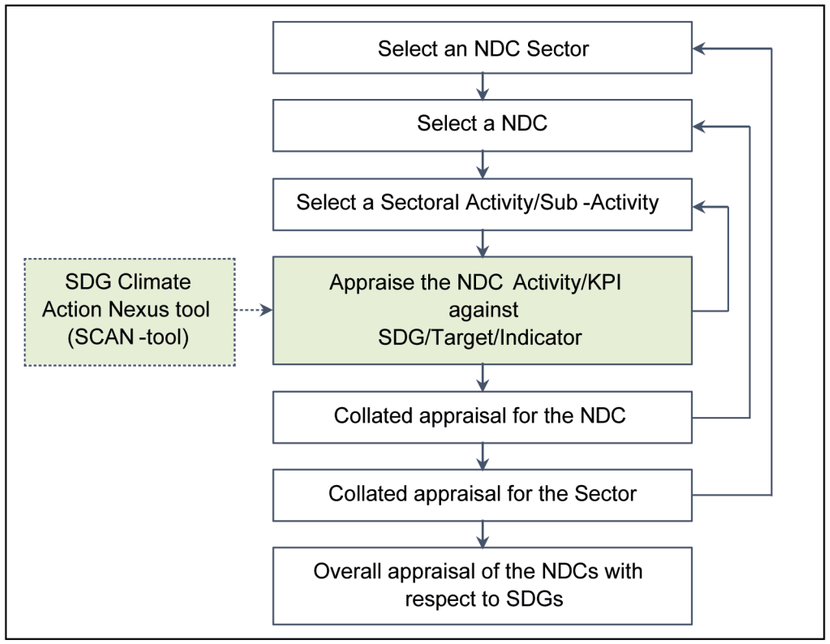


Figure 6-1 Main steps of mapping of NDC-SDG interlinkages

In the present study, the NDC implementation plans include a field to present only the existence of the linkage with SDGs, without indicating whether the interaction is positive or negative and its level of significance. Thus, the methodology used in this assessment is to highlight the presence of linkage between NDCs and SDGs, based on the number of linkages. Here, SDG13 – Climate Action is not considered as NDCs are in fact represent interventions in addressing climate change issues.

6.4.3 Results

The analysis of the NDC implementation plan of each sector (six mitigation, nine adaptation and L&D) showed a wide range of multiple linkages between different NDCs covering all SDGs (see Table 6-5). Overall, 261 activities/sub-activities of the mitigation sectors have 753 linkages with SDGs, while 243 activities/sub-activities of the adaptation sector NDCs have 566 linkages. The 245 number of activities/ sub-activities of L&D have 100 linkages. Note that the number of linkages depends on the number of activities and sub-activities in a particular NDC sector. Table 6-6 presents the number of linkages under each SDG, in mitigation and adaptation NDCs.

Table 6-5 Multiple linkages between NDC and SDGs

Sector		No of Activities/ Sub-activities	Number of links
Mitigation	Agriculture	43	114
	Energy	22	37
	Forestry	35	58
	Industry	49	88
	Transport	64	229
	Waste	48	227
	Sub-total	**261**	**753**
Adaptation	Agriculture	30	65
	Biodiversity	19	61
	Coastal & Marine	19	33
	Fisheries	33	82
	Health	21	25
	Livestock	17	47
	Tourism & Recreation	14	54
	Urban Planning & Human Settlement	24	58
	Water	66	141
	Sub-total	**243**	**566**
Loss and Damage		25	100
Total		**529**	**1,419**

Table 6-6 Number of linkages under each SDG

SDG	Number of links with NDCs			
	Mitigation	Adaptation	L&D	Total
SDG1 - No Poverty	1	1	25	27
SDG2 - Zero Hunger	45	67	0	112
SDG3 - Good Health & Well-Being	117	22	50	189
SDG4 - Quality Education	0	1	0	1
SDG5 - Gender Equity	13	43	0	56
SDG6 - Clean Water & Sanitation	53	118	0	171
SDG7 - Affordable & Clean Energy	107	22	0	129
SDG8 - Decent Work & Economic Growth	50	11	0	61
SDG9 - Industry, Innovation & Infrastructure	88	2	0	90
SDG10 - Reduced Inequality	0	0	0	0
SDG11 - Sustainable Cities & Communities	90	86	25	201
SDG12 - Responsible Consumption & Production	144	45	0	189
SDG14 - Life Below Water	1	94	0	95
SDG15 - Life on Land	41	51	0	92
SDG16 - Peace, Justice & Strong Institutions	0	0	0	0
SDG17 - Partnerships for the Goals	3	3	0	6
Total	**753**	**566**	**100**	**1,419**

Note that the NDC-SDG linkages identified are primarily those having direct and clear relations. Thus, further assessment is required to establish more comprehensive interlinkages that takes into account the indirect linkages as well as the type and level of significance.

The interlinkages of NDCs in the mitigation, adaptation, and L&D sectors with SDGs are presented in Figure 6-2, Figure 6-3, and Figure 6-4, respectively. The colour code is used in the figures to distinguish the NDC sectors and SDGs with clarity in the visualization.

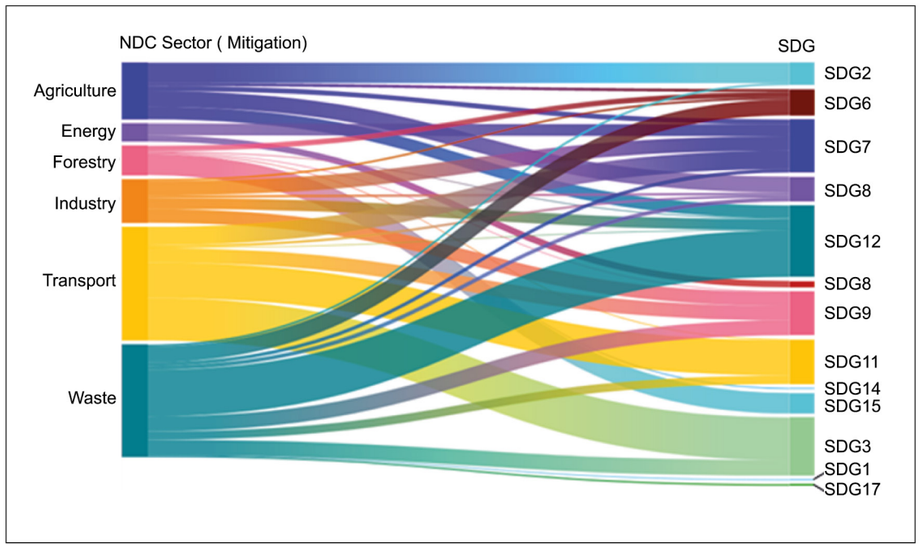


Figure 6-2 Linkages between mitigation sector NDCs and SDGs

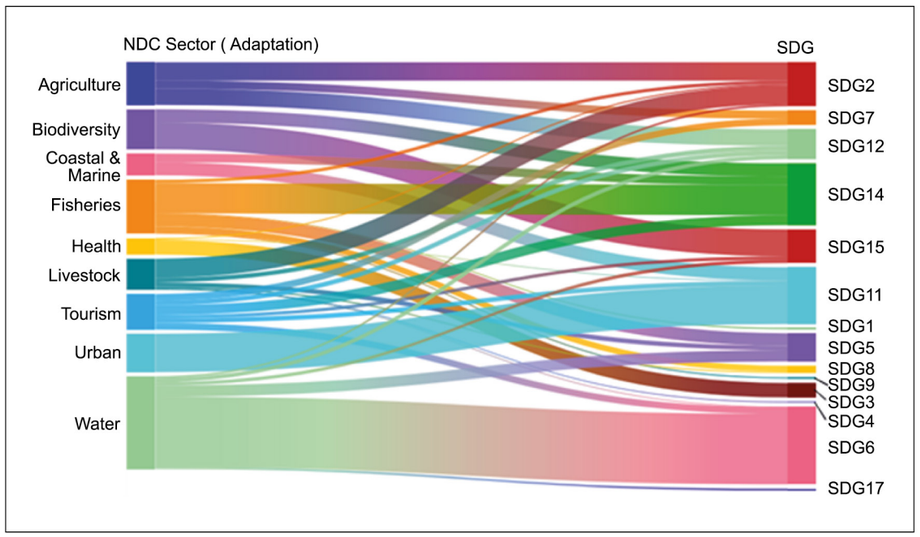


Figure 6-3 Linkages between adaptation sector NDCs and SDGs

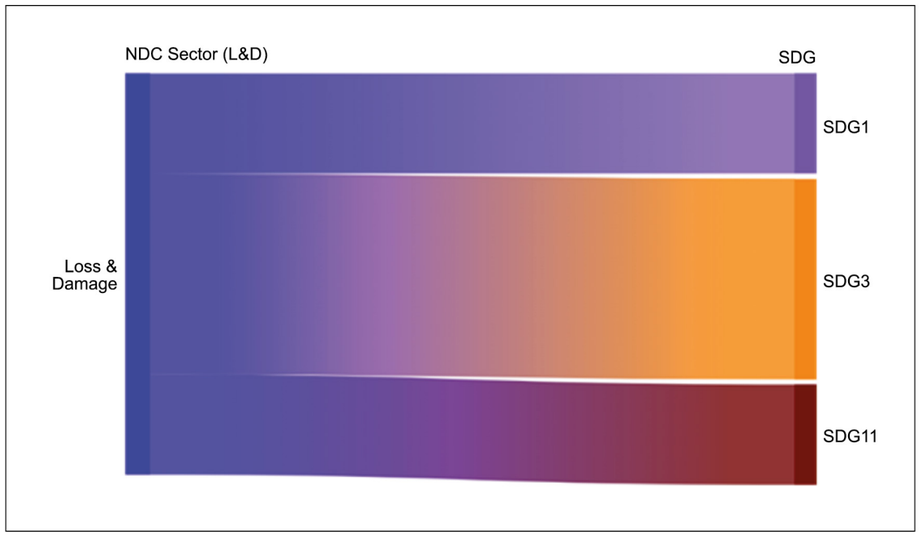


Figure 6-4 Linkages between L&D sector NDCs and SDGs

6.5 Gender Integration and Social Inclusion

6.5.1 Background and Context

The Paris Agreement underlines when taking actions to address climate change, respect, promote and consider the rights of local communities, and people in vulnerable situations and the right to development, gender equality and empowerment of women[72]. Through the Paris Agreement, Sri Lanka has committed to apply gender responsive, participatory approach to climate action taking into consideration vulnerable groups, communities, and ecosystems.

The effects of climate change are not equal. They disproportionately impact the poorest and most marginalized. Women are identified as one of the most vulnerable groups to climate change impacts due to persistent gender-based inequalities prevalent in most societies. Gender alone does not shape vulnerabilities and adaptive capacities; it intersects with a range of other social factors. Social inclusion therefore needs to be viewed and attended considering intersecting factors.

Some of the kay factors that intersect on vulnerabilities and adaptive capacities include sex, age, education, knowledge and skills, ethnicity, abilities, culture, and socio-economic status. Accordingly, the poor, women, differently abled, children, elderly and minority communities belong to marginalized groups to be considered in climate action, both in terms of vulnerabilities and capacities of these groups. It is underlined that gender and social differences are not just vulnerabilities, but potential sources of resilience[73].

72 United Nations, Paris Agreement, 2015. Article 7, clause 5.

73 International Development Research Centre (IDRC), Advancing gender equality and social inclusion through climate action, October 31, 2022 https://www.idrc.ca/en/research-in-action/advancing-gender-equality-and-social-inclusion-through-climate-action

Marginalised and or underrepresented groups can be left out in the promotion and knowledge sharing of the adaptive actions, in accessing resources, information and services. Many people see climate change as a scientific problem requiring technical solutions, disregarding social aspects directly related to adaptation. Women and other marginalised groups are often only understood as beneficiaries of climate action rather than participants, limiting opportunities for community participation.[74]

6.5.2 Gender Aspects and the Status of Women

Globally, it was estimated 247 million women aged 15 years and older will be living on less than 1.90 U.S. dollars per day in 2021, compared to 236 million men. The gender poverty gap is expected to increase by 2030 as women will still be the majority of the world's extreme poor. According to a survey from 2020, the COVID-19 crisis will increase female poverty worldwide[75]. Women make up 70% of people living in poverty in rural areas. In developing countries, women produce up to 80% of the food, however they own less than one fifth of the cultivation areas.[76] Most women are in low paid, informal and insecure work, the household responsibilities and care work limit their income earning and other opportunities. In most societies' women occupy a lower status socially, economically and politically.
According to research in developing countries across the globe, understanding how climate change risks, vulnerabilities and response options differ between men and women, and across different social groups and livelihoods is fundamental to supporting climate action[77].

Sri Lanka National Census 2012 reported 51.5% of the population are women, with a sex ratio of 106 women to 100 men. The World Gender Gap Report by the World Economic Forum ranked Sri Lanka amongst the top 20 countries (out of 115 assessed) in 2006[78]. However, the country has descended to be ranked at 110 out of 146 countries in 2022, despite performing well on indicators such as educational attainment and access to public health. Gender Inequality Index (GII), a composite measure of gender inequality using three dimensions: reproductive health, empowerment and the labour market for Sri Lanka is high, ranked at 73 (2021/2022 assessment), by the Human Development Report[79]. The decline in the gender gap ranking and the high Gender Inequality Index value is attributed to the low share of seats in the parliament occupied by women, which stands at 5.3%, and low female labour force participation rate, 30.9% as opposed to 68.5% for men[80]. As the figures indicate, the labor force participation rate of women is over half that of men.

However, there are some fields that are dominated by women e.g.SLAS 64% of the administrators are women. In the all-island public services (in 2016) 51.9% were males and 48.1% were females. In the combined services 61.2% were females and 38.8% were males (census & Stat). There are some sectors (labour intensive) such as the tea, garment, nursing occupations that are entirely dominated by women.

74 https://lgiu.org/social-inclusion-in-climate-resilience-planning/

75 Statista, Gender poverty gaps worldwide in 2020 & 2021 by gender https://www.statista.com/statistics/1219896/gender-poverty-gaps-worldwide-by-gender/#:~:text=Globally%2C%20247%20million%20women%20aged,of%20the%20world's%20extreme%20poor.

76 Reliefweb, Women and Development: The world's poorest are women and girls, March 2016 https://reliefweb.int/report/world/women-and-development-worlds-poorest-are-women-and-girls?gclid=CjwKCAiAmuKbBhA2EiwAxQnt-71Fyby-ODhvHjgqiqHNfkjTAVanDVAIa6VWGcVOETErGfKvInidWkBoC7LAQAvD_BwE

77 ibid

78 Gender Gap Index reflects 04 dimensions—Political Empowerment Gap, Economic Participation & Opportunity, Education Attainment and Health & Survival Gap. (https://economynext.com/sri-lanka-slips-in-global-gender-gap-rankings-wef-36501/)

79 UNDP, Human Development Report 2021/2022

80 Ibid (Labour Force Participation figures are for the year 2021)

Sri Lanka has the 14th largest gender gap in labour force participation globally, despite achievements in education. It is noted that female participation rate has remained between 30 – 35 per cent over the past two decades. Unemployment rate in 2022 first quarter for women stood at 6.5%, more than double of that of men, 3.0[81]. Similarly, the youth unemployment rate for women is at 36.3% compared with 21.1% for men. Also, women are underpaid relative to men for similar work. Women's labour force participation in the country is often compounded by many factors such as the lack of affordable and quality childcare services, lack of support in sharing household work and some workplace cultures that are not supportive of women employees[82]. Female Headed Households (FHH)[83] account for 25.3% in Sri Lanka (Census & Statistics, 2016-2019) which is higher in the Central and North Central Provinces. Implications of this situation also include increasing women's care responsibilities to those living with a disability.

Women rely more on natural resources which are affected by the impacts of climate change making women more vulnerable than men. The traditional knowledge and experience of women can be used in climate change mitigation, adaptation and disaster risk reduction strategies. Women are agents of change and their responsibilities in households and communities, as stewards of natural and household resources, increase their coping capacities to adapt to changing environmental realities[84].

6.5.3 Poverty and Unemployment

The current crisis has doubled the poverty rate from 13.1 to 25.6 percent between 2021 and 2022, increasing the number of poor people by 2.7 million. The COVID-19 crisis had already increased poverty from 11.3 percent in 2019 to 12.7 percent in 2020, a change that translated into over 300,000 new poor people in that year. The country is now experiencing its highest poverty rate since 2009. While 80 percent of the poor still live in rural areas, the poverty rate in urban areas has tripled from 5 to 15 percent between 2021 and 2022, and half the population in estate areas is now living below the poverty line. Poverty is projected to remain above 25% in the next few years[85].

The number of unemployed persons is estimated as 439,783 during the year 2021. Out of this total, 47.1 percent are males and 52.9 percent are females. At the national level, the unemployment rate for females is more than two times higher than that of the male unemployment rate[86].

81 Department of Census and Statistics, Sri Lanka Labour Force Statistics, Quarterly Bulletin, First Quarter 2022
82 https://asiapacific.unwomen.org/en/countries/sri-lanka
83 http://www.statistics.gov.lk/GenderStatistics/StaticalInformation/SpecialConcerns/FemaleHeadedHouseholdsBySectorProvinceAndDistrict2016
84 https://www.un.org/womenwatch/feature/climate_change/downloads/Women_and_Climate_Change_Factsheet.pdf
85 World Bank, Poverty and Equity Brief, Sri Lanka, October 2022 https://databankfiles.worldbank.org/data/download/poverty/987B9C90-CB9F-4D93-AE8C-750588BF00QA/current/Global_POVEQ_LKA.pdf
86 Department of Census and Statistics, Labour Force Survey, Annual Report 2021

6.5.4 Other Socially Marginalized Groups

Disability:

According to the 2012 estimates by the Department of Census and Statistics, there were 1.6 million people with disabilities[87]. This makes up to 8.7 percent of the population. There are variations between men and women, 43 percent, and 57 percent respectively. Proportion of females with difficulties for both, vision and mobility are higher than that of males.

A majority of the disabled persons are reported as economically inactive (48% of the economically inactive) as they are unable to work due to old age[88]. Around 55.4% of the disabled population aged 15-19 and 86% of the disabled population aged 20-24 are not engaged in any educational activity or vocational training[89].

Elderly[90]:

Population ageing in Sri Lanka is accelerating at a faster rate than other South Asian countries and has been increasing rapidly since 1980s. Between 1981 and 2012, the proportion of population aged 60 years and above has increased from 6.6 % to 12.4 %. Rapid demographic transition with marked decline in death rates and birth rates, increases in life expectancy are leading to important changes in age-sex structure. The life expectancy at birth for males and females was reported as 72 and 79 years respectively and females often lived six years longer than male counterparts in 2012. Women comprise the majority of the total older population. In 2012, females accounted for about 56 % of total aged population in Sri Lanka and for the oldest-old group (80 or over), this proportion was 61 %. There were 94 males for every 100 females for the total elderly population.

6.5.5 Commitments to Gender Equality and Social Inclusion in Climate Change Communications

The 2021 NDC Communication[91] has acknowledged the importance of addressing gender issues in the mitigation and adaptation actions to enable contribution by women as well as to provide equal access to benefits. The NDC Communication recollects the call of the ''Paris Agreement for Climate Change'' for the member states for gender equality and women's empowerment by adopting gender-responsive approaches, and the GoSL commitments to this aspect in the national policy frameworks.

Mainstreaming gender and social safeguards into adaptation priorities is identified as an important strategy in the NDC Communication. Therefore, it is recommended that down-scaled risk assessments and sectoral plans integrate specific needs, vulnerabilities and capacities of women, young children, disabled and elderly populations.

87 Definition: "Any person who, as a result of any deficiency in his physical or mental capabilities, whether congenital or not, is unable by himself to ensure for himself, wholly or partly, the necessities of life."
88 Department of Census and Statistic, Disability in Sri Lanka, 2012 https://unstats.un.org/unsd/demographic-social/meetings/2016/bangkok--disability-measurement-and-statistics/Session-6/Sri%20Lanka.pdf
89 UNICEF, Every Mind, 'Learning Disabilities in Sri Lanka', 2016 https://www.unicef.org/srilanka/every-mind
90 Source: Ageing Population of Sri Lanka: Emerging Issues, Needs and Policy Implications, Thematic Report based on Census of Population and Housing 2012, UNFPA
91 Ministry of Environment, Updated Nationally Determined Contributions under the parisd Agreement on Climate Change, July 2021

The National Environment Policy (2022) section 4.7.7 (pg. 67) highlights the need to enhance female and youth participation and empowerment of gender and youth in environmental management and further states that they will be given special attention in all forms of community and stakeholder engagement activities.

The National Environmental Action Plan 2022-2030 recommends actions under the Strategy No 6, to increase women's participation to combat climate change with a target that gender aspects to be included in all the new policies and plans related to climate change. Strategy No 8, is ''Further social mobilization to ensure inclusion, empowerment and equity, recommending adopting and establish social indicators to measure and monitor social inclusion, empowerment, equity and cultural diversity''.[92]

In the revised draft National Policy on Climate Change (2023) one of the policy objectives is to create awareness on the multifaceted issues of climate change and empower communities, especially women, youth and children, on their roles and responsibilities as agents of change in implementing climate actions.

The National Adaptation Plan Readiness Support Project (ongoing) funded by Green Climate Fund will prepare a Gender and Social Action Plan (GSAP) to effectively mainstream gender and social inclusion across NAP processes.

6.5.6 Identified Gender and Social Inclusion issues in Fisheries, Livestock, Water sectors (Adaptation), Power sector (Mitigation)

Sector analysis shows that women are a significant resource that contribute to each sector. There is gendered division of labour and gender norms in each sector, visible and evident in gender-differentiated roles and responsibilities. Accordingly, there are corresponding needs, priorities, and access to a) information and knowledge, b) technologies, c) training, d) support services, e) machinery and equipment, etc., which are different for men and women.

Gendered division of labour can often be complementary. However, women's contribution largely remains invisible due to the lack of sex disaggregated data, policy gaps, and gender-based perceptions and stereotypes.

6.5.7 Features Common to Every Sector

There are common features across sectors that marginalize the poor, women, and other groups in climate actions as given below.

a. Sectoral planning at the national level focus on technical aspects, leaving out the community and social aspects that are part and parcel of the sectoral production and distribution outcomes.
b. Women and other marginalized groups are not adequately represented or consulted in decision making (including at the local level), despite adequate levels of education and literacy, skills and experience they have.
c. Farmer/Fisheries orgnisations, Cooperative societies are often dominated by men with land ownership at the decision-making level, women's voices are hardly considered. This is considered a customary practice.
d. Sector level planning decisions often prioritise activities led by men, supported with technological advancements and services (such as fishing vessels, irrigation, cooling and processing techniques)
e. In the sectoral value chains women are at the lower end, assigned to primary, stereotypical and often non- monetized tasks.
f. There is no enabling policy and planning environment within the sectors to realise the optimum potential specifically of women, leading to a loss to the national economy.
g. Rural women themselves lack awareness and insight into their situation, their rights, and the potential they have to move forward.
h. Training, capacity building, knowledge sharing opportunities are less accessible to the poorer, marginalized groups and to women.
i. Marginalized groups are constrained by lack of knowledge, poor access to productive resources, technology and financial capacity.
j. Labour intensive and primary tasks get assigned to the resource poor and marginalized groups.
k. Landownership is a critical factor for accessing production resources (inputs, subsidies, credit, access to irrigation water), traditionally land ownership remain with men, marginalizing women and the poorer groups, also due to their lower social positioning.
l. Sectoral policies largely take a neutral approach towards gender issues and other marginalized groups.

6.5.8 Incorporation of Gender Aspects in NDC Implementation Plans

The incorporation of gender issues in the NDC implementation plans should be addressed as follows;

Conducting a sector gender assessment for each sector, with the aim of identifying and documenting:

- Gap analysis of gender-based division of labour specific to the sector, and contribution made by men and women
- Specific production related skills and expertise of men and women
- Requirements and support required by men and women for effective climate adaptation and mitigation
- Capacity building requirements of the institutions and communities on gender issues in the sector for enabling gender responsive climate change adaptation and mitigation

a. Including gender expertise in the needs and feasibility assessments conducted for climate change adaptation,

b. Incorporating modules/sessions capturing the gender issues specific to a sector and approaches to address the issues in all the capacity building programme planned in the NDC actions,

c. Setting specific targets as well as a percentage for women's representation & participation/reaching out in climate change adaptation and mitigation activities,

d. Enabling the collection of sex disaggregated data and analysis to review progress on achieving identified gender responsive targets,

92 Ministry of Environment, National Environment Action Plan 2022-2030: Pathway to sustainable development in Sri Lank, July 2022

e. Assessing sectoral institutions (at the national level) on the awareness and application knowledge of gender issues in climate change in order to identify capacity gaps and needs.

f. Identifying and recognizing women's role in reducing GHG emisions in NDC sectors

g. Build sector institutional awareness and capacities on the key issues related to most vulnerable and marginalized groups and the need to address the same in mitigation and adaptation planning and implementation.

h. Introduce the practice of consulting local communities, women, youth, and other marginalized and/or underrepresented groups at the local level planning and implementation of climate action.

i. Identify and prioritise the activities that lead to increase adaptive capacity and build the resilience of the most marginalized groups, enabling equitable and sustainable investments and practices.

j. Ensure issues of marginalized groups are considered/included in climate resilient technology development, promoting and knowledge sharing, providing access to adaptation resources.

6.6 Implementation Mechanisms

Sri Lanka needs funding, technology transfer, and capacity building in accordance with Article 4 of the UNFCCC and Articles 9, 10, and 11 of the Paris Agreement in order to properly implement the climate activities outlined in the NDC plans. These articles are explicit on supporting developing countries to implement climate change actions and increasing mitigation ambition, considering *'the common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances'*. Paragraph 5 of Article 4 of the Paris Agreement specifically states that *"support shall be provided to developing country Parties for the implementation of this Article, in accordance with Articles 9, 10 and 11, recognizing that enhanced support for developing country Parties will allow for higher ambition in their actions*."

While Sri Lanka seeks international assistance to realise its higher mitigation ambition in this Nationally Determined Contribution, it more urgently needs assistance for adapting and mitigating the losses and damages brought on by climate-related disasters. This covers agricultural adaptation, food production, water for irrigation and drinking, habitations and human health, biodiversity, and coastal protection. For a nation that faces numerous climate dangers, improved climate forecasting, risk communication, early warning, and comprehensive risk management framework are especially crucial.

7. Annex

ToR's of the National Steering Committee (NSC) and the Planning & Monitoring Committee (PMC).

The ToR's given below are those that were listed at the National Steering Committee (NSC) meeting held on the 20th December 2022. These ToR's are subject to change at each NSC given the circumstances of the country and its national requirement.

A. ToR of the National Steering Committee

- Advice and provide guidance on policy, strategy and action plans submitted by the PMC.
- Recommend to the Cabinet of Ministers to approve the policy, strategy and action plans submitted by the PMC.
- Provide support and collaboration between different Ministries and agencies
- Provide guidance and support to establish inter- ministerial and inter- agency coordination for data sharing and implementation of the NDC actions
- Provide practical solutions to overcome barriers in NDC implementation
- Track overall progress of the NDC implementation in comparison to guidelines
- Oversee the means of funding for implementation of NDC actions
- Hold the NSC once a year.

B. ToR of the Planning & Monitoring Committee

- Hold the Planning & Monitoring Committee once or twice a year.
- Develop a comprehensive Implementation Plan from the high -level Action Plan developed by the Ministry of Environment
- Establish inter- ministerial and inter- agency coordination for data sharing and implementation of the NDC actions
- Identify a focal point to coordinate with Ministry of Environment for each NDC sector
- Develop the Institutional Framework where the Director (Planning) of the relevant Institutions (identified in the Implementation Plan) obtain and report the progress of the NDC activities to the Ministry of Environment.
- Develop an MRV system to obtain data from the relevant institutions to report their progress continuously.
- Facilitate capacity building and training programmes to be held regularly to train staff on the implementation of the NDCs and to report progress in a quantitative manner.
- Identify the issues that hinder the implementation activities and recommend solutions to be presented to the National Steering Committee.
- Formulate partnerships with other institutions to prioritize the NDC actions and obtain funding for the activities.
- Make the sector gender sensitive