CLIMATE CHANGE ASSESSMENT

I. BASIC PROJECT INFORMATION

Project Title:	Health System Enhancement Project – Additional Financing
Project Cost:	$123 million
Location:	Civil works in nine apex hospitals in nine districts located within Central, North Central, Saragamuwa, and Uva Provinces. Renovation of Ambulance stations in 20 out of a long list of 41 locations located within all 25 administrative districts.
Sector / Subsector(s):	Health / Control of communicable diseases; Health sector development and reform
Theme:	Inclusive economic growth; environmental sustainable growth; and regional integration
Brief Description:	The additional financing will continue to contribute to the government's development objective to ensure a healthier nation by supporting the development of a more responsive and comprehensive primary health care (PHC) system in Sri Lanka by providing additional financial resources to the ongoing Health System Enhancement Project. The project outputs are: (i) PHC enhanced in Central, North Central, Sabaragamuwa, and Uva provinces; (ii) health information system, disease surveillance and coronavirus disease (COVID-19) response strengthened; and (iii) policy development, capacity building, and project management supported. The additional financing includes a grant from Japan Fund for Poverty Reduction which will support the project to enhance the services by 1990 Suwaseriya Ambulance System service. This shall include (i) the average response time of the 1990 Suwaseriya Ambulance Service reduced for patients with COVID-19 and other emergencies; (ii) the turnaround time of the 1990 Suwaseriya Ambulance Service reduced; and (iii) the capacity of the human resources of the prehospital services strengthened. Key climate hazards that will impact the investments are increase in temperature, exposure to extreme heat, and changes in rainfall pattern. Increase in temperature and extreme heat shall cause threats to human health and increased use of electricity for cooling systems within buildings. Changes in rainfall pattern contribute to both droughts and flooding conditions. Where the rainfall becomes more intense, the flooding and landslides could worsen. These could hamper the operations of the health units if they are in the susceptible areas.

Source: Asian Development Bank.

II. SUMMARY OF CLIMATE CHANGE FINANCE

Project Financing		**Climate Finance**	
Source	**Amount** ($ million)	**Adaptation** ($ million)	**Mitigation** ($ million)
Asian Development Bank			
Ordinary capital resources (regular loan)	110.0	6.28	3.05
Cofinancing			
Japan Fund for Poverty Reduction (grant)[A]	3.0		0.625
Counterpart			
Government of Sri Lanka	10.0		
Total	**123.0**	**6.28**	**3.675**

ADF = Asian Development Fund. Administered by Asian Development Bank.
Source: Asian Development Bank.

III. SUMMARY OF CLIMATE AND DISASTER RISK SCREENING AND ASSESSMENT

<table>
<tr><td colspan="2">A. Sensitivity of Project Component(s) to Climate/Weather Conditions and Sea Level</td></tr>
<tr><td><u>Project Components</u>

(i) Upgrade and rehabilitation of nine apex hospitals in nine districts.

(ii) Continue upgrading and renovation of 135 curative primary health care (PHC) facilities (primary medical care units and divisional hospitals) initiated in the four provinces under ongoing project.

(iii) Continue renovation and refurbishment of one field health center for each of the 127 medical officer of health areas in the four provinces initiated under ongoing project.

(iv) Health information and disease surveillance capacity strengthened.

(v) Improving the ambulance services in all 25 districts.</td><td><u>Sensitivity to Climate/Weather Conditions</u>

Depending on the actual locations, materials used, and design, the PHCs, primary medical care units, and field health centers could be affected by climate change, variability and extremes, and other natural hazards.

Climate change is expected to change the patterns and distribution of rainfall that may aggravate the current situations in the project sites, which include landslides, floods and flashfloods, and droughts.

Extreme weather events with very high wind speeds may severely damage or destroy physical structures and disturb power supply that could affect the stability of information technology equipment.

Extreme storm events could damage the 20 existing Ambulance stations identified within 21 districts and 45 new locations proposed for all districts.</td></tr>
<tr><td colspan="2">B. Climate Risk Screening (where Risk is a function of hazard, exposure, and sensitivity/capacity)</td></tr>
<tr><td>The climate and natural hazards in Sri Lanka contributing to risks are:

Central Province
1. Temperature change (Low)
2. Precipitation change (Medium)
3. Landslides (Medium)
4. Floods/Flash floods (Medium)
5. Droughts (Medium)

North Central Province
1. Temperature change (Low)
2. Precipitation change (Medium)
3. Floods/Flash floods (Medium)
4. Droughts (Medium)

Uva Province
1. Soil erosion leading to land degradation, aggravated by changing rainfall and wind patterns (Medium)
2. Temperature change (Low)
3. Precipitation change (Medium)
4. Floods (Low)
5. Droughts (Badulla, Monaragala) (Medium)

Sabaragamuwa Province
Soil erosion and landslides could be aggravated by intense rainfall episodes and changing rainfall distribution. (Medium)</td><td><u>Description of Risk</u>

Historical disaster records in Sri Lanka from 1974 to present indicate that floods are increasing. The southwest monsoon periods cause severe flooding in the western and southwestern provinces, the northeast monsoons cause flooding in the eastern, northern, and north-central provinces. In the past 30 years, floods have affected 10 million people. Increased rainfall intensities and forest cover reduction have led to increases in landslides.[a]

As the terrain of the Central and Sabaragamuwa Provinces are predominantly hilly and landslide prone, there is a risk of landslides and collapse of soil banks occurring if natural slopes are destabilized without adequate care during site preparatory activities under extreme rainfall conditions.

Floods due to extreme storm events are the most serious natural hazard in North Central Province during northeast monsoon, while the region faces droughts mainly during the southwest monsoon.

In Uva Province, disaster risks include landslides, drought, flash floods, and forest fires.

The present rate of deforestation and poor soil management coupled with climate change shall have a compounded effect on these risks.</td></tr>
<tr><td colspan="2">C. Climate Risk Classification: medium</td></tr>
<tr><td colspan="2">D. Climate and Disaster Risk and Adaptation Assessment</td></tr>
</table>

The Climate Risk Country Profile: Sri Lanka (2020),[b] jointly published by the World Bank group and ADB, suggests that Sri Lanka experienced warming by around 0.8°C over the 20th century. The publication explains the country's complex and spatially variable precipitation regime makes it difficult to estimate the change over time. Nevertheless, it also observes a decreasing annual precipitation in the latter half of 20th century.

Climate change adaptation may involve additional investments on design (including energy efficient lighting, ventilation, cooling systems, and storm water drainage) and materials for the improvement works of the nine apex hospitals identified under output 1, and improved disease surveillance for monitoring changes in disease outbreaks due to climate change under output 2.

Climate change mitigation measures could include:

(i) improved medical waste management;
(ii) use of energy efficient lighting, ventilation, cooling systems within the refurbished, and newly constructed buildings;
(iii) retrofit of existing buildings—architectural designs or building changes with open medical wards that enable reduction of energy consumption; and
(iv) procurement of ambulance vehicles that are more efficient in fuel consumption and complying with national vehicle emission standards.

E. Climate Risk Screening Tool/Procedure Used: SARD climate risk screening framework and methodology.

Source: Asian Development Bank.

IV. CLIMATE ADAPTATION PLANS WITHIN THE PROJECT (FOR COMPONENETS UNDER ADDITIONAL FINANCING ONLY)

Item	Adaptation Activity	Target Climate Risk	Estimated Adaptation Finance [a] (in $ million)	Adaptation Finance Justification
1	Improved monitoring of diseases due to changing climatic conditions via shared care services and timely reporting of the 28 notifiable diseases	Precipitation change and temperature change	0.20	Communicable diseases may be influenced by climate change. PHC innovation funds can be utilized for shared care services and reporting of 28 notifiable disease.
2	Use of new IT equipment to improve disease surveillance for monitoring changes in disease outbreaks	Precipitation change and temperature change	0.45	Communicable diseases may be influenced by climate change. New IT equipment will enhance disease surveillance and monitoring.
3	Acquisition of vehicles to improve the mobility and responsiveness of medical officers of health and field health officers to respond to outbreaks, and to attend preventive health work including immunization of 10 vaccine preventable diseases	Precipitation change, temperature change, landslides, droughts, and Floods	0.40	Communicable diseases may be influenced by climate change. Vehicles provided will enhance mobility and responsiveness of health staff to respond to disease outbreaks and to attend to preventive health work including immunization of vaccine preventable diseases.
4	Capacity building on design, operations, and maintenance of civil works and infrastructure to ensure their proper upkeep and resilience to climate change	Rainfall and wind patterns, and temperature change	0.10	To ensure proper upkeep and operations and maintenance of civil works and infrastructure in consideration of rainfall, wind, temperature changes and disasters, capacity building is needed for facility design, managers, and caretakers.
5	Capacity building on risk communication for timely management of outbreaks, and	Precipitation change and temperature	0.20	Communicable diseases may be influenced by climate change. Capacity building is required for all

Item	Adaptation Activity	Target Climate Risk	Estimated Adaptation Finance [a] (in $ million)	Adaptation Finance Justification
	infection prevention and control to ensure all PHC providers in the rational use of antibiotics, inculcating hand washing practices, etc.	change		PHC providers for infection prevention and control.
6	Incorporate climate and disaster resilient designs into new buildings designed in the Nine apex hospitals	Rainfall and wind patterns, and temperature change	1.50	Extreme climate conditions may affect sustainability and lifespan of civil works. Designs must be climate and disaster resilient.
7	Use of appropriate construction materials resilient to climate change and disaster risks	Precipitation change and temperature change	2.20	Extreme climate conditions may affect sustainability and lifespan of the new buildings. Material used for roofing, and water and electricity supply must be climate and disaster resilient.
8	Construction and rehabilitation of drainage system for rainwater and wastewater to accommodate increased stormwater discharge	Precipitation change	0.65	Extreme rainfall requires suitable drainage system to be incorporated to suit the topography and climate of the site.
9	Operations and maintenance of civil works/infrastructure (outside of civil works packages, i.e., as part of regular revenue budget) to ensure their proper upkeep and resilience to climate change	Rainfall and wind patterns, and temperature change	0.35	Proper upkeep and operations and maintenance of civil works and infrastructure is required beyond the project boundary in consideration of rainfall, wind, temperature changes, and disasters.
10	Policy development, capacity building, and project management supported		0.23	Part of project management costs can be claimed as climate adaptation financing.
		Total	**6.28**	**ADB will shoulder 100% of the climate change adaptation cost.**

ADB = Asian Development Bank, IT = information technology, PHC = primary health care.
[a] These estimates do not include price and physical contingencies, which will be calculated and included once detailed designs are completed.
Source: Asian Development Bank.

V. CLIMATE MITIGATION PLANS WITHIN THE PROJECT (FOR COMPONENTS UNDER AF ONLY)

Item	Mitigation Activity	Estimated GHG Emissions Reduction (tCO_2e)/year[a]	Estimated Mitigation Finance[b] (in $ million)	Mitigation Finance Justification
1	Improved medical waste management at PHC level which will prevent (i) indiscriminate disposal of waste such as through open burning, (ii) spread of communicable diseases, and (iii) sharps injuries	0.0	0.700	Communicable diseases may be influenced by climate change. Medical/ health care waste management will prevent open burning, spread of communicable disease and occupational injuries.
2	Energy-efficiency improvement in lighting (use of LED instead of incandescent or fluorescent bulbs), appliances and equipment, etc. in each BH	4,275.0	1.100	Energy saving lighting system such as LED bulbs are included in the design as well as in the BOQ. This will reduce the operation and

Item	Mitigation Activity	Estimated GHG Emissions Reduction (tCO_2e)/year[a]	Estimated Mitigation Finance[b] (in $ million)	Mitigation Finance Justification
	selected as an apex hospital under AF Renovation of existing buildings in above BHs including modifications that enable reduction of energy consumption (climate, shade, and wind consideration for passive design, cross ventilation, etc.)			maintenance cost. Climate resilient design will reduce energy consumption and carbon footprint.
3	Procurement of ambulance vehicles that are more efficient in fuel consumption and complying with national vehicle emission standards[c]	7.02	1.875	Price difference of a regular refrigerator-mounted vehicle and an energy efficient one (incremental)
	Total	**4,282.02**	**3.675**	**ADB will shoulder 83% of the climate change mitigation cost.**

ADB = Asian Development Bank, AF = additional financing, BH = Base Hospital, BOQ = Bills of Quantities, GHG = Greenhouse Gas, LED = light-emitting diode, PHC = primary health care, tCO_2e = tons of carbon dioxide equivalent.

[a] Energy savings per year x emission factor = GHG emissions reduction.

[b] These estimates do not include price and physical contingencies, which will be calculated and included once detailed designs are completed.

[C] A total of 75 new ambulances shall be introduced to the existing fleet of which 50 will be funded by ADB and 25 by JFPR

Source: Asian Development Bank.

CO_2 Emissions Reduction Calculations

1. Reduction from energy efficient lighting

Calculation of CO_2 emission reduction = (0.76 (amount of CO_2 generated in kilogram per kilowatt-hour [kWh]) * 250 (average energy consumption in a traditional building in Sri Lanka in kWh per square meter per annum) * 22,500 (total primary medical care units and district hospitals building area in square meters))/1000 = **4,275 tCO2e/year**

2. Reduction from Ambulance vehicles

GHG emissions reduction = 11.7 megawatt-hour/year (Energy savings/year) x 0.6 (emission factor) = **7.02 tCO_2e/year**

[a] Global Facility for Disaster Reduction and Recovery. 2011.*Vulnerability, Risk Reduction, and Adaptation to Climate Change*. Sri Lanka.

[b] Climate Risk Country Profile: Sri Lanka (2020): The World Bank Group and the Asian Development Bank.

APPENDIX: INFORMATION USED FOR THE PROJECT'S CLIMATE RISK SCREENING

Figure 1: Predicted deviations in rainfall due to climate change[1]

1. Project Locations

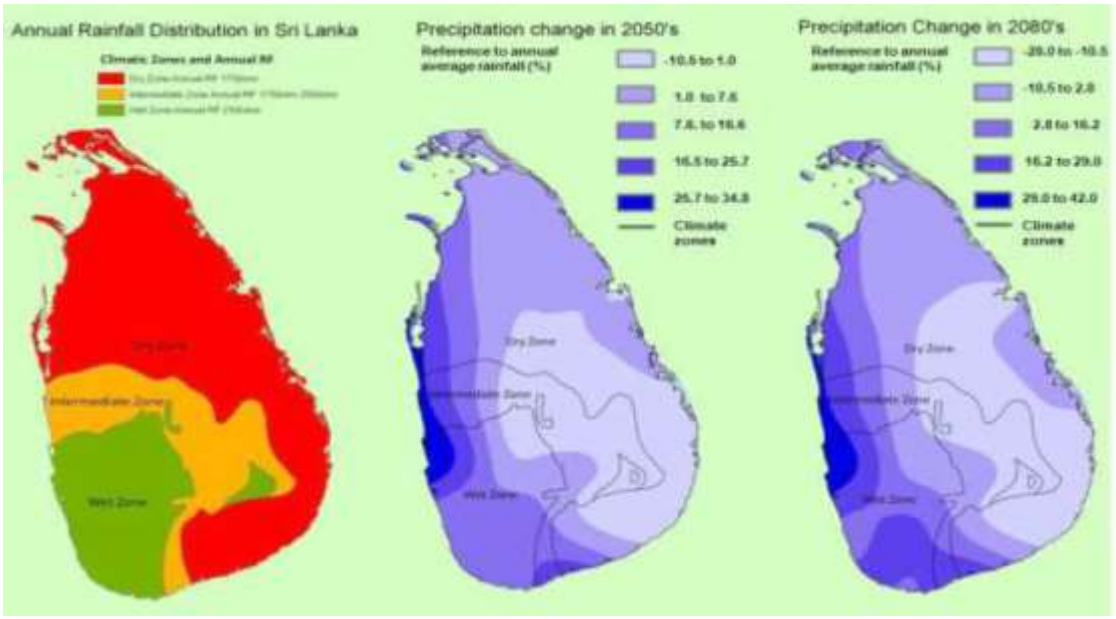
Central Province

North Central Province

Sabaragamuwa Province

Uva Province

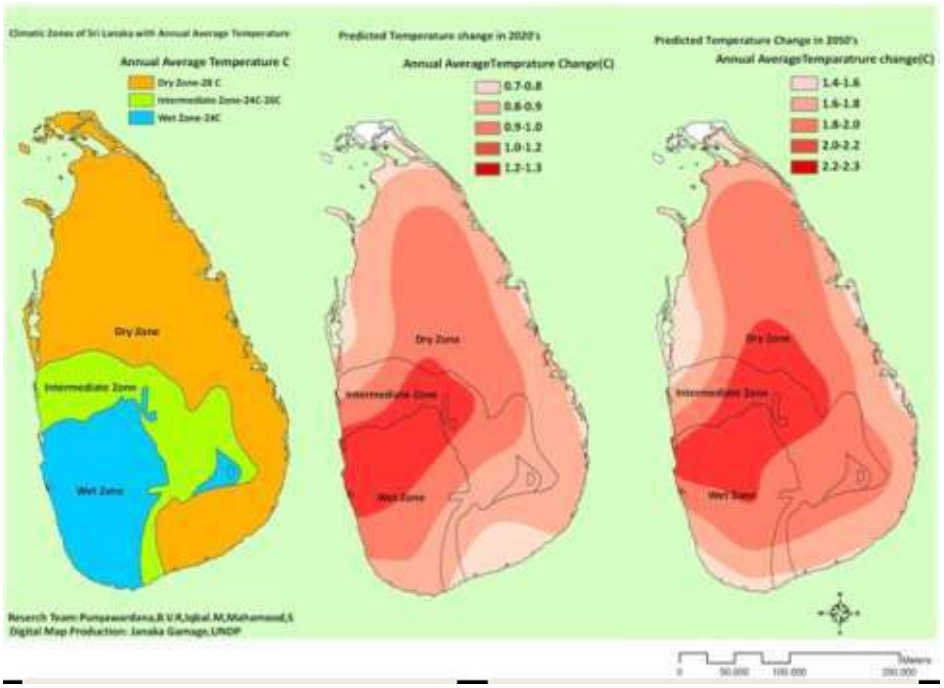
2. Potential Climate Change Impact on Disaster Management



The economic sectors highly vulnerable to climate change have been identified as Agriculture, Fisheries, Tourism, and Coastal Infrastructure.. The areas in the northeastern and central parts of Sri Lanka will particularly be wetter than the current conditions for the period between the years 2036 to 2065. However, for Uva province, the future (years 2066 to 2095) average rainfall will be lower than the current conditions.

[1] Government of Sri Lanka, Ministry of Environment. 2012. *Sri Lanka Second National Communication to UNFCCC*. Colombo.

Figure 2: Predicted deviation in temperature due to climate change[2]



The figures show that temperature will continue to rise where the maximum increase occur in the central parts of the country.

[2] Government of Sri Lanka, Ministry of Environment. 2012. *Sri Lanka Second National Communication to UNFCCC*. Colombo.