2023





# Strengthening Sri Lanka's Ecosystem for Climate and Disaster Risk Management and Finance


RESEARCH REPORT

SLYCAN Trust

SLYCAN Trust

---

**Research Report**

# Strengthening Sri Lanka's Ecosystem for Climate and Disaster Risk Management and Finance

2023

No. 96, Bernard Soysa Mawatha, Colombo 5, Sri Lanka
Email: info@slycantrust.org | Phone: +94 11 744 6238
Website: https://www.slycantrust.org
Adaptation & Resilience Knowledge Hub: https://www.slycantrust.org/knowledge-portal/home



---

**Recommended citation:** SLYCAN Trust (2023). *Research Report: Strengthening Sri Lanka's Ecosystem for Climate and Disaster Risk Management and Finance*. Colombo, Sri Lanka: SLYCAN Trust (GTE) Ltd.

**Contributors**

**Lead researcher:** Dennis Mombauer
**Contributors:** Vositha Wijenayake, Ahalya Suresh, Mayantha Madurasinghe, Thilini Gunathilake, Waruni Karunarathne
**Research support and data collection:** Charuka Galagoda, Kavindu Ediriweera, Senashia Ekanayake, Ashan Karunanada, Shehan Liyanage, Chalani Marasinghe, Dinethra Rodrigo, Damitha Samarakoon, Nipun Dias, Thamali Liyana Arachchi

**Layout and cover design:** Dennis Mombauer
**Cover image:** SLYCAN Trust
**Interior images:** SLYCAN Trust, Nandana Sitinamaluwe, Sanjaya Mendis

*This research report was compiled and drafted by SLYCAN Trust's Research & Knowledge Management Division led by Dennis Mombauer.*

*This knowledge product has been developed as part of the project "Multi-Actor Partnership for Climate and Disaster Risk Financing and Preparedness in the Context of the InsuResilience Global Partnership" supported by the German Federal Ministry for Economic Cooperation and Development (BMZ).*

# Table of contents


| | |
|---|---|
| List of acronyms | 6 |
| Executive summary | 7 |
| 1. Introduction | 9 |
| 2. Methodology | 11 |
| 3. Climate and disaster risk management and finance | 13 |
| 4. Sri Lanka's food systems | 19 |
| 5 .Sri Lanka's CDRFI ecosystem | 31 |
| 6. Priorities for enhancement | 53 |
| 7. Pathways and recommendations | 61 |
| 8. Conclusions | 67 |
| 9. References | 69 |

# List of acronyms

- AAIB — Agriculture and Agrarian Insurance Board
- BMZ — German Federal Ministry for Economic Cooperation and Development
- CBO — Community-based organization
- CBSL — Central Bank of Sri Lanka
- CCS — Climate Change Secretariat of Sri Lanka
- CDRFI — Climate and disaster risk finance and insurance
- CDRM — Climate and disaster risk management
- CSA — Climate-smart agriculture
- CSO — Civil society organization
- DAD — Department of Agrarian Development
- DAPH — Department of Animal Production and Health
- DDO — Deferred drawdown option
- DMC — Disaster Management Centre of Sri Lanka
- DOA — Department of Agriculture
- DOCS — Department of Census and Statistics
- DOM — Department of Meteorology
- DRR — Disaster Risk Reduction
- FTF — Farmer's Trust Fund
- GAP — Good agricultural practices
- GDP — Gross domestic product
- GHG — Greenhouse gas emissions
- GIS — Geographic information system
- GoSL — Government of Sri Lanka
- GS — Global Shield against Climate Risks
- IGP — InsuResilience Global Partnership
- IPM — Integrated pest management
- IPNS — Integrated plant nutrient systems
- IFS — Integrated farming system
- ISF — InsuResilience Solutions Fund
- L&D — Loss and damage
- L&DF — Loss and Damage Fund
- MAP — Multi-actor partnership
- NAP — National Adaptation Plan
- NBRO — National Building Research Organization of Sri Lanka
- NDCs — Nationally Determined Contributions
- NGO — Non-governmental organization
- NITF — National Insurance Trust Fund
- NRMC — National Resources Monitoring Centre
- PPP — Public-private partnership
- RCTs — Resource-conserving technologies
- SBI — Sustainable Banking Initiative
- SDGs — Sustainable Development Goals
- SDC — Sustainable Development Council of Sri Lanka
- SLBA — Sri Lanka Banks' Association
- SNLD — Santiago Network on Loss and Damage
- ToT — Training of Trainers
- UNDP — United Nations Development Programme
- UNDRR — United Nations Office for Disaster Risk Reduction
- UNFCCC — United Nations Framework Convention on Climate Change Warsaw International
- WIM — Mechanism for Loss and Damage associated with Climate Change Impacts

# Executive summary

**I. Climate change increasingly shapes a complex landscape of compound, cascading, and covariate risks** that affects all economic and societal sectors, including food systems, rural livelihoods, settlements, infrastructure, tourism, and trade. Particularly for vulnerable developing countries such as Sri Lanka, it is vital to identify and manage these risks through accessible, proactive, anticipatory, and evidence-based approaches that can protect development gains as well as human lives, livelihoods, wellbeing, and prosperity.

**II. Climate and disaster risks are caused by the dynamic interactions between hazards, vulnerability, and exposure**. They are defined by several key characteristics and can be managed through comprehensive frameworks and instruments that include risk assessments and analytics, risk prevention, risk reduction, risk transfer, and risk retention. Without holistic risk management, adverse climate impacts threaten to exceed the existing adaptive and coping capacities and cause severe losses and damages, which puts an additional strain on already limited resources and affects human lives and livelihoods. Risk finance and insurance instruments can play an important role in such a framework and close existing protection and liquidity gaps to build long-term resilience.

**III. This report identifies entry points and opportunities to enhance risk management and finance in Sri Lanka's food systems**. It is based on national stakeholder engagement as well as case studies in the dry zone districts of Anuradhapura and Trincomalee, which have agriculture as the primary livelihood for a large percentage of the population with livestock, fisheries, and small businesses as additional sources of income and food security.

**IV. Key considerations for food systems and agricultural cultivation in these areas and in Sri Lanka** include agricultural inputs, assets, and farm labour; traditional risk management practices; weather data and advisory; rural infrastructure; finance and insurance; and other risk transfer, risk sharing, and risk pooling mechanisms.

**V. The key risks for Sri Lanka's food systems include direct climate and disaster risks** (such as increasing temperatures, water scarcity, unreliable rainfall patterns, pests and diseases, soil degradation, and extreme weather events) **as well as indirect or compounding risks** (including market volatility, supply chain disruptions, rising cost of living, food waste, and human-wildlife conflict).

**VI. Farmers and other supply chain actors on the local level report several issues and challenges** related to food production and supply chains, environment, water, finance, and insurance, including gaps in financial literacy, trust in insurance solutions, lack of market information, and lack of guarantees or cash support. **Current adaptive practices include** improved or resistant crop varieties; adjustments to cultivation cycles or methods; improved water management; early warning information; and secondary income sources. However, the overall climate resilience of farming households remains low.

**VII. Sri Lanka's enabling environment for risk management and finance comprises several institutions, laws, regulations, policies, plans, and guidelines**, as well as sources of finance and support for smallholder farmers, rural households, and other actors in food system supply and value chains.

**VIII. Sri Lanka has a range of climate and disaster risk finance and insurance (CDRFI) instruments and mechanisms in place, but there is significant potential to close gaps and enhance the existing frameworks**. This includes the adoption of modern technology; enhanced coordination and cohesion; swift implementation of policies; and the creation of effective multi-actor partnerships.

**IX. Major challenges for scaling up CDRFI solutions in Sri Lanka's food systems and enhancing climate risk management** relate to:

- **Current state of food production and supply chains**, such as a low degree of modernization; insufficient infrastructure; and weak connections between farmers and markets.
- **Coordination and collaboration**, such as the need for specific regulatory and policy frameworks as well as coordination, coherence, and exchange between actors.
- **Awareness and data**, such as a lack of relevant literacies; knowledge gaps; and limited availability and accessibility of data and information.
- **Technology and innovation**, particularly improving the enabling environment for new technologies and innovations.
- **Finance and insurance**, such as structural constraints for CDRFI solutions; lack of available funding; and gaps in existing CDRFI mechanisms and instruments.

**X. As identified by stakeholders through the research, these challenges need to be overcome** to move towards a more risk-aware, climate-smart, and resilient food system with modernized livelihoods that are supported by an inclusive as well as participatory enabling environment; a pool of literate and qualified human resources; a stable and transparent financial system; and a robust and dynamic rural financial system with a range of available, accessible, and context-specific financial products and services.

**XI. To reach this envisioned state and the different elements associated with it, four key recommendation areas have been identified**:

**(a) Incentivizing innovation** through various means is the main goal of the first area of recommendations, including by enhancing market access and linkages and overhauling the rural credit system.

**(b)** The second area focuses on a **mindset shift** through education, training, and literacy-building as well as higher public awareness and access to information, including by harnessing social and natural capital.

**(c)** The third recommendation area outlines **multi-actor partnerships**, with a focus on enhancing collaboration, coordination, and exchange between different actors and stakeholder groups, attracting investment, and building on existing structures.

**(d) Inclusive processes** are the focus of the fourth recommendation area, comprising the inclusion and participation of stakeholders at all levels and growing trust through networks, awareness creation, investment, collaborative processes, policies, and skill development.

**XII. Enhancing existing CDRFI solutions and risk management frameworks in Sri Lanka's food systems can provide vital support to vulnerable groups and communities**. Building on existing structures as well as developing new risk transfer approaches could provide climate-vulnerable communities with effective solutions that are based on evidence and data, respond to actual needs, have clearly defined beneficiaries, and ensure equitable access, accountability, and transparency in their modalities. **Innovation, mindset shift, multi-actor partnerships, and inclusive processes are pivotal to operationalizing these principles and transform Sri Lanka's CDRFI ecosystem to correspond to current and future needs and build long-term resilience**.

# CHAPTER 1

# Introduction

**In the age of anthropogenic climate change, human and natural systems can no longer function without disruption**. Climate change increasingly shapes a complex landscape of compound, cascading, and covariate risks that affects all economic and societal sectors, including food systems, rural livelihoods, settlements, infrastructure, tourism, and trade. Particularly for climate-vulnerable developing countries such as Sri Lanka, it is vital to **identify and manage these risks through accessible, proactive, anticipatory, and evidence-based approaches** that can protect development gains as well as human lives, livelihoods, wellbeing, and prosperity.

**As a developing tropical island nation, Sri Lanka is particularly vulnerable to climate change impacts and compounding crises** that affect its human and environmental systems, including the COVID-19 pandemic, supply chain disruptions, economic recession, changes in policies, and rising cost of living. The following report maps and analyses Sri Lanka's current risk management and finance ecosystem, with a focus on climate and disaster risk finance and insurance (CDRFI) in food systems.

The report aims to map **key climate-related risks, vulnerabilities, and fragilities related to climate change as well as the awareness, capacities, resources, and priorities of actors** in the country's food systems, farming households and communities, and agricultural supply or value chains, particularly in the context of climate change adaptation and climate-induced loss and damage.

Furthermore, the report identifies **priorities and recommendations for enhancing the country's current CDRFI ecosystem and strengthen adaptive strategies, mobilize risk finance and investment, empower affected communities, and build mid- and long-term resilience**.

## Climate and Disaster Risk Finance and Insurance (CDRFI)

**CDRFI** refers to pre-arranged financial arrangements and instruments aimed at strengthening financial resilience or providing financial protection for climate and disaster risks, including non-climate-related risks such as earthquakes. The central goal of CDFRI is to assist those in need more rapidly and reliably when a disaster strikes by using an array of quickly disbursing financial instruments. In addition, financial instruments such as insurance can also strengthen long-term recovery after disasters by covering physical damages to both public and private assets, including crop losses.

*(InsuResilience Global Partnership)*

This research report synthesizes and builds on findings from two and a half years of work under the project **"Multi-Actor Partnership for Climate and Disaster Risk Preparedness and Insurance in the Context of the InsuResilience Global Partnership."**

As outlined in the methodology chapter, work under this project encompassed **a variety of activities on the local and national level in Sri Lanka, including continued engagement with key actors** from the public sector, private sector (particularly the finance and insurance industry), civil society, academic and research institutions, development partners, UN entities, and community-based organizations (such as farmer associations and women's groups) on climate change, agriculture, finance, disaster management, sustainable development, and other relevant thematic areas.

The findings aim to reflect the different perspectives and priorities of these diverse stakeholder groups and actors to produce **a holistic image of the CDRFI landscape in Sri Lanka**, especially regarding food systems and the agriculture sector. Based on background research and inputs from the above-mentioned actors, the report highlights potential solution pathways within the national context as well as in connection to the negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) and other global processes.

## Thematic markers

This report utilizes a system of **markers to indicate important thematic areas or cross-cutting considerations** for each of its chapters. The following markers are in use throughout the report:

- *Food systems (crop cultivation)*
- *Food systems (livestock)*
- *Food systems (fisheries)*
- *Climate change and climate risk*
- *Infrastructure and enabling environment*
- *Data and information*
- *Risk management and risk reduction*
- *Finance, insurance, and other resources*
- *Laws and regulations*
- *Policies, plans, and strategies*
- *Gender inclusion and responsiveness*
- *Children and youth*

# CHAPTER 2

# Methodology

The findings, insights, and recommendations compiled in this report are based on desk research and a **comprehensive data collection and consultation process** conducted by SLYCAN Trust between January 2020 and October 2022.

Overall, the **research and capacity-building activities** comprised 17 national and international consultations, workshops, dialogues, and webinars; 20 expert consultations and group meetings; 2 training of trainers (ToT) workshops; two extensive field surveys; and numerous interviews, individual meetings, and auxiliary data collection.

A total of 1,300 participants from all relevant sectors were engaged through the workshops, with an additional audience of more than 8,000 people for events live-streamed online. On the local level, more than 600 crop, farmers, livestock farmers, youth, women from farming communities, and other food system actors were interviewed and engaged.

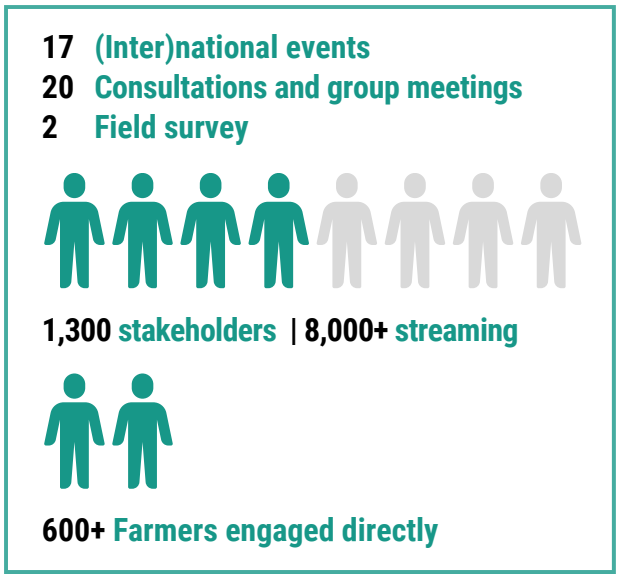



***Figure 1:*** *Overview of stakeholders engaged*

**DISCLAIMER:** This research report is based on **data, inputs, and rates collected in 2020-2022 from a multitude of sources**. However, as the majority of primary field data collection took place in 2020-2021, findings don't necessarily reflect economic developments or changes to existing mechanisms from 2022 onwards.

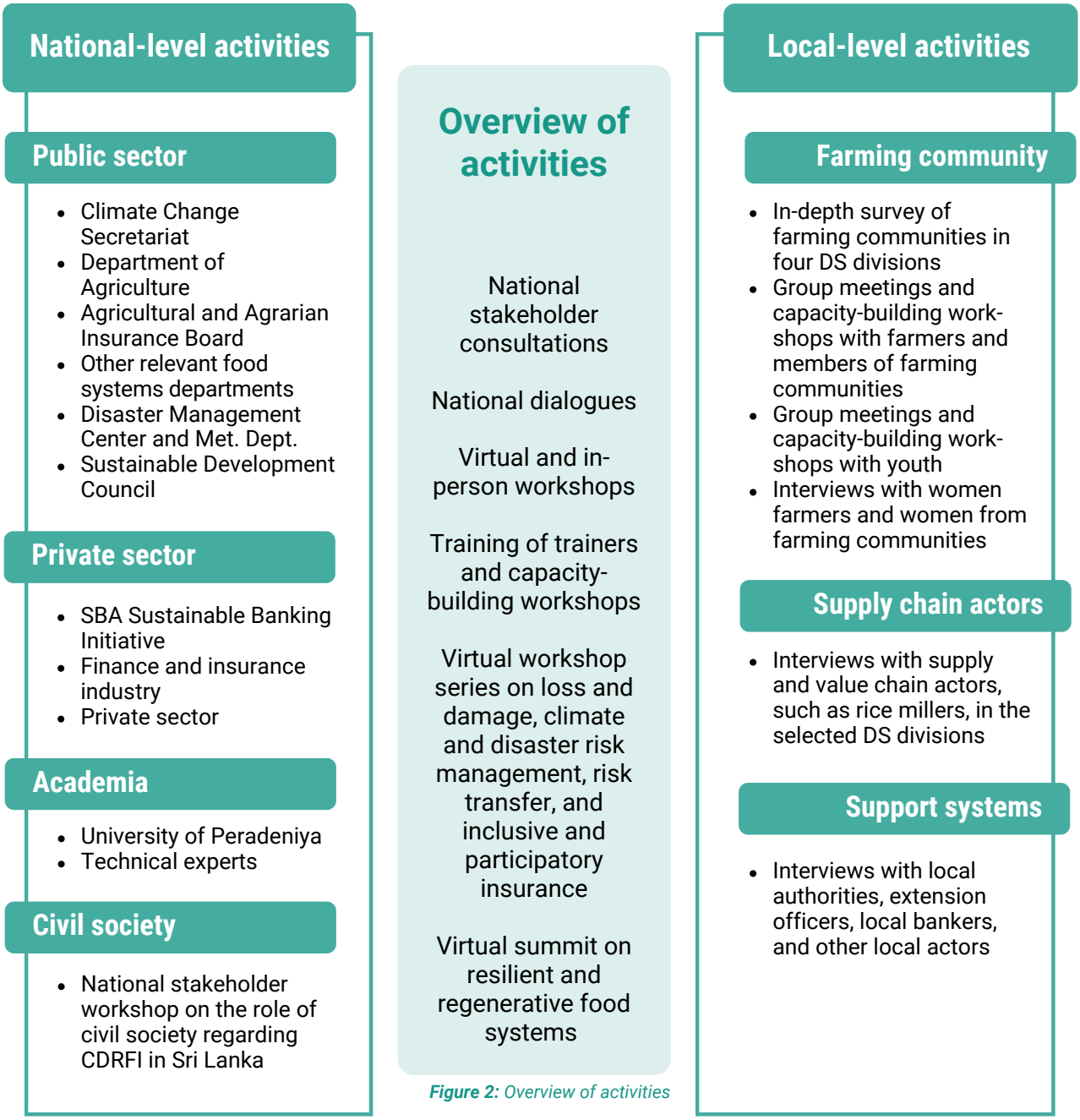



***Figure 2:*** *Overview of activities*

Individual activities under the project focused on **different aspects of the CDRFI ecosystem and its key actors** in Sri Lanka, including the apex agencies for climate change, disaster management, agriculture, finance, sustainable development, and meteorology. Starting with stakeholder mapping and an analysis of the enabling environment, the current state of play was identified and findings then validated through in-depth engagement with relevant stakeholder groups.

Climate and disaster risk management, policy integration of risk transfer, inclusive and participatory mechanisms, youth and civil society engagement, financial instruments, gender, and the specific needs of the agriculture sector emerged as **focus areas for the research throughout the project timeline with additional exploration of regional and global linkages**, especially those related to the UNFCCC process.

# CHAPTER 3

# Climate and disaster risk management and finance

*Abandoned house in high-risk landslide area in Kegalle district, Sri Lanka*

## 3.1. Climate risk and risk management

## 3.2. Risk finance and insurance instruments

**Climate and disaster risk** stems from the dynamic interactions between hazards, vulnerability, and exposure. They are defined by different characteristics and can be addressed through **comprehensive risk management frameworks** that include risk assessment, prevention, reduction, transfer, and retention. If risks are not managed properly, they can cause severe negative impacts that exceed adaptive and coping capacities and lead to loss and damage, putting additional pressure on already strained resources and affecting human lives and livelihoods. **Risk finance and insurance instruments** can play an important role in such a framework and close existing protection and liquidity gaps to build long-term resilience.

## 3.1. Climate risk and risk management

**Risk is defined as the potential for adverse consequences for human or ecological systems, where something of value is at stake and the outcome is uncertain**, recognising the diversity of values and objectives associated with such systems. **Climate-related risks arise from the dynamic interactions between hazards, vulnerability, and exposure** and are further defined by their values, magnitude, likelihood, temporal characteristics, and response options. (IPCC Sixth Assessment Report, 2022). Principal types of risks for food systems include production risks, market risks, financial risks, enabling environment risks, environmental risks, human element risks, social risks, and infrastructure risks.

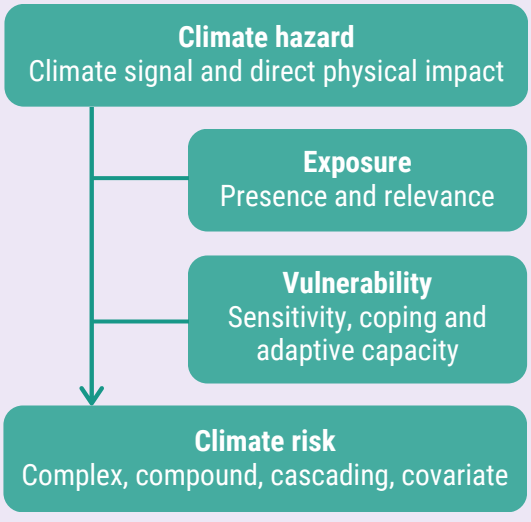



*Figure 3: Elements of climate risk*

Impacts create connections between a hazard (the cause) and a consequence (the effect); **the total chain of causal connections is called an impact chain**. To assess and calculate risk, the elements of a risk (exposure, vulnerability, coping and adaptive capacities) **can be identified and measured through indicators**, which should refer to a threshold or critical state, be clear in their direction, and not be duplicated along the impact chain.

**A hazard is a process, phenomenon, or human activity** that may cause loss of life, injury or other health impacts, property damage, social and economic disruption, or environmental degradation. Hazards can be hydrometeorological, biological, technological, geological, chemical, environmental, extraterrestrial, or societal (UNDRR/Sendai Framework). **Multi-hazard** means multiple major hazards that may occur simultaneously, cascadingly, or cumulatively over time, and taking into account the potential interrelated effects.

Climate hazards or impacts can occur over different temporal and spatial scales. In particular, **rapid-onset events** are usually single, discrete events that occur over hours or days (such as a flood, landslide, or tropical cyclone) while **slow-onset events or trends** evolve gradually through incremental changes (such as increasing temperatures, sea level rise, soil degradation, or salinisation).

### Climate-induced loss and damage

**Loss and damage (L&D)** refers to the actual and/or potential manifestation of negative economic and non-economic impacts associated with climate change that exceed the (practical or theoretical) limits of adaptation and affect human and natural systems. Loss refers to the complete and permanent loss of something while damage refers to something that can be repaired or recovered. In the context of climate change, L&D means the impacts of climate change exceeding the adaptive capacity of countries, communities, and ecosystems, as well as the associated issues of liability and compensation.

Ad-hoc coping strategies to climate change impacts and disasters can often lead to loss of vital assets and livelihoods, threaten development gains, and put additional pressure on already strained public resources. **A holistic risk management framework and ecosystem aims minimize climate and disaster risks and put in place arrangements, mechanisms, tools, and instruments to enhance long-term resilience** and provide financial protection against the adverse impacts of climate change and covariate shocks. This is achieved through:

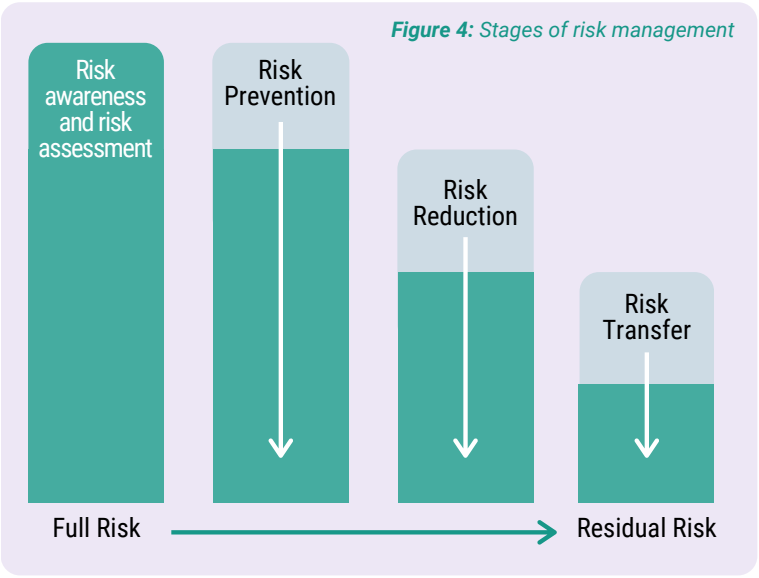
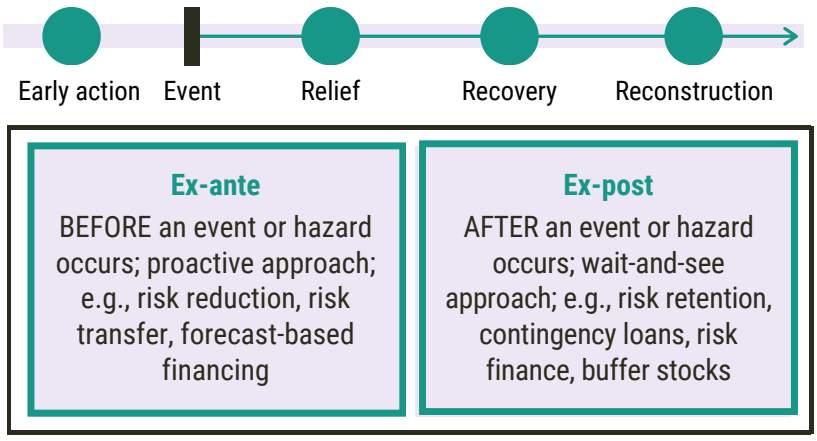



*Figure 4: Stages of risk management*

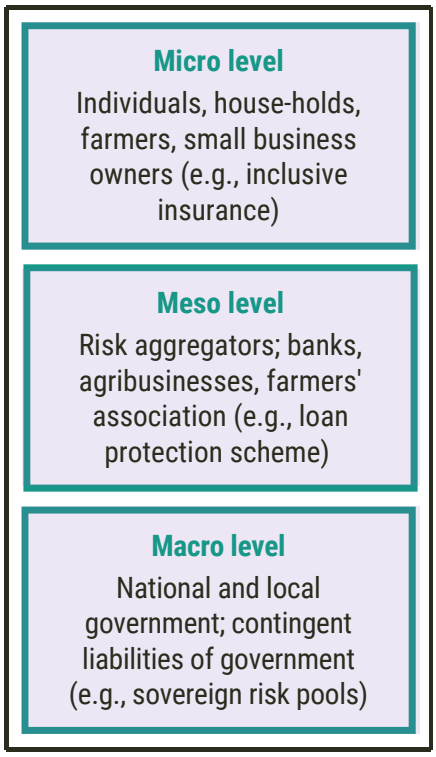
- **Risk awarenness and assessment** (e.g., hazard or risk mapping, risk modelling, scenario analysis)
- **Risk prevention** (e.g., policy and regulations, land use planning)
- **Risk reduction** (e.g., early warning systems, resilient infrastructure, nature-based solutions, disaster preparedness)
- **Risk transfer** (e.g., [re]insurance, risk pooling, catastrophe bonds, weather derivatives)
- **Risk retention** (e.g. contingency reserves or loans, calamity funds, budget reallocation)

## Dimensions of risk management and finance

Traditional risk management often focuses on addressing events and impacts as they happen by providing **ex-post relief, recovery, and reconstruction finance**. However, **ex-ante risk management and finance solutions** enable governments, businesses, and individuals to space out investments and funding needs over longer periods of time before an event, for example by paying regular premiums for insurance.




Temporal dimensions of risk management and finance




Scales of risk management and finance

## 3.2. Risk finance and insurance instruments

**Climate insurance does not provide a stand-alone solution but can be an effective part of comprehensive risk management approaches**. Insurance and risk transfer mechanisms strengthen the resilience of individuals and communities by closing the gap in financial liquidity and preventing a fall into poverty.

Climate insurance is increasingly becoming part of national risk management strategies, and many countries, including Sri Lanka, have included climate insurance in their NDCs. There is a growing dialogue on the global stage, and a number of initiatives aiming to enhance insurance-based climate solutions.

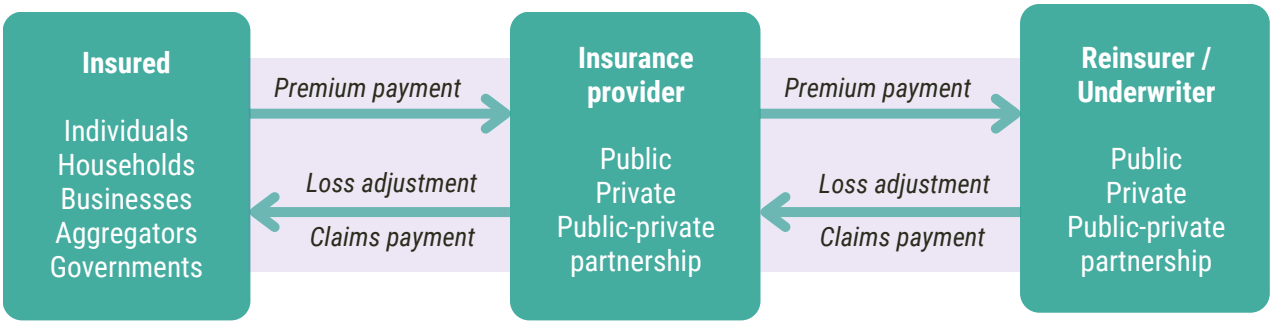



***Figure 5:*** *Structure of insurance schemes*

### Agricultural insurance schemes

**Agricultural insurance schemes, for example crop insurance, livestock insurance, or holistic livelihood protection policies**, allow agricultural operators to transfer risk and spread out risk finance over a longer period of time. As expanded on the following page, there are two basic types of agricultural insurance, namely indemnity-based and parametric (also called index-based) insurance schemes.

#### Needs and Requirements

- Enabling regulatory environment
- Meteorological data (weather stations, satellites, rainfall gauges), yield data, data-sharing protocols and mechanisms
- Availability and quality of historical data
- Financial literacy and inclusion, consumer awareness and trust
- Insurance market, distribution channels, agent networks

### Considerations for risk transfer mechanisms

A comprehensive risk management strategy consists of different elements that address the various dimensions of risk and develop strong synergies. When designing the overall strategy and choosing elements, the following **six considerations are vital to incorporate**:

**Risk information**
Understanding risk, exposure, vulnerability, costs, benefits

**Timeliness**
Speed and timing; phases of relief, recovery, reconstruction

**Costs**
Sources of funding, cost of capital, access costs

**Disbursal mechanisms**
Accountability, transparency, discipline, rules

**Risk layering**
Planning for finance needs of different types of events

**Risk ownership**
Liability of government, private sector, households

**The agriculture sector is among the most climate-sensitive and vulnerable economic sectors**, especially in vulnerable developing countries such as Sri Lanka. Smallholder farmers often do not have the capacity, knowledge, and resources recover from climate-induced extreme weather events or adapt to slow-onset climate impacts. **As part of a comprehensive risk management framework, agricultural insurance schemes and other risk transfer solutions can provide solutions** to enhance the resilience of farmers and other actors in rural supply and value chains.

### Indemnity-based insurance

Compensation based on **proof of a specified loss or assessment** of actual loss in the field.

- Named peril crop insurance (specified event, damage measured in the field)
- Multi-peril crop insurance or yield-based insurance (compensation for unrealized yield due to any unavoidable cause)
- Low basis risk, payments match losses
- Can address different policyholders more individually and address their specific needs
- High transaction and product design costs
- Payouts can be slow due to assessment
- Potential danger of adverse selection or moral hazard

### Parametric/index-based insurance

Payment liability and compensation based on the **measured value of a previously determined, objective, and independent index**.

- Area yield index insurance (pays out to all farmers in an area if average yield is below threshold)
- Weather-based index insurance (payouts based on the realization of certain weather parameter)
- Low transaction and administrative costs
- Timeliness of payouts
- Less adverse selection and moral hazard
- Less complex contracts
- More widespread access
- Issue of basis risk

## Key concepts and terminology

**Basis risk:** The risk of index measurements not matching individual actual losses; can be reduced through robust product design and cover of homogeneous area (both in terms of weather and farming techniques).
**Moral hazard:** The existence of risk transfer schemes can create a false sense of security and lower the incentive to reduce risks and engage in other risk management strategies.
**Adverse selection:** Insurance is only purchased by those with highest risk, leading to potential market failure.
**Bundled insurance solutions:** An insurance scheme or package that provides multiple types of insurance coverage under one policy or that is bundled with a loan or other financial instrument.
**Hybrid insurance solutions:** Insurance schemes that combine features of different types of insurance to meet specific needs, for example, to cover different time windows (with a fast trigger-based payout and a more comprehensive coverage after a damage assessment) or coverage against different kinds of risks.
**Embedded insurance:** The practice of including insurance coverage as a part of other products or services., enabling any third party to become an insurance distributor (for example, an agribusiness providing seeds or a telecommunications operator) based on their existing understanding of customers' needs, customer base, data on customers, and regular touch points.

There is a wide **variety of financial instruments that can enable national- and local-level stakeholders to effectively transfer, retain, or prepare for climate-related risks**. The following table showcases a non-exhaustive selection of some of the most common risk transfer, preparedness, risk retention, and risk finance instruments:

***Table 1:*** *Selected types of financial instruments*

| Risk management | Instrument | Description |
|---|---|---|
| **Risk transfer** | Insurance | Insurance solutions can include indemnity- and index-based insurance schemes, microinsurance, insurance for public assets, natural resource insurance, sovereign risk insurance, regional risk pools, or insurance-linked instruments. |
| | Reinsurance | Reinsurance allows insurers to protect themselves against potential losses from large claims and transfer risk to other insurers or financial markets. |
| | Weather derivatives | Weather derivatives are contracts bought and sold on financial markets that pay based on specific weather-related triggers. |
| | Catastrophe bonds | Cat bonds are financial instruments that transfer disaster-related risks from insurers to investors through the issuance of bonds. |
| | CAT-DDO | A deferred drawdown option is a provision that allows the issuer of the bond to delay access to the bond funds until a specified trigger has occurred. |
| **Preparedness and early action** | Forecast-based finance | Instruments that enable access to financial support for early action based on forecasting information and risk analysis. |
| **Risk retention** | Contingency or reserve funds | Public funds set aside to be used for early response and recovery after disasters or climate shocks. |
| | Contingent debt or credit facilities | Contingent credit lines or debt instruments function similar to contingency funds in case of impacts. |
| | Budget reallocation | Repurposing of already committed in-year budget lines ex-post to manage unexpected impacts. |
| | Offshore sovereign wealth funds | Extrabudgetary funds created through offshore investment of government surpluses. |
| **Risk finance** | Bonds | In addition to catastrophe bond (see above), other categories of bonds include resilience bonds, green bonds, or climate bonds, which allow borrowing for a specific purpose or tied to specific conditions. |

# CHAPTER 4

# Sri Lanka's food systems

*Farmer in Trincomalee district, Sri Lanka*

## 4.1. Overview of Sri Lanka's food systems

## 4.2. Climate risks and challenges

## 4.3. Traditional risk management and resilience

**Agriculture is at the heart of Sri Lanka's food systems** and among the country's most climate-vulnerable sectors. Throughout the agricultural supply chain, **key considerations** include land, water, inputs, assets, risk management, data, advisory, infrastructure, technology, finance, and insurance. Farmers are faced with **climate and disaster risks as well as indirect or compounding risks** that exceed their current adaptive and coping capacities, which largely depend on traditional risk management, local knowledge, and formal or informal loans.

# Chapter summary

## 4.1. Overview of Sri Lanka's food systems

Agriculture is a key part of Sri Lanka's food systems and contributes to around 7% of GDP as well as a significant percentage of employment. However, the agriculture sector still relies largely on traditional skills and technology and is vulnerable to climate-related risks and other shocks. Throughout the supply and value chain, smallholder farmers therefore look at several important factors and aspects to ensure the success of their cultivation: land and water management, agricultural inputs and assets, risk management, weather data and advisory, rural infrastructure, finance, and insurance.

## 4.2. Climate risks and challenges

Primary climate-related risks to food systems in Sri Lanka include temperature increase, water scarcity, erratic rainfall patterns, pests and diseases, soil degradation, and extreme weather events. In addition, other risks (such as supply chain risks, market volatility, or rising costs of living) can compound these climate-related risks and heighten the vulnerability of rural farming households and communities. Surveyed farmers also report several other issues related to their supply chains, water, the environment, and availability of finance and insurance. The low diversification of input providers and buyers for produce further exacerbates these challenges. Some farmers are trying new practices and methods to manage their risks, including better rice varieties, better harvest or planting methods, improved water management, early warning information, or diversifying their income sources.

## 4.3. Traditional risk management and resilience

Traditional risk management is based on the practices and knowledge that farming communities have acquired over many generations, as well as specialized infrastructure such as cascade tank systems. The dense social fabric of the village and its various informal systems provide methods for risk-sharing and risk-pooling, such as the *Seettu* system or participatory guarantee systems. However, climate change affects the effectiveness of the existing risk management framework and therefore the resilience and coping capacities of farming households, which have a low livelihood diversification, limited financial inclusion, and very low insurance penetration besides the compulsory public crop insurance scheme.

**Agriculture—defined here as a range of practices including crop cultivation, livestock, fisheries, plantations, beekeeping, and (agro)forestry—is at the heart of Sri Lanka's food system** and provides livelihoods and employment for rural communities and more than a quarter of the total workforce. Against the backdrop of the global climate crisis, the sector is faced with increasingly complex, compound, covariate, and cascading risks that threaten productivity, income, food security, and the wellbeing of rural farming communities.

## 4.1. Overview of Sri Lanka's food systems

**The agriculture sector contributes around 7%** (7.1% in 2020, 6.9% in 2021) **to Sri Lanka's overall Gross Domestic Product** (GDP), with roughly 14% of this contribution coming from the fisheries, 10% animal production, and 9% forestry sub-sectors. Out of the total labour force of 8.553 million people, almost 28% are employed in agriculture, with a significantly larger percentage of the rural population involved in agricultural activities beyond formal employment (Department of Census and Statistics, Central Bank of Sri Lanka, 2022).

Sri Lanka's food systems revolve around the **production of rice as a main staple crop**, with a total of 5,150,000 tons produced in 2021. In addition, fruits and vegetables, grains, meat, fish, and dairy are also important sources of food security. Agricultural practices in Sri Lanka are mostly centred on rural areas, with nearly three quarters of Sri Lankan families depending on rural livelihoods such as crop cultivation and livestock raising, which are linked to income generation, food security, and social status.

**The agricultural calendar revolves around two cultivation seasons**, *Maha* (the major season from October to March) and *Yala* (the minor season from April to June/July). In the dry zone, all farmers generally cultivate during the *Maha* season, which is supplied with strong rainfall by the North-East monsoon, while only a smaller number might be able to regularly cultivate during *Yala*.

At the beginning of each cultivation season, farmers conduct *Kanna* meetings to decide on the extend of cultivation and allocate water to individual areas and farmers based on a quota system (*bethma*) depending on rainfall and the availability of major and minor cascade tank systems.

**Sri Lanka's agriculture sector still relies largely on traditional skills and technologies and has only adopted modern methods of agriculture to a limited extent**. Due to the low degree of mechanization or modernization, agricultural operations are slow and do not have the capacity to quickly react or adjust to unexpected weather changes or shocks. Furthermore, many farmers are not well-connected to markets and sources of relevant information on demand, price volatility, and risks. They often rely on middlemen to sell their produce, as many lack established distribution channels or transport and storage capacities.

However, farmers are still part of **supply and value chains with a multitude of steps and actors that range from input providers to consumers**. Evidence-based decision-making around cultivation must consider the various up- and downstream risks, actors, and ripple effects that influence farm operations and household income. Similarly, holistic agririsk management should take into account formal risk transfer mechanisms as well as traditional and informal risk-sharing and the role of social capital and community cohesion.

**Key variables for efficient decision-making and optimization of food systems in Sri Lanka** include day and night temperature; precipitation; wind speeds; ambient humidity; soil health and makeup; crop and input types; available quantities of fuel, fertilizer, pesticides, insecticides, weedicides, and labour; growing times; historical yields; available storage facilities; transport options and distance to markets; risk assessment and risk management capacities; financial resources and access to financial services (such as loans); machinery; capital assets; water management and access to irrigation; and a multitude of other factors depending on farm size, extent of the cultivation, and other socioeconomic and sociocultural characteristics.

Farmers are part of **complex supply and value chains** with a variety of steps and actors that go from input providers to consumers. Decision-making around cultivation must also take into account the various up- and downstream consequences and actors that influence farm operations and household income.

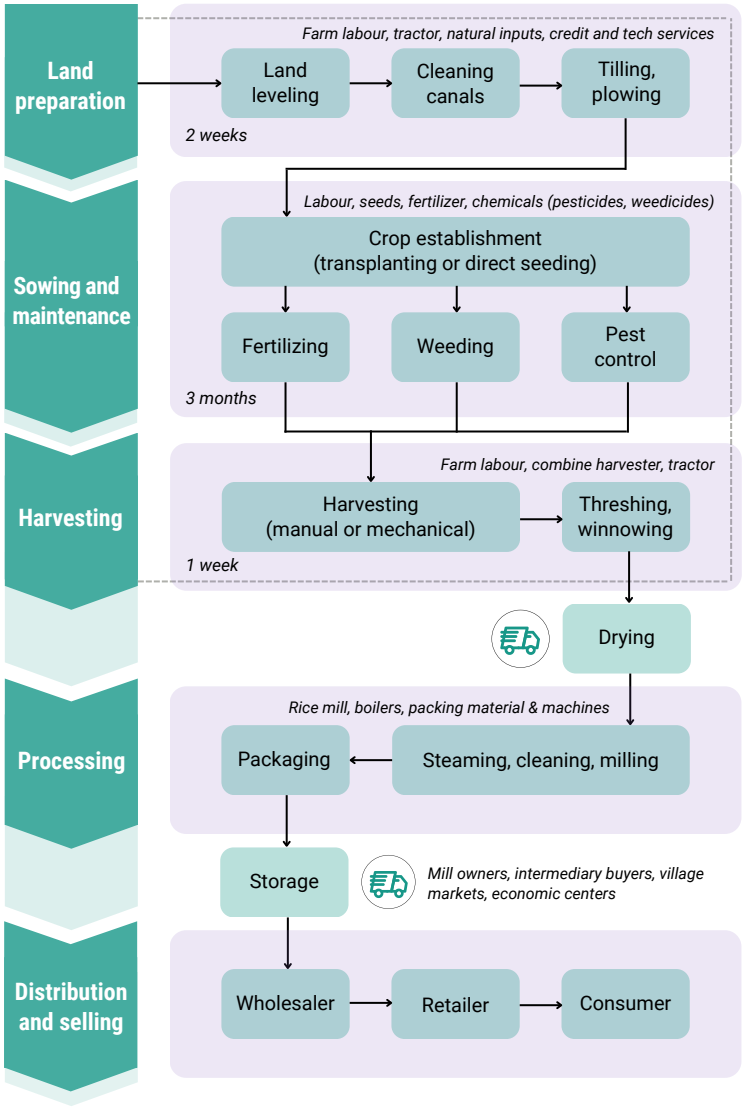



***Figure 6:*** *Example of paddy value chain in Anuradhapura/Trincomalee district*

The following page goes into more detail on the following **five key categories of considerations** for smallholder farmers in Sri Lanka:

- Agricultural inputs, assets, and labour
- Risk management
- Weather data and advisory
- Rural infrastructure
- Finance and insurance

These considerations are fundamental to successful crop cultivation and directly influence the **wellbeing, livelihoods, and resilience of farming households**. Identifying key indicators related to these considerations is vital to understanding decision-making processes on the household and community level.

## Agricultural inputs and assets

Agricultural ecosystems are faced with the key challenge of preserving soil fertility and productiveness despite removing significant amounts of nutrients (nitrogen, phosphorus, potassium etc.) with every harvest. Farmers rely on different categories of inputs to cultivate crops and conserve or enhance soil fertility. This includes seeds, farm labour, and fertilizer, which can be anorganic or organic (manure, livestock waste, compost). In addition to these inputs, farmers use pesticides and weedicides and own or employ productive assets, such as land (freehold, tenant, Government owned, or unauthorized), tractors, or combine harvesters. As most farm operations are small-scale in nature, machinery is often rented or collectively owned.

## Risk management

Agricultural operations face a multitude of risks including production risks that affect yield or product quality (such as climate risks, other weather-related risks, pests, diseases, or wildlife); market risks (such as volatility of input and output prices, availability, and quality or supply-demand fluctuations); financial risks connected to debt, equity, interest, or cash flow requirements; environmental risks; enabling environment risks; social risks; human element risks (accidents, illness, death); and infrastructure-related risks. To manage these risks, farmers engage in risk prevention and risk reduction measures (such as improved water management or resilient crop varieties), risk-sharing (mostly through farmer associations), risk transfer (such as insurance), and risk retention (often in the form of money savings or pawnable assets).

## Weather data and advisory

Farmers need information derived from accurate, timely, and reliable data to make rational cultivation and risk management decisions. This includes information related to market demand and price volatility, but also weather forecasts and actionable cultivation advice based on agrometeorological conditions. Farmers can access the weekly "agrometeorological bulletin" published by the Department of Meteorology, which is based on weather information collected through the Department's network of 42 agrometeorological stations throughout the country. Farmers are also provided with climate and cultivation advisory by the Department of Agriculture (Natural Resources Management Center) at the beginning of each season, bi-weekly weather forecasts available in Sinhala and Tamil, and the "Govimithuru" and "Krushi Advisor" apps.

## Rural infrastructure

Infrastructure includes roads and railways, but also the availability of transport vehicles, storage facilities, electricity, water, and other key utilities. Among Sri Lankan farming communities, only a limited number of households own a vehicle, and household members either use buses (infrequent but cheap) or three-wheelers and private vans to make trips to nearby towns and access spices, other vegetables, clothes, medicines, or children's tuition classes, which is often made more difficult by poor road conditions.

## Finance and insurance

Due to the inherent uncertainties of agricultural cultivation, farmers often rely on savings, community savings, financial solutions under the Co-operative Act, the informal *Seettu* system, or loans to ensure liquidity and allow them to make necessary investments in inputs or machinery. However, due to lack of collateral and proof of land or livestock ownership, farmers have limited access to loans from formal financial institutions and can fall prey to informal lenders with high interest. There is little initiative to invest in insurance, which is often purchased only as a prerequisite for loans from formal financial institutions.

## Case study area 1: Anuradhapura district

*Table 2: District overview Anuradhapura*

| District overview (2020) | |
|---|---|
| DS divisions | 23 |
| GN divisions | 694 |
| Land area<br>*- Cultivated*<br>*- Forested* | 717,900 hectares<br>*- 217,105 ha (30%)*<br>*- 197,900 ha (28%)* |
| Population | 750,464 (91% Sinhalese, 8% Moor, 1% Tamil) |

*Figure 7: Case study areas*

**Anuradhapura** (marked in brown on the map) **is a landlocked dry zone district in Sri Lanka's North Central Province**. The district's economy heavily relies on agriculture, with almost a third of its land area used for crop cultivation, and almost half the working population employed in agriculture. As the country's largest district, it covers almost 11% of the total land area but is home to only 4% of the overall population.

*Table 3: Selected case study areas in Anuradhapura*

| Selected case study areas | |
|---|---|
| Selected areas | Ipalogama DS division (Ganthiriyagama) and Horowpothana DS division (Ataweerawewa, Horowpothana, Kalpe, Suhadagama, Welangaha Ulpatha) |
| Population | 87,517 (Department of Census and Statistics, 2020) |
| Livelihoods | Crop cultivation (paddy, onion, chili, banana, mango, guava, coconut, tobacco, maize, peanut, finger millet), livestock (dairy cattle and buffalo), inland fisheries (mostly in tanks), clay and wood industries, textile handicrafts |

A considerable percentage of the population in Ipalogama and Horowpothana engages in **small-scale paddy cultivation and other forms of agriculture**. Most farmers cultivate paddy during both *Maha* and *Yala* seasons while very few undertake additional cultivation in inter-mediate seasons.

While irrigation systems provide considerable support to cultivation, especially during *Yala* season, farmers in most parts rely on rain-water or tap into groundwater for cultivation during *Maha* season and of crops other than paddy.

## Case study area 2: Trincomalee district

**Trincomalee** (marked in green on the map) **is a dry zone district in Sri Lanka's Eastern Province**. Similar to Anuradhapura, the district primarily depends on paddy cultivation as well as fishing (both inland and offshore), with livestock rearing as a widespread secondary income source. In Trincomalee district, 24.6% of the workforce is employed in agriculture, with an overall labour force participation of the district's population of 45%.

The **main crops cultivated in both selected DS divisions include paddy and coconuts**, with Gomarankadawala having a higher number of paddy farmers and Morawewa having a higher number of coconut farmers. Both DS divisions have a much higher percentage of male than female farmers (79% male to 21% female)

***Table 4:*** *District overview Trincomalee*

| District overview (2020) | |
|---|---|
| DS divisions | 11 |
| GN divisions | 230 |
| Land area<br>*- Cultivated*<br>*- Forested* | 272,700 hectares<br>*- 94,565 ha (35%)*<br>*- 139,903 ha (51%)* |
| Population | 440,718 (43% Moor, 31% Tamil, 26% Sinhalese) |

Morawewa DS division is home to **major tank and irrigation systems** while Gomarankadawala only has a limited number of medium and minor tanks to provide irrigation.

***Table 5:*** *Selected case study areas in Trincomalee*

| Selected case study areas | |
|---|---|
| Selected areas | Gomarankadawala and Morawewa DS division (especially Athabandiwewa, Ethabediwewa, Kandamalawa, Kithuluthuwa, Mahadiulwewa, Mailakudawewa, Pulikandikulawa, Swarnajayanthipura, and Vilpanakulama villages) |
| Population | 16,685 (Department of Census and Statistics, 2020) |
| Livelihoods | Agriculture (mainly paddy, coconut, maize, mango, peanut, chili, pumpkin, and ladyfingers, including through home garden and *Chena* cultivation), livestock (mainly cattle, buffalos, goats, and chicken), inland fisheries, wood industries |

## 4.2. Climate risks and challenges

**Sri Lanka's food systems are faced with a variety of risks that are either caused by climate change or directly or indirectly related or exacerbated by it**. Furthermore, impacts and actions in food systems are also influenced by risks to other sectors, including the financial system, entrepreneurship, trade, development, and cross-cutting aspects.

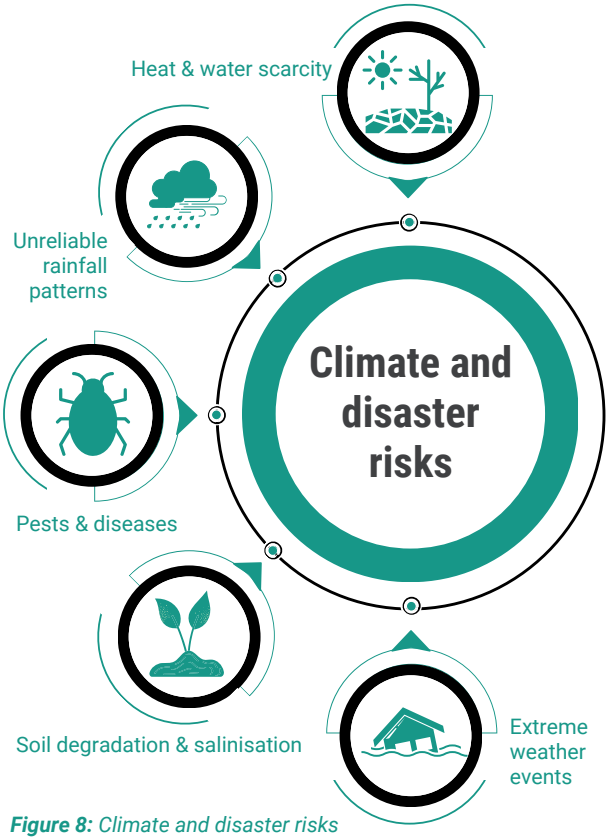



***Figure 8:*** *Climate and disaster risks*

**Principal climate and disaster risks to food systems** include increasing day- and night-time temperatures, heat stress, water scarcity, dry spells, and prolonged droughts; unreliable rainfall patterns and unseasonable excess precipitation; agricultural pests and diseases (such as the fall army worm, *Sena* caterpillar, or mites); soil degradation, erosion, and saline intrusion; and extreme weather events such as floods or storms. In coastal areas, sea level rise, coastal erosion, and ocean acidification are other key climate-related risk factors.

Furthermore, **environmental degradation and biodiversity loss** caused by human activities and the slow-onset impacts of climate change can lead to reduced availability of raw materials, ecosystem services, and natural resources as well as to drops in productivity of crops, livestock, and fisheries.

**In addition to these direct climate risks, Sri Lanka's food systems are faced with indirect or compounding risks**, such as supply chain risks and unavailability of inputs, fuel, and implements; market demand and price volatility leading to reduced wholesale or retail prices and profit margins; lack of reliable real-time market information; rising costs of living, inflation, currency devaluation, loan-related risks, and debt traps; post-harvest losses and food waste; human-wildlife conflict; and human mobility, including internal migration.

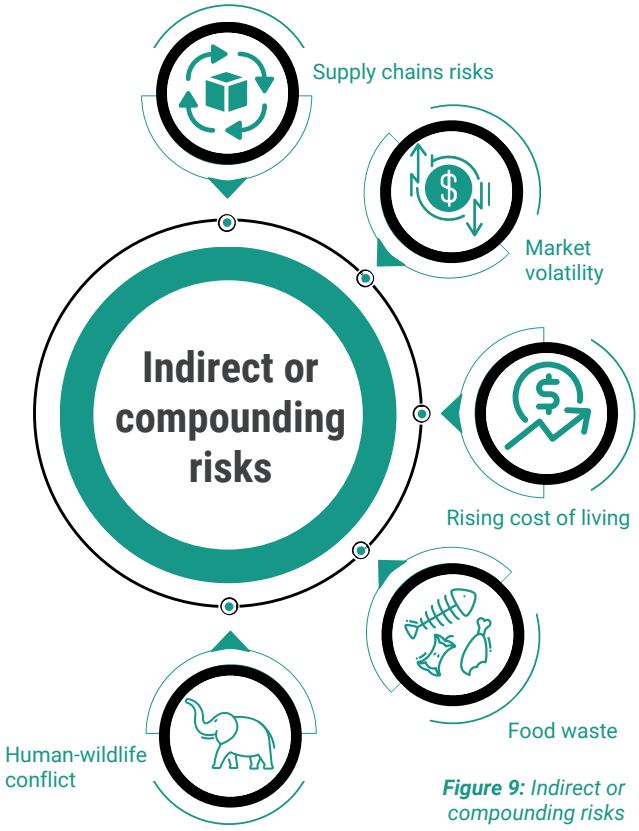



***Figure 9:*** *Indirect or compounding risks*

Two key challenges faced by Sri Lanka's small-holder farmers are related to **production risks and fluctuating market conditions**. These risks can be exacerbated or compounded by **climate change, which adds an additional layer of uncertainty to agricultural operations**. In many cases, extreme weather events or unexpected shifts in weather patterns can exceed the coping capacities of farmers, causing severe losses and damages and threatening to push them into debt traps or poverty. In the case study districts, floods (Anuradhapura), storms, droughts, and wild elephant attacks are among the most common impacts (DOCS, 2020).

Climate change clearly increases **production risks** by causing a higher variability of seasonal precipitation patterns as well as rising ambient temperatures. Mainly rainfed crops are exposed to a lack of rainfall at some times and heavy excess rainfall at others, which can damage harvests or lead to delays in the beginning of agricultural seasons, forcing farmers to shift to shorter-duration crop varieties with reduced yields.

Out of the surveyed farmers in Anuradhaprua and Trincomalee district, **92% reported impacts related to high temperatures or heat waves, 88% to rainfall changes, 81% to water scarcity or droughts, and 70% to groundwater scarcity**. Other key climate-related impacts reported by the survey respondents include increasing prevalence of pests and diseases (88%), soil degradation or depletion (71%), and heavy winds or storms (61%).

## **Reported issues and challenges** (based on surveys and group meetings)

### Food supply chains

- Lack of quality standards for distributed seeds
- Insufficient storage space and high transport costs
- Insufficient information on market demand and prices
- Need for more knowledge about climate change and alternative farming methods
- High cost for chemical fertilizers and pesticides and lack of available equipment (e.g., weeders, sprayers)
- Lack of interest of youth in pursuing farming careers
- Water distribution and management issues

### Environment and water

- Weather- and climate-related impacts (e.g., heat, water scarcity, heavy rains)
- Increasing soil infertility and salinization
- Reduced capacity of irrigation tanks and drainage canals due to siltation or invasive species
- Spreading of invasive weed species in paddy fields
- Increased pests (e.g., mites or *Sena* caterpillar) and diseases
- Groundwater pollution
- Health impacts from use of pesticides and weedicides
- Crop damage caused by human-wildlife conflict

### Finance and insurance

- Limited trust in and under-standing of CDRFI solutions
- Limited financial literacy and inclusion
- Perceived lack of transparency of L&D assessments
- Limited ability of smallholder farmers to pay premiums
- Reduced income due to yield reduction and failed harvests
- Lack of guarantees or cash support from suppliers/buyers
- Lack of technical knowledge of agriculture officers for technology dissemination
- Low income of farmers due to margins of supply chain actors

**Market risks**, on the other hand, can threaten the livelihoods of farmers even in cases of successful harvests. Smallholder farmers are vulnerable due to fluctuating returns in the absence of fixed prices or confirmed buyers. They do not have direct access to markets and lack starting capital to modernize their operations, which could enable them to react more swiftly to supply or demand conditions.

The **limited access to high-quality buyers for paddy and other produce** as well as the often complicated process of selling to the Paddy Marketing Board are key challenges for farmers hoping to get better prices. With regard to selling, more than half of survey respondents (53%) reported low market prices as one of their main issues, with transport (26%) and storage (16%) as the second and third most mentioned difficulties. These challenges are further exacerbated by **cross-cutting issues**, including issues related to poverty; lack of risk, financial, or insurance literacy; the informal economy of rural areas (including farm labour); predatory moneylenders; poor road conditions; gender-related inequities; and being part of vulnerable or marginalized groups.

Farmers in both districts are **trying to manage these risks through a variety of new practices or coping methods**. More than a third of surveyed farmers are trying to plant improved or resistant rice varieties (36%) or seek to obtain better weather and early warning information (35%). Shifting planting or harvest cycles (31%), diversifying income sources (28%), and improved water management (24%) are other techniques employed by some.

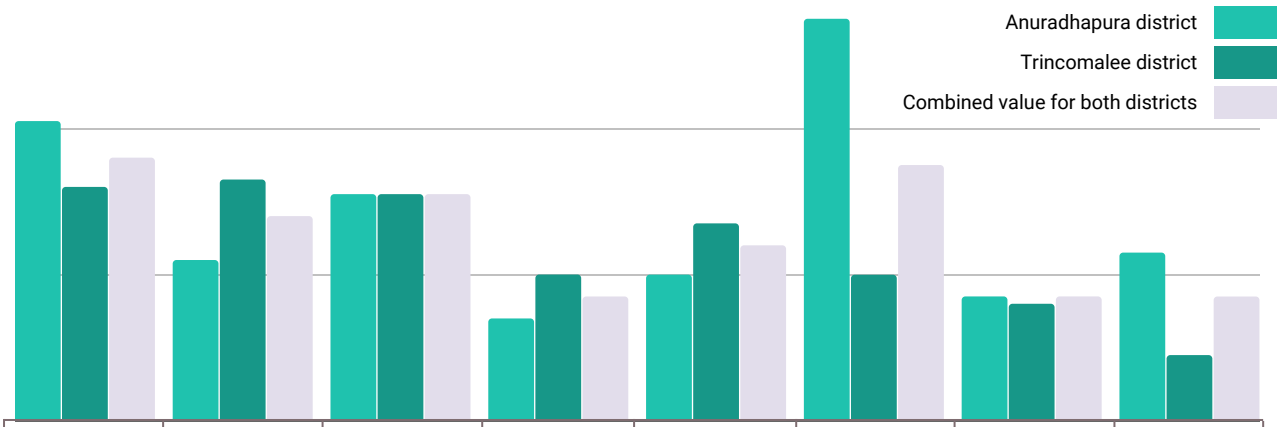
**– Mr. Dharmasiri Rathnayaka**

*Farmer, Morawewa, Trincomalee district*

"In times of dry weather, we have taken measures in recent years to cultivate other crops instead of paddy so farmers could have at least a small income. This was done to adapt to climate change. We must find solutions to help every farmer in this area."

## Adopted practices and coping methods (based on survey)

***Figure 10:*** *Current adaptive practices*




| | Improved or resistant rice varieties | Secondary income-generating activity | Shifting planting or harvest cycles | New harvest or planting methods | Improved water management | Seeking better early warning info | Seeking crop insurance | Abandoning agriculture |
|---|---|---|---|---|---|---|---|---|
| Anuradhapura district | 41% | 22% | 31% | 14% | 20% | 55% | 17% | 23% |
| Trincomalee district | 32% | 33% | 31% | 20% | 27% | 20% | 16% | 9% |
| Combined value for both districts | 36% | 28% | 31% | 17% | 24% | 35% | 17% | 17% |

## 4.3. Traditional risk management and resilience

Taking and managing risks is an inherent part of agricultural livelihoods due to uncertainties related to weather, plant growth, soil health, and interactions with natural ecosystems. **In Sri Lanka, farmers have developed effective strategies to minimize these risks** and amassed a body of local, traditional, and indigenous knowledge and practices, some of which are outlined in the table below:

### Weather-related risks

- Forecasting and traditional knowledge on weather patterns and seasons
- Water scarcity management through cascade tank systems and rainwater harvesting
- Enhanced water management and drainage systems to manage excess water

### Cultivation-related risks

- Intercropping and crop diversification, including through home gardening
- *Chena* cultivation (slash-and-burn)
- Growing other field crops (such as cowpea or green gram) during periods of water scarcity

### Ecosystem- and wildlife-related risks

- Natural and traditional pest and insect control methods and recipes
- Elevated watch huts or tree huts for early detection of elephants
- Traditional environmental knowledge

### General risk management

- Seed banks operated by farmer collectives
- Farmer associations, cooperatives, and community groups (e.g., *Praja Mandala*)
- Traditional risk sharing and risk smoothing (e.g., *Seettu* savings pool)
- Integrated crop-livestock or agroforestry

**– Ms. Chandra Galagoda**

*Farmer, Kalyanapura, Trincomalee district*

"Back then [in the 60s and 70s], during the period of October to November, we had a season of insect attacks (*Maehi Kanna*). But now, this period arrives untimely. [To deal with insects and other pests,] I also make a mixture of things such as *Neem* leaves, *Nika* leves, *Pawatta*, and *Elamotra* (cattle urine), stirred in hot water. After seven days, that mixture is nice and cool. Thereafter, I spray that oil onto the plants. That is how I used to do it back then as well."

However, due to accelerating climatic changes caused by global warming and anthropogenic greenhouse gas emissions, **many of these traditional practices are unable to adequately prepare and protect farmers**. More frequent and intense extreme weather events as well as a variety of long-term processes are reducing agricultural productivity and posing a threat to farmers' income, food security, health, and way of life.

To evaluate the current state of household resilience against climate-related risks, a survey and in-depth interviews in two of Sri Lanka's twenty-five districts were conducted and **a set of resilience indicators** developed. These indicators include diversification of livelihoods beyond farming, availability of irrigation except rainfed, and risk management practices outlined in **Figure 10** above, as well as financial inclusion and insurance.

**Using the example of survey respondents from Trincomalee district, the tables below showcase household resilience and financial capacities according to selected indicators**. The surveyed households, which are exposed to severe climate change impacts, have a low level of livelihood resilience as well as low to medium financial capacities across all income brackets, with limited livelihood diversification, limited risk management measures, and low insurance penetration. In addition, supply chain links are low, with most smallholder farmers having limited options to buy seeds and fertilizer, sell their produce, and receive financial advances or other support from supply chain actors.

Based on data from the survey, a gender-differentiated analysis suggests that **female-headed households have, on average, lower household resilience but similar financial capacities, and similar supply chain linkages**. In particular, the number of cultivated acres and additional income sources are lower for women as compared to men. This baseline situation highlights the need to strengthen and establish CDRFI solutions as well as to measure their impact over time by monitoring the indicators in regular intervals.

*For more information on the calculations below, please refer to our Working Paper on Household Profiles and Resilience Indicators for Climate Risk Transfer in Sri Lanka (2021).*

***Table 6:*** *Livelihood resilience indicators for surveyed households in Trincomalee district*

| Livelihood resilience, Trincomalee district | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Income bracket** | **Livelihood diversification** | | | | **Irrigation** | **Risk management** | | | | | | **Rating** |
| | Paddy | Other | Fish | Entrepr. | Non-rain | E1 | E2 | E3 | E4 | E5 | Other | |
| 0-10,000 | 4 | 1 | 8% | 28% | 72% | 32 | 20 | 24 | 24 | 24 | 44% | 16\|Low |
| 10-20,000 | 3 | 1 | 8% | 0% | 84% | 31 | 38 | 23 | 42 | 19 | 27% | 14\|Low |
| 20,000+ | 4 | 1 | 11% | 25% | 82% | 32 | 32 | 14 | 18 | 18 | 50% | 14\|Low |

*The table shows the average number of acres cultivated with paddy and other crops by survey respondents per income bracket (monthly family income in LKR) as well as the percentage of respondents per income bracket answering yes or no to questions on fisheries ("Do you practice fisheries or fish seedling cultivation?"), entrepreneurship ("Are you engaged in any other business activities?"), and risk management (E1: "Do you use improved or resistant rice varieties?"; E2: "Are you shifting planting or harvest cycles?"; E3: "Are you using new harvest or planting methods?"; E4: "Do you practice improved water management?"; E5: "Are you seeking better early warning information?"; Other: "Are you adopting a secondary income source, seeking crop insurance, or using any other adaptive practices?"). The rating is based on points, with every 20% adding 1 point and 1 point for every full acre of cultivation; total 0-16 = low, 17-32 = medium, and 33+ = high.*

***Table 7:*** *Financial capacities for surveyed households in Trincomalee district*

| Financial capacities, Trincomalee district | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Income bracket** | **Financial inclusion** | | | **Insurance penetration** | | | **Rating** |
| | Bank acc | Loans | Forms | Health | Business | Disaster | |
| 0-10,000 | 76% | 36% | 40% | 4% | 0% | 8% | 6\|Low |
| 10-20,000 | 88% | 77% | 54% | 0% | 0% | 4% | 9\|Low |
| 20,000+ | 100% | 93% | 75% | 14% | 0% | 32% | 13\|Medium |

*The table represents the percentage of survey respondents per income bracket (monthly family income in LKR) answering yes or no to questions on bank account ("Do you have a bank account?"), loans ("Do you have access to credit services or loans?"), forms ("Do you need assistance to fill official forms?"), and health, business, and disaster insurance ("Do you have health insurance, business insurance, or any insurance against disasters?"). The rating is based on points, with every 20% adding 1 point; total 0-10 = low, 11-20 = medium, and 21+ = high.*

# CHAPTER 5

# Sri Lanka's CDRFI ecosystem

*National stakeholder consultation, March 2021*


5.1. Institutional setup

5.2. Regulatory environment

5.3. Policies and plans

5.4. CDRFI systems

5.5. Emerging technologies

5.6. Summary of challenges


**Sri Lanka's enabling environment for CDRFI comprises institutions, laws, regulations, policies, plans, and guidelines**, as well as sources of finance and support for smallholder farmers, rural households, and other actors in food system supply and value chains. There are several instruments and mechanisms in place, but there is still significant potential for enhancement of the existing framework, including through adoption of modern technology, swift implementation of policies, enhanced coordination and cohesion, and multi-actor partnerships to close gaps.

# Chapter summary

## 5.1. Institutional setup

Key institutions for CDRFI in Sri Lanka include public and private finance and insurance actors as well as agencies for DRR, climate change, sustainable development, and agriculture.

## 5.2. Regulatory environment

Sri Lanka has a legal framework that governs finance and (re)insurance. However, there are opportunities to better address regulatory requirements and specific CDRFI instruments.

## 5.3. Policies and plans

Besides the regulatory environment, Sri Lanka also has several policies and plans related to climate risk and food systems. Key documents such as the Climate Prosperity Plan, the National Environment Policy, the Nationally Determined Contributions, or the National Adaptation Plan all include commitments and provisions related to risk transfer and the strengthening of insurance-based solutions as well as other relevant financial instruments.

## 5.4. CDRFI systems

Sri Lanka's existing CDRFI ecosystem comprises a range of instruments and mechanisms, including a compulsory crop insurance scheme, a national natural disaster insurance, a loan protection scheme, and social protection systems. Farmers enrolled in the compulsory crop insurance have the possibility to buy additional voluntary insurance for other crops, livestock, storage, equipment, implements, and health/accidents. These risk transfer mechanisms provide a degree of protection against key climate risks (such as floods, droughts, dry spells, excess water, pests, diseases, and wild elephant attacks), but are indemnity-based and sometimes slow to pay out.

## 5.5. Emerging technologies

Smallholder farmers in Sri Lanka currently have only limited adoption of modern technology; however, there is significant potential to use low-cost or cost-effective emerging technologies and innovations.

## 5.1. Institutional setup and stakeholder map

As a key part of Sri Lanka's economy, society, and heritage, food systems and agricultural risk management are **governed by overlapping regulatory and policy frameworks**, including those focused on agriculture, irrigation, land use, environment, climate change, disaster management, finance, and social protection.

**Key actors for enhancing the current CDRFI ecosystem in Sri Lanka and developing or strengthening risk transfer and risk finance solutions** include the subject ministries and departments for agriculture, livestock, and fisheries, the Climate Change Secretariat (CCS), the Sustainable Development Council (SDC), the Disaster Management Centre (DMC), the National Insurance Trust Fund (NITF), the Agriculture and Agrarian Insurance Board (AAIB), the Treasury and the Central Bank of Sri Lanka (CBSL), and the Department of Irrigation, as well as private sector entities (such as banks and insurance providers), academia and research institutions, civil society, communities, UN agencies, and development partners.

While many of these entities collect relevant data and operate schemes, mechanisms, and systems that relate to CDRFI in food systems, there is a need to enhance coordination, collaboration, exchange of information, and joint initiatives. Furthermore, **access to external funding is needed to keep sustaining these mechanisms and respond to emerging needs in the face of increasing climate impacts and climate-induced loss and damage**, as current funding for climate impacts and CDRFI comes primarily from domestic sources (including public funds, small premiums collected from farmers, and a mandatory contribution from the private sector through the "crop levy").

### Overall **institutional setup**

- Public finance sector (Ministry of Finance, Treasury, Central Bank of Sri Lanka)
- Public insurers (AAIB, NITF)
- Disaster management agencies (DMC, NBRO, Department of Meteorology)
- Key departments for climate change and sustainable development (CCS, SDC)
- Agriculture and food system departments
- Private finance and insurance sector

### Current **sources of finance**

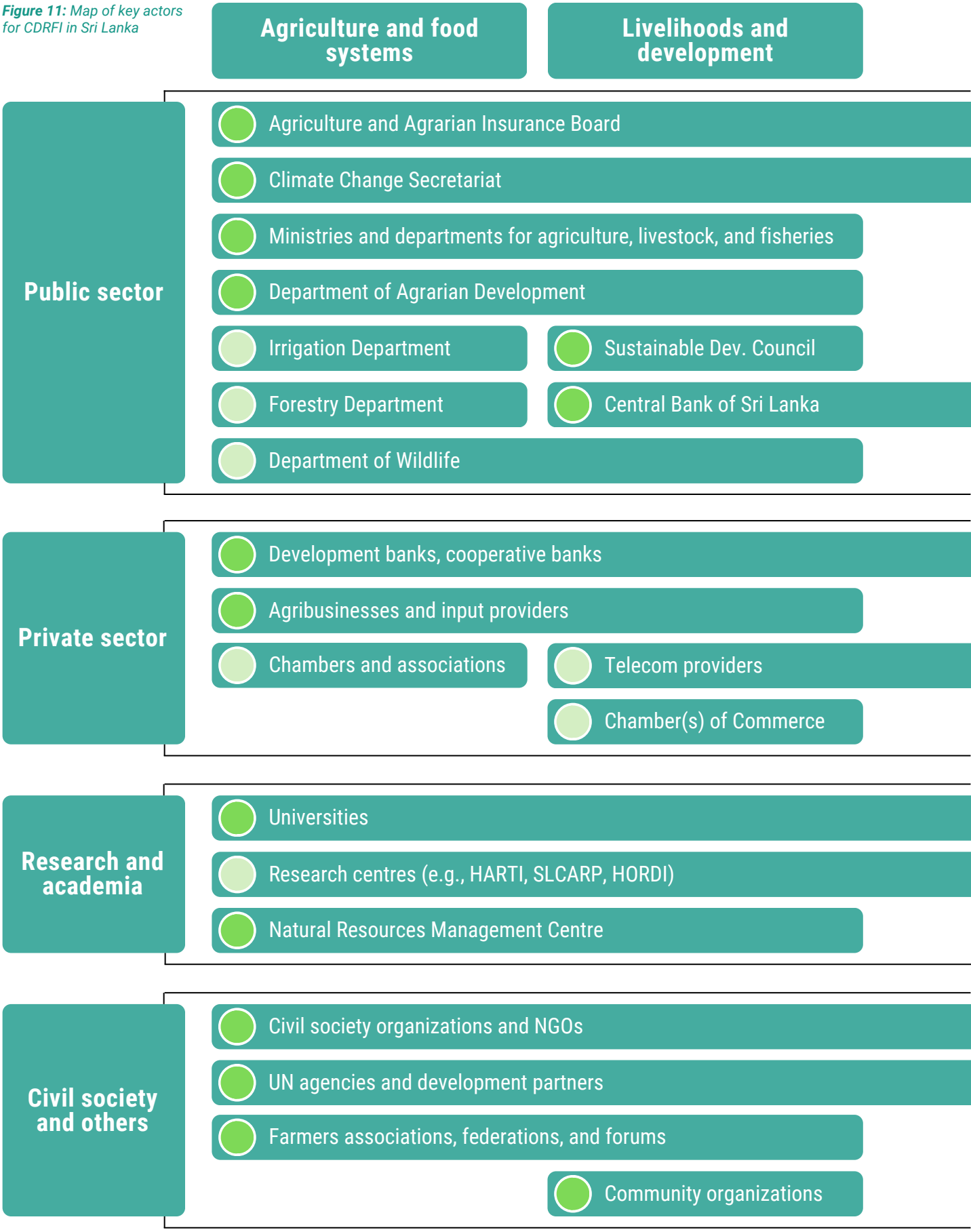
- National budget allocation
- Crop levy on financial institutions
- Automatic premium collection from all insured farmers during purchase of subsidized fertilizer
- Reinsurance (internal and external)

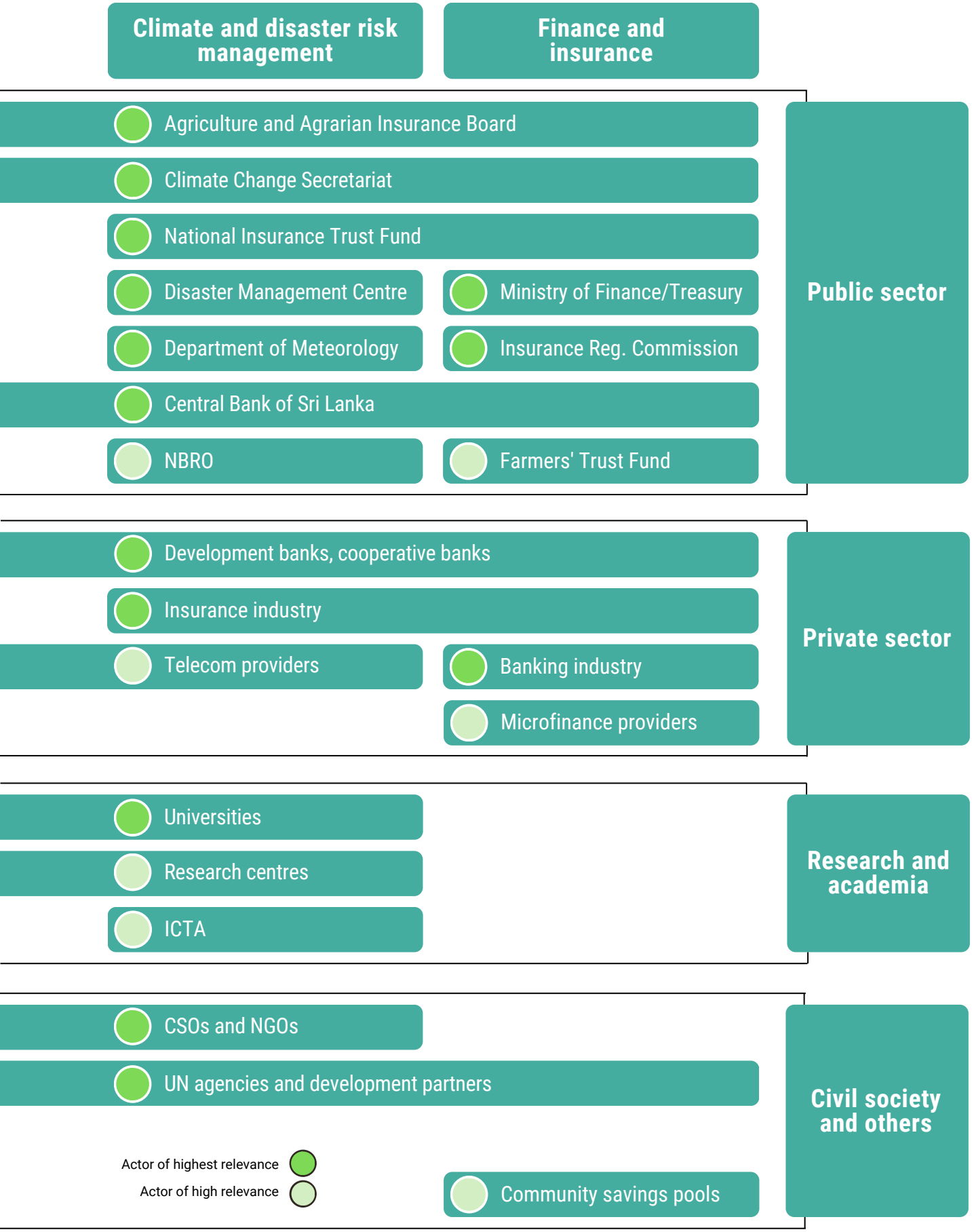
**– Mrs. J. Nirosha Saman Kumari**

*Farmer, Kivulakadawala, Trincomalee district*

"I have engaged in farming since I was 15 years old. We grow paddy, coconuts, mangoes, and various other crops. However, our crops constantly get attacked by wild animals such as monkeys and elephants. [...] One day, it rained for three consecutive days after we had brought the harvest home. About 24,000 to 26,000 kilos of paddy got caught in the rain. The entire harvest turned black. I had to sell a kilo of paddy only for about LKR 15 to 18. With that, I could not pay back my loans and went into debt. [...] We continue our livelihoods amidst such obstacles."

*Figure 11: Map of key actors for CDRFI in Sri Lanka*




Climate and disaster risk management
Finance and insurance
Agriculture and Agrarian Insurance Board
Climate Change Secretariat
National Insurance Trust Fund
Disaster Management Centre
Ministry of Finance/Treasury
Department of Meteorology
Insurance Reg. Commission
Central Bank of Sri Lanka
NBRO
Farmers' Trust Fund
Public sector
Development banks, cooperative banks
Insurance industry
Telecom providers
Banking industry
Microfinance providers
Private sector
Universities
Research centres
ICTA
Research and academia
CSOs and NGOs
UN agencies and development partners
Community savings pools
Civil society and others
Actor of highest relevance
Actor of high relevance

## 5.2. Regulatory environment

**Sri Lanka's insurance sector is governed by a legal and regulatory framework based on several key acts** (including the Agriculture and Agrarian Insurance Board Act of 1999, the Regulation of Insurance Industry Act of 2000, and the National Insurance Trust Fund Act of 2006, including amendments) as well as laws, regulations, and policies across sectors such as agriculture, disaster management, and finance. This enabling environment governs the availability of different insurance products and instruments as well as the involvement of the private sector and the potential for public-private partnerships.

In general, **legal and regulatory risk is a major barrier to private sector involvement in CDRFI solutions**, particularly in developing countries. Few developing countries have specific legal and regulatory frameworks for index insurance, which exposes insurers to considerable uncertainty. Unknown legal status and taxation, exposure to potential lawsuits and regulatory action, and the possibility of future changes in regulations that may require costly adjustments reduce the viability of index insurance schemes and disincentivize private companies to enter the market for parametric climate insurance, particularly in the agriculture sector.

To facilitate and enhance the availability of effective and innovative risk transfer instruments, it is vital to have **a regulatory framework that can minimize, avert, and address relevant risks and provide legal certainty for insurers, and ensure consumer protection mechanisms for the insured**. A fair, safe, and stable insurance market benefits all actors and stakeholders and can accelerate the development and market penetration of climate and agricultural insurance schemes as part of the formal insurance sector.

*Categories of insurance-related risks in Sri Lanka:*

### Legal and regulatory risk

- Legal risk of unenforceable contracts
- Regulatory risk of changes in regulatory framework; compliance risk
- Risk of supervisory action or settlements
- Risk of insufficient supervisory capacity and resources to regulate insurance

### Prudential risk

- Risk related to financial soundness/solvency
- Underwriting risk and credit risk
- Data and data access risk

### Market conduct risk

- Risk related to market functioning, integrity, and efficiency integrity

### Conduct of business risk

- Risk of unfair treatment of customers and lack of consumer protection or client value
- Reputational risk

### Operational risk

- Operational risk related to internal systems, procedures, or processes
- Risk related to business disruption or systems failure (incl. fraud and errors)
- Custody risk
- Risk of insufficient technical capacity of personnel
- Risk of insufficient consumer understanding, financial literacy, and inclusion

### Insurance product risk

- Adverse basis risk, mismatch of compensation and losses
- Lack of insurable interest
- Risk of adverse selection
- Risk of moral hazard

The enabling environment for climate and agricultural insurance is comprised of several **legal and regulatory acts, instruments, and provisions**. The following table gives an overview of the legal framework and the key ordinances, acts, and regulations relevant to the insurance industry as well as climate change, agriculture, risk management, and social protection.

***Table 8:*** *Key laws and regulations relevant to CDRFI in Sri Lanka*

| Act or regulation | Description |
|---|---|
| **Securities and Exchange Commission of Sri Lanka Act No. 19 of 2021** | Establishes the Securities and Exchange Commission of Sri Lanka and provides provisions for a fair, orderly, efficient, and transparent securities market. |
| **Microfinance Act No. 6 of 2016** | Provides for licensing, regulation and supervision of companies carrying on microfinance business (LMFCs). |
| **Finance Business Act No. 42 of 2011** | Provides for control and supervision of licensed finance companies. |
| **National Insurance Trust Fund Act No. 28 of 2006** | Establishes National Insurance Trust Fund (NITF) and an insurance scheme. |
| **Sri Lanka Disaster Management Act No. 13 of 2005** | Establishes the National Council for Disaster Management, the Disaster Management Centre, and the technical committees. |
| **Finance Leasing Act No. 56 of 2000** | Provides for the regulation and monitoring of finance leasing businesses and the rights and duties of lessors and lessees. |
| **Agrarian Development Act No. 46 of 2000** | Addresses matters relating to paddy cultivation and land governance. |
| **Regulation of Insurance Industry Act No. 43 of 2000** | Establishes Insurance Board of Sri Lanka for the development, supervision and regulation of the insurance industry. |
| **Agriculture & Agrarian Insurance Board Act No. 20 of 1999** | Establishes the Agricultural and Agrarian Insurance Board and Agricultural and Agrarian Insurance Fund. |
| **Credit Information Bureau of Sri Lanka Act No. 18 of 1990** | Provides a centralized source of information on the creditworthiness of individuals and businesses. |
| **Recovery of Loans by Banks (Special Provisions) Act No. 4 of 1990** | Provides for the recovery of loans granted by banks for the economic development of Sri Lanka, including rural development banks. |
| **Banking Act No. 30 of 1988** | Provides for the licensing and regulation of banking business. |
| **Control Of Insurance Act No. 42 of 1986** | Governs the incorporation and operation of insurance and reinsurance companies. |

| Act or regulation | Description |
|---|---|
| **Regional Rural Development Banks Act No. 15 of 1985** | Establishes Rural Development Banks by the Monetary Board of the Central Bank of Sri Lanka to develop the rural economy |
| **The State Mortgage and Investment Bank Law No. 13 of 1975** | Establishes the Ceylon State Mortgage Bank and the Agricultural and Industrial Credit Corporation to assist in the development of agriculture, industry and housing. |
| **Insurance Corporation Act No. 2 of 1961** | Provides for the establishment of an insurance corporation for carrying on life insurance and other insurance business. |

The existing legal framework provides for the governance and regulation of finance and insurance mechanisms and entities. In addition to laws and regulations directly referring to finance, insurance, and CDRFI, there also **several other sectors that are relevant to climate change and the environment, risk management and social protection, and food systems**. The following provides a brief overview of a selection of acts and the authorities, entities, or systems that they establish:

### Climate change and the environment

- Sri Lanka Sustainable Development Act No. 19 of 2017 (integrating SDGs into national processes)
- Forest (Amendment) Act No. 65 of 2009 (conservation, protection, and sustainable management of the forest resources)
- Plant Protection Act No. 35 of 1999
- Soil Conservation Act No. 24 of 1996 (conservation and restoration of soil resources)
- National Heritage Wilderness Areas Act No. 3 of 1988 (environmental conservation)
- National Environmental Act No. 47 of 1980
- Fauna and Flora Protection Act No. 38 of 1949 (protection of biodiversity)

### Risk management and social protection

- Divineguma Act No. 1 of 2013 (*Samurdhi* update)
- Resettlement Authority Act No. 9 of 2007 (resettlement of internally displaced persons)
- Welfare Benefits Act No. 24 of 2002 (welfare benefits safety net)
- Reconstruction and Rehabilitation Fund Act No. 58 of 1993 (fund for relief and rehabilitation projects)
- Fishermen's Pension And Social Security Benefit Scheme Act No. 23 of 1990 (pension and social security for fishermen)
- Farmers' Pension and Social Security Benefit Scheme Act No. 12 of 1987 (pension and social security for farmers)
- Co-operative Societies Law No. 5 of 1972 (development of co-operative societies)

### Food systems

- New Villages Development Authority for Plantation Region Act No. 32 of 2018
- Seed Act No. 22 of 2003
- The Fisheries and Aquatic Resources Act No. 2 of 1996
- The Paddy Marketing Act No. 58 of 1993
- The Mahaweli Authority of Sri Lanka Act No. 23 of 1979 and No. 59 of 1993
- The Promotion of Export Agriculture Act No. 46 of 1992
- Regulation of Fertilizer Act No. 68 of 1988
- Animal Feed Act No. 15 of 1986
- State Agricultural Corps. Act No. 11 of 1972
- The Agrarian Research and Training Institute Act No. 5 of 1972 (HARTI)
- Water Resources Board Act No. 29 of 1964
- Irrigation Ordinance No. 32 of 1946

The section above outlines the **multitude of risks related to insurance in Sri Lanka as well as the country's existing legal environment**. To facilitate risk-informed, safe, and reliable development and implementation of risk transfer mechanisms, a national legal and regulatory framework needs to be able to provide formality, legal certainty, fairness, safety, stability, a level playing field for both public and private actors, room for diverse products and services, space for innovation, and strong links to international financial and insurance markets.

The table below provides an **overview of these various regulatory requirements, the country situation in Sri Lanka, and recommendations to enhance** the national legal and regulatory framework for insurance.

***Table 9:*** *Recommendations for enhancing the regulatory environment*

| Regulatory requirement | Country situation | Recommendations |
|---|---|---|
| **Regulatory framework that addresses risks related to insurance** | • Limited specific regulatory provisions for microinsurance<br>• Limited specific regulatory provisions for index-based insurance (addressing issues with insurable interest, basis risk etc.)<br>• No government policy that addresses insurance, reinsurance, and capital market solutions as forms of CDRFI | • Increasing supervisor accessibility and openness<br>• Shifting towards risk-based supervision and solvency (principle of proportionality)<br>• Establishing regulatory framework for microinsurance providers that includes transparency, grievance handling platforms, a database for market research, encourages innovation, and promotes outreach to rural areas |
| **Formality and legal certainty for insurers** | • Mandatory separation of life and non-life insurance operations | • Easing formalization and entrance into the market (insurance licenses) |
| **Fair, safe, and stable insurance market** | • Financial market qualification system<br>• Average claims ratio of just 34%; limited understanding of insurance mechanisms among customers<br>• Insurance penetration and premium income have increased over recent years but remain relatively low | • Requiring listed companies to indicate the extent to which their properties, stock, liability, and other assets are insured and their enterprise risk management framework<br>• Ring-fencing of public insurance funds and subsidies |
| **Level playing field for all insurers and reinsurers** | • SLIC and NITF have dominant market position for public-sector insurance | • Common regulatory oversight and requirements for all players on the insurance market |

| Regulatory requirement | Country situation | Recommendations |
|---|---|---|
| | • AAIB is currently not supervised by the IRCSL and not subject to risk-based capital and regulatory requirements | • Using public funds (e.g., crop levy collected from financial institutions) to reduce market inefficiencies and facilitating private sector engagement in CDRFI in food systems |
| **Room for diverse services and insurance products as well as innovation and pilot schemes** | • High administrative costs in reaching remote rural communities<br>• Currently no derivatives or commodities exchange products<br>• Requirement of "insurable interest" set out under paragraph 34 (a) of the Regulation of Insurance Industry Act poses potential issues for parametric insurance | • Providing subsidies or tax exceptions and change<br>• Removing restrictions on the use of distribution channels and inappropriate distribution channel requirements<br>• Removing limitations on bundling financial and non-financial products<br>• Shortening approval times for new products<br>• Mechanisms for data-sharing, timely and reliable access to data, and independent data validation<br>• Regulatory sandboxes (safe environment to foster innovation or focus on inclusion)<br>• Innovation hubs (supervisor providing practical support to innovative insurance providers) |
| **Strong links to international reinsurers and financial markets** | • Currently no insurance-linked securities (such as catastrophe bonds) available<br>• Lack of separation between insured and insurer for NITF; it is insurer, policyholder, and loss adjuster in one, which could pose an issue for reinsurers | |

## 5.3. Policies and plans

Besides the regulatory environment, **national policies, strategies, and plans play a critical role for facilitating CDRFI solutions and the creation of a CDRFI ecosystem** that can effectively cover different sectors and levels.

Sri Lanka's **Nationally Determined Contributions (NDCs)** are the key document outlining national commitments for climate change mitigation, adaptation, risk management, and other forms of climate action. Sri Lanka submitted its first (I)NDCs in 2015/2016 and its updated NDCs in July 2021, with an amended version submitted in September 2021 and the next submission due by 2025.

The NDCs of Sri Lanka are structured around **six sectors for mitigation** (electricity/power, transportation, industry, waste management, forestry, agriculture) and **nine sectors for adaptation** (agriculture, fisheries, livestock, water, biodiversity, coastal and marine, health, urban planning and human settlements, tourism and recreation). In addition, the NDCs also contain **a dedicated sector for loss and damage (L&D)** as well as cross-cutting chapters on means of implementation as well as integrating the SDGs and gender. The L&D sector as well as other sectors include several commitments related to CDRFI, including the following:

**Agriculture**

- *Strengthen risk management and risk transfer mechanisms in agriculture (NDC 6.3)*
- *Strengthen early warning systems/ advisory for climate hazards and pest and disease risks (NDC 6.4)*
- *Promote protected agriculture and other technologies for climate risk management (NDC 6.6)*

**Fisheries**

- *Introduce effective early warning transmission systems for fishers (including small boats and*
- *traditional crafts) and insurance schemes (NDC 5.2)*
- *Enhance access to credit, inputs training for diversification of livelihoods of the vulnerable*
- *fisherfolk (NDC 6.1)*

**Livestock**

- *Access to risk management and financing to support adaptation to climate risks and changes (NDC 3.4)*

**Loss and Damage**

- *Conduct a gap analysis to assess the current status and understanding of L&D (NDC 1)*
- *Improve data management systems to record losses and damages per sector (NDC 3)*
- *Establish an over-arching, nationally appropriate, functional institutional mechanism for L&D (NDC 4)*
- *Develop a comprehensive risk management framework [...] to recover residual L&D by incorporating appropriate mechanisms for risk transfer (NDC 5)*

**Other Sectors**

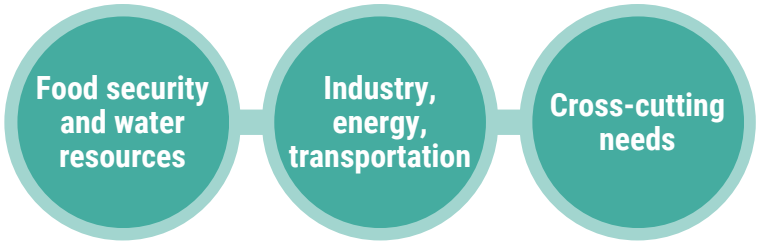
- *Prepare updated vulnerability and risk maps for the coastal belt (Costal and Marine NDC 2)*
- *Risk assessment for all hazards including climate-related events for the health sector (Health NDC 5.2)*
- *Integrate most current climate change risk and vulnerability into physical planning and establish a climate-resilient built environment (Human Settlements NDC 1.1 and NDC 2)*
- *Develop a climate-inclusive insurance scheme for risk management in tourism (Tourism NDC 2.4)*

***Sri Lanka's NDCs** include commitments that relate to CDRFI solutions in food systems and as various cross-cutting considerations that could connect to L&D.*

***Figure 12:** CDRFI in Sri Lanka's Nationally Determined Contributions*

In addition to the NDCs, Sri Lanka has also formulated a **National Adaptation Plan (NAP)** that focuses on planning and implementation related to the NDC's adaptation components. Priority sectors in the NAP include food security, water resources, coastal and marine, health, human settlements and infrastructure, ecosystems and biodiversity, tourism and recreation, export agriculture, and industry, energy, and transportation.

Similar to the NDCs, the NAP also contains **references relevant to CDRFI across several of the sectors**, including related to food systems, agriculture-based supply chains, and cross-cutting considerations.




- *Strengthen early warning systems*
- *Develop network-based communication systems*
- *Identify and collect information on areas most vulnerable to floods, droughts, and landslides*
- *Introduce innovative risk transfer instruments to improve supply chains for agro-based raw materials*
- *Develop forward contract markets for agro-based raw materials*
- *Carry out a policy study to explore the possibilities for application of market-based instruments to motivate adaption*
- *Identify and assess feasibility of introducing innovative risk transfer tools*

***Sri Lanka's NAP** references CDRFI for food systems and as a cross-cutting consideration that aligns with the commitments made under the adaptation sectors in the country's NDCs.*

***Figure 13:** CDRFI in Sri Lanka's National Adaptation Plan*

**CDRFI is recognized as an important aspect of adaptation and addressing loss and damage, embedding it firmly in the national climate policy framework**. While relevant commitments are included across several sectors--including coastal and marine, health, human settlements, tourism, and industry--a special focus is placed on food systems as a vital vulnerable sector.

To provide a more in-depth overview of the policy environment, the following table outlines the **key government policies and plans related to food systems, climate change, disaster risk management, and risk finance in Sri Lanka** and provides a summarized version of relevant objectives and commitments.

***Table 10:*** *CDRFI provisions in Sri Lanka's key policies and plans*

| Policy or plan | Year | Description |
|---|---|---|
| **Climate Prosperity Plan** | 2022 | • Aims to promote risk-informed investment and enable progressive coverage of financial/social protection, including insurance for core climate and disaster risks.<br>• Aims to strengthen credit for domestic banks to enable the financing of adaptation and resilience projects, including through partial credit guarantees, insurance and risk sharing, and subordinated debt investment.<br>• Commits to setting up a Sustainable Insurance Facility that integrates MSME insurance as a core offering via private sector banks and wholesale buyer/seller associations to extend financial protection. |
| **Third National Communication** | 2022 | • Highlights the potential usefulness of promoting weather-based insurance schemes. |
| **Green Finance Taxonomy** | 2022 | • Aims to provide affordable insurance products to increase climate resilience of agricultural and tourism activities, including weather insurance, crop insurance, agricultural asset, livestock, aquaculture production insurance, and tourism safety insurance products. |
| **National Environment Policy** | 2022 | • Aims to introduce innovative insurance products to mitigate threats like climate-induced disasters and human- elephant conflict through a market-based risk management tool with necessary institutional support.<br>• Aims to establish local mechanisms to recover losses and damages from climate change impacts will be designed in line with the WIM, including measures for strengthening weather/climate forecasting, establishing early warning systems, and facilitating index- based climate insurance schemes. |
| **National Environmental Action Plan 2022-2030** | 2021 | • Lists the need for insurance schemes to enhance the safety of fishermen at sea against extreme conditions caused by climate change. |
| **National Agriculture Policy (Draft)** | 2021 | • Commits to designing and adopting weather index-based climate risk management tools. |

| Policy or plan | Year | Description |
|---|---|---|
| **Nationally Determined Contributions** | 2021<br><br>2016 | • Commits to strengthen risk management and risk transfer mechanisms in the agriculture sector.<br>• Commits to introducing effective early warning and insurance systems for the fisheries sector.<br>• Commits to develop climate-inclusive insurance schemes for risk management in the tourism sector.<br>• Commits to introduce possible insurance schemes to recover climate-induced L&D to livelihoods, properties, infrastructure, agriculture, fisheries, and other affected sectors. |
| **National Drought Plan for Sri Lanka** | 2020 | • Commits to promoting drought insurance facilities for the agriculture sector and designing an index-based drought insurance product.<br>• Highlights the role of AAIB in addressing the risks faced by approximately one million smallholder farmers during climate catastrophe events through an efficient and affordable crop insurance product.<br>• Outlines the potential usefulness of indices to assess the severity of drought for crop insurance. |
| **Sri Lanka Overarching Agricultural Policy** | 2020 | • Outlines existing subsidized crop insurance and concessionary rural credit mechanisms. |
| **Roadmap for Sustainable Finance in Sri Lanka** | 2019 | • Commits to supporting and encouraging industry players towards innovation on climate and disaster insurance products and exploring insurance solutions for environmental risks and social inclusion, including climate and crop insurance.<br>• Aims for insurance companies to develop accessible, affordable, and effective climate insurance products tailored to low-income households and MSMEs. |
| **National Fisheries and Aquaculture Policy** | 2018 | • Commits to promoting the establishment of insurance schemes concerning safety at sea and occupational safety in the fisheries sector. |
| **National Adaptation Plan for Climate Change Impacts in Sri Lanka 2016-2025** | 2016 | • Commits to carrying out a policy study to explore the possibilities for application of market-based instruments to motivate adaptive actions and identify and assess feasibility of innovative risk transfer tools.<br>• Commits to introducing innovative risk transfer instruments. |

| Policy or plan | Year | Description |
|---|---|---|
| National Biodiversity Strategic Action Plan 2016-2022 | 2016 | • No reference to CDRFI mechanisms or instruments. |
| Sri Lanka National Emergency Operation Plan 2015-2019 | 2015 | • Mentions Catastrophe Risk Deferred Drawdown Option (Cat-DDO) under financial instruments available to Sri Lanka in a state of emergency. |
| National Action Program for Combating Land Degradation in Sri Lanka 2015-2024 | 2014 | • No explicit reference to CDRFI mechanisms or instruments but commits to scaling up adaptive measures and integrating risk reduction into physical planning. |
| Technology Needs Assessment and Technology Action Plans for Climate Change Adaptation 2011-2013 | 2014 | • Commits to assisting financial institutes to offer insurance schemes for community-based fisheries. |
| Sri Lanka Comprehensive Disaster Management Programme 2014-2018 | 2014 | • Aims to availability of risk information to help expand the insurance industry.<br>• Proposes to review existing insurance/risk transfer mechanisms and develop systems that are appropriate and affordable.<br>• Aims to investigate the potential to use new risk transfer systems used globally and regionally to<br>• strengthen country capacity such as pool funding or emergency fund access mechanisms. |
| National Climate Policy | 2012 | • No reference to CDRFI mechanisms or instruments. |
| National Physical Planning Policy and Plan 2011-2030 | 2011 | • No reference to CDRFI mechanisms or instruments. |
| National Climate Change Adaptation Strategy 2011-2016 | 2011 | • Lists among the priority adaptation actions the encouragement of risk transfer methods such as insurance and commits to promoting risk transfer initiatives and providing support for farmers. |
| National Policy on Disaster Management | 2010 | • Highlights the public right to receive information, services, and facilities before and after disasters, including documentation and insurance services. |

| Policy or plan | Year | Description |
|---|---|---|
| | | • Commits to improving fiscal resilience to disasters through efficient budgetary mechanisms, access to contingent credit, and sovereign and private catastrophe insurance products based on a fiscal disaster risk assessment. |
| **National Livestock Development Policy** | 2004 | • Aims to encourage and facilitate private sector engagement (including farmer organizations and producer cooperatives) in animal husbandry extension including credit, financing, and risk insurance. |

As shown in the table above, key documents such as the Climate Prosperity Plan, the National Environment Policy, the Nationally Determined Contributions, or the National Adaptation Plan all include commitments and provisions related to risk transfer and the strengthening of insurance-based solutions as well as other relevant financial instruments.

Out of **18 analyzed national policy documents that reference CDRFI, two thirds have been developed from 2015 onwards** (post-Paris Agreement), **and fifty percent in or after 2020**. Previous versions of most sectoral policies did not mention risk transfer, insurance, risk finance, or similar instruments, indicating a shift in direction towards enhanced integration of CDRFI solutions.

**More recent policies have expanded CDRFI-related goals towards additional sectors and in more detailed ways**, particularly in the context of climate change and climate-induced loss and damage. In addition to these policies and plans, there are also other documents, such as the **National Guidelines for Climate-Smart Agricultural Technologies and Practices** (2019), which refer to risk transfer and CDRFI solutions.

**– Mr. K. K. P. Karunaratna**

*Farmer, Trincomalee district*

"It has been about eight years since I started farming. Initially, I had no desire for that but since I couldn't find a job, I eventually got used to farming. [...] [T]he most convenient job that can be done here for survival is engaging in agriculture. I finally accepted it as something that I inherited."

**However, there is scope to strengthen the implementation of the existing commitments, especially at the sectoral and local level**, for example, through improving the coordination of different mechanisms, securing additional sources of finance, ensuring inclusive and participatory processes, and further main-streaming CDRFI solutions into Sri Lanka's policy landscape.

## 5.4. CDRFI systems

**Sri Lanka has an existing ecosystem of CDRFI instruments and mechanisms, including crop insurance schemes which have been running since 1958**. This was initiated with a pilot project in selected areas and later expanded to several nationwide agricultural insurance schemes. Initially managed by the Crop Insurance Board, these schemes are now overseen by the Agriculture and Agrarian Insurance Board (AAIB) as well as the National Insurance Trust Fund (NITF), which has been contributing to crop insurance fund maintenance since its establishment in 2006.

Since its inception, crop insurance in Sri Lanka has undergone various changes in modalities and operations. As of 2021, two main insurance schemes for farmers were operated by the AAIB: a **compulsory crop insurance scheme for those registered for the fertilizer subsidy** distributed by the Department of Agriculture through Agrarian Service Centers (farmers certified as eligible for the fertilizer subsidy by agrarian service officers); and **voluntary insurance schemes** for crops, livestock, storage, equipment, implements, and health/accidents (*Suwasetha*).

As per the Insurance Regulatory Commission of Sri Lanka, there are currently **27 registered insurance companies, 68 registered insurance brokers, 23 registered loss adjusters, and one national reinsurer** (the NITF). Of these insurance companies, 18 offer non-life insurance, with many issuing natural disaster or catastrophe coverage as extensions of existing fire and allied perils policies. Private sector crop insurance is offered by several companies, although penetration of private crop insurance schemes is lower than the voluntary schemes operated by AAIB and has remained comparatively low since the market was opened to private sector in 1999.

### Public crop insurance scheme

See next pages for a detailed explanation.

### National natural disaster insurance scheme

Operated by the NITF, this scheme provides coverage for damages caused by natural disasters (except drought and fire but including not climate-related disaster) to houses, home appliances, and SMEs across the island, with claim amounts up to LKR 2.5 million.

### Loan protection scheme

This insurance scheme covers risks to financial institutions that provide loans related to paddy cultivation and covers drought, flood, and wild elephant attack damages up to LKR 10,000 per acre depending on the cultivation phase. This scheme is operated by the NITF and financed through a crop levy of 1% of profit after tax that is collected from all financial institutions in Sri Lanka under the purview of the Banking Act No. 30 of 1988, the Finance Companies Act No. 78 of 1988, and the Regulation of Insurance Industry Act No. 43 of 2000.

### Social security and protection

There is also a multitude of social protection systems (such as cash transfer programmes including *Samurdhi*, *Surekuma*, and *Pin Padi*), pensions, disability allowance, subsidies to key commodities, scholarships, and disaster relief, as well as in-kind programmes including school feeding and maternal nutrition.

The **compulsory crop insurance scheme operated by AAIB** covers the cultivation of all registered farmers for six basic crops and can be further expanded through separate premium payments if farmers want to cover other crops, livestock, equipment, storage facilities, or health. It is part of a ecosystem of insurance mechanisms (both public and private) as well as disaster relief funds, social security, social protection, and market-based instruments that can transfer, share, or pool climate-related risks. The following section dives deeper into the AAIB scheme:

## Coverage

**Under the compulsory scheme, six basic crops (paddy, maize, soybean, big onion, potato, and chilies) are insured against floods, droughts, dry spells, excess water, pests and diseases, and wild elephant attacks**. The insurance covers up to LKR 40,000 (USD 200-214 in 2021) per acre for damages to any of the above crop cultivations (starting with LKR 3-4,000 per acre one month after the last declared day of sowing and going up to LKR 14,000 from the second and LKR 21,000 from the third month after sowing) depending on the cultivation stage of the crop and different levels of risk based on the water source utilized for cultivation. All varieties of paddy are covered.

**For the voluntary scheme, farmers have the option to insure additional crops** (green gram, black gram, peanuts, sugarcane, tea, coconut, ginger, banana, export crops, vegetables, and fruits), **livestock** (goats, cattle, and heifers), **agricultural equipment or implements (including tractors), storage facilities, and accidents/health**. However, data indicates that penetration of the voluntary scheme is relatively low, although farmers often obtain it as a requirement to access loans from formal financial institutions.

## Premiums

For the compulsory scheme, **insurance premiums are paid automatically when farmers buy government-subsidized chemical fertilizer** (urea, trisodium phosphate, and potassium chloride) under the *Kethata Aruna* programme (as of 2020/2021 before policy changes), with an amount of LKR 150 out of LKR 500 total payment for a 50 kg bag of fertilizer going toward the insurance. Access to this scheme is based on registration of farmers with the government, while **for the voluntary scheme, farmers pay a premium to the AAIB**. For livestock insurance, farmers pay a percentage of the worth of the animal based on its condition and risk patterns as determined by actuaries.

## Triggers and payouts

Both insurance schemes are indemnity-based, which requires **losses and damages to be assessed on the ground before compensation payments can be made**. These assessments are carried out by agrarian officers and officers from the Divisional Secretariats, with the calculation for compensation amounts based on tables at the agrarian office.

Once the assessment/claim is submitted at the district level, it is transferred to the main AAIB office and then to the Treasury for disbursement of funds. For the initial payouts to be received, farmers need to have an account at a government bank (i.e., Bank of Ceylon, Regional Development Bank, National Savings Bank, People's Bank), failing which the amounts are issued via crossed cheque. Payouts are usually made at the end of the season after an assessment of damages to the cultivation has been carried out against a **baseline established by actuaries at the beginning of each season**.

## Outreach

Outreach is conducted through an **AAIB officer present at the seasonal *Kanna* meetings of farmer associations** to strengthen awareness of the compulsory insurance and advice farmers on additional insurance options. However, challenges and difficulties are faced in establishing proof of land or livestock ownership, as well as the tracking of individual livestock. AAIB (through Agrarian Services or banks) also provides instructions on how to pay premium installments and contribute to the insurance.

## Data and information

The Department of Meteorology operates a network of 42 **automated agrometeorological stations throughout the country to gather continual weather data**, which is published in the weekly "agro-meteorological bulletin." Raw weather data as well as historic data can be accessed from these stations as well as the rain gauges operated by the Irrigation Department which collect further relevant weather data. The government also issues cultivation advisory to farmers through channels, such as toll-free advisory and notification services, as well as disaster information (DMC, NBRO).

## Laws and regulations

**Main laws governing agricultural insurance in Sri Lanka** are the Agriculture and Agrarian Insurance Board Act No. 20 of 1999, the Regulation of Insurance Industry Act No. 43 of 2000, and the National Insurance Trust Fund Act No. 28 of 2006. Further relevant legislation includes the Agricultural Lands Act No. 42 of 1973, the Securities and Exchange Commission of Sri Lanka Act No. 36 of 1987, the Farmers' Pension and Social Security Benefit Scheme Act No. 12 of 1987, the Fishermen's Pension and Social Security Benefit Scheme Act No. 23 of 1990, the Agrarian Development Act No. 46 of 2000, the Sri Lanka Disaster Management Act No. 13 of 2005, and the Agrarian Development (Payment of Compensation) Regulations No. 1 of 2013.

While current public crop insurance schemes in Sri Lanka are indemnity-based, the Government as well as other actors are **developing or piloting parametric crop insurance schemes**. This includes a pilot scheme operated by the AAIB to provide weather-index based insurance to farming communities in several districts (such as Hambantota, Gampaha, or Vavuniya).

**Parametric insurance has the potential to provide faster, more transparent compensation payouts; reduce moral hazard and adverse selection; and simplify operations**. However, parametric insurance instrument can encounter issues related to basis risk, data, and expertise required for product design.

## 5.5. Emerging technologies

The majority of Sri Lanka's farmers are smallholders who are **utilizing modern technology only to a limited degree, partially due to constraining factors** such as small field size, irregular field boundaries, cloudy growing seasons, limited capital, and lack of technical expertise and literacy.

However, there is a **significant potential to adopt low-cost and cost-effective emerging technologies** to benefit smallholder farmers and allow them to better plan and monitor their cultivation, manage risks, and link them with markets.

***Table 11:*** *Existing technology initiatives in Sri Lanka's food systems*

| | |
|---|---|
| **Digital advisory and extension**<br>*Extension services; general agronomy support; nutrition; market, price, and subsidy calculation; artificial intelligence and machine learning; livestock information; pest management; seeds and fertilizer; soil and land management; water and irrigation; weather and climate services* | • Toll-free agriculture advisory service (DOA)<br>• Saviya Dialog advisory service<br>• Govi notification, information, and technical guidline services<br>• Web-based weather forecasting pilot project for crop advisories (NRMC/DOM)<br>• Central database and information management system for stakeholders in the agriculture sector (Ministry of Agriculture, currently in development)<br>• Jaffna Agriculture Information Center |
| **Digitized farm tools**<br>*Farm management software; digital support for precision agriculture* | • Agriculture Sector Modernization Project<br>• Technical Assistance to the Modernization of Agriculture Programme<br>• Digital Paddy Land Registry project (DAD) |
| **Digital market linkages**<br>*Agricultural inputs; output market links; service provider links; supply chain management* | • Smallholder Agribusiness Partnerships<br>• WFP's Last Mile Climate Services & Resilience Building of Smallholders<br>• Digitalized supply chain partnerships or loan schemes |
| **Financial services and fintech**<br>*Credit tools; financial training; payment gateways and network payment processors; digital lending; mobile or digital wallets; price comparison tools; savings tools; digital payment solutions; mobile payment and app-based solutions; insurtech; e-infrastructure providers; digital ledgers; financial data aggregators* | • Sri Lanka Bankers' Association (SLBA) Sustainable Banking Initiative (SBI)<br>• Green loan and green lease schemes<br>• Green bond schemes<br>• FinTech Regulatory Sandbox of CBSL |

## 5.6. Summary of challenges

**This section provides a summary of the challenges, constraints, gaps, and needs** related to CDRFI in Sri Lanka, which have been identified through the research and outlined in the previous sections and chapters. For quick reference, these findings have been clustered into those pertaining to food production and supply chains (including cultivation as well as environment and water), coordination and collaboration (including institutional setup, regulatory environment, policies, and plans), awareness and data, technology and innovation (including emerging technologies), and finance and insurance.

***Table 12:*** *Summary of constraints and challenges*

| Category | Challenge, constraint, gap, or need |
|---|---|
| **Food production and supply chains** | • High reliance on traditional skills and technologies<br>• Dependence on rain-fed cultivation and reliable weather patterns<br>• Weak connection between farmers and markets or distribution networks, high number of intermediaries<br>• Insufficient or costly transport and storage, including a lack of cold storage facilities for perishables, causing high post-harvest losses<br>• High costs and difficulty in sourcing for quality seeds, inputs and agricultural equipment<br>• Lack of interest of youth in pursuing farming careers<br>• Issues connected to increasing climate-related human mobility (migration, displacement), such as loss of social cohesion and reduced availability of farm labour<br>• Gender imbalance and inequities among registered farmers<br>• Human-wildlife conflict and pest and diseases causing losses |
| **Coordination and collaboration** | • Need for specific regulatory frameworks for microinsurance and index-based insurance<br>• Need for an overarching CDRFI policy that addresses insurance, reinsurance, insurance-linked securities, derivatives, and other capital market solutions<br>• Challenge to implement existing policy commitments on CDRFI at the sectoral and local level<br>• High administrative and transaction costs for CDRFI solution providers to reach rural areas, smallholders, and MSMEs<br>• Gaps in institutional coordination and policy coherence<br>• Limited exchange of information and knowledge between different sectors and between the public sector, private sector, civil society, academia, and other actors; lack of clearly defined roles<br>• Gaps in institutional capacities to develop, implement, or regulate CDRFI solutions or innovative risk finance and transfer instruments<br>• Gaps in timely revision and updates of policies and plans related to CDRFI as well as assessments of effectiveness and relevance |

| Category | Challenge, constraint, gap, or need |
|---|---|
| | • Lack of comprehensive monitoring and evaluation systems for risk management on the national, local, and sectoral level, including sector-specific indicators and common assessment frameworks |
| **Awareness and data** | • Insufficient information on marked demand and prices<br>• Limited risk literacy, insurance literacy, and financial literacy<br>• Limited knowledge on climate change and alternative farming methods or inputs<br>• Need to mainstream climate risk into education and training systems<br>• Lack of a data-sharing policy and establish a central database or knowledge hub for climate risk and CDRFI<br>• Limited integration between different sources and types of data (e.g., ground data, remote sensing, earth observations)<br>• Limited reliability, accuracy, and coverage of existing data<br>• Accessibility barriers for data and knowledge faced by different stakeholders<br>• Lack of holistic assessment of current climate-induced L&D and protection gap |
| **Technology and innovation** | • Limited degree of modernization through farm implements, machinery, and digitization<br>• Lack of technical knowledge of agriculture officers for technology dissemination and digitization<br>• Low willingness of farmers to try and adopt new methodologies or practices other than the traditional ones they are used to |
| **Finance and insurance** | • Limited financial inclusion of farmers<br>• Low income of farmers due to low market prices and margins kept by millers, wholesalers, retailers, and other supply chain actors<br>• Lack of guarantees or cash support from suppliers and buyers<br>• Challenges with establishing proof of land or livestock ownership<br>• Low insurance penetration and premium income<br>• Slow process of loss assessment and compensation payments from existing indemnity-based schemes<br>• Limited access to external funding, premium and capital support, and additional sources of finance<br>• Difficulty to obtain reinsurance from external reinsurers<br>• Limited trust in and understanding of CDRFI solutions among farmers and other food systems actors<br>• Limited ability of smallholder farmers to pay premiums<br>• Lack of gender-specific or gender-responsive CDRFI solutions<br>• Not all crops and crop varieties covered by existing CDRFI schemes |

# CHAPTER 6

# Priorities for enhancement

*Group meeting with members of farming community in Trincomalee district, Sri Lanka*


6.1. Food production

6.2. Coordination

6.3. Awareness and data

6.4. Technology & innovation

6.5. Financial system

6.6. Risk transfer & insurance


Based on stakeholder inputs and a moonshot exercise, several **goals and priorities for enhancing Sri Lanka's CDRFI ecosystem** have been identified and outlined. Food production and supply chains, coordination and collaboration, awareness, data, technology, innovation, the financial system, and risk transfer and insurance solutions can work towards achieving a long-term vision of resilience, sustainability, and adaptation to climate change that includes vulnerable communities and manages shocks in a dynamic and proactive manner.

# Chapter summary

## 6.1. Food production and supply chains

Stakeholders envision a shift towards a more risk-aware, climate-smart, and resilient food system that provides livelihoods and entrepreneurship opportunities for rural communities, including through enhanced market access, modernization, reduction of post-harvest losses, cascade tank rehabilitation, digitization, and promotion of social standing of farmers.

## 6.2. Coordination and collaboration

Strengthening coordination and coherence of the institutional and policy framework for CDRFI in Sri Lanka is vital for effective, inclusive, and participatory processes.

## 6.3. Awareness and data

Financial literacy and a qualified workforce are as important as the availability and accessibility of actionable data for all stakeholders involved in risk management and finance.

## 6.4. Technology and innovation

Building on the previous categories, technology and innovation can be harnessed to modernize agricultural livelihoods and enhance existing CDRFI mechanisms and instruments.

## 6.5. Financial system

CDRFI solutions such as insurance or other risk transfer mechanisms are part of a financial system and rely on predictability, consistency, and stability to function to their full extent.

## 6.6. Risk transfer and insurance

Finally, CDRFI is not only about specific instruments, but about a paradigm shift towards a dynamic and robust rural financial system that shields food systems and communities from climate-related risks and provides affordable, dependable, and simple solutions.

**Critical enablers for participatory, inclusive, and effective CDRFI mechanisms** include risk awareness and literacy; a favourable political and regulatory environment; access to data and advanced technologies; inclusive insurance and finance products with high value for customers; aligned distribution channels and salesforce; and robust monitoring and evaluation programmes that provide feedback for continuous improvement.

**For a transformation towards more sustainable, climate-smart, and resilient food systems, the following priorities and pathways** have been identified by key stakeholders based on the workshops, consultations, dialogues, meetings, and interviews carried out by SLYCAN Trust from 2020 to 2022 in Sri Lanka.

## 6.1. Food production and supply chains

### Goal

*National food security and a risk-aware, climate-smart, and resilient food system that provides livelihoods and entrepreneurship opportunities for rural communities.*

- Comprehensive and inclusive assessments of food system sustainability and resilience (including externalities, trade-offs, and synergies) are available.
- Farmers have direct access to relevant markets and distribution networks through simplified supply chains, minimization of intermediaries, or product pooling through community aggregators.
- Effective and no-regret options for resilience-building in food systems are being implemented and the required expertise, resources, and capacities are available to all farmers; for example, such options could include the development and cultivation of more resilient and/or high-yielding crops and crop varieties; the introduction of inter-season or third-season cultivation with short-duration crops; the diversification of cultivation with perennial crops; proper land selection based on agroecology; micro-irrigation techniques; rainwater harvesting; improved land management techniques; and better resource-conserving technologies.
- Farmer associations have access to the appropriate farm implements, machinery, equipment, and digitization.
- Better storage and transport facilities, upgraded infrastructure, and training area available to reduce post-harvest losses and food waste.
- Cascade tanks are rehabilitated or restored through holistic and ecosystem-based programmes that integrate aquaculture, fisheries, and livestock.
- Minor tanks and catchment areas are developed and current irrigation monitoring systems improved.
- Reformed land ownership regulations and digitised land records enhance access to and documentation of land ownership.
- Social standing and dignity of labour for farmers are enhanced to ensure continued engagement of young and/or second-generation farmers.

## 6.2. Coordination and collaboration

### Goal

*A consistent and transparent institutional, policy, and regulatory environment that enables effective and innovative CDRFI solutions with the participation and inclusion of all relevant stakeholders, acknowledging their different roles, mandates, responsibilities, and priorities.*

- Policymakers use decision-making support tools to facilitate large-scale systemic shifts to Sri Lanka's food systems and build long-term climate resilience.
- An overarching policy framework for CDRFI in Sri Lanka integrates relevant sectors and insurance, reinsurance, capital market solutions, bonds, and other aspects and instruments.
- The regulatory framework is enhanced to address new and emerging technologies and innovation related to insurance and financial instruments, including through regulatory sandboxes or innovation spaces.
- Statutory requirements to mainstream risk management and reduction of climate- and non-climate-related risks are instituted, and listed companies are required to indicate their enterprise risk management framework and the extent to which their properties, stock, liability, and other assets are insured.
- A regulatory framework for microinsurance providers is in place and includes a database for market research, transparency, grievance handling platforms, mechanisms to encourage innovation, and promotion of outreach to rural areas.
- Social and economic standards on how to afford insurance are assessed.
- Green infrastructure and renewable energy infrastructure (grid, storage etc.) are scaled up through the streamlining of approval processes and implementation of long-term plans.
- Green building concepts (for example, sustainable design through material reuse and renewable energy) are promoted in the agriculture sector.
- Ventilation and lightning considerations are better incorporated into planning and construction of new buildings.

## 6.3. Awareness and data

### Goal

*Universal basic financial, political, and economic literacy as well as a pool of qualified human resources to develop, implement, and monitor CDRFI solutions. Accurate, timely, and reliable data that is freely accessible and can be used to derive useful information for risk management and informed and rational decision-making.*

- Human resources and the overall knowledge base in the country are further developed.
- Fit-for-purpose systems are in place to preserve institutional memory and facilitate continued engagement of key actors in relevant national and global processes.
- A common data-sharing platform and database that compile existing data, research, knowledge, and case studies relevant to climate risk from different stakeholders are created, maintained, and available to all relevant actors and stake-holder groups.
- Common data-sharing protocols and mechanisms have been established for sectoral and local-level agencies to feed their data into this common platform and database that is accessible, reliable, and up-to-date.
- Mechanisms for independent data validation have been developed and operationalized.

- Data and operation management and institute data-sharing policies have been updated for enhanced and/or free availability of data.
- A national agriculture database that tracks produce storage and transport has been established, and scoping studies are being conducted on value chains and value addition, export markets, and investment opportunities.
- Comprehensive climate risk assessments are being conducted and an inventory of common risks, intervention options, and feasibility of entry points for CDRFI compiled.
- Analytical techniques for big data are being developed and adopted, including cloud computing, data mining, predictive analytics, machine learning, and pattern recognition.
- Available data, connections, and track records from different entities (such as agribusinesses or telecommunications providers) are synthesized and used to assess risks while ensuring data security and privacy protection.
- All actors, including farmers, have access to reliable and timely market information and advisory as well as agrometeorological or agronomic advisory.
- Relevant attitudinal and behavioural traits of customers and producers have been identified and businesses are more comfortable with handling this data as well as risk assessments.

## 6.4. Technology and innovation

### Goal

*Modernized livelihoods that leverage emerging technologies and foster innovation towards enhanced risk management and resilience.*

- The communications infrastructure is enhanced and relevant actors have access to communication tools and analytics.
- Innovative technologies are available to strengthen financial inclusion and access to financial services, including digital lending, digital wallets, digital ledgers, price comparison tools, digital payment solutions, or savings tools.
- Innovative technologies are utilized to make insurance more accessible and reduce transaction costs, for example through automated loss adjustments, smart contracts, mobile distribution, or automated underwriting.
- Public sector agencies at the local level are updated with the latest technologies.
- Standardization in the development sector, construction sector, and food sector.
- Enhanced awareness among local communities on modern and innovative technologies and stronger incentives to adopt them.
- New and innovative modern technologies are available in the agriculture sector to provide more accurate and reliable data and information, such as GPS-guided smartphone apps to map cultivation plots; remote sensing and earth observations data; machine learning to combine satellite and ground data for cropland mapping; spoilage sensors to measure temperature and humidity in storage facilities; low-cost emerging sensor technology; connected device data; volunteered geographic information; or picture-based crop insurance.
- Enhanced methods and methodologies are available and being utilized to predict and forecast extreme weather events and climatic changes in the short, medium, and long term.

## 6.5. Financial system

### Goal

*A financial system that is stable, transparent, and efficient with consistent and predictable policies, access to stable foreign exchange flows, and free flow of funds inside and outside the country.*

- Stable interest and inflation rates are ensured through regulatory measures, allowing financial instruments such as leasing, bond markets, and stock markets to function in a predictable and effective manner.
- Revisited taxation system and use taxation as an instrument to guide investment and channel funding into priority areas.
- A local Exim bank set up with the specific focus and expertise of supporting import- and export-related banking and financial services.
- A strengthend investment infrastructure is available for the private sector to step in and address capital shortages.
- Alternative financing options (for example, sustainable crowdfunding, private equity, blended finance, investment funds, venture capital, or philanthropies) are available.
- Institutional capacities are available for writing successful grant proposals and access funding from bi- and multilateral sources.
- Climate risk information is utilized when giving loans, with banks collecting data and having a proper understanding of climate risks in their portfolios and reporting.
- Severely crisis-affected businesses are being rehabilitated with the provision of legal, managerial, and financial tools and facilities to support their recovery.

### The current system of rural credit and loans

**Sri Lanka has a vast informal economy, particularly in rural areas**. As farmers are vulnerable to external shocks (including climate-related ones) and need to pre-finance their cultivation, they are susceptible to debt traps and can end up in a vicious cycle of borrowing for loan repayments if harvests fail or do not bring sufficient income. While informal village- or association-level systems provide a degree of support, farmers might have to resort to pawning household assets or fall prey to predatory money lenders.

**The formal banking sector is often not available as an option, as farmers lack collateral and are unable to prove land ownership**. Furthermore, when giving loans, banks evaluate the financial capacity of farmers but do not consider climate risk in a systemic way, despite the availability of government-issued cultivation advisory and weather warnings.

## 6.6. Risk transfer and insurance

### Goal

*A paradigm shift from agricultural credit to a dynamic and robust rural financial system with a range of available financial products and services, including sustainable, affordable, dependable, and simple insurance solutions for farmers and other actors within the food system and its supply chains.*

- Insurance schemes are more attractive and fit for purpose by packaging them with loans or providing them as part of a lending package; offering portfolio coverage or packaged products; providing additional benefits (such as better access to microloans); offering insurance bundled with advisory services or seeds; or offering partial payouts during the season in case of losses.
- Consumers have an enhanced product understanding through different channels (such as agents or cooperatives) that consider their baseline financial and insurance literacy as well as context-specific approaches used to process information and clarify the benefits, responsibilities, and limitations related to the insurance scheme and the relationship between insurer and insured.
- New CDRFI measures build on existing structures and mechanisms such as social protection systems, public insurance schemes, pension funds, or ongoing projects.
- Financial and insurance literacy and inclusion are strengthened and support is available to consumers for paperwork.
- Options to mobilize donor support or climate funding for insurance solutions are being explored, including in the form of technical assistance, the payment of operational costs, direct premium or capital subsidies, reinsurance payments, or donor capitalization of the risk pool.
- Public insurance funds and subsidies are ring-fenced and protected against volatility.
- Agricultural credit and loan systems have been reformed to remove debt traps, tenor mismatches, and access barriers.
- Social safety nets and subsidies financed by public and private finance are further strengthened to ensure that everyone is protected against climate risks.
- Specific financing opportunities and business grants are available for women to provide additional income streams and diversification to households.
- Women-centric insurance products are available and more gender-aware sales and marketing approaches are being utilized.
- Safe spaces are available for women to talk about gender-specific issues and integrate their stories, needs, and challenges into policy-making processes and insurance product development.
- Youth and youth-led organizations are empowered to make their voices heard and engage in the development and implementation of CDRFI instruments and mechanisms.

# CHAPTER 7

# Pathways and recommendations

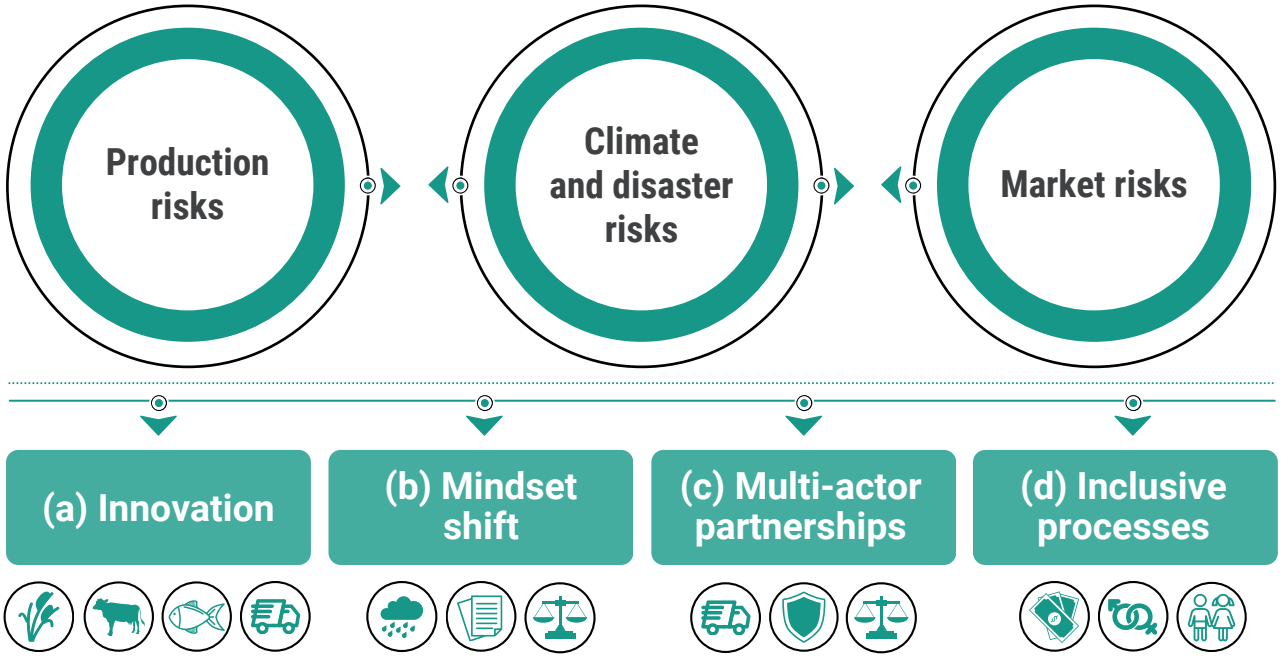
*Livestock herd in Trincomalee district*

**Food systems in Sri Lanka are facing three primary categories of risks: production risks, climate and disaster risks, and market risks**. Smallholder farmers and other food system stakeholders are attempting to address these risks through traditional risk management practices and a limited adoption of new methods and technologies. However, overall household resilience and financial capacities remain low. (**Chapter 4**).

**The existing environment and ecosystem for risk reduction, risk transfer, and risk retention aims to address these vulnerabilities and strengthen food system resilience** through a variety of regulations, policies, and CDRFI systems, including a compulsory crop insurance scheme, a national natural disaster insurance scheme, social protection systems, and disaster relief. (**Chapter 5**)

Through a consultative process, national- and local-level stakeholders in Sri Lanka have identified **guiding visions and priorities for six key aspects of Sri Lanka's food systems**: production and supply chains, coordination and collaboration, awareness and data, technology and innovation, financial system, and risk transfer and insurance (**Chapter 6**).

*Figure 14: Key areas of risks and recommendations*




Building on the existing systems and enabling environment, **the following recommendations have been identified to enhance Sri Lanka's CDRFI ecosystem** in line with these guiding visions and in response to the identified vulnerabilities, gaps, and needs:

## (a) Innovation

**Incentivizing innovation**

- Create innovation hubs and regulatory sandboxes to attract innovators in fintech and insurtech and allow for low-risk pilot projects, rapid prototyping, start-ups etc.
- Support innovators and investors through advisory, grants, low-interest loans, competitions, and other initiatives by the public or private sector.
- Highlight "progressive" farmers who are using good agricultural practices and innovations as champions and change agents for CDRFI solutions in the agriculture sector.
- Enhance availability of open source data and package data in user-friendly and actionable ways for different actors and stakeholder groups.
- Invest in satellite technology, expand the existing observatory network, and develop a national framework for earth observations and agriculture monitoring to support risk management and the implementation of parametric CDRFI solutions.
- Digitize existing data on land, livestock, cultivation extent, yield, or cropping intensity (such as the data collected by Agrarian Service Centres across the island) and relate it to climatic parameters (such as rainfall data collected by the Department of Meteorology) to create a reliable indicator for risk assessments.

- Provide additional instruction and training on the use of relevant technologies and smart application of inputs to all farmers.

**Enhancing market access**

- Invest in farmer-centred information systems, leveraging digital technologies and AI to deliver data products and services as well as tailored agrometeorological, agronomic, and market advisory, digital extension tools, farm management software, and digital market linkages.
- Establish a commodity market where farmers can advertise production and deal directly with potential buyers to enhance their resilience as well as exposure and strengthen supply chain cohesion.
- Provide marketing support to smallholder farmers and scale up local farmer market initiatives to enhance direct market access for smallholders.

**Overhauling the rural credit system**

- Create rural credit-rating agencies and bureaus which can provide up-to-date information about potential borrowers based on their credit record as well as climate risk assessments and existing adaptive capacities.
- Use AI for sales support and to enhance data-driven personalization and reduce or minimize distribution costs.
- Further scale up available loan facilities under the Agrarian Banking System operated by DAD, including cultivation loans, harvesting loans, crop protection loans, women farmer organization loans etc.

## (b) Mindset shift

**Building literacies**

- Incorporate awareness creation and capacity-building measures on risk, financial, and insurance literacy into the education system (school curricula, vocational training, higher education) and provide specific training and information opportunities for women and youth.
- Introduce climate change content in all grades in the school syllabus as well as co-curricular and extracurricular activities related to climate change and risk management.
- Strengthen school-level clubs and societies for sustainable awareness creation and active societal participation on these thematic areas.
- Conduct trainings and skill development to enhance individual and institutional capacities of relevant agencies to develop, implement, and monitor CDRFI solutions, as well as other technical aspects such as GIS or simulation software.
- Train radio, television, and social media moderators and speakers on climate-related information to communicate and translate relevant reports, forecasts, and risk information.
- Enhance text-message based information dissemination to farmers and provide tools and learning materials that allow them to use this information effectively.
- Create mechanisms to reward those who take precautions and proactively manage climate risks in their farming and business practices.
- Establish local-level hubs that provide additional opportunities for vocational training as well as access to support, information, resources, and mentorship for entrepreneurship, supplementing or expanding the existing *vidhatha* and *nena sala* centers.

**Harnessing social and natural capital**

- Conduct assessments of traditional and informal risk-sharing and risk-pooling systems as well as the role of social capital and community cohesion for climate risk management.
- Explore ways to recognize and incentivize contributions of farmers to climate action and environmental conservation, for example, through transfer of finance, benefits, or discounts for ecosystem services or carbon sequestration, or by building on existing systems such as payments for soil conversation measures under the Soil Conservation Act.
- Recognize and highlight local success stories and work towards a greater recognition of achievements related to risk management and resilience-building in food systems.

## (c) Multi-actor partnerships

**Creating partnership frameworks**

- Create a more collaborative regulatory environment that facilitates multi-actor partnerships and evens the playing field, for example, through specific regulations for microinsurance and index-based insurance, grace periods for insurtech providers, technical assistance, or premium subsidies.
- Develop forums and lines of communications between the public and private sector, facilitating regulators to provide compliance support and information on regulatory requirements while private sector insurers can provide inputs for changes to the regulatory environment.
- Expand existing forums and multi-actor partnerships to better address climate risk and CDRFI solutions through exchange, coordination, and collaboration between different stakeholder groups and sectors.
- Establish a platform for all relevant stakeholders to collaborate without duplication and access CDRFI-related technology, information, and data.
- Mainstream climate risk into local planning processes and incorporate risk assessments and CDRFI into training and capacity-building of local government authorities and officers, including agricultural extension officers, economic development officers, the GAP certification unit, foreign employment development officers, *Samurdhi* officers, women's development officers, and others.

**Attracting investment**

- Integrate climate risk assessments, climate finance, and loss and damage finance into local planning processes and entrepreneurship development.
- Incorporate relevant indicators (e.g., agronomical indicators related to percentage of crops destroyed or discrepancy to expected average yield) and attribution of climate-induced L&D (economic and non-economic) into existing data collection mechanisms, particularly those on disasters and agriculture.
- Identify and promote minimum viable business models for CDRFI solutions and provide support for their development rather than focusing mainly on subsidy models.
- Establish rural hubs for skill development and entrepreneurship to facilitate access to knowledge, resources, and capacities for economic diversification.

## (d) Inclusive processes

**Holistic food system risk management**

- Create a common framework for assessment of climate impacts that includes farmers' perspectives and inputs.
- Develop a system for banks to give quotes to farmers and fishermen based on their geographical location, type of industry they are engaged in, risk, vulnerability, government debt support, and other key indicators.

**Growing networks of trust**

- Build on existing networks and relationships of trust (for example, dealers, input providers, or mobile network operators) and include different actors along the value chain in design- and decision-making processes for CDRFI solutions, including through embedded insurance schemes.
- Increase confidence in CDRFI solutions among rural smallholder farmers by building upon and expanding existing resources and programmes, such as the awareness creation programmes conducted by FTF.
- Invest in technology and digitization to increase speed, transparency, and reliability of assessments and payouts from the public and private sector.
- Incorporate communities into data collection and risk assessment processes for ground truthing and building trust; for example, through picture-based insurance or by using existing social infrastructure and village resources.

**Enhancing inclusive processes**

- Develop a comprehensive national policy for women finance and remove gender-related access barriers for CDRFI solutions.
- Build capacities of youth and establish structures for youth participation and engagement in relevant processes related to CDRFI.
- Strengthen safety nets and CDRFI mechanisms that incorporate other actors in the food system, such as farm labourers, transporters, or food entrepreneurs.

# CHAPTER 8

# Conclusions

**Climate risk is one of the defining challenges of the 21st Century**. As part of a landscape of covariate, compounding, and cascading risks, it poses a complex challenge for food systems and other key sectors in Sri Lanka and countries across the world.

Farmers and other actors in the food system are aware of this challenge and already face climate-related impacts as well as production and market risks. However, they often lack the necessary awareness, knowledge, technical expertise, equipment, or resources to adequately manage these risks and enhance their livelihood resilience.

**Enhancing risk management frameworks and CDRFI solutions in Sri Lanka's food systems can prove pivotal for building the resilience of vulnerable groups and communities**. However, to be effective, these solutions should connect to existing institutional structures (such as extension officers, agro-advisory systems, databases, data collection mechanisms); be based on evidence and data; respond to actual needs; have clear beneficiaries; and ensure equitable access, affordability, accountability, and transparency in their modalities.

**Furthermore, adequate access to funding and other means of implementation is needed to sustain these mechanisms and respond to emerging needs** caused by increasing climate impacts and climate-induced loss and damage. This report provides an overview of the existing enabling environment, framework, and ecosystem for risk management, risk finance, and CDRFI in Sri Lanka, as well as an overview of the priorities of key actors and recommendations to enhance CDRFI solutions.

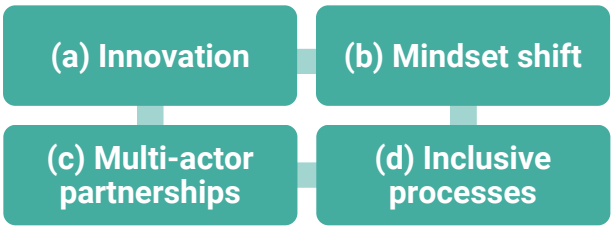
**Key challenges related to climate risk and risk management in Sri Lanka's food systems** include the following:

- High dependence on weather and natural resources, low degree of modernization and mechanization.
- Weak connection between farmers and markets, gaps in existing infrastructure.
- Gender-related challenges and inequities.
- Lack of interest of youth in farming.
- Need for an overarching CDRFI policy and specific regulatory frameworks.
- Gaps in institutional coordination, policy coherence, capacities, exchange, transfer, and vertical and horizontal integration.
- Limited cooperation, knowledge exchange, and partnerships between different actors.
- Lack of comprehensive monitoring and evaluation systems for climate risk.
- Challenges related to financial, risk, and insurance literacy and financial inclusion.
- Need for enhanced access to and better availability of weather data, projections, risk analytics, and other key information.
- Low willingness of farmers to adopt new practices and methods, limited trust in CDRFI solutions.
- Difficult environment for CDRFI solutions among smallholders farmers due to structural constraints and characteristics.
- Delay between impact and compensation payouts due to indemnity-based schemes.
- Limited access to external funding.

Based on inputs from key actors, **the following priorities for enhancing food system resilience and CDRFI solutions have been identified**:

- A risk-aware, climate-smart, and resilient food system that provides livelihoods and entrepreneurship opportunities.
- A consistent and transparent institutional, policy, and regulatory environment that enables inclusive and participatory CDRFI solutions.
- Universal basic financial, political, and economic literacy as well as a pool of qualified human resources.
- Modernized livelihoods that leverage emerging technologies and foster innovation towards enhanced risk management and resilience.
- A national financial system that is stable, transparent, and efficient with consistent and predictable policies, allowing access to stable foreign exchange flows.
- A paradigm shift from agricultural credit to a more dynamic and robust rural financial system with a range of available financial products and services.

To close the identified gaps and work towards these priorities, **four main recommendation areas** have been compiled:




- **Innovation:** Aims to create an enabling environment that incentivizes innovation and enables different actors to introduce new technologies and mechanisms. This also includes strengthening access to information across the supply chain and tightening linkages between producers and markets, as well as enhancing access to rural credit and loan facilities.
- **Mindset shift:** To overcome challenges of low literacy and trust, this pathway focuses on mainstreaming climate risk into the education and training system as well as public awareness creation to foster key literacies related to climate risk, finance, and insurance. It also includes greater acknowledgement of food system livelihoods and the formal recognition of environmental benefits and social capital.
- **Multi-actor partnerships:** This key pathway addresses issues around coordination, coherence, exchange, and integration by strengthening the enabling environment and creating forums, platforms, and spaces for different actors to connect and collaborate. This also serves to make it easier for stakeholders to invest and creates more fertile grounds for the private sector to engage.
- **Inclusive processes:** Building on existing networks and relationships, this pathway works towards greater trust and confidence in CDRFI solutions and aims to incorporate actors across the supply chain into various processes to give them ownership and a voice. This also includes special provisions for youth and women to address existing inequities and barriers.

These recommendations can provide **building blocks for different actors to strengthen Sri Lanka's ecosystem for climate and disaster risk management and finance**. Enhancing and scaling up CDRFI solutions in food systems can support farmers and their communities, safeguard livelihoods and food security, and build long-term resilience by dynamically and proactively responding to current and future needs.

# 9 References


- ADB. (2019). *The Enabling Environment for Disaster Risk Finance in Sri Lanka. Country Diagnostics Assessment*. Metro Manila, Philippines: Asian Development Bank.
- Adegoke, J., Aggarwal, P., Rüegg, M., Hansen, J., Cuellar, D., Diro, R., . . . Zougmoré, R. (2017). *Improving climate risk transfer and management for climate-smart agriculture. A review of existing examples of successful index-based insurance for scaling up*. Global Alliance for Climate-Smart Agriculture.
- ADPC. (2018). *Sri Lanka Baseline Assessment Country Report*. Asian Disaster Preparedness Center - Sri Lanka Office.
- Aleksandrova, M. (2019). *Social Protection as a Tool to Address Slow-Onset Climate Events. Emerging issues for research and policy*. Bonn, Germany: German Development Institute
- Barrientos, A. (2010). *Social Protection and Poverty. Social Policy and Development Programme Paper Number 42*. Geneva, Switzerland: United Nations Research Institute for Social Development.
- Bernier, Q., & Meinzen-Dick, R. (2014). *Networks for Resilience. The Role of Social Capital*. Washington, USA: International Food Policy Research Institute.
- Bulancea, P. (2018). *Responding to Shocks Through the Social Protection System: Opportunities for Sri Lanka*. High-Level Conference on Adaptive Social Protection in Sri Lanka. Colombo, Sri Lanka: UNICEF.
- Carmago, A. (2019). *The role of insurance supervisors in climate risk insurance*. Access to Insurance Initiative.
- Carpenter, R. (2018). *Index Insurance. Status and Regulatory Challenges*. Access to Insurance Initiative.
- Carter, M., De Janvry, A., Sadoulet, E., & Sarris, A. (2017). Index Insurance for Developing Country Agriculture: A Reassessment. *Annual Review of Resource Economics*.
- Center for Excellence in Disaster Management and Humanitarian Assistance. (2014). *Sri Lanka Disaster Management Reference Handbook*. Hickam, Hawaii, USA: Center for Excellence in Disaster Management and Humanitarian Assistance.
- Central Bank of Sri Lanka. (2022). *Annual Report 2021*. Colombo, Sri Lanka: Central Bank of Sri Lanka.
- Clyde & Co LLP. (2018). *Closing the protection gap through inclusive insurance*. Clyde & Co LLP.
- Dalberg Asia. (2021). *Funding Agricultural Innovation for the Global South: Does it Promote Sustainable Agricultural Intensification?* Colombo, Sri Lanka: Commission on Sustainable Agriculture Intensification.
- Davies, M., Béné, C., Arnall, A., Tanner, T., Newsham, A., & Coirolo, C. (2013). *Promoting Resilient Livelihoods through Adaptive Social Protection: Lessons from 124 programmes in South Asia*. Development Policy Review, 31, 27-58.
- De Silva, S. C. (n.d.). *Sri Lanka's National Natural Disaster Insurance Scheme*. Colombo, Sri Lanka: National Insurance Trust Fund.
- Dyson, B. (2020). *Could the basis risk 'bogeyman' threaten the rise of parametric insurance?* S&P Global Market Intelligence.
- FAO. (1992). *Glossary of Terms for Agricultural Insurance and Rural Finance*. Rome, Italy: Food and Agriculture Organization of the United Nations.

- FAO. (2021). *Climate Change Impact on Crop Production in Sri Lanka. Challenges and adaptation options*. Rome, Italy: Food and Agriculture Organization of the UN.
- Fernández, R., Dubreuil, M., Gotora, T., & Kyuma, R. (2019). *Discussion Paper: Creating synergies between macro and micro level insurance*. Bonn, Germany: Munich Climate Insurance Initiative.
- Food and Agriculture Organization. (2018). *Country Gender Assessment of Agriculture and the Rural Sector in Sri Lanka*. Colombo, Sri Lanka: Food and Agriculture Organization of the United Nations.
- Germanwatch. (2020). *Climate risk insurance and informal-risk sharing. A Critical Literature Appraisal*. Bonn, Germany: Munich Climate Insurance Initiative.
- GFDRR. (2014). *Financial Protection Against Natural Disasters: From Products to Comprehensive Strategies. An Operational Framework for Disaster Risk Financing and Insurance*. Washington, USA: The World Bank.
- GFDRR. (2014). *Stories of Impact. Addressing Climate Risks in Sri Lanka*. Washington, USA: The World Bank.
- Government of Sri Lanka, Agricultural and Agrarian Insurance Board. (2017). *Annual Report 2016*. Colombo, Sri Lanka: Agricultural and Agrarian Insurance Board.
- Government of Sri Lanka, Ministry of Agriculture. (2019). *2018 Progress and 2019 Development Programmes*. Battaramulla: Ministry of Agriculture.
- Greatrex, H., Hansen, J. W., Garvin, S., Diro, R., Blakeley, S., Le Guen, M., . . . Osgood, D. E. (2015). *Scaling up index insurance for smallholder farmers: Recent evidence and insights*. CCAFS Report No. 14. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security.
- GSMA. (2015). *State of the Industry Report on Mobile Insurance, Savings & Credit Report*.
- Guarín, A., Nicolini, G., Vorley, B., Blackmore, E., & Kelly, L. (2022). *Taking stock of smallholder inclusion in modern value chains: ambitions, reality and signs of change*. London, United Kingdom: International Institute for Environment and Development.
- HARTI. (2009). *Livestock for Rural Development and Poverty Reduction: Sri Lankan Experience*. Colombo, Sri Lanka: Hector Kobbekaduwa Agrarian Research and Training Institute.
- Hazell, P., Anderson, N., Balzer, A., Clemmensen, A. H., Hess, U., & Rispoli, F. (2010). *The Potential for Scale and Sustainability in Weather Index Insurance for Agriculture and Rural Livelihoods*. Rome, Italy: International Fund for Agricultural Development.
- Heenkenda, S. (2011). Agricultural Risk Management through Index-Based Microinsurance: Exploring the Feasibility of Demand Perspective. *Vidyodaya Journal of Humanities and Social Sciences*, 3, 127-154.
- Heenkenda, S. (2015). *Index-Based Microinsurance for Paddy Sector in Sri Lanka: An Evaluation of Demand Behavior*.
- Hermann, A., Köferl, P., & Mairhöfer, J. P. (2016). Climate Risk Insurance: New Approaches and Schemes. Economic Research Working Paper. Allianz.
- IAIS/Sustainable Insurance Forum. (2018). *Application Paper on the Use of Digital Technology in Inclusive Insurance*. International Association of Insurance Supervisors.
- IAIS/Sustainable Insurance Forum. (2018). *Issues Paper on Climate Change Risks to the Insurance Sector*. International Association of Insurance Supervisors.
- ICMIF. (2021). *From protection to prevention. The role of cooperative and mutual insurance in disaster risk reduction*. Cheshire, UK: International Cooperative and Mutual Insurance Federation.

- IFAD. (2021). *Rapid prototyping for inclusive insurance: Testing customer challenges and gaining early insights on feasibility*.
- ILO. (2017). *World Social Protection Report 2017-2019. Universal social protection to achieve the Sustainable Development Goals*. Geneva, Switzerland: International Labour Organization.
- ILO Impact Insurance Facility. (2017). *Fact sheet: Index-Based Crop Insurance Project*.
- Insurance Development Forum. (2019). *How technology can help bridge the protection gap*. Insurance Development Forum.
- Insurance Development Forum. (2019). *IDF Practical Guide to Insuring Public Assets*.
- Insurance Development Forum. (2020). Technology and Innovation: *Tools to help close the Protection Gap in Microinsurance Markets*.
- Insurance Development Forum. (2021). *Insuring Resilience - Critical Legal, Regulatory and Policy Architecture*.
- InsuResilience Global Partnership / FARM-D. (2020). *Demonstrating Impact: How to monitor and evaluate gender-responsive Climate and Disaster Risk Finance and Insurance (CDRFI)*.
- International Association of Insurance Supervisors. (2018). *Issues Paper on Index-based Insurances, particularly in Inclusive Insurance Markets*. International Association of Insurance Supervisors.
- IPCC. (2022). Climate Change 2022: *Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Intergovernmental Panel on Climate Change.
- Jensen, N., & Barret, C. (2017). Agricultural Index Insurance for Development. *Applied Economic Perspectives and Policy*, 39(2), 199-219.
- KPMG. (2020). *Sri Lanka Insurance Report - April 2020*. KPMG International Cooperative.
- Kramer, B. (2019). *Can weather index insurance help farmers adapt to climate change?* IFPRI Blog.
- Kreft, S., & Kohler, D. (2019). *Climate Risk Insurance: From Policy to Practice*. I.VW-HSG Trendmonitor, 3.
- Kreft, S., Schaefer, L., Behre, E., & Matias, D. (2017). *Climate Risk Insurance for Resilience: Assessing Countries' Implementation Plans*. Bonn, Germany: United Nations University: Institute for Environment and Human Security.
- Krystalli, R., Stites, E., Humphrey, A., & Krishnan, V. (2019). *The Currency of Connections: The establishment and reconfiguration of informal livelihood groups in Bentiu, South Sudan*. Washington, USA: Mercy Corps.
- Kuriakose, A. T., Heltberg, R., Wiseman, W., Costella, C., Cipryk, R., & Cornelius, S. (2013). Climate-Responsive Social Protection. *Development Policy Review*, 31, 19-34.
- Le Quesne, F., Tollmann, J., Range, M., Balogun, K., Zissener, M., Bohl, D., . . . Kreft, S. (2017). *The Role of Insurance in Integrated Disaster & Climate Risk Management: Evidence and Lessons Learned*.
- Linnerooth-Bayer, J., Surminski, S., Bouwer, L. M., & Noy, I. (2019). Insurance as a Response to Loss and Damage? In R. Mechler, & e. al., *Loss and Damage from Climate Change. Climate Risk Management, Policy and Governance* (pp. 483-512). Springer.
- Marambe, B., Punyawardena, R., Silva, P., Premalal, S. et. al. (2015). Climate, climate risk, and food security in Sri Lanka: need for strengthening adaptation strategies. In W. Leal, *Handbook of Climate Change Adaptation* (pp. 1789-1959). Berlin/Heidelberg: Springer-Verlag.

- Microinsurance Network. (2021). *Takaful, microtakaful, and the foundations of inclusion. Briefing note*.
- Microinsurance Network. (2021). *Why insurance for informal workers is needed now more than ever*.
- Miles, K. S., & Wiedmaier-Pfister, M. (2019). *Integrating Gender Considerations into Different Models of Climate Risk Insurance*. Bonn and Eschborn, Germany: InsuResilience Global Partnership.
- Miles, K., & Hauler, I. (2021). *Policy Report: The Nexus between International Gender and Climate and Disaster Risk Finance and Insurance Frameworks to support with National Action*.
- Miles, K., & Hauler, I. (2021). *Step by Step Guidance: A gender-smart approach to monitoring and evaluation (M&E) of Climate and Disaster Risk Finance and Insurance (CDRFI) Programmes*. InsuResilience Global Partnership.
- Mombauer, D. (2021). Managing risk: How Sri Lankan farmers address climate threats. Mongabay Sri Lanka.
- Moody, N., Fraser, S., Miles, K., & Schneider, J. (2020). *The Development Impact of Risk Analytics*. Insurance Development Forum.
- NASA. (2022, July). *Using Satellite Data to Improve Index Insurance*.
- Nilwala, W. M., & Jayarathna, R. S. (2018). *Agriculture Insurance for Sustainable Development in Sri Lanka: Evidence from Kurunegala District*. 15th International Conference on Business Management.
- Panda, A. (2021). *Climate Change and Agricultural Insurance in the Asia and the Pacific Region*.
- Panda, A., Lambert, P., & Surminski, S. (2020). *Insurance and financial services across developing countries: an empirical study of coverage and demand*. London, UK: London School of Economics and Political Science, Grantham Research Institute on Climate Change and the Environment.
- Pathiraja, C. (2018). *Disaster Response and Relief in Sri Lanka*. High-Level Conference on Adaptive Social Protection in Sri Lanka. Colombo, Sri Lanka: National Disaster Relief Services Centre.
- Raithatha, R., & Priebe, J. (2020). *Agricultural insurance for smallholder farmers. Digital innovations for scale*.
- Rambukwella, R. N., Vidanapathirana, R. P., & Somaratne, T. G. (2007). *Evaluation of Crop Insurance Scheme in Sri Lanka*. Colombo, Sri Lanka: Hector Kobbekaduwa Agrarian Research and Training Institute.
- Rambukwella, R., Vidanapathirana, R., Champika, J., & Priyadarshana, D. (2020). *Performance of Weather Index Insurance (WII) Scheme in Sri Lanka*. Colombo, Sri Lanka: Hector Kobbekaduwa Agrarian Research and Training Institute.
- Ramm, G., & Balogun, K. (2020). *Integrating Insurance into Climate Risk Management*. Bonn, Germany: Munich Climate Insurance Initiative.
- Ranuge, S. (2018). *Adaptive social protection in Sri Lanka: Building resilience to disasters and climate change*. High-Level Conference on Adaptive Social Protection in Sri Lanka. Colombo, Sri Lanka: Welfare Benefits Board.
- Schanz, K.-U., & Sommerrock, F. (2016). *Harnessing Technology to Narrow the Insurance Protection Gap*. The Geneva Association.
- Sivarajah, P., & Ahamed, A. N. (1989, April). The Paddy Crop Insurance in Sri Lanka - An Overview. *Economic Review*, 27-30.
- SLYCAN Trust. (2019). *Case Study: Climate Change and Agricultural Insurance in Sri Lanka*. Colombo, Sri Lanka: SLYCAN Trust. Retrieved from http://slycantrust.org/knowledge-resources/climate-change-and-agricultural-insurance-in-sri-lanka
- SLYCAN Trust. (2021). *Discussion Brief: Climate Risk Management and Finance in Sri Lanka*. Colombo, Sri Lanka: SLYCAN Trust.

- SLYCAN Trust. (2021). *The Farmer's Perspective: Climate Risk and Risk Management in Sri Lanka's Agriculture Sector*. Colombo, Sri Lanka: SLYCAN Trust.
- SLYCAN Trust. (2021). *Working Paper: Addressing Climate and Disaster Risk through Inclusive and Participatory Mechanisms*. Colombo, Sri Lanka: SLYCAN Trust.
- SLYCAN Trust. (2021). *Working Paper: Household Profiles and Resilience Indicators for Climate Risk Transfer in Sri Lanka*. Colombo, Sri Lanka: SLYCAN Trust.
- SLYCAN Trust. (2022). *District Report: Climate Risk, Risk Management, and Risk Transfer Mechanisms in Sri Lanka: Anuradhapura District*. Colombo, Sri Lanka: SLYCAN Trust.
- SLYCAN Trust. (2022). *District Report: Climate Risk, Risk Management, and Risk Transfer Mechanisms in Sri Lanka: Trincomalee District*. Colombo, Sri Lanka: SLYCAN Trust.
- SLYCAN Trust. (2022). *Summary Brief: Addressing Climate and Disaster Risk in Sri Lanka: Crop Insurance Schemes*. Colombo, Sri Lanka: SLYCAN Trust.
- SLYCAN Trust. (2022). *Summary Brief: Addressing Climate and Disaster Risk in Sri Lanka: Livestock Insurance Schemes*. Colombo, Sri Lanka: SLYCAN Trust.
- SLYCAN Trust and Clyde & Co. (2022). *White Paper: Enhancing Innovative Climate Risk Transfer and Agricultural Insurance Mechanisms in Sri Lanka*.
- Surminski, S., Panda, A., & Lambert, P. J. (2019). *Disaster Insurance in Developing Asia: An Analysis of Market-Based Schemes*. Metro Manila, Philippines: ADB.
- The Geneva Association. (2017). *The Stakeholder Landscape in Extreme Events and Climate Risks Management*. Zurich, Switzerland: The Geneva Association —'International Association for the Study of Insurance Economics'.
- The World Bank. (2016). *Fiscal Disaster Risk Assessment and Risk Financing Options*. Sri Lanka. Washington, USA: The World Bank Group.
- The World Bank. (2020). *Contingent Liabilities from Natural Disasters: Sri Lanka*. Washington, USA: The World Bank Group.
- The World Bank. (2021). *DRFA Module 6 Fact Sheet - Risk Finance Instruments: An in-depth look at agricultural insurance*.
- The World Bank/ADB. (2020). *Climate Risk Country Profile: Sri Lanka*. The World Bank Group and the Asian Development Bank.
- The World Bank/CIAT. (2015). *Climate-smart agriculture in Sri Lanka*. CSA Country Profiles for Africa, Asia, and Latin America and the Caribbean Series. Washington, USA: The World Bank Group.
- Thilakarathne, S., & Wijesundara, B. (2009). *Insurance and risk selection in natural disaster; with special reference to Sri Lankan insurance industry*. Proceedings of the National Symposium on Promoting Knowledge Transfer to Strengthen Disaster Risk Reduction and Climate Change Adaptation.
- Tilakaratna, G., & Jayawardana, S. (2015). *Social Protection in Sri Lanka: Current Status and Effect on Labour Market Outcomes*. SARNET Working Paper No. 3. Institute for Human Development.
- UNDP. (2016). *Leaving No One Behind: A Social Protection Primer for Practitioners*. New York, USA: United Nations Development Programme.
- UNDRR. (2019). *Disaster Risk Reduction in Sri Lanka. Status Report 2019*. Bangkok, Thailand: United Nations Office for Disaster Risk Reduction, Regional Office for Asia and the Pacific.
- UNEP. (2021). *Insuring the climate transition. Enhancing the insurance industry's assessment of climate change futures*. United Nations Environment Programme Principles for Sustainable Insurance Initiative.

- UNU-EHS. (2018). *Disaster Risk and Readiness for Insurance Solutions. InsuRisk Assessment Report 2018*. Bonn, Germany: United Nations University: Institute for Environment and Human Security.
- UNU-EHS. (2021). *InsuRisk Report 2021: Disaster Risk, Social Protection and Readiness for Insurance Solutions*. Bonn, Germany: United Nations University: Institute for Environment and Human Security.
- USAID. (2018). *Climate Risk Profile: Sri Lanka*. USAID.
- V20. (2021). *Sustainable Insurance Facility (SIF): Solutions to Build Resilient Micro, Small and Medium Enterprises*.
- Väänänen, E., Nett, K., Costella, C., & de Suarez, J. M. (2019). *Policy Brief: Linking climate risk insurance with shock-responsive social protection*. Bonn and Eschborn, Germany: InsuResilience Global Partnership.
- WFP and Government of Sri Lanka. (2016). *Sri Lanka - Consolidated Livelihood Exercise for Analysing Resilience*.
- WFP/IFAD. (2011). *Weather Index-based Insurance in Agricultural Development. A Technical Guide*.
- Wickramasinghe, K. (2018). *Climate insurance for Sri Lankan farmers: potential and practicalities*. globaldev.
- Wickramasinghe, K. (2019). *Climate Insurance for Dry Zone Farmers in Sri Lanka: Prospects for Index Insurance*. Colombo, Sri Lanka: Institute of Policy Studies of Sri Lanka.
- Wijenayake, V. (2019). *Climate Risk and Risk Management for Evidence-Based Climate Adaptation Action*. Colombo, Sri Lanka: SLYCAN Trust.
- Wijenayake, V., & Mombauer, D. (2019). *Integrating Gender Responsiveness to Climate Change Adaptation Actions, and Moving towards Gender Responsive NDCs and NAPs*. Colombo, Sri Lanka: SLYCAN Trust/APN.
- Wijesekera, S. (2015). *Irrigated Paddy Cultivation Systems in Sri Lanka and Climate Change: Indifference as a Crucial Element*.
- World Economic Forum. (2020). *Building a More Resilient and Sustainable World: An action plan for the insurance and asset management industry*.

## Acknowledgements

SLYCAN Trust would like to thank all stakeholders and actors involved in the national consultative process as well as the local-level case studies conducted in Anuradhapura and Trincomalee district. We are grateful for the time, expertise, and invaluable insights provided by the participants and resource persons engaging in the workshops, consultations, dialogues, webinars, group meetings, trainings, interviews, and individual meetings throughout the project timeline.

## Organizational profile

SLYCAN Trust is an internationally recognized non-profit think tank working on climate change, sustainable development, biodiversity and ecosystem conservation, animal welfare, and social justice including gender and youth empowerment. Our work spans the national, regional, and global level from policy analysis and evidence-based research to on-the-ground implementation. For more information, please visit our homepage or our Adaptation & Resilience Knowledge Hub.

*This knowledge product has been developed as part of the project "Multi-Actor Partnership for Climate and Disaster Risk Financing and Preparedness in the Context of the InsuResilience Global Partnership" supported by the German Federal Ministry for Economic Cooperation and Development (BMZ).*