

## Strengthening Climate-Resilient Food Systems to tackle Climate Crisis and to Ensure Food Security

Climate change is real; it is not a myth but is happening faster, even at rates more significant than we all feared. It is the long-term change in the typical or average weather of a region. Such shifts in weather patterns may result from natural causes, such as variations in the solar cycle. However, anthropogenic activities, at least since the industrial revolution in the 1800s, are now being recognized as the main driver of climate change. Due to rapid developmental activities, burning fossil fuels has enhanced the emission of greenhouse gasses (GHGs) that trap the sun's heat and raise temperatures. The GHG emissions have continued to rise due to activities such as clearing forests, releasing carbon dioxide, and emitting methane from garbage landfills. The energy, transport, and agriculture sectors are among the leading GHG emitters. The GHG emissions have continued to increase, and as a result, the earth is now about 1.1 °C warmer than it was in the 1800s. Alarmingly, the top 10 hottest years on record have occurred in the 21<sup>st</sup> century, with 2016 being the hottest year recorded (NOAA, 2022).

Some of the consequences of climate change are intense flooding and droughts, severe fires, rising sea levels, catastrophic storms, melting icebergs, and declining biodiversity. New terminologies have evolved in the field of climatology for a better understanding of the subject. The terms climate change, global warming and climate emergency are synonymous with the most significant challenge ever faced by mankind in the 21<sup>st</sup> century.

### Climate impacts on Sri Lanka

While climate change is indeed a global crisis, its impacts are mostly localized and personal. The Intergovernmental Panel on Climate Change (IPCC) has confirmed that South Asia will experience a significant change in its climate during the 21<sup>st</sup> century. Research has shown that the frequency of extreme rainfall events in Sri Lanka will increase. This would result in excess soil moisture stress in rain-fed uplands, flood damages in lowland paddy fields and rapid drying out of the cascade of tanks in the long run (Abeysekera *et al.*, 2021) imposing significant negative impacts on Sri Lanka's agricultural productivity. Several reports have indicated an increase in the minimum and maximum ambient temperatures in most districts of Sri Lanka and a decrease in rainy days resulting prolonged dry spells and droughts. Being a party to the United Nations Framework Convention on Climate Change (UNFCCC-1992) and Paris Agreement (2016), Sri Lanka recognizes the need to accelerate addressing climate-related issues.

The climate risk in South Asia could significantly damage its economies, social development, and environmental aspects, and Sri Lanka is no exception. Considering the climate-related natural disasters, the INFORM Risk Index has categorized Sri Lanka under "moderate disaster risk" in terms of the overall risk by ranking the country in the 97<sup>th</sup> position out of 191 countries. Further, the World Bank and the Asian Development Bank (WB and ADB, 2020) have reported that Sri Lanka is positioned at 56<sup>th</sup> in terms of exposure to flooding, 45<sup>th</sup> in exposure to tropical cyclones and associated hazards, and 76<sup>th</sup> for drought exposure. With an annual increment of ambient temperature at 0.01-0.03°C since 1960 (Marambe *et al.*, 2015), the daily minimum temperature (nighttime) has shown a rapid increase to that of the daily maximum temperature (daytime). The extreme rainfall events may affect the floristic composition of ecosystems. All these information indicate the need for prioritization of climate actions in Sri Lanka, focusing on the exposure to climate risk factors.

### Food Systems Approach

Food is one of the basic human needs and a right. However, prevalence of food insecurity still continues worldwide providing a critical reflection of the failure of the existing food system. Urban areas of many countries are often affected by food insecurity, influencing the economic vibrancy of cities that produce more than 80% of global Gross Domestic Product (GDP). Further, cities are already plagued with poverty, homelessness, and social inequality. Globally, more than 880 million people live in informal settlements with fewer opportunities and poor access to basic necessities like electricity, healthcare, sanitation, education, and clean water.

A Food System comprises a complex set of activities, interactions and actors along the food value chain involving production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded (FAO, 2018). A food system goes beyond the basic elements of "farm to fork" concept in feeding a population (Weerahewa *et al.*, 2020). Food systems also include the enabling policy environments and cultural norms in food. An ideal food system would be nutrition-, health- and safety-driven, productive and efficient (and thus able to deliver affordable food), environmentally sustainable and climate-smart, and inclusive (Weerahewa *et al.*, 2020). A sustainable food system (SFS) delivers food security and nutrition for all



in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised (FAO, 2018). Figure 1 illustrates the Food System Wheel Framework, as proposed by FAO, which is centered on poverty reduction, food security and nutrition.

Climate change could depress global crop yields up to 30% by 2050, leaving approximately 59 million people at risk of undernourishment (Global Commission on Adaptation, 2019). The most of the global food systems are under threat, and actions taken today will determine whether millions more people go hungry in the near future. Climate change is already bringing more damages, stresses, and sufferings to the world’s cities, which are home to more than half the global population. About 68% of the world population is expected to live in urban areas by 2050 (<https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>). This level of urbanization would increasingly challenge the food security, thus highlighting the importance of having resilient food systems. The national governments, development agencies and the private sector organizations support smallholder farmers to secure their livelihoods in adapting to climate change. As climate change intensifies causing reductions in the food production, these farmers, many of whom are already food insecure and living in poverty in many developing countries, will face even greater challenges.

Reshaping existing food systems to make them more sustainable is one of the major challenges faced by the globe in the present era. Sustainability of a food system

is focus on simultaneously generating positive values along the three dimensions, namely, economic, social and environmental (Figure 2). The challenges are multiple and multi-faceted, especially for developing countries, to make the food systems more climate resilient, more productive and to make them more inclusive of poor and marginalized populations than in the current scenario.

**The way forward**

Sri Lanka requires adjusting to the structural challenges by increasing agricultural productivity of both land and labour. Failure to adjust will result in worsening sector performance leading to declining agricultural production and falling farm incomes channelling critical investments and productive labour away from the sector. These negative effects can be compounded by challenges such as the inflow of competitive imports due to trade liberalisation, vulnerability to climate change impacts, etc. Thus, the country must face the challenge by increasing investments in order to improve farm productivity, agricultural production and farm incomes to face the competition from manufacturing and service sectors. Realizing these outcomes requires adopting productivity-enhancing technology and shifting production to higher-valued commodities. Implementation of these strategies must be achieved whilst facing challenges from constraints such as small farm-sizes, weak farm-market and research-extension linkages, and poor export infrastructure.

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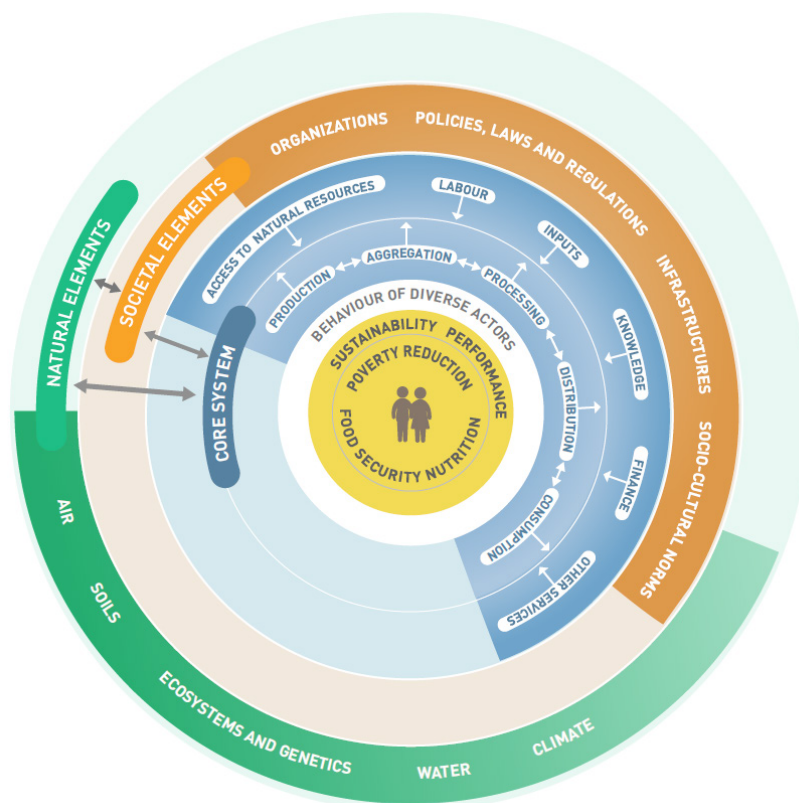
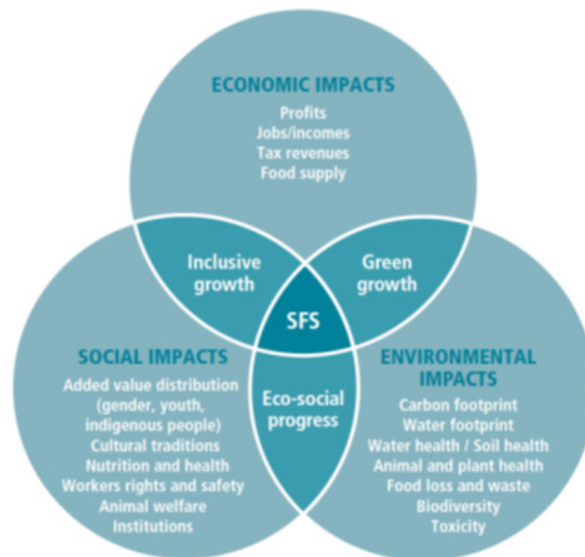


Figure 1: Food System Wheel (FAO, 2018).



**Figure 2:** Sustainability of a food system (FAO, 2018).

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