## Introduction

Climate changes are affecting every aspect of FSM's communities lives due to the small size of the islands and atolls, their low elevation, and extensive coastal areas. Climate risks are further amplified by the regional El Niño Southern Oscillation phenomena that threaten the food and water security of island communities. Further changes are projected to manifest in the coming decades because of increased temperature, decreased rainfall, rising sea levels, and ocean acidification. Recurrences of disasters and crises threaten food security through impacts on traditional agriculture, causing the forced migration of coastal communities to highlands in search of better living conditions. As many of the projected impacts are now unavoidable, implementing some degree of adaptation is essential to enhance food security, strengthen livelihoods, and increase the resilience of FSM communities to future climate risks (see Annex 13 pre-feasibility study for the data supporting these assertions).

The following annex provides an explanation of the theory of change for the overall project, outlining the causal pathways for overcoming key barriers and demonstrating the link between the interventions and building community resilience to the impacts of climate change.

## Problem Tree and Climate Rationale

The problem tree diagram (figure 1 below) has been developed to highlight the main climate drivers and climate risks the proposed project will address, while also detailing some of the development challenges contributing to food insecurity across FSM. The main drivers/climate risks for food security and agriculture production in FSM are: (i) saltwater intrusion from coastal erosion (ii) sea level rise, and (iii) increased frequency of and intensity of extreme weather events including tidal surges.

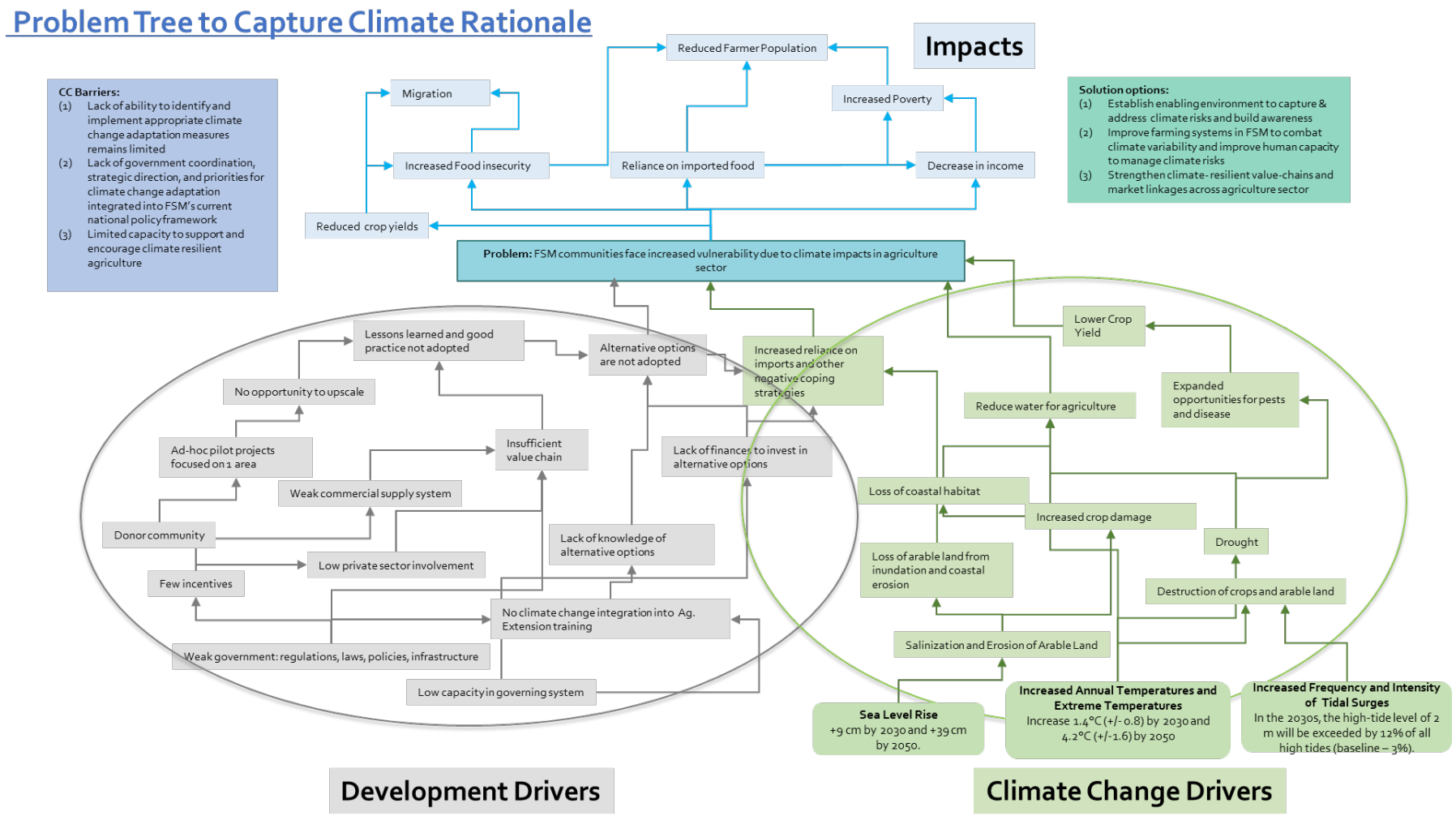
As outlined in the diagram the key climate barriers for food security in FSM include:

(1) Lack of ability to identify and implement appropriate climate change adaptation measures remains limited
(2) Lack of government coordination, strategic direction, and priorities for climate change adaptation integrated into FSM's current national policy framework
(3) Limited capacity to support and encourage climate resilient agriculture

The proposed solutions to address the above are:

(1) Establish enabling environment to capture & address climate risks and build awareness
(2) Improve farming systems in FSM to combat climate variability and improve human capacity to manage climate risks
(3) Strengthen climate- resilient value-chains and market linkages across agriculture sector

*Figure 1. Problem Tree to Capture Climate Rationale*[1]




[1] Framework adapted from GCF Technical Workshop Adaptation Rationale, November 2018, Songdo, South Korea

## Intervention Strategies

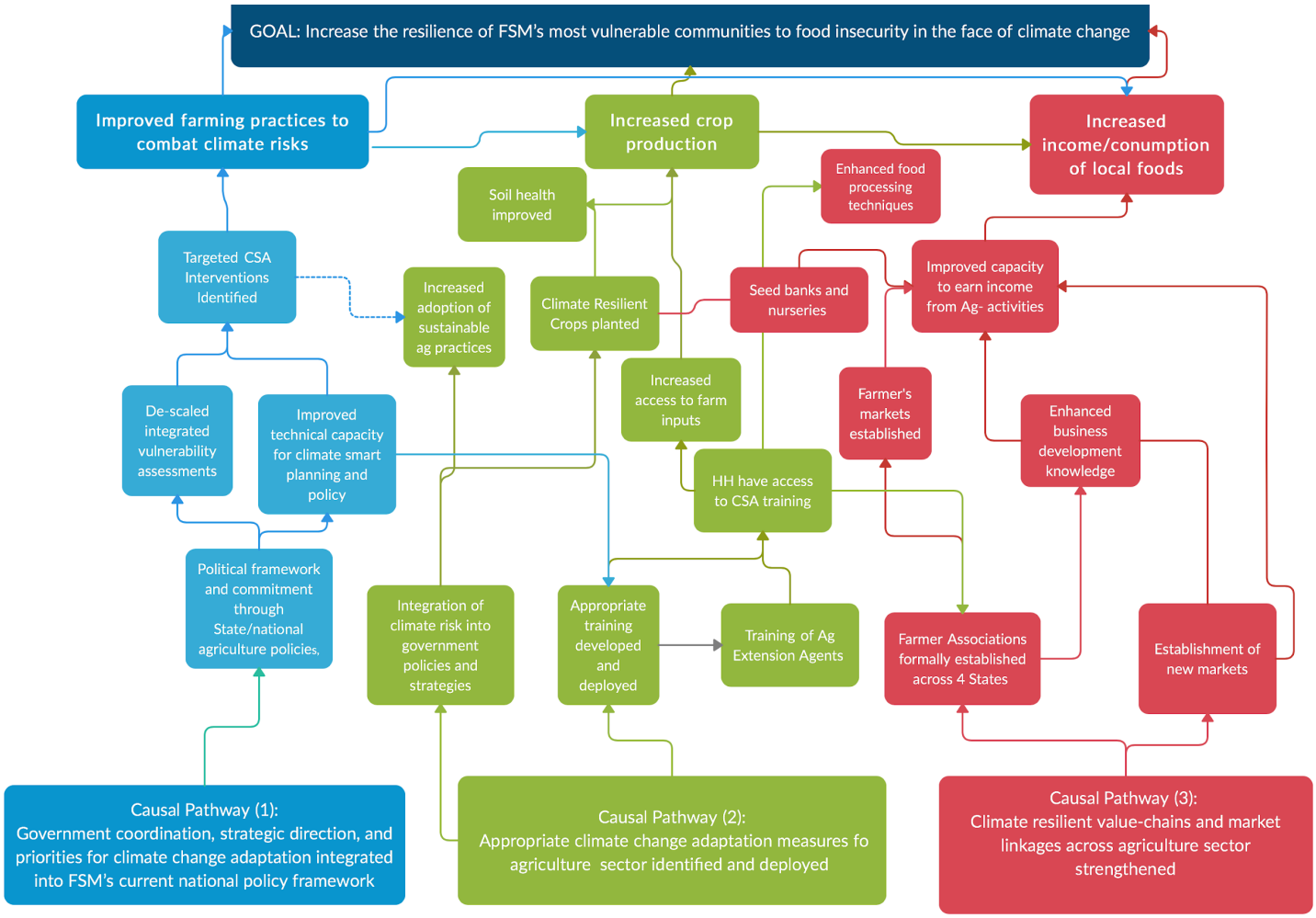
The diversity of Micronesian islands and atolls in both physical and human attributes, and their response to climate-related drivers means that climate change impacts, vulnerability, and adaptation are variable from one island to the other and among islands in each state. On small islands and remote atolls where resources are often limited, recognizing the starting point for action is critical to maximizing benefits from adaptation. They do not have uniform climate risk profiles (high confidence ) and not all adaptations are equally appropriate in all contexts (Nurse et al. 2014 ).

The IPCC (2014) describes adaptation as "the process of adjustment to actual or expected climate and its effects." Through adaptation, societies and communities can seek to moderate the harm of current and future climate risks or to take advantage of new opportunities. For island communities, adaptation options include steps that could be implemented locally (in situ) to facilitate continued occupancy in atoll islands.

Given the need for building resilience to climate risks as they relate to food security, the proposed interventions envision three main interlinked causal pathways (see Figure 2 below). The first intervention (Outcome 1) of the proposed project is to establish an enabling environment for adaptive action and investment which includes conducting de-scaled integrated vulnerability assessments, which should allow for tailored climate-smart adaptation strategies to be utilized when introducing CSA practices to households (Outcome 2). The specific tailored measures for climate adaptation will create an effective pathway for deployment in local communities. To deploy tailored measures the second intervention (Outcome 2) builds capacity for government agencies and institutions to actually promote, leverage, and support climate adaptation and climate smart agriculture at the local level. Through these interventions, opportunities and trainings households will improve agricultural production and thereby food security (access, availability, and stability).

The third intervention (Outcome 3) will allow for the development of new opportunities for market access thereby increasing farmer incomes and consumption of local food, engaging private sector models for adaptive agriculture practices, creating new pathways and reserve capacity for severe climate disruptions, and strengthening awareness of the benefits of local food.

*Figure 2. Causal Pathways*




The pathways created by the interventions of this project aim to increase the resilience of FSM's most vulnerable communities to food insecurity in the face of climate change.

## Theory of Change

The overall theory of change (ToC) for the project is that if FSM can improve its enabling environment for agriculture and climate change, develop tailored climate smart-agriculture packages, and strengthen value chains for farmers then FSM communities can build increased resilience to climate change and improved food security because livelihoods will be improved and local food will be more available, accessible, utilized, and stable, particularly for vulnerable communities .

### *Assumptions*

The major assumptions underlying the overall theory of change include the following:

1. Establishing an enabling environment to better capture and address climate risks and build awareness of effective adaptive strategies will improve resiliency and food security outcomes for both the government and vulnerable households ;
2. Strategic targeting and opportunities for farmers to experience and promote climate resilient practices will drive greater awareness and uptake; and
3. Focused support of market development can catalyze uptake of climate smart agricultural practices

*Barriers*

The key barriers that the chosen interventions will address are:

1. Lack of de-scaled and locally available data on risks and impacts of climate change constrains opportunities for effective targeting and uptake of climate adaptation in local communities
2. Significant lack of technical knowledge and capacity in climate smart agriculture policy, planning, and techniques for both government actors and vulnerable households
3. Weak enabling environment for government and community uptake of climate smart agriculture and planning
4. Instability of food supply due to extreme events and the growing effects of climate change, particularly sea level rise and the salinization of arable land
5. Underdeveloped market opportunities and value streams for households
6. Declining availability of local agriculture due to declining soil fertility (i.e. salinization and flooding), agricultural labor, and a growing reliance on imported food

***Paradigm Shift Pathway[2]***

The overall intervention will support a paradigm shift for FSM mostly through the **promotion of resilient agriculture** the tailored climate smart-agriculture packages will support adaptation and climate-resilient interventions to reduce the shock of a changing climate on agricultural productivity. The targeted interventions through Component 2 are designed to respond directly to key regional climate hazards and the specific risks they pose to subsistence famer households across FSM all while building more resilient communities. Interventions supporting adaptation and productivity will be targeted toward unique farmer groups and will include improved climate-resilient varieties, innovative adaptation practices and technologies, diversification, and explore business models to ensure these practices are financially viable in the long-term.

A secondary paradigm shifting pathway the project will support is **facilitating climate informed advisory for mainstreaming climate considerations in agricultural management**. As outlined above, FSM farmers lack access to critical information about daily weather, what future climate risks they face, and what they should do about these risks. Through output 1.5, this project will support farmers to proactively respond to climate hazards.

[2] Adapted to align with the GCF's Draft Agriculture and Food Security Sectoral Guide

A third paradigm shifting pathway that the project will tangentially address is to **reconfigure the food system across FSM.** This is one of the longer-term impacts that the project is aiming to achieve. Through Component 3 the project will improve resilience to climate threats by improving the overall supply chain for food/crops, build awareness for local thereby shifting consumption towards healthier and more environmentally friendly diets foods (output 3.3), and building better supply chain resilience through enhancing food processing and preservation (output 3.2).

The ToC diagram (Figure 3 below) depicts the outputs and outcomes selected to address the key barriers and how these will work to achieve the building of more resilient FSM communities to climate change.

*Figure 3. Theory of Change*