

# Climate Change Risk Management Options for the Agriculture Sector

## Introduction

The Latin America and Caribbean (LAC) region has a long history of coping with natural hazards such as hurricanes, floods, and coastal storm surges. However, climate change is expected to exacerbate the threat of natural hazards and pose new ones. As a result of climate change, average temperatures and sea levels are known to be rising, precipitation patterns might change, and hurricanes could intensify. Many of these changes are already occurring, and are projected to become more severe in the future.

The Inter-American Development Bank (IDB) supports a wide-range of projects in the LAC region. Climate change-related risks could adversely affect the financial, economic, environmental, and social performance of current and future IDB investments in the region. This factsheet identifies climate change risks and risk management options that can be incorporated into IDB-investments for the agriculture sector.

These climate change risk management measures range widely in scope, scale and time frame. It is anticipated that the user will consider the applicability of these measures and refine based on



the project or region of interest. In general, it is recommended that all projects should include disaster preparedness measures, such as measures to issue timely and effective early warnings, evacuation and safety plans, and business continuity plans. A review of the insurance scheme is also recommended as a means to minimize post disaster losses. For new projects, selecting risk management measures during the feasibility and design phase can help avoid costly retrofits and maximize resilience to climate change impacts throughout the project life.

## Climate Change Risk Management Options for the Agriculture Sector

Climate Change Risk Management Options	How the Option Addresses Hazard	Relative Cost	Implementation Feasibility
<b>Hazard and Impact to Sector</b> <b>Sea Level Rise</b> <b>Loss of arable land from inundation or potential saltwater intrusion</b>			
Install levees to keep water out of desired farmed areas	Routes water away from field	\$\$\$	Ranges from moderately easy to difficult to implement depending on the size of the levee
Increase the quantity of irrigated water to reduce effect of salt load on crop	Decreases soil salinity	\$\$	Moderately easy to implement
Reduce dependence on groundwater supply by using surface water where available	Reduces additional saltwater intrusion and allows irrigation by water of more suitable quality	\$\$	Difficult to implement; depends on availability of alternative water supplies and more efficient technologies
Consider artificial recharge of groundwater to prevent saltwater intrusion	Creates an artificial barrier to saltwater intrusion	\$\$	Moderately difficult to implement
<b>Hazard and Impact to Sector</b> <b>Storm Surge</b> <b>Inundation of crops, possibly by saltwater</b>			
Move farmed areas inland; revert to more natural vegetation that provides storm surge protection such as mangroves and wetlands	Routes water away from field	\$\$\$	Difficult to implement; large social costs
Install levees to keep water out	Reduces potential for flooding	\$\$\$, but depends on setting	Ranges from moderately easy to difficult to implement depending on the size of the levee
<b>Hazard and Impact to Sector</b> <b>Hurricane Winds</b> <b>Damage to crops by wind</b>			
Use guide wires to protect large trees from high winds; build wind breaks; use alley-cropping	Provides extra security to prevent trees from falling over	\$	Easy to implement
Harvest early, if possible	Reduces crop losses	Depends on crop type	Easy to implement; may not be feasible for some crops
<b>Hazard and Impact to Sector</b> <b>Flooding</b> <b>Damage to crops</b>			
Install pumping system to dewater fields	Removes standing water following a flood	\$\$	Moderately easy to implement
Change type of crop to one that can handle temporary inundation (e.g. orchards, vineyards)	Reduces crop losses	Depends on crop type	Moderately easy to implement but the process takes time because of the establishment of new annual plants

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Climate Change Risk Management Options	How the Option Addresses Hazard	Relative Cost	Implementation Feasibility
Restore coastal or riverine wetlands	Allows infiltration of flood waters	\$\$	Moderately easy to implement, depending on suitability of site conditions
Improve flood protection infrastructure (primarily levees or upstream dams)	Protects crops from flood	\$\$\$\$	Ranges from moderately easy to difficult depending on the type/degree of flood infrastructure
<b>Hazard and Impact to Sector Drought Damage to crops from reduced water and increased susceptibility to pests and disease</b>			
Increase irrigation efficiency, such as through drip irrigation and similar higher efficiency methods	Protects crops from drought by using water more efficiently	\$\$	Moderately easy to implement
Use of treated wastewater for irrigation	Increases water availability for irrigation (water quality tolerance varies among crops)	\$\$\$	Moderately difficult to difficult to implement, depending on whether there is wastewater treatment in place and social attitudes
Develop institutional mechanisms, i.e. insurance, to protect farmers from loss of production due to drought conditions	Provides financial support in the event of extreme events	\$\$\$	Moderately difficult to implement
Install deeper wells where adequate water supplies exist; develop additional water catchments (this is typically a short-term emergency solution, especially if there is a long-term imbalance between supply and demand)	Increases water supply and reliability	\$\$\$	Moderately easy to implement; may not be feasible for some areas
Explore alternative crops, and/or different varieties that are more resistant; support research into crop characteristics that are more suitable for growth under warmer and drier conditions	Provides a long-term adaptation pathway	\$\$\$	Difficult to implement; a long-term strategy, needs regional or international-scale cooperation
Use natural predators to reduce unwanted pests	Reduces potential damage to crops without chemicals	\$	Moderately easy to implement; may not be feasible for some crops
<b>Hazard and Impact to Sector Extreme Temperatures Damage to crops and loss of production</b>			
Develop institutional mechanisms to protect farmers from loss of production due to extreme temperature conditions (this also applies to drought conditions)	Provides financial support in the event of extreme events	\$\$\$	Moderately difficult to implement
Install blowers and shade to protect plants	Provides some cooling for plants	\$	Easy to implement; may not be feasible for all areas
Change type of crops, grow appropriate crop for new temperature conditions, timing and length of chill hours	Reduces crop losses	Depends on crop type	Feasibility is region-specific

### Table Guide

The relative costs and implementation feasibility are indicated for each option based on the professional judgment of the authors, and only to be taken as an **approximate starting point** for additional analysis. The costs have been broadly categorized into four levels (identified as \$ to \$\$\$\$) with the following general meaning:

**\$** = Relatively straightforward to implement, either simple changes on the ground or adoption of new regulations/guidelines etc.

**\$\$** = Relatively small scale projects on the ground that can be implemented with modest design and planning requirements.

**\$\$\$** = Intermediate scale efforts, more spatially extensive, and/or requiring more engineering design, scientific development, and/or planning/institutional changes than in the above two categories.

**\$\$\$\$** = Major new infrastructure development with significant new design, planning and permitting requirements.

The relative degree of difficulty is indicated for each option using the following four broad categories (difficult, moderately difficult, moderately easy, and easy) with the following general meaning:

**Easy** = Relatively straightforward to implement, provides long-term benefits, has no adverse secondary impacts.

**Moderately easy** = Minimal demands on capacity (staffing, funding, and maintenance capabilities), option is not expected to result in significant social or environmental impacts.

**Moderately difficult** = Intermediate scale efforts required to implement; option could require further assessment of environmental and social impacts, additional regulatory requirements, or capacity and technical expertise.

**Difficult** = Major effort would be needed to implement; option could result in adverse environment/social impacts, or could require significant expenditures, capacity, technical expertise, political will, or legal authority.

### Other fact sheets in this series include climate change risk management options for the:

- ▶ Energy Sector
- ▶ Water and Sanitation Sector
- ▶ Transportation Sector
- ▶ Tourism Sector
- ▶ Urban Infrastructure Sector



### For more information

IDB Environmental Safeguards Unit has mandated a more in-depth document to accompany this factsheet. To obtain a copy, or for more information on IDB Environmental Safeguards Unit's climate change risk assessment process, contact Hilary Hoagland-Grey, Lead Environmental Protection Specialist, at [hilaryhg@idb.org](mailto:hilaryhg@idb.org).

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