Agri-Tech Manual

"The Climate-Resilient Farming Handbook: A Tech-Enabled Guide for Flood & Drought Management."

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Client: ABC NGO

Background: Farmers are facing unpredictable weather events affecting productivity. In this context, the present manual provides guidelines on selecting climate-resilient crop varieties, remote sensing-based early warning system for drought/flood monitoring, and integrating soil, weather, and irrigation data to optimize planting and input decisions.

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1.0 Introduction & Manual Scope

1.1 Purpose of the Manual

Agriculture in flood-prone and drought-prone regions is increasingly exposed to high climate variability, marked by delayed monsoons, extreme rainfall events, prolonged dry spells, heat stress, and unseasonal weather anomalies. While scientific climate data—such as satellite imagery, weather forecasts, and agro-meteorological advisories—has improved significantly, a persistent operational gap exists between data availability and its practical application at the farm level (FAO, 2017; IPCC, 2022).

The primary purpose of this manual is to bridge this gap by translating complex climate, weather, and remote sensing information into clear, field-level decision protocols that can be applied by extension staff and farmers on a daily basis. The manual emphasizes *when to act, what to act on, and how to act* under varying climate risk scenarios.

Specifically, this handbook aims to:

- Enable anticipatory decision-making rather than reactive responses to climate shocks.
- Integrate remote sensing-based early warning systems with local agronomic practices.
- Support crop, variety, and input decisions based on real-time soil, weather, and water data.
- Reduce yield losses and livelihood risks through climate-resilient agronomy.

This approach aligns with the principles of Climate-Smart Agriculture (CSA) and Disaster Risk Reduction (DRR), as promoted by FAO, CGIAR, and national agricultural research systems (FAO, 2018; ICAR, 2020).

1.2 Target Audience

This manual is designed for multi-tier implementation, recognizing that climate resilience requires coordinated action across different actors within the agricultural system.

Primary Users and Roles:

User Category	Core Responsibilities	Expected Use of Manual
Field Extension Officers	Land profiling, advisory delivery, field verification, reporting	Full technical reference
Village Level Entrepreneurs (VLEs)	Digital tool operation, farmer handholding, data entry	Operational procedures
Lead / Progressive Farmers	Demonstration plots, peer learning, local adaptation	Simplified decision guidance

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The content assumes basic literacy and smartphone access, but does not require advanced technical training. All procedures are structured to function under low-connectivity rural conditions, consistent with digital extension models recommended by ICAR and FAO (ICAR, 2019; FAO, 2021).

1.3 How to Use This Guide

To ensure fast and uniform decision-making during climate events, this manual follows a standardized color-coded alert system, harmonized with national early warning frameworks used by the India Meteorological Department (IMD) and State Disaster Management Authorities (IMD, 2023).

Color-Coded Alert System:

Alert Level	Meaning	Operational Implication
Green (Safe)	Normal or favorable conditions	Continue recommended practices
Yellow (Watch)	Potential weather or crop stress	Prepare preventive measures
Red (Act)	High probability of damage	Immediate field intervention

Each operational chapter in these manual references these alert levels explicitly, ensuring consistency across weather advisories, satellite alerts, and agronomic actions. This system is designed to minimize ambiguity and reduce decision delays at the village level (UNDRR, 2019).

1.4 The "Resilience" Framework

Climate resilience in agriculture is not limited to short-term survival but encompasses the capacity of farming systems to persist, adapt, and evolve under long-term climatic stress. This manual operationalizes resilience through a three-layer framework, adapted from FAO and IPCC definitions (FAO, 2018; IPCC, 2022).

Resilience Pillars in Agricultural Context:

Pillar	Definition	Practical Examples
Absorption	Ability to withstand shocks without collapse	Submergence-tolerant rice, drought-hardy millets
Adaptation	Adjusting practices to changing conditions	Altered sowing windows, deficit irrigation
Transformation	Structural change for long-term risk reduction	Raised beds, crop diversification, digital advisories

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This framework ensures that interventions promoted in the manual do not remain isolated technical fixes, but instead contribute to a progressive transition toward climate-resilient farming systems at the landscape and community scale.

End of Section 1.0

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2.0 Digital Risk Assessment & Land Profiling

2.1 GPS Land Mapping

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