T E C H N I C A L N O T E

Advisories for Adapting to El Niño

Building a Decentralised System for Risk Tracking, Knowledge Sharing, and Scaling Climate-Resilient Solutions

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June 2026

About This Note

This technical note provides a framework for developing timely advisories and decentralised response systems to address the multi-sectoral impacts of El Niño on agriculture, livestock, water resources, ecosystems, and rural livelihoods in India. It describes how local institutions, farmer networks, civil society organisations, extension agencies, and governments can collaborate to track emerging risks, generate local solutions, and rapidly disseminate practical guidance.

Executive Summary

El Niño events — driven by warming of Pacific Ocean surface temperatures — are among the most powerful climate signals affecting Indian agriculture. They alter monsoon onset, distribution, and intensity; trigger prolonged dry spells and heat stress; catalyse pest and disease outbreaks; deplete water bodies; and erode the nutritional and livelihood security of hundreds of millions of farming families. Yet India's climate advisory architecture remains predominantly centralised: seasonal forecasts flow from national meteorological agencies to state governments, losing granularity at every step. By the time advisories reach the farm, they are too broad, too late, or too technical to drive local action.

This technical note makes the case for a complementary decentralised layer: a community-anchored climate intelligence and advisory system that works alongside — and greatly amplifies the utility of — national forecasting systems. The note covers:

- The differentiated El Niño impacts across India's major agroecological and livelihood systems
- The design of a nested, multi-level monitoring system grounded in community observation
- Platforms — both digital and non-digital — for real-time data flow and feedback
- Mechanisms for documenting, validating, and horizontally sharing local adaptation solutions
- A framework for converting El Niño stress into a strategic window for scaling agroecological transitions
- An advisory development template covering pre-season, in-season, extreme event, and recovery phases
- Institutional architecture and a practical roadmap for operationalisation

1. The El Niño Challenge: Understanding Differentiated Impacts

1.1 What Is El Niño and Why Does It Matter for Indian Agriculture?

El Niño refers to the periodic warming of sea surface temperatures in the central and eastern equatorial Pacific Ocean. Through atmospheric teleconnections, it suppresses the Asian summer monsoon, delays its onset, reduces cumulative seasonal rainfall, and increases the probability of mid-season dry spells, particularly in peninsular and central India. El Niño years also correlate with elevated Rabi-season temperatures, erratic winter rainfall in north India, and increased cyclonic activity in the Bay of Bengal post-monsoon.

For a country where over 50 per cent of net sown area remains rainfed and where agriculture directly employs more than 40 per cent of the workforce, El Niño is not merely a climatic event — it is a food security, livelihood security, and rural equity crisis waiting to materialise. The severity of outcomes depends less on the signal itself and more on the adaptive capacity that communities and institutions have built in advance.

1.2 Differentiated Impacts by Livelihood and Ecosystem Type

Livelihood / Ecosystem Type	Key El Niño Impacts	Relevant Geographies
Rainfed Dryland Farming	Delayed sowing, mid-season dry spells, reduced yields of kharif cereals and pulses, increased aphid and pod borer pressure, moisture stress at reproductive stage	AP, Telangana, Vidarbha, Bundelkhand, Chhattisgarh drylands
Irrigated Farming	Reduced reservoir and canal availability post-kharif, groundwater depletion, power shortages for pump irrigation, late-season crop failure in rabi	Krishna-Godavari command areas, Punjab-Haryana canal zones
Pastoral and Agropastoral Systems	Fodder deficits, water scarcity at watering points, heat stress and disease in livestock, distress sale of animals, loss of draught power	Deccan plateau, Rajasthan, parts of Gujarat and MP
Forest-Dependent Communities	Reduced non-timber forest produce (NTFP) availability, drying of streams, increased fire risk, reduced water availability for jhum agriculture	Odisha, Jharkhand, Chhattisgarh, Northeast India, Eastern Ghats
Coastal and Fisher Communities	Disrupted monsoon onset affecting fishing calendars, salinity intrusion into freshwater bodies, bleaching of mangroves and coral systems, post-cyclone livelihood disruption	Andhra coast, Odisha coast, Kerala backwaters, Sundarbans
Horticulture Systems	Heat stress at flowering in mango, cashew, and vegetable crops; increased	AP, Karnataka, Maharashtra, Himachal Pradesh

	thrips and mite populations; post-harvest losses due to temperature rise	
Hill and Tribal Agriculture	Erratic rainfall affecting terrace agriculture, spring drying, reduced millets and legume productivity, increased landslide risk	Northeastern states, Sikkim, Uttarakhand, Eastern Ghats

1.3 Cross-Cutting Socioeconomic Vulnerabilities

El Niño impacts do not fall uniformly. Within the same village, women farmers managing kitchen gardens and small livestock face disproportionate burdens as household food provisioning falls to them. Marginal and small farmers with no credit buffers are the first to distress-sell assets. Adivasi and Dalit communities with insecure land rights and forest access rights find their coping mechanisms constrained by institutional gaps. Youth who have migrated to urban areas face reverse migration pressure during rural stress events, while older farmers managing farms alone face labour shortages. Tenant farmers are also more vulnerable as they lack access to income support, insurance or other safety nets. Agricultural labor will also face difficulties finding work due to the new structure of VB-GRAM-G and lack of agri work in case of a weak monsoon.

Any advisory or response system must begin with this differentiated vulnerability map — not with crop production statistics alone.

2. The Case for Decentralised Monitoring and Advisory Systems

2.1 Why Centralised Forecasts Are Insufficient for Local Adaptation

India's national meteorological infrastructure — the India Meteorological Department (IMD), National Centre for Medium Range Weather Forecasting (NCMRWF), and Earth System Science Organisation (ESSO) — has improved dramatically in forecast skill over the past decade. Extended range forecasts, seasonal outlooks, and district-level advisories through platforms such as Gramin Krishi Mausam Sewa (GKMS) and AgroMet services represent real advances. Yet several structural limitations constrain their usefulness for community-level adaptation:

- Spatial resolution gap: District-level forecasts cannot capture the micro-watershed and village-level variability in soil type, topography, and water availability that determines actual crop outcomes.
- Temporal mismatch: Weekly or ten-daily advisories miss the rapid dynamics of pest emergence, seed germination decisions, and irrigation scheduling that operate on 2–3-day windows.
- Last-mile translation deficit: Forecasts in English and technical language require translation into local languages, culturally embedded analogies, and concrete farm-level actions — a function that extension systems remain under-resourced to perform.
- Unidirectional architecture: Centralised systems broadcast information downward but lack feedback loops to capture local observation, indigenous phenological knowledge, or emerging in-season anomalies.

- Equity blindness: Generic advisories do not account for the differentiated vulnerabilities of women farmers, marginal cultivators, and forest-dependent communities.

2.2 Local Observations as a Complementary Intelligence Layer

Generations of farming communities have evolved sophisticated, place-specific indicators for reading weather, soil, water, and crop conditions. These include: flowering phenology of indicator tree species as season-onset signals; soil colour, texture, and moisture-holding behaviour as soil health proxies; behavioural changes in farm insects and birds as early warnings of weather shifts; traditional calendar systems linking crop cycles to lunar, stellar, and seasonal markers. This knowledge — embedded in practice, not documentation — is a largely immobilized resource for real-time monitoring.

When combined with systematic, low-cost community observation protocols, this knowledge can fill critical gaps in the meteorological advisory chain. Citizen science — structured community observation feeding into shared databases — has demonstrated this potential across multiple global contexts, from rain gauge networks in smallholder Africa to pest surveillance networks in South Asian vegetable systems.

2.3 The Multi-Actor Decentralised Monitoring Ecosystem

A decentralised system is not a parallel infrastructure built from scratch. It is an architecture that connects existing actors — village volunteers, Krishi Sakhi networks, FPO field staff, panchayat officials, local NGO workers, KVK technical staff — through shared protocols and platforms. The key design shift is from passive information recipients to active knowledge contributors: every actor in the chain both receives and generates climate intelligence.

3. Designing the Decentralised Risk Tracking System

3.1 Community-Level Monitoring: What to Observe

The community monitoring framework rests on eight indicator domains, each with observable parameters that require no specialised equipment and can be recorded by trained village-level monitors:

Indicator Domain	Observational Parameters
Rainfall	Onset date, dry spell duration, daily amount (simple rain gauge), spatial distribution across village watershed
Soil Moisture	Visual and tactile field assessments at 0–15 cm and 15–30 cm depth; moisture stress indicators in standing crops; crack formation in Vertisols
Water Body Status	Tank and pond water levels (painted gauge poles), well water depth, stream flow observations, seep and spring discharge
Crop Stress	Canopy colour change, leaf rolling and wilting, grain filling abortion, panicle blast, premature maturity — recorded crop-by-crop
Pest and Disease	First appearance dates, spread rate, severity on a 1–5 scale, affected crop stages; special attention to vector-borne disease emergence
Fodder and Livestock	Standing fodder area, green fodder availability, livestock body condition scoring, mortality rates, disease outbreak notes
Household Food Security	Dietary diversity score (weekly), meal frequency reduction, distress asset sales, migration commencement, MGNREGA demand increase
Labour and Market	Agricultural wage rates, input availability and price spikes, market access disruption, credit stress indicators

3.2 Monitoring Actors and Roles

Each level of the monitoring architecture has specific roles calibrated to the capacity and scale of that actor:

Actor	Monitoring Roles	Scale / Coverage
Village Climate Monitor (Gram Mausam Mitras)	Daily rainfall, weekly crop/pest/soil observations; feed to cluster WhatsApp group; maintain village climate register	1–2 per revenue village; preferably women
FPO Field Officer / Krishi Sakhi	Aggregate village-level data; validate and contextualise; flag anomalies; coordinate with KVK; host cluster learning sessions	1 per cluster of 10–15 villages
Block Resource Centre (BRC / ATMA)	Compile cluster data; correlate with IMD forecasts; prepare block-level advisory inputs; coordinate with district agriculture department	1 per block

KVK (Krishi Vigyan Kendra)	Validate local observations against research knowledge; identify best practices for documentation; support advisory preparation; connect to SAU network	1 per district
District Agriculture Department	Integrate monitoring data into district contingency planning; activate government support schemes; coordinate with line departments (irrigation, animal husbandry)	District-level nodal officer
State Agricultural University / IMD	Provide seasonal and weekly forecast inputs; validate community observations at regional scale; co-develop training materials for monitors	Technical backstop

3.3 Digital and Non-Digital Platforms

Digital Channels

- WhatsApp-based reporting: Standardised observation templates sent as structured messages or photographs; cluster-level groups moderated by FPO field officers; aggregation by BRC staff
- Mobile-based citizen science apps: Simple apps (compatible with Android feature phones) for structured data entry with geotag and timestamp; offline-capable with batch upload when connectivity allows
- Open-access dashboards: District and state-level visualisations of aggregated community data overlaid on IMD forecast layers; accessible to panchayat officials and the public
- SMS alert systems: Outbound alerts to registered farmer groups when threshold conditions are detected (e.g., 14-day dry spell confirmed, pest alert Level 3 reached)

Non-Digital Infrastructure (Equally Critical)

- Village Climate Register: A physical logbook maintained at the gram panchayat office recording daily weather observations, crop condition notes, and pest/disease reports in local language
- Community notice boards: Weekly advisory summaries posted at panchayat, FPO, and self-help group meeting places
- Village announcement: Integration with existing community announcement systems for time-sensitive alerts
- Monthly community learning circles: Structured farmer group meetings to review the month's observations, share adaptation experiences, and prepare the next month's focus areas

3.4 Data Flow Architecture: Village to State

Data Flow Schematic

VILLAGE → CLUSTER → BLOCK → DISTRICT → STATE

Daily: Raw observations (rainfall, crop stress, pest sightings) via WhatsApp / SMS / register
Weekly: Cluster summaries compiled by FPO field officer; block synopsis by BRC
Bi-weekly: District contingency review meeting with line departments
Monthly: State synthesis report integrating all districts; advisory revision cycle

Feedback flows downward at each step within 48 hours: validation, advice, resource alerts

Validation mechanisms are essential to prevent noise from overwhelming signal. Three-tier validation is recommended: (i) peer validation within the cluster group (cross-checking observations across 3–5 villages), (ii) technical validation by KVK or BRC staff against known crop and pest phenology, and (iii) triangulation with IMD and NDVI/remote sensing data available through platforms such as FASAL, Bhuvan, and NRSC services.

4. Community-Based Solution Discovery and Sharing

4.1 Why Local Solutions Matter

During El Niño stress events, farming communities do not wait passively for government advisories. They observe, adapt, improvise, and innovate — often rediscovering traditional practices that have been marginalised by the green revolution's input-intensive monoculture model, and often developing novel combinations of indigenous knowledge and new tools. These solutions are frequently invisible to research and extension systems because they are undocumented, informal, and geographically dispersed.

The challenge is not to create solutions from scratch; it is to surface, validate, and amplify what communities are already doing well. This requires a deliberate architecture for solution discovery, documentation, and horizontal sharing.

4.2 Categories of Local Adaptation Solutions

- Drought-resilient variety selection: Identification of landraces and open-pollinated varieties that outperform hybrids under moisture stress; community seed bank maintenance and exchange
- Soil moisture conservation: Tied ridges, broad-bed-and-furrow systems, in-situ moisture harvesting, dead furrow bunding, mulching with crop residues, green manure incorporation to improve soil organic matter
- Community water management: farm pond repair, check dam desiltation, percolation tank maintenance, traditional tank (kunta/cheruvu) rejuvenation through gram sabha-led water budgeting
- Crop diversification and sequencing: Short-duration pulse intercrops, mixed cropping systems, relay cropping to capture residual moisture, vegetable cultivation on tank beds during dry spells

- Agroforestry integration: Retention of boundary trees and perennial shrubs for soil moisture, microclimate buffering, and supplementary income during crop failure years
- Livestock feed and fodder innovations: Urea-molasses mineral blocks, azolla cultivation for poultry and small ruminants, fodder banking with sun-dried surplus biomass, silage preparation
- Traditional ecological knowledge: Indigenous rainfall prediction from plant and animal phenology, soil type identification and differential management, traditional tank cascade management systems
- Integrated pest management under stress: Pest-monitoring with yellow sticky traps, neem-based botanicals, tri-capping pheromone traps, conservation of natural enemy habitats in field margins

4.3 Documentation and Validation Protocol

A four-step protocol for solution documentation and validation:

- Identification: Community-level innovation scout (typically a respected, experienced farmer) nominates practices that have demonstrated positive outcomes under the current stress season. FPO field officer documents using a standardised case-study template capturing: practice description, inputs required, labour demand, cost, performance evidence, and farmer contact.
- Peer verification: The documented practice is presented at a cluster learning session. Farmers from at least three different villages cross-examine the case, ask questions about applicability, and rate relevance on a structured rubric.
- Technical review: KVK agronomist or CSA technical team reviews documented case against known research evidence. Three outcomes: (a) validated as-is, (b) validated with modifications to improve efficacy or safety, (c) referred for on-farm trial before wider sharing.
- Digitisation and dissemination: Validated solutions are entered into a shared solution repository (accessible as a mobile-friendly website and downloadable PDF compendium) with photographs, local-language description, short video where feasible, and agroecological zone tagging for search.

4.4 Horizontal Sharing Mechanisms

- Cross-village and cross-cluster farmer field days: Quarterly events where farmers from different clusters visit ongoing examples of adaptive practices
- Exchange visits: 2–3-day visits for village monitors and FPO leaders to communities in neighbouring districts or states who have successfully navigated a previous El Niño season
- Solution compendiums in local languages: Printed and digital booklets in regional languages including Telugu, Marathi, Odia and other relevant languages with illustrated descriptions of validated practices
- Radio, community and social media: Scripted farmer testimonials broadcast through All India Radio agricultural programmes, community radio stations, and YouTube / WhatsApp / Facebook video
- FPO-to-FPO learning networks: Structured peer exchange between CSA-associated FPOs and others in the region, facilitated by CSA's network team

5. Turning Crisis Into Opportunity: El Niño as a Transition Window

5.1 The Strategic Logic

El Niño periods create a paradoxical opportunity. When conventional high-input monocultures fail visibly and dramatically, and when agroecological farms demonstrate comparatively greater resilience — retaining soil moisture, maintaining partial yields, sustaining fodder through diversified systems — the relative advantage of agroecological approaches becomes legible in ways that normal seasons do not allow. Farmers who were ambivalent about transition become open to change. Policymakers who resisted deviating from green revolution orthodoxy face pressure to fund what is demonstrably working.

This is the window. The question is whether civil society organisations, research institutions, and progressive government agencies are prepared to use it — with documentation, advocacy, and scaled support — rather than simply firefighting through the crisis and returning to business as usual.

5.2 Priority Technologies and Practices to Scale During El Niño Windows

Practice / Technology	Strategic Rationale for El Niño Scaling
Agroecological farming systems	Diverse, integrated farms with higher soil organic matter retain moisture longer, buffer temperature extremes, and sustain multiple income streams when a single crop fails
Millets and climate-resilient dryland crops	Sorghum, pearl millet, finger millet, foxtail millet, and minor millets have deep-rooted drought tolerance, nutritional density, and market potential — but require coordinated seed supply, processing, and market development
Soil organic matter enhancement	Vermicompost, Jeevamrit, crop residue incorporation, green manure crops — improving soil water-holding capacity is the single most effective on-farm drought adaptation strategy
Water harvesting structures	Farm ponds, in-situ moisture conservation structures, check dams — capitalise on MGNREGA, PMKSY, and watershed programme convergence to massively scale during El Niño years when demand is highest
Community seed systems	Village seed banks with drought-tolerant open-pollinated varieties are a direct insurance mechanism; El Niño failure of hybrid seeds dramatically increases farmer receptivity to seed sovereignty approaches
Integrated farming systems	Combining crop, livestock, poultry, and perennial tree components reduces income variability; FPOs can coordinate fodder banking, silage production, and group livestock health services
Farmer-managed natural regeneration (FMNR)	Protecting and managing natural regeneration of trees on farmland improves soil moisture, provides fodder, and diversifies income — low-cost and rapidly deployable

Decentralised renewable energy irrigation	Solar pump systems for supplementary irrigation from community ponds reduce dependence on grid power; subsidy windows often open during crisis periods
Decentralised weather services	Automatic weather stations available at panchayat or FPO cluster level dramatically improve forecast accuracy for advisory purposes; costs have fallen to affordable levels. Simple rain gauges are sufficient to monitor rainfall. We can use locally made ones as well.

5.3 Documentation and Advocacy During the Crisis Window

The work of converting crisis into transition opportunity requires specific documentation and communication effort:

- Systematic comparison of farm outcomes: FPO field officers systematically document yield, income, soil condition, and livelihood outcomes on agroecological farms vs. conventional farms in the same village during the El Niño season. This evidence base is the foundation for policy advocacy.
- Farmer testimonials and video documentation: Short, compelling farmer testimonials documenting what worked and why — in local language, appropriate for social media, community meetings, and policy presentations
- Policy briefs: Rapid policy briefs prepared by CSA and partners linking field evidence to specific recommendations for scheme redesign, fund allocation, or regulatory change
- Media engagement: Proactive media engagement to ensure that farmer resilience stories — not just distress narratives — are part of the El Niño news coverage

6. Advisory Development Framework

6.1 Principles for Effective Advisories

Advisories are the operational output of the monitoring system. Their quality determines whether the intelligence generated by community monitoring translates into farmer action. Six design principles should govern advisory development:

Principle	What It Means in Practice
Location-specific	Advisory content keyed to specific agroecological zones, soil types, and cropping systems — not generic state or district level
Action-oriented	Each advisory must specify what the farmer should do, by when, with what materials — not simply describe what is happening or predicted
Easy to understand	Local language, concrete analogies, illustrated where possible, free of jargon; validated by farmers before dissemination
Timely and seasonal	Phased by season stage: pre-season, early kharif, mid-season, stress period, recovery; produced on a schedule farmers can rely on
Inclusive	Specific sub-advisories or footnotes addressing women farmers, landless labourers, pastoral communities, and forest-dependent households whose needs differ from the default farmer profile

Evidence-based but adaptive	Grounded in both scientific knowledge and validated community experience; updated as the season evolves based on monitoring data

6.2 Advisory Phases and Content Templates

Phase 1: Pre-Season Preparedness (March–May for Kharif)

- Seasonal El Niño probability and expected monsoon onset range; contingency planning trigger points
- Variety selection guidance: short-duration varieties, drought-tolerant landraces, multi-crop diversification bundles
- Seed and input preparation: community seed bank activation, vermicompost production acceleration, preparation of botanicals
- Water harvesting structure repair and pre-positioning
- Fodder cultivation planning: inclusion of sorghum, cowpea, and perennial grasses in kharif plan
- Insurance enrolment: PM Fasal Bima Yojana activation calendar, FPO-facilitated group enrolment
- Access to entitlements: Also access to credit and income support scheme payment disbursal so that rural communities have a cash buffer.

Phase 2: In-Season Management (June–September)

- Weekly forecast interpretation for the cluster/block area
- Crop stand assessment at 21 Days After Sowing (DAS) and replanting / gap-filling advisory if needed
- Irrigation scheduling advisory for supplementary irrigation from farm ponds
- Pest and disease surveillance triggers and action thresholds (linked to monitoring network alerts)
- Soil moisture conservation operations: tied ridges, mulching, inter-row cultivation timing
- Fodder crisis early warning and procurement advisory

Phase 3: Extreme Event Response

- Crop rescue advisory during prolonged dry spells: deficit irrigation protocols, foliar nutrition, anti-transpirant application
- Livestock emergency advisory: fodder deficit management, disease prevention under heat stress, emergency water sourcing. If the crisis is very severe, measures like fodder banks, cattle camps, might be needed.
- Post-flood / post-cyclone advisory: salvage harvesting, seed drying and storage, crop replanting windows
- MGNREGA/VB RAM G/PDS/Primary health service/ DBTs demand facilitation: how to submit demands, what works are permissible, FPO coordination with panchayat

Phase 4: Recovery and Resilience Building (Post-Season)

- Rabi crop advisory adapted to soil moisture status after El Niño kharif

- Soil health restoration measures: cover cropping, compost application, minimum tillage
- Livestock herd rebuilding: priority breeds, vaccination schedule, fodder establishment
- Livelihood diversification: value addition, FPO market linkage, non-farm skill development
- Learning documentation: participatory season review; what worked, what did not, what to do differently next season

7. Institutional Architecture: Roles and Responsibilities

7.1 The Institutional Ecosystem

A decentralised advisory system does not replace existing institutions; it reorganises their interactions around a shared intelligence and action architecture. The following matrix maps key actors to their primary responsibilities:

Institution	Roles in the Advisory System	Key Considerations
India Meteorological Department (IMD)	Seasonal forecasts, district-level agro-met advisories (GKMS), validation of community observations at regional scale	Primary technical authority for weather data
National and State Agricultural Universities (SAUs)	Research backstop for advisory content, validation of community solutions, training of extension staff and KVK teams	Technical credibility; needs active field engagement
Krishi Vigyan Kendras (KVKs)	Front-line technical support, community observation validation, demonstration of resilient technologies, on-farm trials, training of village monitors	Critical link between research and community — currently under-resourced for this role
ATMA / Extension Departments	Block and district-level advisory aggregation, coordination with line departments (irrigation, animal husbandry), facilitation of scheme convergence	Administrative mandate; needs strengthening for real-time advisory work
Panchayati Raj Institutions (PRIs)	Village-level data custodian (climate register), gram sabha platform for advisory dissemination, MGNREGA demand facilitation, local coordination	Democratic legitimacy; often bypassed in current advisory chains
Farmer Producer Organisations (FPOs)	Cluster-level monitoring coordination, solution documentation, horizontal sharing, input procurement during crisis, market stabilisation	Key field operational unit; most direct farmer contact
Community-Based Organisations / SHG Networks	Household food security monitoring, inclusion of women and vulnerable groups in advisory dissemination, community savings mobilisation for resilience	Essential for equity dimension of advisory system
Civil Society Organisations	System design and training, monitoring validation, solution documentation, policy advocacy, cross-landscape learning coordination	Neutral convener; field-grounded; long-term presence

Private Sector / Digital Platforms	Weather station data partnerships, digital platform development, last-mile SMS/IVR systems, agri-fintech for crisis credit	Innovation and scale; requires careful governance to prevent data privatisation
Research Institutions (ICAR, ICRISAT, CIMMYT)	Long-term agronomic research, climate-resilient variety development, farming systems research, evaluation of decentralised monitoring system performance	Strategic backstop; need closer integration with community knowledge systems

7.2 Governance Principles

- Data sovereignty: Community-generated monitoring data must remain in community ownership; any use by commercial actors requires explicit consent and benefit-sharing
- Open access: Advisory outputs and solution documentation must be publicly accessible, not locked behind proprietary platforms
- Democratic oversight: Village-level monitoring and advisory systems must be accountable to gram sabha, not only to project management structures
- Gender parity: Women must be represented in all monitoring, advisory, and governance roles — not as token presence but as substantive decision-makers
- Convergence mandate: No parallel systems; advisory architecture must integrate with existing government programmes (PMFBY, PMKSY, MGNREGA, NHM) rather than creating new silos

8. Recommendations

8.1 Immediate Actions (0–3 Months)

- Activate village climate monitors in high-vulnerability clusters: Identify and train 200–500 village-level monitors across the most El Niño-exposed districts in AP, Telangana, Odisha, and Maharashtra using CSA's Gram Mausam Mitra protocol.
- Establish WhatsApp-based cluster reporting groups: Create structured reporting groups at cluster level with standardised templates, moderated by FPO field officers; integrate with a simple aggregation dashboard.
- Produce pre-season advisory package: Develop location-specific pre-kharif advisories covering variety selection, water conservation preparation, input planning, and insurance enrolment for each agroecological zone in the target geography.
- Launch rapid documentation drive for community solutions: Conduct structured documentation of existing adaptive practices across CSA-associated FPOs using the four-step validation protocol described in Section 4.
- Convene a state-level multi-actor coordination meeting: Bring together IMD regional office, SAU agrometeorology department, ATMA, relevant KVKs, and civil society organisations to agree on data-sharing protocols, joint advisory production calendar, and resource commitments.

8.2 Medium-Term Actions (3–12 Months)

- Develop and deploy open-access monitoring dashboard: Commission a simple, mobile-compatible dashboard aggregating community observations, overlaid with IMD forecast data and NDVI/crop condition maps.
- Establish a solution repository in local languages: Build and maintain a searchable digital repository of validated community adaptation practices in Telugu, Marathi, Odia, and Hindi, with short video documentation.
- Design and pilot a learning alliance: Facilitate a structured learning alliance across 3–4 districts, bringing together FPOs, KVKs, NGOs, and panchayat representatives for quarterly review and knowledge exchange.
- Integrate monitoring system with government contingency planning: Work with district agriculture departments to embed community monitoring data formally into District Agricultural Contingency Plans (DACPs) and district disaster management frameworks.
- Produce evidence brief on agroecological resilience during El Niño: Systematically document comparative farm outcomes across agroecological and conventional farms during the current season; prepare policy brief for state and national advocacy.

8.3 Long-Term Systemic Recommendations

- Institutionalise community climate observatories within the Panchayati Raj system: Advocate for formal recognition and budget support for village-level climate monitoring as a function of gram panchayats, linked to the disaster management planning mandate.
- Reform KVK mandates for community advisory work: Advocate for a revised KVK performance framework that values community-level advisory output, climate monitoring support, and localised solution validation alongside conventional technology demonstration.
- Develop national standards for community-based agro-climate monitoring: Work with IMD, ICAR, and the Ministry of Agriculture to develop national guidelines for community monitoring protocols, data quality standards, and integration with formal systems.
- Build the policy case for agroecological transition support: Use El Niño resilience evidence to make the sustained case for redirecting agricultural support schemes (input subsidies, extension services, credit) toward agroecological transitions at scale.
- Create a South-South learning platform: Connect India's community-based advisory experience with similar initiatives in Sri Lanka, Bangladesh, Nepal, and sub-Saharan Africa through CGIAR networks, SAARC agricultural cooperation, and South-South knowledge exchange programmes.
- The localized community solutions repository should also inform and shape future ICAR research studies on climate resilient practices and varieties.

6A. Managing Weather Uncertainty: Sowing Decisions, Contingency Planning, and Source Mapping

El Niño seasons are characterised not only by deficient rainfall overall but by intense intra-seasonal variability — prolonged dry spells punctuated by occasional heavy downpours. This dual hazard — too little water for most of the season, then too much at once — demands an advisory approach that is simultaneously conservative (protecting against drought stress) and preparatory (mitigating waterlogging and runoff damage). Neither hazard alone defines the El Niño challenge; their combination does.

Key Advisory Principle

The twin risks of El Niño seasons for dryland farmers:

- Extended dry spells → crop failure from moisture stress
- Sudden heavy downpours → waterlogging, runoff, nutrient leaching, and lodging

Both risks must be addressed in the same advisory framework.

6A.1 General Standing Advisories: Dos and Don'ts for Weather-Uncertain Seasons

The following advisories apply across all El Niño-prone dryland and rainfed regions and should be communicated to farmers before and at the start of the kharif season. They constitute a 'base layer' of guidance that remains valid regardless of how the season evolves:

A. Crop and Variety Selection

Principle	Rationale and Guidance
DO: Prioritise short-duration varieties	Short-duration varieties of sorghum (75-85 days), pearl millet (70-80 days), pigeonpea (120-150 days), and groundnut (90-105 days) escape terminal drought by completing grain filling before the dry season intensifies. These should be the default in El Niño years.
DO: Choose drought-tolerant and dual-purpose varieties	Select varieties with proven performance under moisture stress — including traditional landraces from community seed banks — that offer grain plus fodder value, reducing total loss even in partial crop failure.
DO: Plan a mixed or intercropped system	Sorghum + pigeonpea, pearl millet + cowpea, groundnut + castor — diverse cropping systems distribute risk across crops with different water requirements and failure points.
DON'T: Sow water-intensive crops as primary kharif crop	Avoid paddy on purely rainfed uplands, sugarcane expansion, and water-hungry vegetables as first crop in uncertain rainfall years. These amplify loss when rainfall is deficient.
DON'T: Commit entire farm to a single hybrid	Hybrid varieties optimised for high-input conditions often underperform under stress relative to improved OPVs or landraces. Diversify seed source and variety within the farm.
DO: Keep contingent crop plans ready	Prepare a tiered planting plan: primary crop if normal onset, substitute crop if monsoon is 2-3 weeks late, and a short-season salvage crop if monsoon is severely delayed (see Section 6A.3).

B. Soil Moisture Conservation

Soil Moisture Practice	When and How
Deep summer ploughing	Plough to 20-25 cm before monsoon onset to break the hard pan, improve infiltration, and reduce runoff. Critical in Vertisols and compacted red soils.
Tied ridges and broad-bed-and-furrow	Create in-situ moisture harvesting structures along contour at land preparation time. Tied ridges at 3-4 metre intervals capture runoff within the field rather than allowing it to leave.
Mulching immediately after germination	Crop residue mulch of 3-5 tonnes/ha significantly reduces evaporative loss from soil surface. Use previous year's residue, dry grass, or sorghum/pearl millet stover.
Green manure and cover crop incorporation	Dhaincha, sunhemp, or cowpea as a short green manure before main crop planting — or as interrow cover — improves soil organic matter, water infiltration, and nitrogen availability.
Avoid bare soil between rows	Inter-row cultivation to break surface crust after each heavy shower improves subsequent infiltration and reduces runoff from the next downpour.
Bunding and field channel preparation	Repair or construct field bunds before season to retain in-field moisture and prevent gully erosion during heavy rain events.

C. Water Harvesting and Drainage Preparation

- Desilt farm ponds and community tanks before monsoon onset — a heavy early shower can be captured rather than wasted if storage is ready
- Prepare drainage channels alongside low-lying plots to prevent waterlogging during heavy downpours, particularly in black cotton soils that seal under rain
- Do not seal field outlets in anticipation of dry spells; maintain reversible bunding that can be quickly opened to drain excess water
- In canal command areas: Do not grow paddy on tail-end plots if reservoir levels are low at sowing time — late-season water requirement cannot be met

D. Input and Infrastructure Preparedness

- Procure seed of multiple varieties (primary + contingent) before the season — post-monsoon seed availability collapses in El Niño years
- Prepare Jeevamrit, vermicompost, and botanical pest management inputs in advance — input supply disruptions are common in stress years
- Check and repair irrigation equipment (pumps, pipes, drip fittings) before season — repair services are overwhelmed during the season
- Ensure crop insurance enrolment is completed before the cut-off date — FPOs should facilitate group enrolment at village level

6A.2 Critical Sowing Advisory: The Soil Moisture Threshold Approach

One of the most important and frequently overlooked advisory interventions in El Niño years is the sowing threshold advisory. Early sowing into dry or marginally moist soil — driven by calendar pressure or false break rains — is a major cause of crop failure. Plants germinate, emerge, and then face a dry spell before root systems are established. The result is total stand loss and the need to re-sow, often into a worse moisture situation, with depleted seed and financial resources.

The IMD's standard recommendation and CSA's field experience both confirm that sowing should be delayed until genuine monsoon establishment, defined by the following soil moisture thresholds:

Sowing Rule: Wait for Soil to be Ready, Not the Calendar

SOWING THRESHOLD ADVISORY

Light soils (sandy loam, red sandy soils):

- Sow only after receiving cumulative rainfall of 50-60 mm within the preceding 7 days
- OR when the soil is moist to a depth of 10-12 cm after monsoon onset as declared by IMD

Heavy soils (deep Vertisols, clay loams, black cotton soils):

- Sow only after receiving cumulative rainfall of 60-75 mm within the preceding 7 days
- OR when the soil is moist to a depth of 10-12 cm after monsoon onset as declared by IMD

Verification method: Push a wooden stick or iron rod to 10-12 cm into the soil in the planting zone.
If it comes out with moist soil clinging to it — sow. If it comes out dry — wait.

Confirm onset with: IMD monsoon declaration for your district via GKMS / Meghdoot app.

This advisory is especially critical because El Niño years often bring 'false breaks' — one or two heavy showers followed by a 10-14-day dry period before actual monsoon establishment. Farmers who sow on the first showers face seedling mortality in the dry spell that follows. The threshold approach protects against this by requiring that the soil profile is genuinely charged before planting. Village climate monitors should measure and report cumulative rainfall weekly from the first shower; FPO field officers disseminate the sowing status — 'threshold not yet reached', 'threshold reached for light soils', 'threshold reached for all soils' — through the monitoring network.

Soil Type Identification for Threshold Application

Soil Type	Field Identification	Sowing Threshold
Red sandy / light loam	Light reddish-brown; forms loose clods; drains quickly after rain; warm to touch in summer	50-60 mm / 10 cm moist
Medium red / brown loam	Brownish-red; moderate clay content; holds shape when moist; moderate drainage	55-65 mm / 10 cm moist
Black cotton / deep Vertisol	Dark grey to black; high clay; cracks deeply in dry season; swells and becomes sticky when wet; slow drainage	65-75 mm / 10 cm moist
Shallow red gravel	Red with gravel and rock fragments; very low water retention; high runoff	45-55 mm — drought-tolerant crops only
Sandy alluvial	Light tan-brown; coarse texture; very fast drainage; near rivers and streams	50 mm — irrigation supplement essential

6A.3 Contingency Crop Planning: A Tiered Response Framework

A contingency plan is a pre-prepared decision tree: if the monsoon behaves this way, plant this crop in this window, with these management adjustments. Preparing this plan before the season — not during the stress — is what makes it actionable. The tiered framework below should be customised to each agroecological zone and communicated during pre-season preparation meetings:

Scenario	Advisory Action	Recommended Crops / Focus
Normal onset (on or before June 15 in AP / Telangana)	Proceed with primary kharif plan. Sow as per soil moisture threshold. Full season varieties viable.	Sorghum, pearl millet, pigeonpea, groundnut, cotton — as per local tradition and soil type
Delayed onset (June 16 – July 10)	Switch to shorter-duration varieties. Reduce land under water-intensive crops. Emphasise pulse-based intercrops.	Short-duration sorghum / bajra, green gram (moong), black gram (urad), sesame, cowpea
Severely delayed onset (July 11 – July 31)	Shift to very short-duration salvage crops only. Consider fodder prioritisation to protect livestock. Partial farm coverage acceptable.	Foxtail millet (60 days), moth bean, horse gram, cowpea for fodder, guar
Onset after August 1	Abandon kharif food crop in severely stressed areas. Focus on rabi preparation, fodder establishment, soil health restoration. Activate MGNREGA demand.	Sunflower / mustard / chickpea / safflower — shifted to rabi window
Intermittent heavy rains after dry spell	Do not resow immediately. Wait for soil moisture threshold to be re-met. Check for pest pressure on standing crop. Drain waterlogged plots urgently.	Reassess crop stage and standing plant density before deciding to resow or gap-fill

Contingency seed kits — pre-assembled packets of short-duration backup crop seeds — should be stocked by FPOs and CSA resource centres before the season begins, so that when a delayed sowing

advisory is issued, the substitute seed is immediately available. This requires pre-season seed sourcing and storage to be completed by April-May.

6A.4 Resource and Contact Mapping: Who to Reach When

A decentralised advisory system is only as good as its ability to connect farmers to the right resources at the right moment. Pre-season mapping of all relevant sources — technical, institutional, input supply, emergency — transforms the advisory from an information document into an action-enabling tool. This mapping should be prepared for every block or cluster and updated annually.

Categories of Resources to Map

Resource Category	Who to Map and What Information to Capture
Weather and Forecast Services	IMD district agro-met unit; GKMS block contact; Meghdoot app QR code; Kisan Call Centre (1800-180-1551); NDVI / crop condition portal for district agriculture officer
Seed Sources	KVK demonstration plot contacts for contingency variety seed; community seed bank locations and custodian names; FPO seed procurement officer; NFSM seed distribution centre
Technical Advisory	KVK subject matter specialists by crop (with phone numbers); SAU extension faculty for pest / disease emergencies; CSA field team contacts; ATMA block technologist
Pest and Disease Diagnosis	Plant Protection Officer (PPO) at district agriculture office; NCIPM pest surveillance contact; licensed agronomist at input dealer; CSA NPM resource person network
Water and Irrigation	Minor irrigation department sub-divisional engineer; groundwater department contact; PMKSY implementation officer; solar pump subsidy application window and deadline
Livestock Emergency	Veterinary assistant surgeon for nearest PHC; district animal husbandry officer; fodder procurement sources; emergency vaccination schedule and veterinary camp dates
Financial and Insurance	PM Fasal Bima Yojana district nodal officer; lead bank district coordinator for crop loan restructuring; MGNREGA programme officer; state disaster relief fund activation contacts
Market and Value Chain	APMC contact for emergency arrivals; FPO marketing officer; e-NAM helpdesk; state civil supplies corporation for distress procurement activation

Cluster Resource Card: A Practical Tool

Practical format: Cluster Resource Card

Prepare a single A4 laminated card (or WhatsApp pinned message) for each cluster containing:

- 8-10 key contact names, roles, and mobile numbers
- Nearest community seed bank location and custodian name
- Rainfall threshold status (updated weekly by village monitor during season)

- Current contingency scenario tier (updated bi-weekly by FPO field officer)

Post at: panchayat office, FPO office, and Krishi Sakhi home.
Include a QR code linking to the full digital resource map for smartphone users.

The Living Resource Map: Keeping It Current During the Season

A pre-season resource map has limited value if it is not maintained during the season. As the season evolves, new resources become relevant — drought relief depots open, emergency seed distributions are announced, veterinary camps are scheduled. The FPO field officer should maintain a protocol for updating the resource map bi-weekly and disseminating changes through the cluster WhatsApp group. Specific triggers for updates: when the contingency scenario shifts tier, the relevant seed and MGNREGA contacts should be immediately foregrounded; when a pest alert is issued, the relevant technical contact is highlighted; when IMD issues an extreme event warning, emergency drainage, livestock, and relief contacts are pushed to the top of the cluster communication.

9. Practical Roadmap: From Framework to Field

9.1 A Phased Implementation Plan

Phase	Key Activities	Lead Actors
PHASE 1 Foundation (Months 1–3)	Village monitor recruitment and training; WhatsApp group setup; village climate register distribution; pre-season advisory production; inter-institutional coordination meeting; baseline documentation of community solutions	CSA, FPO field teams, KVKs
PHASE 2 System Build (Months 3–6)	Dashboard development and testing; solution repository launch; cluster learning circles begin; mid-kharif advisory cycle; monitoring data feeding into district contingency review	CSA, tech partner, ATMA, district agriculture departments
PHASE 3 Season Proof (Months 6–12)	Full monitoring cycle through kharif and rabi; extreme event response protocols tested; comparative farm outcome documentation; post-season learning review; state-level synthesis report; policy advocacy brief	Full partnership network
PHASE 4 Institutionalisation (Year 2–3)	Integration with PRI planning systems; KVK mandate reform advocacy; government scheme convergence formalised; cross-state learning alliance; national standards advocacy	Government, SAUs, ICAR, CSA as convener

9.2 Resource Requirements (Indicative)

A decentralised advisory system at meaningful scale does not require large capital investment. The primary resource requirements are for people, training, and connectivity — not for physical infrastructure. Indicative resource heads for a pilot covering 5 districts and 500 villages:

Resource Head	Description / Notes
Village monitor training and incentives (500 monitors × 12 months)	Modest honorarium or recognition system; training costs approximately ₹3,000–5,000 per monitor including materials
FPO field officer capacity building	2-day intensive training plus quarterly refresher; materials and facilitation costs
Simple monitoring dashboard (web + mobile)	Open-source development; modest server costs; budget for local language translation
Solution documentation (video + print)	Short video production (2–3 min per solution), Telugu/Marathi/Odia translation and printing of compendium
Exchange visits and learning events	Quarterly cluster learning circles; two inter-district exchange visits per year; one cross-state learning event
Coordination and advocacy	State-level coordination meetings; policy brief production; media engagement

Financing Note

The bulk of this resource requirement can be met through convergence with existing schemes: ATMA funds for extension capacity, MGNREGA for water harvesting structures, PMKSY for irrigation investments, NHM for horticulture advisories, and CSR/CSA project funds for the coordination and documentation layer. The system is designed for integration, not duplication.

9.3 Success Indicators

- Number of village climate monitors active and reporting weekly (target: 90% of enrolled monitors reporting by month 3)
- Advisory penetration rate: Percentage of farmers in covered villages who received and acted on at least one advisory per month (target: 60% by end of season 1)
- Time-to-advisory: Average days from detection of a climate anomaly to dissemination of a responsive advisory (target: ≤5 days)
- Solution documentation: Number of community adaptation practices documented, validated, and entered in the repository (target: 50+ solutions in year 1)
- Comparative resilience evidence: Documented yield and income comparisons between agroecological and conventional farms across El Niño season (for policy advocacy)
- Institutional integration: Number of district contingency plans formally incorporating community monitoring data (target: all 5 pilot districts by year 1)

10. Conclusion

El Niño is not simply a climatic event. It is a stress test of the agricultural and institutional systems we have built — a test that reveals, with painful clarity, which farming systems are brittle and which are resilient, which institutions are responsive and which are bureaucratic, and which communities have built adaptive capacity and which have been left dependent.

The framework described in this note does not promise to eliminate El Niño's impacts on Indian farming communities. It promises something more realistic and more valuable: a system through which communities can see the risks coming earlier, act on credible local intelligence rather than waiting for advice from distant authorities, share what is working across landscapes, and use the very moment of crisis to accelerate the transitions that will make them less vulnerable in the next season and the one after.

Two decades of CSA's field engagement have demonstrated — in NPM transitions across Andhra Pradesh, in CMSA scaling across Telangana, in organic transitions in Sikkim and Odisha — that farming communities are not passive recipients of climate risk. They are active, knowledge-generating, adaptive agents. What they need is not more top-down advisories. They need systems that take their observations seriously, amplify their innovations, connect them to each other, and back them with the institutional and policy support they deserve.

The decentralised climate intelligence and advisory system described here is a practical expression of that commitment. It is, in essence, an argument for democratic knowledge: the idea that the people who face the risk are also the people best positioned to navigate it — if given the tools, the networks, and the institutional respect that their knowledge and labour deserve.

Appendices (developed for operational use)

- Appendix A: Village Climate Monitor Training Curriculum (3-day)
- Appendix B: Community Observation Templates (rainfall, crop stress, pest, water, livestock)
- Appendix C: Village Climate Register Format
- Appendix D: Solution Documentation Template
- Appendix E: Advisory Template — Pre-Season, In-Season, Extreme Event, Recovery
- Appendix F: District Contingency Plan Integration Protocol
- Appendix G: Agroecological Zone Map of Target Geographies

A N N E X U R E S

Advisories for Adapting to El Niño

Operational Tools for the Decentralised Climate Intelligence and Advisory System

Centre for Sustainable Agriculture (CSA)

Hyderabad, India | June 2026

Contents of This Volume

Annexure A: Village Climate Monitor (Kisan Mitra/Krishi Sakhi) Training Curriculum

3-Day Residential / Field-Based Training Programme

This curriculum trains village-level climate monitors (Gram Mausam Mitras) to systematically observe, record, and report climate and crop conditions during the kharif season. Participants should be selected by the gram sabha or FPO, preferably one woman and one man per village, who are literate, respected, and committed to regular field observation. The training prepares them to use observation templates, operate rain gauges and soil moisture tools, contribute to the cluster WhatsApp reporting network, maintain the village climate register, and communicate sowing threshold advisories to fellow farmers.

Duration	3 days (residential preferred; can be split into Day 1 + Day 2–3 with a one-week gap for home practice)
Group size	15–20 monitors per batch; co-facilitated by FPO field officer and CSA/ATMA resource person
Venue	Village level or cluster resource centre with access to farm plots for field exercises
Materials needed	Village Climate Register booklet, observation template set, 100-mm rain gauge, soil moisture stick, Meghdoot app-enabled smartphone (shared), hand lens, seed germination test kit
Language	Telugu / Marathi / Odia (as applicable); all materials in local language

Day 1: Understanding the Climate Context and Observation Principles

Session 1.1 Why This Season Is Different (60 minutes)

- El Niño: what it means for this kharif in simple terms — likely late monsoon, dry spells, possible heavy downpours
- Why farmers' observations matter — the gap that centralised forecasts cannot fill
- What a Kisan Mitra/Krishi Sakhi does: daily observation, weekly reporting, community communication
- Discussion: What did farmers observe differently in previous stress years?

Session 1.2 Reading the Sky, Soil, and Crop — Traditional and Modern Indicators (90 minutes)

Field exercise: Participants walk a transect across two plots (one black soil, one red soil) and discuss what they observe. Facilitator introduces each indicator domain:

- Rainfall indicators: reading a rain gauge; cumulative versus event-based measurement; recording in the register
- Soil moisture: the stick-test method; visual cues (cracking in Vertisols, dustiness in sandy loams); tactile assessment at 10 cm and 20 cm

- Crop stress indicators: leaf rolling (moisture stress), yellowing (nitrogen or water), stunting, premature ear emergence, panicle blast
- Traditional phenological indicators: which local tree flowering or bird behaviour signals participants already use for season prediction

Session 1.3 The Sowing Threshold Advisory (45 minutes)

Key Advisory to Communicate to Farmers

Light soils: 50-60 mm cumulative rainfall in 7 days OR soil moist at 10-12 cm

Heavy soils: 60-75 mm cumulative rainfall in 7 days OR soil moist at 10-12 cm

Field verification: The stick test — moist soil clings = SOW; dry = WAIT

Confirm with IMD onset declaration via Meghdoot app / Grameen Krishi Mausam Sewa (GKMS) SMS

- Practice: Participants compute cumulative rainfall from a sample register and determine whether the threshold has been met
- Role-play: How to communicate the advisory to a farmer who is eager to sow

Session 1.4 The Village Climate Register — Introduction and Practice (60 minutes)

- Structure of the register: daily rainfall page, weekly crop/pest observation page, seasonal summary page
- Practice: Complete one week of simulated entries as a group
- Handling incomplete data: what to record when observation is not possible; how to flag uncertainty
- Who keeps the register, where it is stored, and who reviews it

Day 2: Pest, Disease, and Livestock Observation; Digital Reporting

Session 2.1 Pest and Disease Surveillance (90 minutes)

Field exercise: Walk a standing crop plot (or use photograph cards if crop not yet established) to practise pest identification and severity scoring.

Pest / Disease	Identification Sign	Key Crops
Stem borer	Dead heart / white ear; presence of larvae in stem	Paddy, sorghum, maize
Aphids / whitefly	Colony on leaf underside; leaf curl; honeydew sooty mould	Cotton, groundnut, vegetables
Pod borer (Helicoverpa)	Entry hole in pod; frass; skeletonised flower	Pigeonpea, chickpea, soybean
Leaf spot / blast	Water-soaked to brown lesions; expanding with humid weather	Sorghum, pearl millet, finger millet
Thrips / mites	Silver streak on leaves; leaf roll; fine webbing	Cotton, chilli, vegetables

Collar rot / root rot	Wilting despite soil moisture; brown collar region	Groundnut, soybean, vegetables

- Severity scoring scale: 1 = trace presence, 2 = light (up to 10% plants), 3 = moderate (10–25%), 4 = severe (25–50%), 5 = very severe (>50%)
- When to escalate: any pest at severity 3 or above should be immediately flagged to FPO field officer
- Photographing pest damage: angles, focus, scale reference

Session 2.2 Water Body and Fodder Monitoring (60 minutes)

- Tank and pond water level gauge poles: how to paint, read, and record
- Well water depth measurement using a stone and string
- Fodder availability: standing area estimate, green versus dry fodder, community fodder reserve status
- Livestock body condition scoring (1–5 scale): visual indicators of under-nutrition
- Signs of heat stress in cattle, small ruminants, and poultry

Session 2.3 Digital Reporting via WhatsApp and Meghdoot (90 minutes)

- Setting up on the cluster WhatsApp group: joining the group, understanding message discipline (observation messages only, no forwards)
- The standard reporting template: how to fill and send a weekly observation as a structured WhatsApp message
- Meghdoot app: downloading, setting location, reading the 5-day forecast, interpreting rainfall probability graphics
- SMS fallback: for monitors without smartphones, the cluster field officer's number for voice / SMS reporting
- What NOT to send: misinformation, unverified images, personal messages

WhatsApp Weekly Template

Standard Weekly WhatsApp Reporting Format:

Village: [name] Date: [dd/mm] Reported by: [name]
1. Rainfall this week (mm): ___ Cumulative since June 1 (mm): ___
2. Soil moisture at 10 cm: Moist / Dry / Waterlogged
3. Crop status: Good stand / Moderate stress / Severe stress / Failure
4. Pest/disease alert (Y/N): If Y — crop, pest name, severity (1-5): ___
5. Water body level: Full / 3/4 / Half / 1/4 / Dry
6. Fodder situation: Adequate / Moderate shortage / Critical shortage
7. Any immediate concern to flag: [free text, max 2 sentences]

Day 3: Advisory Communication, Solution Documentation, and Practicum

Session 3.1 Communicating Advisories to Farmers (60 minutes)

- The monitor's role as a two-way channel: receiving advisories from the FPO field officer and translating them into farm-level action
- How to present the sowing threshold advisory at a chaupal or self-help group meeting
- Handling resistance: farmers who want to sow early despite the threshold not being met
- Referring to the right source: pest ID to FPO field officer; livestock emergency to veterinary assistant surgeon; water crisis to panchayat
- Maintaining trust: accuracy over speed; recording uncertainty honestly; never guessing

Session 3.2 Introduction to Solution Documentation (60 minutes)

- What counts as a local adaptation practice worth documenting? (Criteria: observable, replicable, beneficial under stress)
- Using the Solution Documentation Template (Annexure D) to document one practice from the home village
- Taking photographs for documentation: before/after, context, scale
- The validation process: how documented practices move from observation to peer review to repository

Session 3.3 Field Practicals (half day)

Participants work in groups of four to complete all tasks independently:

- Walk a 0.5-acre plot and complete a full crop observation using the Annexure B template
- Measure soil moisture at three points using the stick test and record in the Village Climate Register
- Calculate cumulative rainfall from the past 7 days using sample data and issue a sowing threshold verdict for a light soil and heavy soil plot
- Complete and send a standardised weekly WhatsApp report to the training group
- Document one local crop management practice using the Annexure D template

Assessment and Certification

- Pass mark: 80% accuracy on observation template completion; ability to calculate and communicate sowing threshold
- Supervised first week: FPO field officer reviews first two weekly reports from each monitor; corrective feedback given
- Refresher: one half-day refresher at week 6 of the season
- Recognition: certificate from local NGO; honorarium or equivalent recognition as determined by FPO

Annexure B: Community Observation Templates

Five standardised templates for use by Gram Mausam Mitras. All templates are designed to be printable on A5 paper for the physical register, or filled as a structured WhatsApp message. Fill one per week per village; retain physical copies in the Village Climate Register (Annexure C). Submit digital copies to the cluster group by Sunday evening each week.

Template B1: Weekly Rainfall Record

Village: _____ Month / Year: _____
District: _____ Monitor name: _____

Day	Rainfall (mm) (read gauge by 8 AM)	Dry spell day (Y / N)	Remarks (heavy shower, hail, etc.)
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			
WEEKLY TOTAL			
CUMULATIVE (season to date)			

Sowing threshold status this week (circle):

☐ Light soils — threshold MET (≥50 mm cumulative)	☐ Heavy soils — threshold MET (≥60 mm cumulative)	☐ Threshold NOT yet reached for either soil type

IMD monsoon onset declared for this district? (circle): YES / NO / NOT YET — Source checked: Meghdoot app / GKMS SMS / other: _____

Template B2: Weekly Crop Stress Observation

Village: _____ Week ending: _____ Crop/s grown: _____

Indicator	Observations (circle or describe)	Area affected (acres / %)
Canopy colour	Normal green / Pale yellow / Dark yellow / Purple-bronze	
Leaf rolling / wilting	None / Temporary (recovers at night) / Permanent	
Crop stand uniformity	Uniform / Patchy gaps (< 10%) / Significant gaps (> 10%) / Replanting needed	
Growth stage	Germination / Seedling / Tillering / Vegetative / Flowering / Grain fill / Maturity	
Estimated crop stress level	None (0) / Mild (1) / Moderate (2) / Severe (3) / Total failure (4)	
Irrigation applied this week?	Yes — source: _____ / No	
Fertiliser / nutrition applied?	Yes — input: _____ / No	
Overall crop condition verdict	Good / Satisfactory / Poor — Needs intervention / Failed — replant	

Additional crop notes (any unusual appearance, early maturity, lodging, etc.)	

Template B3: Pest and Disease Surveillance

Village: _____ Date observed: _____ Crop: _____

Pest / Disease	Severity (1–5) 1=trace, 5=very severe	Signs observed (circle)	Crop stage at attack
Stem borer		Dead heart / White ear / Larvae in stem	
Pod borer (Helicoverpa)		Entry hole in pod / Frass / Flower damage	
Aphids / Whitefly		Colony on underside / Leaf curl / Sooty mould	
Thrips / Mites		Silver streaks / Leaf roll / Fine webbing	
Leaf spot / Blast		Brown lesions / Water-soaked spots / Spread	
Collar rot / Root rot		Wilting / Brown collar / Pull-up test positive	

White grub (soil)		Wilting patch / C-shaped larvae in soil	
Other (describe)			

Severity scale reminder: 1 = Trace (isolated plants) | 2 = Light (<10% plants) | 3 = Moderate (10–25%) | 4 = Severe (25–50%) | 5 = Very severe (>50%)

ACTION RULE: Any pest at severity 3 or above → IMMEDIATELY inform FPO field officer by phone AND WhatsApp

Natural enemies observed (spiders, ladybirds, parasitoid wasps, etc. — describe briefly)	
Photograph taken? File name / location:	
Recommended action discussed with neighbour farmers:	

Template B4: Water Body and Irrigation Status

Village: _____ Week ending: _____

Water Indicator	Observation
Village tank / pond current level	Full / Three-quarters / Half / One-quarter / Almost empty / Completely dry
Tank level compared to last week	Higher / Same / Lower — by approximately _____ cm
Open well / bore well depth to water	_____ feet / metres from ground level
Well water level compared to last week	Higher / Same / Lower / Dry
Streamflow (if present in village)	Flowing normally / Reduced flow / Dry / Flooding
Spring / seep discharge	Active / Reduced / Dry / Not applicable
Irrigation applied from tank/well?	Yes — acres irrigated: _____ / No
Waterlogging observed in any plot?	Yes — location and area: _____ / No
Drainage needed?	Yes — action taken: _____ / No

Any water-related concern to flag (e.g. tank breach, canal failure, pump breakdown):	

Template B5: Livestock and Fodder Status

Village: _____ Week ending: _____ Monitor: _____

Livestock / Fodder Indicator	Observation
Total livestock in village (approx.)	Cattle: ___ Buffaloes: ___ Goats/Sheep: ___ Poultry: ___
Fodder availability this week	Adequate / Moderate shortage / Critical shortage / No fodder available
Green fodder source	Own farm / Common land / Purchase — price: ₹___/bundle / None available
Dry fodder stock	Adequate (> 4 weeks) / 2–4 weeks / < 2 weeks / Exhausted
Livestock body condition (average)	Good (score 3–5) / Moderate (score 2) / Poor (score 1) — describe: _____
Heat stress signs observed?	Yes — in: Cattle / Buffalo / Goats / Poultry — describe: _____ / No
Disease outbreak observed?	Yes — in: _____ animals, suspected disease: _____ / No
Livestock mortality this week	Yes — species: _____ number: _____ / No
Distress sale of animals observed?	Yes — number sold: _____ / No — reason: _____
Veterinary help needed?	Yes — type of help: _____ / No

Any fodder conservation or alternative feed practices being used this week:	

Annexure C: Village Climate Register Format

The Village Climate Register (Gram Mausam Panjiyan) is a physical A4 logbook maintained at the gram panchayat office or Krishi Sakhi's home. It serves as the permanent paper record of the village's climate observations and is the backup for all digital reporting. The register has five sections, each covering one full kharif season. Instructions for each section are printed on the inside front cover of the register.

Register format	Printed logbook, A4 size, 60 pages per season
Custodian	Village climate monitor (primary); gram panchayat secretary (backup)
Location	Panchayat office shelf or Krishi Sakhi home — accessible to any farmer
Review frequency	Cluster field officer reviews monthly; KVK reviews seasonally
Archival	Retained at panchayat office for minimum 5 years after the season

Section C1: Cover Page (inside front cover)

Each register should have the following information filled on the inside front cover at the start of the season:

Village name	
Gram Panchayat	
Block / Mandal	
District	
State	
Primary Monitor name and mobile	
Secondary Monitor name and mobile	
FPO field officer name and mobile	
KVK block contact name and mobile	
Season (Kharif / Rabi) and Year	

Section C2: Daily Rainfall Log (pages 1–30)

One double-page spread per month; 31 rows for days 1–31; four columns: date, rainfall (mm), dry spell cumulative days, remarks. Printed lines for writing. Cumulative rainfall-to-date column updated every Sunday.

Printed Reminder in Register

PRINTED ON EVERY RAINFALL PAGE:

Sowing threshold reminder:
Light soils: Do not sow until cumulative rainfall reaches 50-60 mm in 7 days OR soil is moist at 10-12 cm
Heavy soils: Do not sow until cumulative rainfall reaches 60-75 mm in 7 days OR soil is moist at 10-12 cm

False break rain warning: One or two heavy showers do NOT mean the monsoon has established.
Wait for the IMD monsoon onset declaration for your district before treating rain as established monsoon.

Section C3: Weekly Crop and Pest Observation Log (pages 31–50)

One page per week; pre-printed fields corresponding to Templates B2 and B3. Key fields: crop growth stage, stress level (0–4), any pest at severity ≥ 3 (Y/N), action taken. Last column: 'Reported to cluster group? (Y/N)' to confirm digital reporting has occurred.

Section C4: Seasonal Milestones and Events Log (pages 51–55)

A chronological log of significant events — monsoon onset, first pest alert, dry spell start and end dates, sowing date advisory issued, extreme weather events, MGNREGA demand submitted, any emergency livestock death. Each entry: date, event description, source of information (monitor observation / IMD forecast / FPO advisory), action taken.

Section C5: End-of-Season Summary (pages 56–60)

Filled at the end of the season in a facilitated community review session. Key fields:

- Total seasonal rainfall (mm) and comparison with normal (source: IMD district data)
- Number of dry spells greater than 7 days and their timing
- Principal pest/disease challenges this season and control measures used
- Crop outcomes: percentage of plots with good / moderate / poor / failed harvest
- Livestock situation: fodder stress weeks, mortality, disease outbreaks
- Three things that worked well this season
- Three things that could be done better next season
- Any local adaptation practice worth documenting (flag for Annexure D process)

The end-of-season summary is the primary input to the annual learning review meeting and feeds into the district-level synthesis report.

Annexure D: Community Solution Documentation Template

This template is used to document local adaptation practices identified by village monitors, FPO field officers, or farmers themselves. A completed template is the first step in the four-stage validation process: (1) documentation, (2) peer review at cluster learning circle, (3) technical review by KVK or CSA, and (4) entry into the shared solution repository. Templates are submitted to the FPO field officer who initiates the peer review.

Eligibility Criterion

What counts as a documentable practice?

Any farm management, water management, soil management, pest management, seed selection, or livelihood

diversification practice that a farmer has used successfully under climate stress conditions, and that other farmers in the same or similar agroecological zone could realistically adopt.

It does NOT need to be new or unusual. A traditional practice that is being lost but proved its value during a dry spell or pest outbreak is equally worth documenting.

Part 1: Basic Information

Practice name (as the farmer calls it)	
Practice category (circle one)	

☐ Crop variety / seed selection	☐ Soil moisture conservation	☐ Water harvesting / management	☐ Pest / disease management
☐ Agroforestry / FMNR	☐ Livestock / fodder management	☐ Post-harvest / value addition	☐ Other (describe)

Documenting farmer name	
Village, block, district	
Farm size and soil type	
Crops grown on this farm	
Season and year in which practice was observed	
Documented by (name, designation)	
Date of documentation	

Part 2: Practice Description

What does the farmer do? (describe in simple, step-by-step terms as the farmer would explain it)	

When in the season is this practice applied? (crop growth stage / calendar period)	
What inputs does it require? (materials, tools, labour — be specific about quantities)	
Approximate cost of inputs (₹ per acre)	
Labour requirement (person-days per acre)	
Is this practice done individually or collectively (with neighbours / group)?	

Part 3: Evidence of Effectiveness

What outcomes did the farmer observe? (yield, crop survival, soil condition, water retention, pest reduction — describe in the farmer's words)	

What was happening on neighbouring plots that were NOT using this practice, for comparison?	
Has this practice been tried in a previous stress year? If yes, what was the outcome then?	
Farmer's own confidence in this practice (1 = uncertain, 5 = very confident): ___ Reason:	

Part 4: Agroecological Applicability

Soil types where this works	
Rainfall conditions where this works	
Where this practice may NOT work	
Crops it is most useful for	
Any special conditions or prerequisites	

Part 5: Photographs and Supporting Evidence

Number of photographs taken:	
Photograph file names / descriptions (what each photo shows):	
Any other supporting evidence (soil samples, yield records, neighbour testimonials):	

Part 6: Validation Track (to be filled by FPO field officer and KVK)

Stage	Outcome	Notes
Cluster peer review	Date: _____ Outcome: Validated as-is / Validated with modification / Referred for trial	Comments from peer review:
Technical review (KVK/CSA)	Date: _____ Reviewer: _____ Outcome: Validated / Modified / Trial needed	Technical comments:
Repository entry	Date entered: _____ Repository ID: _____ Zone tag: _____	Language versions prepared:

Annexure E: Advisory Templates — Four Phases

These templates are the standard formats for preparing and disseminating advisories at the cluster/block level. Each advisory is prepared by the FPO field officer and/or BRC staff using monitoring data from the village network, IMD forecast inputs, and KVK technical guidance. Advisories are disseminated through cluster WhatsApp groups, panchayat notice boards, and direct SMS to registered farmer groups.

Format	Single A4 page (or equivalent WhatsApp message); one advisory per cluster per issue
Language	Local language (Telugu/Marathi/Odia) — prepared by field officer, reviewed by KVK subject matter specialist
Approval	FPO field officer drafts; KVK or CSA field team reviews within 24 hours; field officer disseminates
Archival	Copy filed in cluster advisory register; digital copy uploaded to shared folder
Frequency	Pre-season: once in May; In-season: weekly during kharif; Extreme event: within 48 hours of trigger; Recovery: once post-season

Template E1: Pre-Season Preparedness Advisory

ADVISORY HEADER FORMAT:
Advisory No.: ___ Issue Date: ___ Valid for: [cluster/block name]
Prepared by: [FPO field officer name] Reviewed by: [KVK/CSA reviewer name]
For more information contact: [FPO office number] / [KVK helpline]

A. Seasonal Outlook

IMD seasonal forecast summary for this district (monsoon onset probability, likely total rainfall, expected distribution pattern):	
El Niño status (from IMD seasonal bulletin): probability of below-normal rainfall: ____%	
Key risk this season (circle and describe):	

☐ Delayed onset	☐ Mid-season dry spell	☐ Erratic distribution	☐ Heavy downpours early	☐ Combined dry spell + heavy rain

B. Variety and Crop Plan Recommendation

Crop Plan Component	Recommended variety / action	Rationale
Primary crop recommendation		(short-duration, drought-tolerant — specify variety names for this zone)
Intercrop recommendation		(pulse + cereal combination to reduce risk)
Contingency crop (if onset delayed > 2 weeks)		(specify very short-duration variety)
Crop to AVOID this season (if any)		(water-intensive crop not suitable for predicted conditions)

C. Seed and Input Preparation Checklist

☐ Procure primary crop seed — variety: _____	☐ Procure contingency crop seed — variety: _____
☐ Test seed germination (target: >85% germination rate)	☐ Treat seed with Trichoderma / bio-seed treatment
☐ Prepare Jeevamrit batch (ready by June 1)	☐ Prepare vermicompost — target: 2 tonnes/acre
☐ Repair / service irrigation pump and pipes	☐ Desilt farm pond / check bund integrity
☐ Enrol in PMFBY crop insurance before: [date]	☐ Check and repair field bunds and drainage channels

D. Sowing Advisory

Critical: Sowing Threshold Status

DO NOT SOW until the soil moisture threshold is confirmed:
Light soils: 50-60 mm cumulative in 7 days OR soil moist at 10-12 cm + IMD onset declared
Heavy soils: 60-75 mm cumulative in 7 days OR soil moist at 10-12 cm + IMD onset declared

Current rainfall-to-date in this cluster (updated by village monitor): _____ mm
Sowing status: WAIT / LIGHT SOILS MAY SOW / ALL SOILS MAY SOW

Any additional pre-season actions specific to this cluster's conditions:	

Template E2: In-Season Weekly Advisory

Advisory No.: ___ Week of: ___ Cluster: ___ IMD Forecast: ___-day outlook summary

A. Weather and Rainfall Update

Rainfall this week in cluster (range across villages): ___ to ___ mm. Cumulative since June 1: ___ mm. Normal to date: ___ mm. Deviation: ____%	
IMD forecast for next 5 days (from Meghdoot): expected rainfall, temperature range, any advisory warning:	
Current dry spell length (if applicable): ___ days continuous without >5 mm rainfall	

B. Crop Status and Management Advisory

Crop	Current status	This week's action advisory
Sorghum / pearl millet	Growth stage: ___ Stress level: ___ Recommended action:	
Pigeonpea / pulses	Growth stage: ___ Stress level: ___ Recommended action:	
Groundnut / oilseeds	Growth stage: ___ Stress level: ___ Recommended action:	
Cotton (if applicable)	Growth stage: ___ Stress level: ___ Recommended action:	
Vegetables / horticulture	Growth stage: ___ Stress level: ___ Recommended action:	

C. Pest and Disease Alert Status

Category	Details	Additional information
Status this week	No alert / Watch (severity 1-2 in some plots) / Alert (severity 3+ — take action)	
Pest / disease of concern		

Recommended control measure		
When to apply		
Source for inputs / guidance		

D. Water and Soil Moisture Advisory

Supplementary irrigation recommendation (Y/N): If Y — from which source, at which crop stage, how much:	
Soil moisture conservation action recommended this week (inter-row cultivation, mulching top-up, bund repair):	

Template E3: Extreme Event Response Advisory

Issued within 48 hours of a trigger event: consecutive dry spell exceeding 14 days, confirmed pest outbreak at severity 4+, heavy rainfall event exceeding 100 mm in 24 hours, heat wave warning, or any livestock disease outbreak.

Emergency Advisory Header

TRIGGER EVENT: _____ Date detected: _____ Area affected: _____

A. Situation Assessment

What is happening: (brief factual description of the extreme event from village monitor data)	
Estimated area affected: ___ acres. Estimated number of farmer households affected: ___	
Crops / livestock most at risk in this cluster:	

B. Immediate Actions (next 48–72 hours)

FOR PROLONGED DRY SPELL:

- Apply available supplementary irrigation from farm pond / community tank (priority: crops at flowering/grain-fill stage)
- Apply foliar spray of 1% KNO_3 (potassium nitrate) or 2% DAP solution to provide emergency nutrition and reduce transpiration stress
- Apply anti-transpirant (kaolin clay 5% spray) to leaves if available
- Inter-row cultivation immediately to break soil crust and reduce evaporation
- Do NOT apply any nitrogen-based fertiliser to soil during dry spell — will burn roots

FOR HEAVY RAINFALL / WATERLOGGING:

- Open field outlet channels immediately to drain standing water — even 24 hours of waterlogging can kill crop roots
- Do not apply any inputs (fertiliser, pesticide) during flooding — waste and contamination
- Assess crop stand after water recedes — gap-fill if > 20% of plants lost
- Watch for collar rot and root rot in the 7–10 days following waterlogging
- Apply Trichoderma to soil in affected areas after drainage

FOR LIVESTOCK EMERGENCY:

- Contact veterinary assistant surgeon immediately (number: _____)
- Shade provision: ensure animals have shade, especially between 11 AM and 4 PM
- Water: increase water access frequency to 3–4 times daily minimum
- Reduce feed load during heat stress; supplement with mineral blocks if available
- Isolate any sick animals immediately

C. Support Resources Available

MGNREGA works that can be activated (tank repair, check dam, drainage): contact panchayat secretary: _____	
Emergency fodder source: _____ Contact: _____	
Input dealer with anti-transpirant / KNO_3 in stock: _____	
Insurance claim procedure (if crop loss confirmed): Contact PMFBY nodal officer: _____ by date: _____	

D. Follow-up Monitoring

Report crop stand re-assessment to cluster group by: [date]	
Next advisory will be issued on: [date]	

Template E4: Post-Season Recovery Advisory

Issued after kharif harvest (October–November), covering rabi planning, soil health restoration, livestock rebuilding, and livelihoods consolidation.

A. Season Review Summary

Total kharif rainfall received: _____ mm vs normal _____ mm (deviation: ____%)	
Principal challenges encountered this season (list top 3):	
Estimated proportion of farmers with: Good harvest ___% / Moderate ___% / Partial failure ___% / Total failure ___%	

B. Rabi Crop Advisory

Rabi sowing recommendation: date window _____ to _____ based on post-kharif soil moisture and IMD forecast	

Soil type	Recommended rabi crop	Key management note
Deep Vertisol	Chickpea (preferred), safflower	Moisture conservation: zero-tillage or minimum tillage sowing
Medium red soil	Sunflower, linseed, mustard (where applicable)	Apply 2 tonnes vermicompost/acre before sowing
Shallow red / gravel	Horsegram, lentil, mustard	Short-duration varieties only; supplemental irrigation not feasible
Irrigated / well command	Wheat, rabi vegetables, potato (as applicable)	Check groundwater level before planning water-intensive rabi

C. Soil Health Restoration

☐ Incorporate all available crop residue — do not burn	☐ Apply compost / vermicompost (target: 2 t/acre before rabi)
☐ Sow green manure / cover crop on fallow plots	☐ Deep ploughing after kharif harvest to break compaction
☐ Soil moisture conservation bunds repaired before rabi	☐ Record soil health observations in Village Climate Register

D. Livestock and Fodder Recovery

Fodder availability assessment: current stock (weeks): _____ Action needed:	
Livestock vaccination schedule for the coming quarter (contact veterinary officer):	
Fodder establishment plan for next season (area, crop, sowing date):	

E. Learning Documentation

Three practices that worked well under stress this season (to be developed as Annexure D entries):	
Three practices or preparations that should have been done differently:	
Season review meeting date and participants:	

Annexure F: District Contingency Plan Integration Protocol

District Agricultural Contingency Plans (DACPs) are mandatory documents prepared by district agriculture departments under ICAR-CRIDA guidelines. They specify crop and variety options for different rainfall deviation scenarios. This protocol defines how community monitoring data from the Gram Mausam Mitra network is integrated into the DACP framework, and how DACP contingency recommendations are translated into actionable cluster-level advisories.

F1: Linking Community Monitoring to the DACP Framework

The DACP defines contingency options for three scenarios: (i) delayed onset by 2–4 weeks, (ii) mid-season long dry spell, and (iii) early cessation of monsoon. Community monitoring data provides the real-time trigger that tells the district agriculture office which scenario the current season is entering.

Trigger Event	Community Monitoring Threshold	Action to Initiate
Delayed onset trigger	Cumulative rainfall at district level <50 mm by July 1 (light soils) or <60 mm by July 1 (heavy soils) — as reported by Gram Mausam Mitras in >60% of villages	Activate DACP delayed onset variety substitution list; issue contingency crop advisory via FPO network; check contingency seed kit availability
Mid-season dry spell trigger	Any block reports >14 consecutive dry days at any point in July-August, confirmed by >70% of village monitors in that block	Activate DACP mid-season dry spell management options; issue extreme event advisory (Template E3); escalate to district contingency committee
Early cessation trigger	IMD issues forecast of below-normal September rainfall; district cumulative rainfall at <75% of normal by September 1	Activate DACP early cessation crop switching; issue recovery advisory; coordinate with MGNREGA and insurance for affected farmers
Heavy rainfall trigger	Any village reports >100 mm in 24 hours with confirmed crop flooding; cluster field officer verifies	Issue drainage advisory immediately; assess crop damage; coordinate with revenue department for relief; document for insurance claims

F2: Data Submission Protocol

The following protocol governs how community monitoring data flows into the district contingency planning system:

- Daily: Village monitors submit Template B1 rainfall data to cluster WhatsApp group. FPO field officer aggregates for the cluster.
- Weekly: FPO field officer compiles cluster-level summary (average rainfall, worst-case village, any trigger approaching threshold) and sends to Block Resource Centre by Sunday evening.
- Bi-weekly: BRC (ATMA block technologist) prepares block synopsis and shares with district agriculture office and the designated district nodal officer for climate monitoring.
- Trigger-activated: When any trigger threshold (above table) is met or approached within 3 days, the FPO field officer escalates directly to the district nodal officer by phone within 24 hours. WhatsApp cluster data serves as evidence.

- Monthly: District agriculture office convenes a 2-hour District Contingency Review Meeting with representatives from ATMA, KVK, minor irrigation, animal husbandry, and revenue departments. FPO network data is one standing agenda item.

F3: Roles in the Integration

Actor	Responsibility in the Integration Protocol
Gram Mausam Mitra	Accurate daily rainfall recording; weekly template completion; immediate escalation of any trigger threshold approach
FPO Field Officer	Cluster aggregation; trigger threshold calculation; direct link to BRC and district nodal officer; WhatsApp group moderation
BRC / ATMA Block Technologist	Block synopsis preparation; attendance at district contingency review; liaison between field data and district plans
District Agriculture Office (Nodal Officer)	Convenes bi-weekly review; maintains trigger log; coordinates scheme activation (seed kit, MGNREGA demand, relief application); issues district-level advisory
KVK	Technical validation of community-reported triggers; recommendations for variety substitution under DACP; training support for field officers
CSA / FPO Federation	Maintains WhatsApp reporting infrastructure; cross-district synthesis; early warning to network if regional-level trigger developing

F4: Integrating Community Data into the DACP Document Itself

During the annual DACP revision cycle (typically January–March), district agriculture offices should formally incorporate community monitoring data into the plan. Three specific integrations are recommended:

- Village-level soil type mapping: Community monitoring data and GIS records from ATMA/KVK should be used to map the distribution of light soils versus heavy soils at the village level. This allows the sowing threshold advisory to be pre-computed for each village and printed into the DACP as village-specific guidance.
- Historical trigger frequency data: Cumulative rainfall records from the Gram Mausam Mitra network, combined with IMD district data, should be used to compute the historical frequency of each trigger event (delayed onset, mid-season dry spell, early cessation) at block level. This frequency data should be included in the DACP's risk profile section.
- Seed kit requirements estimation: Based on the frequency of delayed onset and mid-season dry spell triggers, the DACP should estimate the annual seed kit requirement (contingency variety seed quantities) needed for each block, and include a pre-season procurement plan.

F5: Quality Assurance Checklist for Integration

District agriculture office and CSA/FPO federation should verify the following at the start of each season:

☐ Village monitor roster complete and all monitors have been trained	☐ Cluster WhatsApp groups active; FPO field officers confirmed as moderators
☐ Village Climate Registers distributed to all villages in the network	☐ Trigger threshold thresholds communicated to BRC and district nodal officer
☐ DACP contingency variety seed kits procured and stocked at block level	☐ District Contingency Review Meeting schedule agreed for the season
☐ IMD district agro-met unit contact confirmed and GKMS advisory subscription active	☐ Insurance (PMFBY) cut-off dates communicated to all FPO cluster leaders

Annexure G: Agroecological Zone Reference — Target Geographies and Key Characteristics

This annexure provides a reference guide to the key agroecological zones in CSA's primary operating geographies — Andhra Pradesh, Telangana, Odisha, Maharashtra, and Sikkim — relevant for El Niño advisory customisation. Advisories should always be anchored to the specific zone rather than issued generically at state level.

Note on zone classification: This reference uses the broad NRSA/CRIDA agroecological zone framework, simplified for operational use. KVK staff and ATMA extension officers should validate zone boundaries with district-level survey data.

Zone 1: Southern Dry Agro-Climatic Zone — Andhra Pradesh / Telangana

Parameter	Details
Districts (AP)	Anantapur, Kurnool, Kadapa, Nandyal, Sri Sathya Sai
Districts (Telangana)	Mahbubnagar (Nagarkurnool), Nalgonda, Suryapet (partly), Wanaparthy
Rainfall (normal)	500–700 mm; highly variable; large drought probability
Soils	Predominantly shallow to medium red soils (Alfisols); some deep Vertisol patches
Dominant cropping system	Groundnut, sorghum, cotton (rainfed); paddy (irrigated tanks)
El Niño sensitivity	Very high — longest dry spells; most frequent delayed onset; highest distress migration
Sowing threshold (light red soils)	50–55 mm in 7 days; IMD onset for Anantapur/Kurnool typically June 15–July 1
Contingency crop priority	Foxtail millet, horse gram, moth bean — can sow even if onset delayed to late July
Key CSA interventions	NPM scaling, community seed banks with local sorghum/groundnut varieties, Sahaja Aharam market linkage

Zone 2: Telangana Plateau — Northern and Central Telangana

Parameter	Details
Districts	Adilabad, Kumuram Bheem, Nirmal, Nizamabad, Karimnagar, Jagtial, Rajanna Sircilla, Medak, Sangareddy, Siddipet
Rainfall (normal)	750–1000 mm; bimodal distribution; significant dry spell risk in August
Soils	Mixed: deep Vertisols (black cotton soils) in central areas; medium to shallow red soils in north
Dominant cropping system	Soybean, cotton, maize, sorghum; paddy (irrigated and rainfed lowlands)

El Niño sensitivity	Moderate to high — particularly vulnerable in soybean flowering (late August dry spells)
Sowing threshold (Vertisols)	65–75 mm in 7 days; false break rains common in early June — critical to wait
Contingency crop priority	Short-duration soybean (MCS-450, Pusa 9712), green gram (IPM 02-3), cowpea for fodder
Drainage importance	High — Vertisol waterlogging after heavy downpours is a major risk alongside dry spells
Key CSA interventions	CMSA (Community Managed Sustainable Agriculture), NPM, DDS community seed banks

Zone 3: Krishna-Godavari Delta and Coastal AP

Parameter	Details
Districts	West Godavari, East Godavari, Krishna, NTR, Eluru, Konaseema
Rainfall (normal)	1000–1200 mm; paddy-dominant, canal-irrigated
Soils	Deep alluvial soils; some coastal saline soils
El Niño sensitivity	Moderate for kharif paddy; high for cyclone risk (Bay of Bengal post-monsoon); high for salinity intrusion in coastal areas
Key El Niño advisories	Canal water availability tracking (Krishna/Godavari reservoir levels); cyclone preparedness in tail-end months; salt-tolerant variety options for coastal plots
Sowing threshold	Paddy transplanting governed by canal water availability and reservoir levels rather than rainfall threshold alone
Contingency crop priority	Short-duration paddy varieties (NLR 34449, NLR 145); direct-seeded rice if puddling water is limiting
Key CSA interventions	Organic paddy certification, FPO market linkage, IPM in vegetable systems

Zone 4: Eastern Ghats and Tribal Belt — Odisha and AP

Parameter	Details
Districts (Odisha)	Koraput, Malkangiri, Rayagada, Nabarangpur, Kalahandi
Districts (AP)	Alluri Sitarama Raju, Parvathipuram Manyam, Visakhapatnam (partly)
Rainfall (normal)	1000–1400 mm; well distributed but with significant variability
Soils	Lateritic red soils, sandy loams; steep slopes; high erosion risk
Dominant cropping system	Finger millet, mixed millets, paddy (valley lowland), minor millets (upland); jhum on upper slopes

El Niño sensitivity	High for upland millets; jhum agriculture highly sensitive to rainfall distribution; NTFP collection affected by stream drying
Sowing threshold	45–55 mm for upland lateritic soils; but traditional sowing markers (flowering of indicator trees, soil-check using traditional methods) often more reliable
Community knowledge	Rich traditional knowledge of rainfall prediction, seed selection, and soil management — document and integrate
Key CSA interventions	Seed sovereignty (Apna Beej), PGS certification, biodiversity conservation farming

Zone 5: Vidarbha and Marathwada — Maharashtra

Parameter	Details
Districts	Yavatmal, Wardha, Amravati, Washim (Vidarbha); Osmanabad, Latur, Nanded (Marathwada)
Rainfall (normal)	700–900 mm; highly erratic; responsible for highest farmer suicide rates in drought years
Soils	Deep Vertisols (cotton soils) dominant; some medium red-black soils
Dominant cropping system	Cotton, soybean, tur (pigeonpea), sorghum
El Niño sensitivity	Very high — Bt cotton with high input investment is extremely vulnerable to mid-season dry spells; pigeonpea delayed by late onset
Sowing threshold (deep Vertisols)	70–75 mm in 7 days; onset for Vidarbha typically June 10–20; Marathwada June 20–July 5
Contingency crop priority	Short-duration pigeonpea (ICPL 87119 — Asha), green gram (BPMR 145), cowpea
Drainage importance	Critical — deep Vertisol waterlogging risk after heavy downpours in soybean at vegetative stage
Key CSA interventions	Organic cotton certification, FPO formation, input cost reduction, NPM

Zone 6: Sikkim — Mountain Agroecological Zone

Parameter	Details
Districts	East Sikkim (Gangtok), South Sikkim, West Sikkim, North Sikkim
Rainfall (normal)	2000–3500 mm; monsoon June–September; strong altitudinal variation
Soils	Young mountain soils; high organic matter at altitude; erosion-prone on steep slopes
El Niño effect	Different from peninsular India: often brings reduced fog and drier conditions at high altitude; lower spring snowfall can affect summer irrigation flows

Dominant cropping system	Cardamom (major cash crop), large cardamom, ginger, vegetable production, organic rice in valleys
Key El Niño risks	Reduced water availability for cardamom (highly moisture-sensitive); increased pest pressure in cardamom (foorkey virus under stress); reduced spring-fed irrigation
Sowing threshold	Not applicable in same form — crop decisions governed by temperature more than rainfall; spring onset temperature is the key trigger
Key CSA interventions	Organic certification (first 100% organic state), FPO market access, PGS expansion, cardamom IPM

Cross-Zone Advisory Customisation Checklist

Before issuing any advisory, the FPO field officer or BRC staff should confirm the following zone-specific parameters:

☐ Zone identified for this cluster	☐ Soil type (light / medium / heavy) for sowing threshold
☐ Normal monsoon onset date for this zone	☐ Contingency variety list from DACP for this zone
☐ Primary pest and disease risks for this zone's dominant crops	☐ Key institutional contacts relevant to this zone (KVK, PPO, irrigation office)

A zone-specific advisory uses this checklist to ensure that every recommendation is grounded in the local soil, climate, crop, and institutional context — rather than being a generic state-level advisory that may be irrelevant or misleading for this particular cluster's conditions.