



Climate-Resilient Agriculture Roadmaps for Nadia District (2025-2035)

A Comprehensive Framework for
Food Systems Transformation



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List of Abbreviations and Full Forms

ATMA	Agricultural Technology Management Agency
ARDD	Animal Resources Development Department
AWD	Alternate Wetting and Drying
APMC	Agricultural Produce Market Committee
BCKV	Bidhan Chandra Krishi Viswavidyalaya
BOD	Biochemical Oxygen Demand
BRC	Bio-Resource Centre
CLA	Continuous Learning and Adaptation
CO ₂	Carbon Dioxide
CSR	Corporate Social Responsibility
DBT	Department of Biotechnology
FPO	Farmer Producer Organization
FYM	FarmyardManure
GOI	Government of India
GCF	Green Climate Fund
IFS	Integrated Farming System
KCC	Kisan Credit Card
KVK	Krishi Vigyan Kendra
MEL	Monitoring, Evaluation and Learning
MNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
NABARD	National Bank for Agriculture and Rural Development
NPK	Nitrogen, Phosphorus, and Potassium

NRM	Natural Resource Management
PGS	Participatory Guarantee System
PKVY	Paramparagat Krishi Vikas Yojana
PMFBY	Pradhan Mantri Fasal Bima Yojana
RKVY	Rashtriya Krishi Vikas Yojana
SHG	Self-Help Group
FY	Financial Year
WBADMIP	West Bengal Accelerated Development of Minor Irrigation Project
SDG	Sustainable Development Goal



Executive Summary

This comprehensive roadmap presents a detailed strategic framework for a systematic transformation of Nadia district into a model of climate-resilient agriculture by 2030. It addresses the district's most urgent issues head-on, having been developed through a comprehensive, participatory multi-stakeholder consultation process.

These include **severe soil health degradation**, a **critical water security crisis** characterized by groundwater depletion and widespread arsenic contamination, increasing **climate variability** that causes frequent floods and droughts, and limited market access that lowers farmer incomes.

Four intricately linked strategic pillars—climate adaptation, livelihood improvement, ecological restoration, and institutional strengthening—form the framework of the approach. The overarching vision for climate-resilient and sustainable agricultural transformation in Nadia aims to achieve a 75% increase in real farmer incomes, a 25–30% improvement in water-use efficiency,

the conversion of 2,000 hectares to certified organic or natural farming, and a direct enhancement in the adaptive capacity of nearly 50,000 farming families through integrated, technology-driven, and community-based interventions. The plan will be implemented in clear, gradual phases.

It will begin with a pilot project in the highly vulnerable Hanskhali block during 2025–2026 to test practical solutions and gather insights. Successful approaches will then be scaled up across the district from 2026 to 2028.

By 2028–2035, the aim is to fully establish and replicate the “Nadia Model” as a sustainable framework for climate-resilient agriculture. Strong, functional convergence between government agencies (Sarkar), civic associations (Samaj), and private marketplaces (Bazaar) is essential for ultimate success. These elements must be strategically coordinated via an empowered and reinvigorated ATMA platform.

Keywords: Climate Resilient Agriculture, West Bengal, Nadia, Policy Framework, Agroecology, Rural livelihood



1 Introduction and Context

1.1 The Imperative for Transformation

Nadia district, a key agricultural hub in West Bengal's fertile Indo-Gangetic Plain, supports a population of 5.17 million, with over half (54%) directly dependent on agriculture for their livelihoods.

This vital sector now faces unprecedented, interconnected threats from climate change, acute resource degradation, and intense market volatility.

This roadmap is born from the clear recognition that achieving sustainable transformation requires the deep integration of advanced climate science, proven ecological principles, and on-the-ground socio-economic realities.

1.2 A Participatory Foundation

The strategy's core was co-created during a dedicated two-day stakeholder consultation in May 2025, involving over 50 representatives from across the agricultural spectrum. This included district and block-level officials from key government departments (Agriculture, Horticulture, Animal Resources, and Water Resources), leading Farmer Producer Organizations (FPOs), dynamic Women's Self-Help Groups (SHGs), financial institutions (NABARD, commercial banks), civil society organizations, and academic experts from Bidhan Chandra Krishi Viswavidyalaya (BCKV). The methodology was grounded in principles of systems thinking, resilience theory, and the sustainable livelihoods framework.

2 Current State Analysis: A District at a Crossroads

2.1 Demographic and Socio-Economic Profile

Nadia is characterized by a high population density of 1,316 persons/sq km, exerting significant pressure on land and natural resources. A predominantly rural population (75.58%) relies on agriculture. The literacy rate is 74.97%, with a discernible gender gap (78.36% male vs. 71.40% female). Socially, Scheduled Castes constitute a significant 29.92% of the population, highlighting the importance of inclusive strategies.

2.2 Agro-Ecological Assessment

- **Physiography & Climate:** Situated in the active Ganga-Brahmaputra delta, the district comprises New Alluvial Plains (eastern/central parts) and Old Alluvial Plains (western parts). The climate is humid subtropical with a mean annual temperature of 27°C and an average annual rainfall of 1245 mm, characterized by high humidity and a distinct monsoon season.
- **Soil Resources:** Soils are predominantly alluvial, fertile, and neutral to slightly acidic (pH 6.5-7.5),

ideal for a variety of crops. However, critical challenges exist: organic carbon levels are moderate (0.5-0.75%) and declining, and there are widespread micronutrient deficiencies, with 67% of soil samples deficient in zinc and 34% in boron.

2.3 Water Resources: A Crisis in the Making

- **Surface Water:** A network of rivers, including the Bhagirathi, Jalangi, Churni, and Ichamati, provides surface water. However, these are plagued by pollution, notably from jute retting, which elevates Biochemical Oxygen Demand (BOD) 10-15 times, causing fish mortality and ecosystem damage.
- **Groundwater:** Groundwater is the main source of irrigation in the district, but it is being used faster than it can be naturally replenished. Its utilization level has already reached about 67.5%, and the water table is dropping by 0.3 to 0.8 meters every year. Moreover, arsenic contamination above safe limits affects more than eight blocks, while excessive fertilizer use has caused nitrate pollution, posing increasing health and environmental concerns.

2.4 Agricultural Production Systems and Infrastructure

- **Cropping Patterns:** Paddy-based monoculture dominates, leading to ecological simplification and vulnerability. Landholding patterns are highly fragmented, with over 86% of holdings classified as marginal or small, presenting both a challenge and an opportunity for collective action.
- **Irrigation Infrastructure:** Heavy reliance on groundwater is evidenced by ~45,670 shallow tubewells and 1,240 deep tubewells. Canal irrigation has a utilization rate of only ~77%. Critically, micro-irrigation (drip and sprinkler) covers less than 1% of the irrigated area, indicating a massive opportunity for water efficiency.
- **Marketing Infrastructure:** While physical infrastructure exists (4 APMCs, 12 sub-markets, 89 rural haats), utilization is sub-optimal due to poor facilities, weak linkages, and farmer preference for informal markets. Post-harvest losses for horticultural produce are estimated at a significant 15-20%.

2.5 Allied Sectors: Livestock, Fisheries, and Horticulture

- **Livestock:** The district has a substantial and diverse livestock population, including cattle, goats, and poultry. Milk production per capita (155 g/day) is above the state average but below the national average, indicating growth potential.
- **Fisheries:** With a total water area of 17,895 ha, the district has significant inland fisheries potential. Current practices are often monocultures, with opportunities for diversification and integrated systems.
- **Horticulture:** A major strength, Nadia ranks among the top districts in West Bengal for the production of bananas, lady fingers, brinjal, cabbage, and mangoes, providing a solid foundation for high-value diversification.

2.6 Institutional Landscape

A growing network of 47 active FPOs and numerous women-led SHGs demonstrates an emerging collective spirit. SHGs, in particular, have shown a statistically significant positive impact on women's empowerment indices. Key supporting institutions like the Agricultural Technology Management Agency (ATMA), Krishi Vigyan Kendras (KVKs), BCKV, and NABARD provide a foundational platform for extension, research, and financing.





3 Challenge Analysis and Problem Statement

3.1 The Water Security Crisis

- **Groundwater:** The dual challenge of quantitative depletion (0.3-0.8 m/year decline) and qualitative degradation (arsenic and nitrate contamination) poses a direct threat to public health, crop safety, and long-term agricultural sustainability.
- **Surface Water:** Systemic degradation due to jute retting, siltation of ponds (25% storage capacity lost), functional failure of minor canals (40% non-functional), and a 15% loss of wetlands since 2000 have crippled ecosystem services like recharge, flood control, and habitat.

3.2 Intensifying Climate Change Impacts

- **Temperature Trends:** The mean annual temperature has increased by 0.8°C since 1980, with more pronounced warming in maximum temperatures.
- **Extreme Weather Events:** The frequency and intensity of cyclones (e.g., Amphan, Yaas), hailstorms, and erratic rainfall patterns have increased, leading to biannual floods in six blocks and periodic droughts, causing yield variability of 20-30% and undermining farmer confidence.

3.3 Soil Health Degradation: The Foundation is Failing

- **Chemical Degradation:** A severely skewed NPK use ratio (62:32:21), widespread micronutrient deficiencies, declining soil organic carbon (now at 0.6-1.2%), and increasing soil acidity are hampering productivity and resilience.
- **Physical Degradation:** Intensive tillage has led to soil compaction (bulk density increased by 12%), reduced infiltration rates (down 25%), and the formation of hard plough pans, restricting root growth and water movement.

3.4 Market and Value Chain Constraints

- **Limited Value Addition:** Only about 15% of agricultural produce undergoes local value addition, resulting in significant lost income opportunities for rural communities.
- **Financial Exclusion:** Access to formal credit is limited to only 45% of farmers, and crop insurance penetration is very low at 34%, leaving farmers financially vulnerable.
- **Infrastructure Gaps:** Inadequate cold storage, processing units, and market information systems lead to high post-harvest losses and poor decision-making.
- **Labour Shortage and Low Mechanization:** Agriculture in the district continues to depend heavily on manual labour, but seasonal migration and rising labour costs have created severe workforce shortages during peak farming periods. Farm mechanisation remains low, especially among small and marginal farmers, due to high equipment costs, limited access to custom hiring services, and lack of technical training, leading to reduced productivity and delays in critical farm operations.



4 Vision, Strategic Framework, and 2030 Targets

4.1 Vision Statement

To create a climate-resilient, economically vibrant, and socially inclusive agricultural system in Purulia that ensures sustainable livelihoods, efficient use of natural resources, and reduced vulnerability to droughts and climate shocks through diversification, innovation, and community-led development.

4.2 Theory of Change

The roadmap's theory of change is based on a systems transformation approach. The foundational assumption is that sustainable change requires simultaneous intervention across multiple leverage points. The causal pathway is: IF we strengthen institutional convergence and farmer organizations AND we implement integrated interventions addressing production, value addition, and market access, WHILE ensuring women's leadership and community ownership, THEN we will achieve systemic transformation that enhances climate resilience, improves livelihoods, and restores ecological balance.

4.3 Strategic Objectives and Quantifiable (2035 Targets)

Objective 1: Climate Adaptation & Resilience

Primary Target: Enhance the adaptive capacity of 50,000 farming families.

Supporting Targets:

- Adoption of climate-smart agricultural practices across 1 lakh (15%) hectares.
- **25-30%** improvement in water-use efficiency through micro-irrigation and better management.
- Establishment of advanced early warning systems and weather-based agro-advisory services accessible to **75%** of farmers.
- Increase Area under Agroforestry by **5%** and co-create **50** additional Fodder Banks across the district.

- By 2035, the district will promote solar-powered irrigation and community-based water management, achieving 60% clean energy use in agriculture through collaborative efforts of farmers, government, and partners.
- 80% of farmers in pilot blocks have a predefined disaster preparedness plan.

Objective 2: Livelihood Enhancement & Diversification

Primary Target: Achieve a 75% increase in real farmer income (from the baseline of ₹78,000 to ₹136,500 per annum).

Supporting Targets:

- 25% increase in productivity of major crops through improved practices.
- 60% of produce is processed locally to capture greater value.
- Establishment of 2,000+ women-led agri-enterprises.
- Development of at least 5 strong branded products from Nadia in regional/national markets.
- 30% increase in income diversification through livestock, fisheries, floriculture, and agri-based enterprises, reducing reliance on crop income alone.

Objective 3: Ecological Restoration & Sustainability

Primary Target: Restore ecological balance and ecosystem services.

Supporting Targets:

- Bring 2000 hectares under certified organic or natural farming and promote up to 10,000 hectares under IPM/natural cultivation practices by 2035 through FPO-led clusters and institutional convergence.

- 50% reduction in synthetic pesticide use and a 30% reduction in synthetic fertilizer use.
- Restoration and ecological management of 50 critical water bodies.

Objective 4: Institutional Strengthening & Governance

Primary Target: Establish effective, accountable, multi-stakeholder governance mechanisms.

Supporting Targets:

- 30% scheme convergence at the block level, as measured by joint planning and budgeting.
- 40% of FPOs achieve financial sustainability without grant dependency.
- 35% of farmers are linked to formal markets through FPOs, contracts, or direct sales.
- 35% of farmers accessing institutional credit (KCC and other loans).

4.4 The Four Pillars Strategic Framework

Pillar 1: On-Farm Production Systems

Scope: Transforming core production practices at the field level.

Core Components:

- **Sustainable Crop Production:** Promotion of climate-resilient varieties, crop diversification with pulses and oilseeds, and conservation agriculture.
- **Integrated Farming Systems (IFS):** Development of synergistic crop-livestock-fish models for optimal resource recycling and risk distribution.
- **Soil Health Management:** A focus on restoring soil organic carbon through composting, green manuring, and reduced tillage.

- **Water Conservation:** On-farm water management through in-situ measures and efficient irrigation.
- **Biodiversity Enhancement:** Integration of agroforestry, beekeeping, and preservation of indigenous seed varieties.

Pillar 2: Off-Farm Value Addition

Scope: Enhancing farmer incomes by capturing greater value post-harvest.

Core Components:

- **Primary Processing Infrastructure:** Establishment of decentralized units for cleaning, grading, sorting, and packaging.
- **Secondary Processing:** Development of facilities for producing jams, pickles, chips, and other value-added products.
- **Quality Assurance & Certification:** Support for organic, PGS, and other certifications to access premium markets.
- **Branding & Marketing:** Creating a "Nadia Naturals" brand and developing e-commerce and direct marketing channels.

Pillar 3: Commons and Natural Resource Management (NRM)

Scope: Sustainable and equitable management of shared resources.

Core Components:

- **Community-based Water Resource Management:** Reviving ponds, tanks, and canals through water user associations.
- **Agroforestry on Common Lands:** Planting fruit, fodder, and timber trees on bunds and wastelands.
- **Disaster Risk Reduction:** Building climate-resilient infrastructure like flood embankments and cyclone shelters.

Pillar 4: Enablers (Markets, Finance, Institutions)

Scope: Sustainable and equitable management of shared resources.

Core Components:

- **Community-based Water Resource Management:** Reviving ponds, tanks, and canals through water user associations.
- **Agroforestry on Common Lands:** Planting fruit, fodder, and timber trees on bunds and wastelands.
- **Disaster Risk Reduction:** Building climate-resilient infrastructure like flood embankments and cyclone shelters.



5 Integrated Implementation Framework and Strategic Way Forward (2025–2035)

By 2035, Nadia District will emerge as a model of climate-resilient, water-secure, and market-linked agriculture, where farmers' incomes rise sustainably, women and youth are central to growth, and natural resources are restored through collective action. The decade-long plan envisions a transition from input-intensive agriculture to resource-efficient and diversified systems, supported by digital innovation, institutional convergence, and people's participation.

5.1 Phase I: Foundation Building (2025–2028)

This phase will focus on developing proof-of-concept initiatives, strengthening institutional capacity, and establishing a comprehensive baseline database through an intensive pilot in Nadia district, selected for its high climate vulnerability, agricultural significance, and strong community participation.

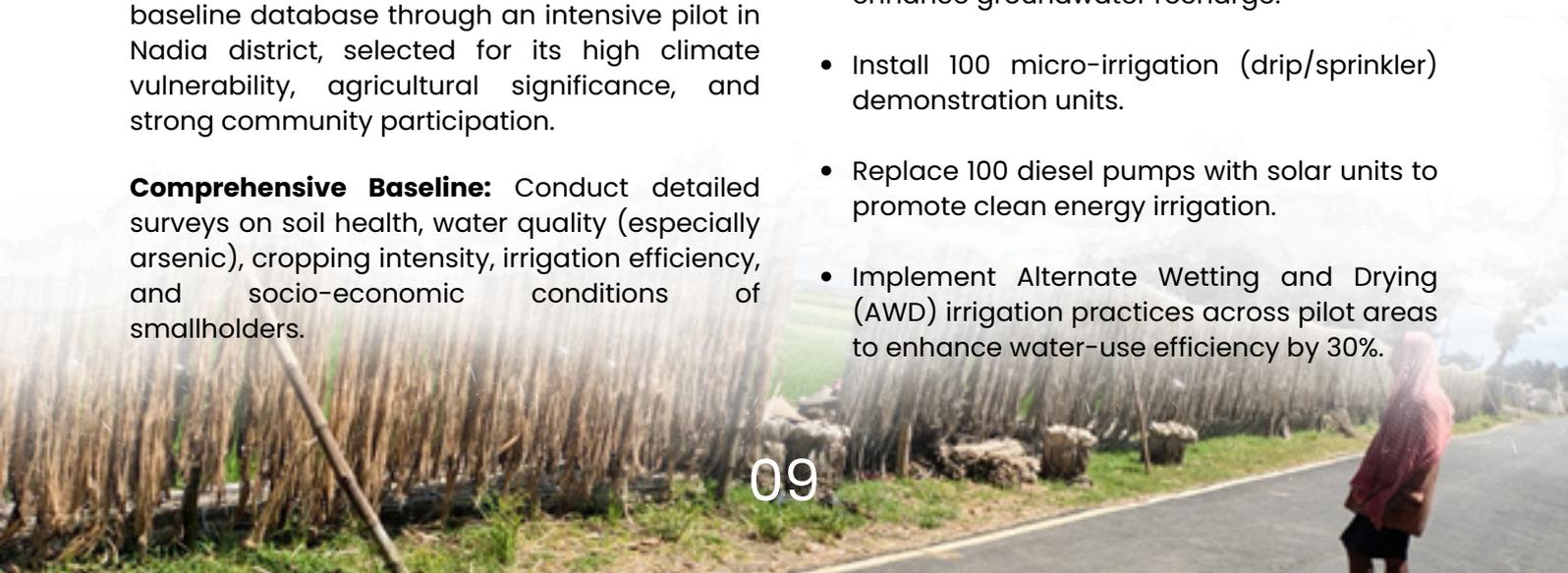
Comprehensive Baseline: Conduct detailed surveys on soil health, water quality (especially arsenic), cropping intensity, irrigation efficiency, and socio-economic conditions of smallholders.

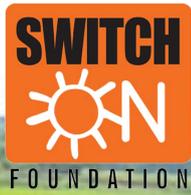
On-Farm Interventions:

- Promote climate-resilient seed varieties (drought- and flood-tolerant).
- Develop 5–10 diversified cropping demonstration plots (paddy-pulses-vegetables) to promote resilient practices.
- Establish 3 organic/natural farming clusters (100–150 acres each) targeting 500 ha under certified organic/natural cultivation by 2028.

Water Security:

- Rejuvenate 50 farm ponds and renovate minor canals to reduce waterlogging and enhance groundwater recharge.
- Install 100 micro-irrigation (drip/sprinkler) demonstration units.
- Replace 100 diesel pumps with solar units to promote clean energy irrigation.
- Implement Alternate Wetting and Drying (AWD) irrigation practices across pilot areas to enhance water-use efficiency by 30%.





Institutional Strengthening:

- Governance and business planning training for 20 FPOs across the district.
- Formation and training of Water User Associations for newly revived water structures.
- Activation of Block-Level ATMA Convergence Committees for local planning and monitoring.

District-Wide Foundational Actions:

- Awareness campaigns on climate-resilient agriculture and resource conservation.
- Launch of an AI-driven agro-advisory dashboard for real-time weather, soil, and market advisories.
- Converge schemes such as RKVY, PKVY, ATMA, and MGNREGA under ATMA leadership for integrated planning.

Financing:

- Scheme convergence with CSR and development partner grants for diagnostics, training, and pilot demonstrations.

5.2 Phase 2: Scaling and Diversification (2028–2030)

Building upon the pilot's success, this phase will emphasize district-wide expansion, value chain strengthening, and enterprise development.

Key Actions:

Geographical Expansion:

- Scale interventions to 5–7 vulnerable blocks, customizing strategies to local agro-ecological and socio-economic contexts.

Value Chain Development:

- Establish 3–5 cluster-based processing units for major commodities like mango, banana, potato, and jaggery, targeting 10–15% value addition in farm produce.

Renewable Energy Expansion:

- Scale up solar irrigation from 100 to 500 functional units, covering 1,000+ hectares of farmland.

Enterprise Development:

- Facilitate 2,000 women-led enterprises in poultry, dairy, composting, and small-scale food processing.

Digital Integration:

- Ensure E-NAM onboarding of all major FPOs. Expand digital agro-advisory systems for 100% block-level coverage.

Infrastructure Development:

- Establish Bio-Resource Centers (BRCs) in at least 50% of Gram Panchayats (90 nos.) for input production, training, and seed treatment.
- Build processing and collection centers with cold storage at the block level.
- Set up district-level logistics and marketing hubs to link farmers with buyers.

Financing:

- Mobilize NABARD refinancing, blended credit models, and CSR partnerships for renewable energy, digital systems, and agro-processing infrastructure.

5.3 Phase 3: Consolidation and Replication (2031–2035)

This phase will consolidate the gains achieved during the first two phases and position Nadia as a self-sustaining, climate-smart agricultural district. The focus will be on institutional maturity, district-wide replication, and long-term sustainability.

Key Actions:

Institutional Strengthening:

- At least 20 FPOs to become financially self-reliant, managing aggregation, credit, and marketing independently.
- SHG federations and Water User Groups to take charge of extension, input supply, and maintenance of community assets.
- ATMA to evolve as the District Agri-Resilience Mission Cell ensuring convergence and digital monitoring.

Climate and Resource Management:

- Expand climate-smart practices to 100,000 ha, including AWD irrigation and organic/natural farming.
- Achieve a 50% reduction in diesel dependency through 1,000 solar pumps and micro-irrigation systems.
- Rejuvenate all key water structures and integrate GIS-based water budgeting tools.

Value Chain and Market Integration:

- Establish district-level agri-value hubs with processing, packaging, and cold storage.
- Launch 5–7 Nadia-branded products in regional/national markets.
- Ensure 60% of total produce is locally processed and marketed through e-NAM and digital platforms.

Livelihoods and Inclusion:

- Operationalize 3,000 women-led enterprises in horticulture, livestock, and processing.
- Implement the Nadia Agri-Innovation Fellowship to engage rural youth in agri-tech ventures.
- Achieve a 75% increase in farmer income from the 2025 baseline.

Knowledge, Monitoring & Financing:

- Integrate AI-based agro-advisory and remote-sensing tools for decision support.
- Conduct third-party impact assessments and publish the “Nadia Resilience Model” for replication.
- Establish a Revolving Climate Fund leveraging NABARD, CSR, and producer contributions for long-term sustainability.

Financing:

- Mainstreamed through plan budgets, producer revenues, and private investments.

Key Outcomes:

Climate Resilience & Natural Resource Management:

- 100,000 ha under climate-resilient and diversified cropping systems.
- 10,000 ha under certified organic/natural farming.
- 1,000 solar pumps installed; 50% reduction in diesel dependency.
- 1,000 micro-irrigation units and 500 rejuvenated ponds for improved water-use efficiency.

Institutional Empowerment:

- 20 FPOs and 1 district-level federation become fully self-sustaining.
- 3,000 functional SHGs engaged in input supply, composting, and micro-enterprises.
- Fully operational ATMA-led Convergence and Monitoring Cell with AI-driven dashboard.

Livelihoods & Gender Inclusion:

- 3,000 women-led enterprises established across poultry, dairy, processing, and value addition.
- 75% increase in average farm income from 2025 baseline.
- 50,000 farmers gain access to digital advisory and e-market platforms.

Infrastructure & Value Chain Development:

- 5–7 cluster-based processing and marketing hubs operational.
- 5 district-branded agri-products launched in state/national markets.
- 60% of local produce is processed or marketed through FPO channels and e-NAM.

Digital and Financial Ecosystem:

- “Nadia Agri-Innovation Fund” institutionalized to support agri-tech and climate innovations.

- Real-time monitoring and evaluation through district-level digital dashboard.
- Converged financing model combining schemes, CSR, and revolving community funds.

By 2035, Nadia will stand as a resilient, inclusive, and self-sustaining agricultural district—integrating technology, market access, and climate action into a unified rural growth model.

5.4 Implementation and Monitoring Framework – Sarkar, Bazaar, and Samaj

The implementation in Nadia will adopt a systems-based framework integrating Sarkar (Government), Bazaar (Market), and Samaj (Community) to ensure scientific, inclusive, and scalable outcomes.

- **Sarkar:** Acts as the institutional backbone, facilitating inter-departmental convergence, evidence-based planning, and infrastructure development through ATMA-led coordination.
- **Bazaar:** Functions as the economic driver, strengthening agri-value chains, post-harvest management, and input-output market systems to ensure price efficiency and farmer profitability.
- **Samaj:** Serves as the social catalyst, promoting participatory planning, gender inclusion, and local governance for sustained behavioral and ecological resilience.



A scientifically designed Monitoring, Evaluation, and Learning (MEL) framework will ensure accountability and adaptive management. It will employ key performance indicators (KPIs)—covering productivity, resource-use efficiency, livelihood diversification, and institutional performance—monitored through administrative databases, remote sensing, field surveys, and community-based monitoring tools.

A digital dashboard will enable real-time tracking and data visualization. The review mechanism will operate on three tiers:

- **Monthly:** Block-level technical reviews by ATMA.
- **Quarterly:** District-level assessments led by the District Magistrate.
- **Annual:** Integrated performance evaluation and knowledge sharing among stakeholders.

This science-driven approach will foster feedback-based learning and adaptive decision-making for resilient agricultural transformation in Nadia.



6 Institutional Framework – Sarkar, Bazaar, and Samaj

The integrated framework of **Sarkar (Government)**, **Bazaar (Market)**, and **Samaj (Community)** forms the foundation for implementing climate-resilient and inclusive agricultural development in Nadia. Sarkar ensures policy support, convergence, and infrastructure development; Bazaar drives value chains, processing, and market access; while Samaj anchors community participation, social mobilization, and local ownership. Together, these three pillars will foster a self-sustaining ecosystem that enhances productivity, resilience, and livelihood security across the district.

6.1 Government Departments (The Sarkar Arm)

- **ATMA:** The nodal agency for convergence. Will be strengthened to prepare integrated district agricultural plans, chair monthly interdepartmental meetings, and manage a common extension calendar.
- **Department of Agriculture:** Lead on promoting climate-resilient seed varieties, soil health management, and the organic farming cluster program.
- **Department of Water Resources/WBADMIP:** Responsible for the creation of minor irrigation infrastructure, water detention structures, and technical support for watershed development.
- **Department of Food Processing Industries & Horticulture:** Drive crop diversification by providing planting material, supporting nurseries, and promoting protected cultivation (polyhouses, shade nets).
- **Animal Resources Development (ARD) Department:** Implement breed improvement programs, fodder development schemes, and mobile veterinary services.
- **Department of Fisheries:** Support pond renovation, provide quality fish seed, and train farmers in integrated aquaculture.
- **Department of Agricultural Marketing, Food & Supplies:** Will facilitate market linkages, storage and processing infrastructure, and integration with e-NAM for transparent and efficient price discovery.

- **District Rural Development Cell (DRDC) / WBSRLM:** Will promote women-led and community-based enterprises, foster self-help group convergence, and support livelihood diversification initiatives.
- **WBLDC (West Bengal Livestock Development Corporation):** Will strengthen dairy value chains, including milk collection, chilling, and marketing networks.
- **WBCADC (West Bengal Comprehensive Area Development Corporation):** Will facilitate cluster-based integrated farming, input support, and capacity-building programs for farmers

6.2 Community Organizations (The Samaj Arm)

Farmer Producer Organizations (FPOs):

- **Role:** Act as the primary aggregators for inputs, credit, and produce. Manage primary processing and marketing.
- **Support Needed:** Intensive handholding for business planning, access to working capital, and market linkage facilitation. The goal is to transition them from grant-dependent entities to self-sustaining businesses.

Self-Help Groups (SHGs)

- **Role:** Serve as the bedrock for women's empowerment and micro-enterprise development in agriculture and allied sectors.
- **Support Needed:** Training in technical skills (composting, poultry, food processing), financial literacy, and leadership. They will be key players in the bio-input supply chain and local value addition.

Civil Society Organizations (CSOs) / Non-Governmental Organizations (NGOs):

- **Role:** Facilitate community mobilization, capacity building, and social inclusion of vulnerable groups.
- **Support Needed:** Strengthened collaboration frameworks and integration into district-level planning and monitoring systems to ensure participatory implementation.

Cluster-Based Business Organizations (CBBOs):

- **Role:** Provide technical, managerial, and business development support to FPOs and SHG federations.
- **Support Needed:** Capacity enhancement for market intelligence, value chain analysis, and digital management systems to improve FPO sustainability.

Cooperatives/PACS (Primary Agricultural Credit Societies):

- **Role:** Strengthen the rural credit and input delivery system, facilitate collective procurement and marketing, and promote inclusive financial access.

6.3 Private Sector and Financial Institutions (The Bazaar Arm)

• Banks & NABARD:

- **Role:** Provide timely and adequate credit for all components of the roadmap.
- **Action:** Develop and market bundled "climate-smart" loan products. Simplify the process for KCC and crop insurance enrollment.

• Agri-Businesses & Processors:

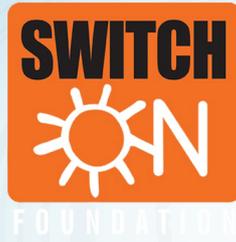
- **Role:** Provide an assured market with a fair price through buy-back agreements.
- **Action:** Engage with FPOs for contract farming of specific commodities like processed potatoes, mango pulp, or organic rice.

• Technology Providers:

- **Role:** Supply efficient irrigation systems, renewable energy solutions, and digital farm management tools.
- **Action:** Set up local sales and service centres and offer customised solutions for smallholders.

7 Conclusion: A Collective Covenant

Beyond just a blueprint, the Nadia Climate-Resilient Agriculture Roadmap is a social commitment for a safe, successful, and sustainable agricultural future. Unwavering political resolve, tenacious bureaucratic dedication, and the proactive, empowered agency of Nadia's agricultural community are all necessary for its accomplishment. In addition to ensuring its own food, water, and livelihood security, Nadia will pave the road for a climate-resilient district by pursuing this path with tenacity and a common goal. The moment has come to take action.



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