

CHHATTISGARH AGRICULTURE AND ALLIED SECTORS ROADMAP 2047



**Transforming Agriculture into
a Diversified, Climate-Resilient,
Technology-Driven and
Value-Added Rural Economy**

**Baseline year: 2025–26
Target year: 2047**



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Preface

Agriculture and allied sectors are fundamental to the economic development, food and nutritional security, and livelihood sustainability of Chhattisgarh. With its diverse agro-climatic conditions, rich natural resources, agricultural biodiversity and strong rural traditions, the state possesses considerable potential to transform agriculture into a diversified, climate-resilient, technology-driven and value-added rural economy. Realising this potential requires a long-term vision that integrates agricultural productivity with natural resource conservation, technological innovation, enterprise development and inclusive economic growth.

The Chhattisgarh Agriculture and Allied Sectors Roadmap 2047 has been prepared to guide the transformation of the state's agricultural and allied sectors towards sustainable prosperity by the centenary of India's independence. Using 2025–26 as the baseline year and 2047 as the target year, the roadmap provides a strategic framework for strengthening agriculture, horticulture, livestock, fisheries, forestry, food processing and other rural enterprises. Informed by field-level insights generated through the Viksit Krishi Sankalp Abhiyan (VKSA), farmer–scientist interactions and multi-stakeholder consultations, the roadmap emphasizes convergence, collaborative planning and locally responsive solutions. This approach reflects VKSA's focus on bridging the gap between scientific research and farmers' needs through two-way knowledge exchange and coordinated institutional action. The roadmap envisages a fundamental shift from production-oriented growth to value-led development, with greater emphasis on farmers' incomes, resource-use efficiency, market access, risk reduction and livelihood diversification. It addresses key challenges, including dependence on rainfall, limited irrigation coverage, small and fragmented landholdings, underutilization of rice-fallow areas, climate variability, post-harvest losses and inadequate value addition. It proposes integrated, location-specific strategies tailored to Chhattisgarh's three major agro-climatic zones: the Chhattisgarh Plains, Bastar Plateau and Northern Hills. Priority areas include rice-fallow intensification, promotion of pulses and oilseeds, diversification into horticulture and millets, development of livestock and fisheries, efficient water management, soil-health improvement, farm mechanization, digital agriculture and stronger agricultural value chains.

A key emphasis of this roadmap is to ensure that the benefits of agricultural transformation reach small and marginal farmers, tribal communities, women and rural youth. Strengthening Farmer Producer Organisations, cooperatives, self-help groups and rural enterprises, alongside improved extension services, scientific research, skill development and market linkages, will be essential to achieving this objective. Climate-smart agriculture, biodiversity conservation, sustainable use of natural resources and circular bioeconomy approaches are also integral to the proposed development pathway.

The roadmap envisages a phased transformation during 2026–2030, 2031–2040 and 2041–2047, progressing from foundational improvements to large-scale value-chain development

and, ultimately, a competitive, knowledge-driven agricultural and bio-resource economy. Its successful implementation will require coordinated efforts among government departments, ICAR institutes, Indira Gandhi Krishi Vishwavidyalaya, Krishi Vigyan Kendras, research and educational institutions, farmer organisations, private enterprises and other development partners. Regular monitoring, evidence-based planning and periodic review will be essential to translate the proposed strategies into measurable outcomes.

I hope this roadmap will serve as a useful reference for policymakers, researchers, development professionals, agricultural institutions and other stakeholders working towards the sustainable development of Chhattisgarh. By combining scientific knowledge, technological innovation, institutional collaboration and the strengths of local farming communities, the state can move towards a future in which agriculture and allied sectors become major drivers of prosperity, resilience and inclusive rural development.

The vision of Chhattisgarh @ 2047 is not merely to produce more, but to create greater value, secure better livelihoods and build a sustainable and prosperous future for its farming communities.

(Authors)

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1. Executive Summary

Chhattisgarh enters the next two decades with a strong agricultural foundation and a significant opportunity to transition from volume-led production to value-led rural prosperity. The state has about 4.78 million ha of cultivated area, accounting for around 35% of its geographical area, while net irrigation coverage is estimated at roughly 23% of cultivated area. Around 37.46 lakh farmers are reported, of whom approximately 80% are small and marginal. Rice remains the dominant crop, and dependence on rainfall continues to constrain productivity and farm incomes. These conditions highlight both the vulnerability of the existing production system and the considerable potential for productivity enhancement, agricultural diversification and sustainable rural growth.

The roadmap envisages a three-phase transformation. Phase I (2026–30) will establish the foundations through improved agricultural data systems, efficient irrigation, soil-health management, quality seed access, rice-fallow utilisation, stronger farmer collectives, livestock and fisheries services, post-harvest infrastructure and district-level value-chain plans. Phase II (2031–40) will scale agricultural diversification, processing, market-oriented production clusters, precision agriculture, climate-smart practices, genetic improvement, integrated farming systems and rural enterprises. Phase III (2041–47) will consolidate Chhattisgarh's position as a high-value agricultural and bio-resource economy, supported by competitive regional products, circular bioeconomy systems and knowledge-intensive rural employment.

The central strategic shift is from *more production* to *more value per unit of land, water, labour and biomass*. Paddy will remain important for food security and farm incomes, while future growth should increasingly draw on pulses, oilseeds, millets, horticulture, dairy, goatery, poultry, fisheries, agroforestry, minor forest produce, food processing and branded regional products. The roadmap proposes an indicative ambition to double the real value of agricultural and allied-sector output between the mid-2020s and 2047. This will require sustained productivity growth, expanded and more efficient irrigation, a greater contribution from high-value crops and allied activities, and a substantial increase in the share of marketed agricultural produce passing through organised and value-added channels, with a proposed target of at least 50% by 2047. These are planning ambitions, not forecasts, and will require periodic assessment against baseline conditions and implementation capacity.

- **Make farmer prosperity the primary outcome:** Measure progress through real farm incomes, profitability, employment and livelihood resilience, alongside production and productivity indicators.
- **Adopt district-specific development strategies:** Align agricultural interventions with agro-climatic potential, market access, farmer priorities and natural-resource constraints.
- **Prioritise water productivity:** Promote efficient irrigation, watershed development and

rainwater harvesting to achieve more crop output and income per unit of water.

- **Accelerate rice-fallow diversification:** Make suitable rice-fallow areas a priority for expanding pulses, oilseeds and other locally appropriate crops through timely sowing, quality seed and assured market access.
- **Mainstream allied sectors and value addition:** Develop livestock, fisheries, horticulture, agroforestry and food processing as integrated growth engines, supported by producer organisations, storage, processing and market linkages.
- **Strengthen the science and innovation ecosystem:** Position ICAR institutions, Indira Gandhi Krishi Vishwavidyalaya (IGKV), KVKs, agricultural universities and other research institutions as key partners in technology validation, farmer advisories, capacity building and impact assessment.
- **Establish an integrated governance framework:** Create a unified Agriculture and Allied Sectors Transformation Mission with a shared 2047 monitoring dashboard, clearly defined departmental responsibilities, convergence mechanisms and five-year reviews to assess progress and recalibrate priorities.

2. Vision, Mission and Strategic Outcomes

Vision 2047

Chhattisgarh will become a resilient, diversified and knowledge-driven agricultural economy in which every farming household can earn from a portfolio of crops, livestock, fisheries, horticulture, forestry and value-added enterprises while soil, water, biodiversity and climate resilience improve.

Mission

To transform the state's agriculture and allied sectors through productivity enhancement, diversification, efficient water management, climate-resilient technologies, value-chain development, farmer institutions, digital agriculture, research-led innovation and inclusive enterprise development.

Outcome domain	2047 direction	Core measure
Farm prosperity	Higher and more stable real farm household income	Real farm household income index
Productivity	Yield gaps substantially narrowed	Yield vs. attainable yield
Diversification	Reduced dependence on single-crop income	Share of non-paddy/high-value income
Water	Higher irrigation reliability and water productivity	Income per m ³ /irrigated area
Allied sectors	Livestock, fisheries and horticulture become major income engines	Sector GVA and household income
Value addition	More produce processed, branded and marketed through organised channels	Share of output value-added
Climate resilience	Lower production volatility and resource degradation	Climate-risk indicators
Inclusion	Women, tribal farmers and smallholders participate in value chains	Participation and income metrics
Youth	Agriculture creates skilled, technology-enabled jobs	Agri-enterprises/jobs
Nutrition	Higher local availability of pulses, millets, vegetables, fruits, milk, eggs and fish	Per-capita availability/consumption

The roadmap should be implemented as an economic transformation programme, not as a collection of departmental schemes. Each major intervention should answer five questions: What income problem does it solve? Which farmers benefit? What technology or infrastructure is needed? Who owns the outcome? How will impact be measured after three and five years?

3. Present Status: Economy and Agriculture

The latest state economic-survey estimates indicate that agriculture and allied activities—including agriculture, livestock, fisheries and forestry are expected to reach about ₹1,19,871 crore at current prices in 2025-26, compared with ₹1,06,521 crore in 2024-25, implying 12.53% nominal growth. At constant prices, the sector is estimated to rise from ₹53,928 crore to ₹57,969 crore, a 7.49% increase. [4]

PRS analysis of the 2026-27 state budget estimates agriculture, manufacturing and services at approximately 21%, 46% and 33% of the state economy respectively at current prices. Agriculture therefore remains economically important even as industrialisation and services accelerate. [5]

The state's official Water Resources Department describes net sown area of about 4.683 million ha and gross sown area of 5.561 million ha, while emphasising the large potential to improve irrigation utilisation. ICAR reports cultivated area of 4.78 million ha, net irrigation of about 23% and cropping intensity around 119%. [1,6]

This baseline points to a key policy paradox: the state has substantial land, rainfall and biomass resources, yet a large share of farm income remains exposed to rainfall variability, low productivity, limited rabi intensification and weak post-harvest/value-chain capture.

- **Strategic implication 1:** irrigation expansion must be paired with micro-irrigation, drainage, crop planning and water budgeting.
- **Strategic implication 2:** the rice economy should be strengthened through quality, productivity, processing and branding while freeing suitable land for higher-value alternatives.
- **Strategic implication 3:** the next productivity frontier is not only yield; it is yield × price realisation × cropping intensity × value addition × risk reduction.
- **Strategic implication 4:** agricultural transformation must be geographically differentiated across the Plains, Bastar Plateau and Northern Hills.

4. Farmers, Holdings and Rural Livelihood Structure

NITI Aayog's Chhattisgarh natural-farming profile reports about 37.46 lakh farmers and around 80% small and marginal farmers. Older Agriculture Census evidence also shows a high concentration of marginal and small operational holdings. This structure makes individually owned mechanisation, cold-chain assets, processing plants and market intelligence difficult to finance and operate efficiently. [2,7]

The roadmap therefore treats farmer aggregation as basic economic infrastructure. FPOs, cooperatives, producer companies, women's SHGs, tribal collectives and custom-hiring enterprises should be organised around commodities and service functions, not simply formed to meet numerical targets.

Constraint	Strategic response	2047 institutional goal
Small holdings	Aggregation of production and services	Functional producer organisations in every major cluster
Low bargaining power	Collective procurement/marketing	Transparent price discovery
High transaction costs	Shared logistics and machinery	Village/cluster service hubs
Limited risk capacity	Insurance + diversification + advisories	Portfolio-based farm risk management
Limited processing	Cluster-level common facilities	Local primary processing in major commodities
Youth migration	Agri-tech enterprises and skilled jobs	Rural agri-service economy
Women's unpaid work	Women-led enterprises and mechanisation	Women as owners/managers, not only beneficiaries

The policy principle should be 'aggregate the market, not the farmer's land'. Land consolidation is neither necessary nor always desirable. Instead, aggregation should occur for seed, machinery, irrigation services, storage, grading, processing, transport, finance, insurance and marketing.

5. Natural Resources and Agro-Climatic Zones

Chhattisgarh is naturally divided into three broad agro-climatic settings: the Chhattisgarh Plains, Bastar Plateau and Northern Hills. Their rainfall, soils, topography, tribal livelihood systems, forest dependence and market access differ. A uniform crop policy would therefore leave substantial value on the table.

Zone	Core characteristics	Priority transformation
Chhattisgarh Plains	Higher market access; extensive paddy; better irrigation potential; mixed soils	Rice productivity + vegetables + pulses/oilseeds + dairy + processing
Bastar Plateau	High rainfall; forest-rich; tribal livelihoods; diverse traditional crops; terrain constraints	Millet + horticulture + fisheries + goat/poultry + MFP + ecological value chains
Northern Hills	Hilly/undulating; rainfed farming; horticulture potential; tribal livelihoods	Maize/pulses/oilseeds + fruits/spices + livestock + watershed + cold chain

Land capability mapping should become the basis of district crop plans. Every hectare should be classified broadly by soil, slope, water availability, climate risk, market distance and ecological sensitivity. The result should be a 'right crop, right place, right season, right technology' planning system.

The state should develop a 2047 Natural Resource Atlas combining soil health, groundwater, surface water, crop suitability, erosion risk, biodiversity, carbon potential and market infrastructure. This should be updated every three years and integrated with AgriStack and crop surveys. The state's digital crop survey already aims to create a verified source of farmer and crop data that can be used by banks, insurers and other ecosystem actors. [8]

6. Water Security: The Foundational Mission

Water is the most important constraint and opportunity for Chhattisgarh agriculture. ICAR reports net irrigation at around 23% of cultivated area, while the Water Resources Department emphasises large scope for better utilisation of available water. State planning has also articulated additional irrigation potential and higher rabi irrigation ambitions. [1,6,9]

The 2047 approach should move from project-centric irrigation to basin- and farm-level water productivity. New irrigation infrastructure remains necessary, but equal priority should be given to canal modernisation, command-area development, field channels, drainage, farm ponds, check dams, watershed works, groundwater recharge and precision irrigation.

Mission	2026–30	2031–40	2041–47
Irrigation reliability	Repair, complete and digitise existing systems	Expand efficient command areas	Universal reliability in economically viable clusters
Micro-irrigation	Target horticulture, vegetables, pulses	Scale to diversified irrigated clusters	Mainstream as standard technology
Watersheds	Treat critical micro-watersheds	Landscape-scale restoration	Climate-resilient catchment management
Water budgeting	Pilot village water budgets	District crop-water plans	Statewide dynamic water accounting
Rabi expansion	Prioritise rice fallows	Scale double cropping	High-value multi-season systems

Water policy should explicitly discourage expansion of water-intensive crops in water-stressed pockets. Irrigation subsidy should increasingly reward measured water efficiency and productivity rather than merely installed capacity.

7. Rice: From Dominance to Strategic Strength

Rice will remain central to Chhattisgarh's food system, culture, procurement economy and rural livelihoods. The objective is not to reduce rice indiscriminately; it is to improve the economics and resilience of rice while relocating low-productivity rice to more suitable alternatives.

ICAR notes about 3.7 million ha under rice in earlier baseline material, much of it rainfed, with average productivity around 1.3 t/ha in that reference. It identifies drought, gall midge and bacterial leaf blight among constraints and recommends improved, drought-tolerant and resistant varieties. [1]

- Create a 'Rice Productivity and Quality Mission' combining improved varieties, seed replacement, balanced nutrition, direct-seeded/water-saving options where suitable, mechanisation and integrated pest management.
- Develop premium Chhattisgarh rice brands around aromatic, specialty, indigenous and nutritionally differentiated rice.
- Expand milling efficiency, grading, parboiling, rice bran utilisation, broken-rice processing and rice-based food products.
- Use remote sensing and crop surveys to identify low-yield uplands where diversification provides better returns.
- Link procurement policy with quality, storage, milling and market diversification rather than only raw paddy volume.
- Develop rice straw markets for fodder, bioenergy, mushroom cultivation, packaging materials and other circular uses.

The 2047 target should be a higher-value rice economy with lower production risk and substantially higher value per tonne, rather than simply a larger procurement quantity.

8. Rice-Fallow Transformation

Rice-fallow agriculture is arguably the largest near-term land-use opportunity in the state. ICAR has specifically identified greening rice fallows in Chhattisgarh with pulses and oilseeds as a route to bridge demand gaps, increase farm income and improve resource use. [10]

The state should create a Rice-Fallow Transformation Mission with satellite identification, soil-moisture classification and district-level crop menus. The first principle is to match crops to residual moisture; the second is to provide short-duration varieties, seed drills, timely seed supply, pest management and assured market linkage.

Rice-fallow segment	Suitable interventions	Support package
Residual moisture adequate	Chickpea, lentil, field pea	Seed + drill + extension + procurement
Light soils / short window	Linseed, mustard, pulses	Short-duration varieties + moisture conservation
Bund/wide-bund land	Pigeonpea and intercropping	Bund management + seed + demonstrations
Irrigated fallow	Vegetables, maize, pulses	Micro-irrigation + market/processing
Tribal/remote areas	Millets, pulses, oilseeds	Local seed systems + aggregation

The state should aim to bring at least 2 million ha of currently underutilised post-rice land into productive rabi or relay systems by 2047, subject to water, soil and ecological suitability. A 2030 milestone of 1 million ha can be used for programme mobilisation and verification. These are proposed planning targets.

9. Pulses: Food, Nutrition and Income Security

Pulses should become a strategic crop family rather than a residual rabi option. ICAR has identified chickpea, lentil and pigeonpea opportunities in Chhattisgarh, including conversion of rice-fallow and bund areas. [1]

Priority crops should include chickpea, lentil, pigeonpea, blackgram and greengram, with location-specific inclusion of field pea and other legumes. The research agenda should focus on short-duration, drought-tolerant, disease-resistant, machine-harvestable and nutritionally improved cultivars.

- Create pulse seed hubs in major districts with breeder-foundation-certified seed multiplication pipelines.
- Promote seed drills and mechanised sowing in rice fallows.
- Build disease diagnostics and integrated wilt/root-rot management.
- Develop procurement and processing clusters for dal, roasted pulses, pulse flour and ready-to-cook products.
- Promote pulse-based cropping in wide rice bunds and suitable uplands.
- Link pulses with nutrition programmes and institutional procurement.

A state Pulse Mission should set district-wise production and value targets rather than only area targets. The success metric should be additional net income generated from previously idle land and reduced dependence on imported pulses.

10. Oilseeds and Edible-Oil Opportunity

Oilseeds offer Chhattisgarh a strong diversification opportunity because the crop portfolio can fit residual-moisture and rainfed systems. Rapeseed-mustard, soybean, groundnut, sesame, niger and sunflower can be organised into agro-ecological clusters.

The strategy should prioritise yield, oil quality, disease resistance, mechanisation and processing. Mustard and soybean require stronger disease surveillance; groundnut requires seed and post-harvest quality; sesame and niger can be positioned as niche health oils; sunflower can be tested in suitable irrigated/rainfed niches.

Value-chain layer	2047 direction
Production	Higher-yielding, climate-resilient varieties and precision agronomy
Seed	District seed hubs and local multiplication
Mechanisation	Small-plot seeders, harvesters and threshers
Processing	Village/cluster expellers, solvent/advanced processing where viable
Branding	Chhattisgarh cold-pressed and specialty edible oils
By-products	Oilcake for feed; biomass circularity
Market	Institutional + retail + e-commerce + inter-state trade

A Chhattisgarh Edible Oil Security Programme should combine productivity with processing. Farmer collectives should be supported to retain a greater share of value from oilseed cultivation.

11. Millets and Traditional Crops

Kodo, kutki and ragi are strategically important for nutrition, climate resilience, tribal livelihoods and differentiated markets. State programmes already promote millets, while field-level reports indicate growing interest in kodo due to market demand and perceived low-input suitability. [11,12]

The 2047 objective should be to move from raw millet marketing to a complete millet ecosystem: quality seed, decentralised processing, dehulling, grading, flour, ready-to-cook foods, snacks, institutional nutrition, functional foods and export niches.

- Establish district millet seed banks with farmer-participatory selection.
- Develop standard protocols for dehulling, milling and shelf-life.
- Build women-led millet processing enterprises.
- Create a 'Chhattisgarh Millets' identity with traceability and quality standards.
- Integrate millets into school meals, hostels and public nutrition programmes where appropriate.
- Promote climate-risk mapping to identify areas where millet substitution reduces production risk.

The state should protect indigenous germplasm while simultaneously improving modern varieties. Traditional knowledge should be documented through community seed systems and benefit-sharing mechanisms.

12. Horticulture: The High-Value Growth Engine

Horticulture should become one of the main engines of agricultural value growth because fruits, vegetables, spices, flowers and plantation crops generally generate greater value per hectare than staple cereals when production, storage and marketing systems function well. Nationally, horticulture already accounts for roughly one-third of agricultural GVA according to the Economic Survey. [13]

Chhattisgarh has diverse agro-climatic niches suitable for mango, guava, litchi, papaya, banana, jackfruit, tomato, onion, chilli, turmeric and other crops. District ODOP mapping already identifies several horticulture and food-product specialities, providing a platform for cluster development. [14]

Cluster type	Priority interventions
Fruit clusters	Planting material + orchards + drip + packhouse + processing
Vegetable clusters	Protected cultivation + irrigation + aggregation + cold chain
Spice clusters	Quality planting material + drying + grading + residue management
Tribal horticulture	Mango/jackfruit/tamarind/custard apple and local crops + processing
Urban/peri-urban	Protected vegetables + dairy + direct marketing

The major constraint is perishability. Every horticulture expansion programme must therefore include grading, packhouses, reefer logistics, cold storage, processing and market contracts. Area expansion without post-harvest planning should not be supported.

13. Livestock: Dairy Transformation

Milk production in Chhattisgarh increased from 11.82 lakh tonnes in 2014-15 to 20.76 lakh tonnes in 2024-25, according to the Ministry of Fisheries, Animal Husbandry and Dairying. This demonstrates the sector's growth potential. [15]

The next stage is productivity and value capture: better genetics, animal nutrition, fodder, preventive healthcare, clean milk, collection, chilling, processing and branded dairy products.

- Create district dairy clusters linked to milk routes and chilling capacity.
- Expand artificial insemination and genomic/record-based breeding where economically appropriate.
- Develop fodder corridors using crop residues, perennial fodder, silage and community fodder resources.
- Strengthen mobile veterinary services, vaccination, disease surveillance and digital animal identification.
- Promote women-led dairy producer groups with transparent milk testing and payment.
- Build value-added products: curd, paneer, ghee, flavoured milk, indigenous fermented products and institutional supply.

The dairy strategy should avoid a purely animal-number approach. The core metric should be milk yield per productive animal, feed conversion, disease-free days, price received per litre and household net dairy income.

14. Goat, Sheep, Pig and Backyard Livestock

The 20th Livestock Census recorded substantial cattle, goat and pig populations in Chhattisgarh. A state livestock-development compendium reports approximately 99.84 lakh cattle, 40.05 lakh goats and 5.27 lakh pigs in 2019, with distinct growth patterns across species. [16,17]

Small ruminants and pigs can be particularly important for land-constrained households because they convert local biomass into marketable animal protein and can provide liquidity during crop stress.

Enterprise	Priority strategy
Goatery	Breed improvement + health + fodder + producer groups + meat value chain
Pig farming	Improved breeds + biosecurity + feed + market infrastructure
Sheep	Breed selection + pasture/fodder + health + aggregation
Backyard poultry	Improved germplasm + vaccination + feed + local branded eggs/meat
Duckery	Integrated rice–fish–duck systems in suitable areas

Livestock missions should be designed as enterprise systems. Each beneficiary package should include production, veterinary support, feed, finance, insurance and market linkage. Women's SHGs can be major delivery partners.

15. Fisheries and Aquaculture

Fisheries is already one of the state's strongest allied-sector growth stories. Fish production increased from 5.72 lakh metric tonnes in 2019-20 to 8.73 lakh metric tonnes in 2024-25, while fish seed production increased from 288 crore to 583 crore. The state also has sanctioned hatcheries, feed plants, ponds, cages, biofloc and RAS infrastructure under PMMSY. [15,18]

The 2047 strategy should move from expansion of production to productivity, species diversification, feed efficiency, biosecurity, cold chain, processing and market access.

- Increase pond productivity through scientific stocking, feed management and water quality monitoring.
- Expand reservoir cage culture only after carrying-capacity assessment and ecological safeguards.
- Scale biofloc/RAS where electricity, technical skill and market conditions support viability.
- Strengthen hatchery quality and genetic improvement of cultured species.
- Develop fish feed and local feed ingredient value chains.
- Establish ice plants, insulated transport, cold rooms and hygienic fish markets.
- Promote fish processing, ready-to-cook products and institutional marketing.

Fishery development should also integrate pond renovation, water conservation and livelihood diversification. Fish ponds can become nodes for integrated crop–fish–duck–vegetable systems where technically appropriate.

16. Poultry and Egg Economy

Poultry can generate frequent cash flow and is particularly suitable for women and youth enterprises. The roadmap should support both commercial clusters and backyard poultry, recognising that their economics, genetics, biosecurity and markets differ.

- Establish disease-free chick supply and vaccination systems.
- Develop feed efficiency and local feed ingredient research.
- Promote improved backyard poultry suitable for tribal and low-input systems.
- Create egg collection, grading and cold-chain systems.
- Encourage producer-owned mini processing and branded poultry products.
- Build trained rural poultry service providers for vaccination, brooding and farm management.

Commercial poultry should be concentrated near reliable feed, transport and markets, while backyard systems should be embedded in livelihood and nutrition programmes. Biosecurity and disease surveillance must be non-negotiable.

The state can also develop an 'Egg Nutrition and Enterprise Mission' linking women's groups, school/institutional procurement and local production. Procurement should remain transparent and competitive while building reliable local demand.

17. Integrated Farming Systems

The central farm-level model for smallholders should be diversified integrated farming rather than dependence on a single annual crop. A representative system can combine rice/pulses + vegetables + dairy/goat + poultry + fish + compost + agroforestry, with the exact combination determined by land, water and market conditions.

Farm resource	Possible conversion into income
Rice straw	Fodder, mushroom, compost, bioenergy
Farm pond	Fish + irrigation + duckery
Livestock manure	Compost, biogas, bio-slurry
Boundary land	Fruit trees, timber, fodder, spices
Kitchen/household waste	Compost/biogas
Crop residues	Feed, mushroom substrate, pellets
Women's labour/time	Processing, nursery, poultry, dairy, value addition

Every district should establish 20–50 model integrated farming clusters representing local conditions. Economic accounting should record gross returns, paid-out cost, family labour, risk and resource-use efficiency. Successful models should be scaled through FPOs and KVKs.

The aim is not to prescribe a single 'integrated farming model' but to create a menu of validated systems with clear enterprise budgets.

18. Agroforestry, Forestry and Farm Biomass

Chhattisgarh's forest resources and rural dependence on biomass create an opportunity for a bioeconomy that links agriculture, forestry, livestock and processing. Agroforestry can provide timber, fruit, fodder, fuelwood, carbon and ecological services while diversifying farm income.

ICAR identifies agroforestry systems suitable for the Eastern Plateau, including Gmelina and eucalyptus based agri-silvi-horticultural combinations with crops such as mustard, linseed, lentil, okra and bottle gourd. Species choice must be governed by water demand, market, biodiversity and state regulations. [19]

- Map farm boundaries and degraded land suitable for agroforestry.
- Promote multipurpose native and marketable tree species according to site.
- Develop nurseries and quality planting material.
- Create aggregation and primary processing for timber, bamboo, fruit and non-timber forest products.
- Develop carbon and ecosystem-service accounting frameworks without creating speculative farmer liabilities.
- Integrate livestock fodder trees and silvopastoral systems.

For tribal areas, the strategy should strengthen community-based forest produce enterprises, primary processing, grading, storage and branding while protecting customary rights and ecological sustainability.

19. Minor Forest Produce and Tribal Livelihoods

Minor forest produce (MFP) and non-timber forest products are central to many tribal livelihoods. The opportunity is to shift from raw collection to quality-controlled, processed and branded products. Existing district ODOP mapping already identifies tamarind, mahua, chironji and other forest-linked products. [14]

Commodity	Value-addition pathway
Tamarind	Cleaning → deseeding → block/paste → beverage/food ingredients
Mahua	Safe drying → grading → food/feed/non-food products under applicable standards
Chironji	Cleaning → grading → packaging → premium retail
Herbal products	Scientific identification → quality testing → compliant processing
Honey	Quality testing → filtering → bottling → traceable branding
Bamboo	Treatment → engineered products → furniture/packaging

Tribal producer organizations should own processing where feasible. Women's groups should be integrated into grading, processing and packaging. Digital traceability can help establish origin-based brands.

The state should develop a Tribal Agri-Food and Bioeconomy Fund to finance small processing units, cold storage, testing laboratories, packaging and market access in remote districts.

20. Seed Systems and Genetic Improvement

Seed is the first technology delivered to a farm. The roadmap requires a state-wide seed system that links ICAR institutes, IGKV, agricultural universities, KVKs, state seed agencies, private firms and farmer seed producers.

- Map crop-wise seed replacement rates and varietal gaps annually.
- Create breeder-to-certified seed pipelines for rice, pulses, oilseeds, millets and horticultural crops.
- Develop decentralised seed villages and community seed banks for locally adapted varieties.
- Prioritise climate resilience: drought, heat, submergence, disease and pest resistance.
- Strengthen quality control, seed testing and traceability.
- Support rapid multiplication technologies and protected seed production for horticulture.
- Establish pre-release participatory testing with farmers and FPOs.

By 2047, Chhattisgarh should have a globally credible public–private breeding ecosystem for crops of strategic state importance. Breeding objectives should include not only yield but nutritional quality, processing quality, mechanisation suitability and resilience to biotic and abiotic stresses.

Biotic stress management deserves a dedicated state mission because pests and pathogens can rapidly erase productivity gains. Early warning, resistant varieties, diagnostics, biological control and integrated pest management should be built into crop programmes.

21. Soil Health and Nutrient Management

ICAR identifies deficiencies of nitrogen, phosphorus, zinc and boron in the state's red and yellow soils. Soil fertility management should therefore move from blanket fertiliser recommendations to soil-test and crop-specific nutrient management. [1]

- Universalise periodic soil testing through mobile and laboratory networks.
- Create village-level soil health maps and nutrient budgets.
- Promote balanced fertilisation, micronutrients and organic matter management.
- Use crop residues, compost, manure and bio-inputs where agronomically justified.
- Promote legumes and green manuring to improve soil nitrogen and structure.
- Develop site-specific nutrient management tools using digital soil maps.
- Track soil organic carbon and pH as long-term resource indicators.

Natural farming and organic farming should be promoted where evidence, markets and farmer economics support them. The policy should avoid presenting one production system as universally suitable. Instead, farmers should receive evidence-based options and be able to choose systems according to crop, soil, market and risk.

The 2047 objective is not simply 'more organic inputs' but it is healthier soil with higher nutrient-use efficiency, stable yields and lower long-term input risk.

22. Biotic Stress Management and Plant Health

Chhattisgarh's diverse cropping systems and humid monsoon environment create recurring pest and disease risks. Climate change may alter pest ranges, disease pressure and epidemic timing. The state should create an integrated Plant Health Intelligence Network.

Component	Action
Surveillance	District sentinel plots + remote sensing + farmer reports
Diagnostics	Regional labs for pathogen/pest identification
Forecasting	Weather-linked pest/disease models
Biological control	Mass production and quality control
Resistance	Breeding and deployment of resistant varieties
IPM	Crop-specific packages with economic thresholds
Advisory	SMS/app/voice/extension alerts in local languages

A state Plant Health Command Centre should aggregate field observations, weather, crop stage and pest/disease data. Alerts should be localised to village/cluster level and translated into actionable recommendations.

The system should also monitor invasive species, emerging pathogens and pesticide resistance. ICAR–NIBSM and other national institutes can be positioned as strategic partners for diagnostics, surveillance, capacity building and technology validation.

23. Climate-Resilient Agriculture

Climate resilience should be embedded in every programme rather than treated as a separate project. Chhattisgarh agriculture is particularly exposed to rainfall variability because of its large rainfed area. The state climate strategy identifies watershed management, irrigation efficiency, conservation agriculture, agroforestry, weather services, integrated nutrient/pest management and capacity building as relevant adaptation measures. [20]

- Develop district climate-risk calendars and crop advisories.
- Promote drought-, heat-, flood- and disease-resilient varieties.
- Increase soil organic matter and residue retention where suitable.
- Scale farm ponds, check dams, contour measures and water harvesting.
- Expand weather stations and hyperlocal advisories.
- Promote diversified farm portfolios and index/area-yield insurance.
- Create contingency seed reserves for delayed monsoon and extreme events.

The long-term objective is to reduce variance in farm income, not only average yield. A resilient farm with slightly lower peak yield but much lower downside risk may be economically superior to a high-input system with severe climate sensitivity.

24. Precision Agriculture and Digital Farming

Digital crop surveys are already being developed in Chhattisgarh to create a verified source of farmer and crop data. This foundation can evolve into a comprehensive digital agriculture architecture. [8]

The state should develop a farmer-centric digital platform connecting land/crop records, advisories, input authentication, insurance, credit, machinery, market information and service providers while maintaining privacy and data governance.

- Satellite-based crop mapping and yield estimation.
- AI-enabled pest/disease and weather advisories.
- Soil and water sensors in high-value clusters.
- Drone-based scouting and precision application where economically viable.
- Digital farm machinery booking and custom-hiring platforms.
- Digital traceability for export/value-added commodities.
- Outcome dashboards for schemes rather than expenditure-only dashboards.

Technology adoption must be driven by economic return. The state should support shared services and village-level digital entrepreneurs so that smallholders can access technology without owning expensive equipment.

25. Farm Mechanisation and Custom Hiring

Small holdings make individual ownership of specialised machinery uneconomic. The solution is a distributed machinery-service economy. Earlier state data indicate thousands of agricultural machinery service centres have already been established, providing a foundation for expansion. [21]

Machinery need	Service model
Rice transplanting/harvesting	FPO/custom-hiring clusters
Pulse seeders	Village machinery banks
Small plot harvesting	Lightweight multi-crop equipment
Horticulture	Power tillers, sprayers, grading equipment
Dairy	Chaff cutters, milking systems, feed mixers
Post-harvest	Threshers, dryers, graders, packers

Mechanisation should be evaluated through service cost per hectare and timeliness, not machine count. Rural youth can be trained as machinery operators and service entrepreneurs.

A 'Farm Mechanisation as a Service' platform can match demand and equipment across villages. Equipment should be selected for Chhattisgarh's soil, field size, terrain and crop systems rather than imported as generic packages.

26. Post-Harvest Management and Storage

Value is frequently lost after production through poor drying, grading, storage, transport and handling. Chhattisgarh should therefore treat post-harvest infrastructure as productive capital.

- Village-level drying and primary cleaning facilities.
- Scientific warehouses and negotiable warehouse receipt systems.
- Modern rice mills with quality sorting and bran recovery.
- Dal mills in pulse clusters.
- Oilseed cleaning, grading and expelling facilities.
- Cold rooms and packhouses in horticulture clusters.
- Refrigerated and insulated logistics for fish, dairy and meat.
- Quality laboratories for residues, mycotoxins and food safety.

The state should develop commodity-specific post-harvest blueprints. Infrastructure should be located where production density, market demand and logistics justify utilisation. Underutilised assets are a major hidden cost; therefore every project should include an operator, business plan and utilisation target.

27. Food Processing and Agro-Industrialisation

The transition from agricultural economy to agri-industrial economy is essential to capture more value locally. The state industrial policy already identifies food and agricultural commodity processing and minor forest produce/herbal-based businesses as areas for investment. [22]

Priority processing chains include rice, pulses, oilseeds, millets, tomato, tamarind, jackfruit, mango, litchi, turmeric, dairy, fish, poultry and forest produce.

Cluster	Anchor industries	Small enterprise opportunities
Rice	Modern milling, parboiling, rice bran	Snacks, flour, ready foods
Pulses	Dal milling	Roasted/flour/ready-to-cook
Oilseeds	Expelling/refining	Cold-pressed specialty oils
Horticulture	Pulp, puree, dehydration	Pickles, sauces, dried foods
Millets	Dehulling/milling	Nutrition foods/snacks
Dairy	Chilling/processing	Paneer, curd, ghee
Fish	Ice/processing	Fillets, ready-to-cook
MFP	Cleaning/processing	Branded tribal foods

Industrial policy should prioritise local raw material linkage, farmer ownership, energy efficiency, water reuse and employment. Mega projects should be complemented by hundreds of viable small and medium processing enterprises.

28. Branding, Marketing and Exports

Chhattisgarh has a strong portfolio of geographical, cultural and ecological identities: aromatic rice, black rice, millets, tamarind, mahua-linked products, turmeric, jackfruit, litchi, tomato products and other district specialities. The state's ODOP platform already identifies district-specific products. [14]

The 2047 marketing strategy should build a common quality-and-traceability architecture under which commodity brands retain their distinct identities.

- Develop a 'Chhattisgarh Agri & Natural Products' umbrella identity.
- Use quality grades, testing and traceability as market differentiators.
- Build producer-owned brands through FPOs and cooperatives.
- Support e-commerce and institutional procurement.
- Develop export cells for selected commodities with stable surplus.
- Train enterprises in packaging, labelling, food safety and contract management.
- Use state trade fairs and buyer–seller meets strategically.

Export strategy should focus on products where the state can meet consistent quality and supply rather than chasing every possible market. Domestic premium markets are equally important and may provide lower regulatory complexity.

29. Agricultural Finance, Insurance and Risk Management

Agricultural transformation requires patient capital. Credit should shift from seasonal crop loans alone toward investment finance for irrigation, livestock, fisheries, orchards, processing, machinery and renewable energy.

Financial instrument	Use
KCC/working capital	Seasonal crop and allied operations
Term loans	Dairy, fisheries, orchards, machinery
Credit guarantee	FPO/SME processing enterprises
Interest support	Strategic infrastructure with measurable outcomes
Insurance	Yield, weather, livestock and fisheries risk
Warehouse receipts	Post-harvest liquidity
Blended finance	Remote/tribal and climate-resilient infrastructure
Venture/innovation fund	Agri-tech and bioeconomy startups

Insurance should become a portfolio risk-management tool. Digital crop surveys can improve underwriting and claims. The state should encourage bundling of insurance with quality seed, advisory and credit rather than treating insurance as a standalone financial product.

A Chhattisgarh Agriculture Transformation Fund can crowd in private, cooperative and development finance for high-priority value chains.

30. Farmer Producer Organisations and Cooperatives

FPOs and cooperatives should become the market-facing operating units of the roadmap. Their role should be commercial: aggregate inputs, deliver services, manage quality, operate primary processing, negotiate contracts and build brands.

- Commodity-specific FPO clusters rather than generic multi-commodity entities where feasible.
- Professional CEOs/managers with transparent accounting.
- Digital bookkeeping and transaction records.
- Working-capital facilities linked to confirmed procurement/marketing.
- Shared logistics and processing assets.
- Women and tribal producer organisations in priority districts.
- Performance-linked support based on turnover, member income and profitability.

The state should publish an annual FPO health index based on member participation, turnover, margins, repayment, value addition and income improvement. The objective is fewer dormant entities and more economically viable institutions.

31. Women in Agriculture and Rural Enterprise

Women perform major roles in crop production, livestock, processing, seed management and household food systems, but ownership and decision-making often remain limited. The roadmap should therefore move from women as beneficiaries to women as enterprise owners.

- Women-led dairy, poultry, goatery and fish producer groups.
- Women-owned millet and MFP processing units.
- Digital and bookkeeping training.
- Mechanisation that reduces drudgery.
- Credit products designed around enterprise cash flows.
- Women as village-level para-veterinarians, seed entrepreneurs and agri-advisers.
- Procurement channels for women-owned food enterprises.

Every major scheme should report gender-disaggregated ownership, income and leadership—not merely beneficiary numbers.

The 2047 goal is a substantial increase in women's share of agricultural and allied enterprise ownership and formal market participation.

32. Tribal and Aspirational-District Strategy

Tribal regions should not be treated as peripheral agricultural zones. Their biodiversity, traditional crops, forest resources and community institutions can become strategic assets in the 2047 bioeconomy.

Priority interventions include millets, pulses, horticulture, goats, backyard poultry, fisheries, MFP, lac, honey, medicinal plants, agroforestry, community seed systems and local processing.

- Village-level livelihood portfolios rather than single-crop schemes.
- Local-language extension and tribal knowledge documentation.
- Community-owned processing and aggregation.
- Improved road, digital and cold-chain connectivity.
- Nutrition-sensitive agriculture.
- Special financing windows for remote enterprises.
- Ecological safeguards for forest and watershed systems.

Remote districts require higher transaction-cost support during the transition. The goal is not permanent subsidy dependence but viable local enterprises with better market access.

23. Youth, Skills and Agri-Entrepreneurship

Agriculture 2047 will need technicians, data analysts, machinery operators, drone service providers, food technologists, veterinarians, para-vets, fish technicians, nursery managers, cold-chain professionals and rural business managers.

Skill cluster	Example enterprise
Digital agriculture	Crop mapping/advisory service
Mechanisation	Custom-hiring centre
Horticulture	Nursery/precision irrigation
Livestock	Para-vet/feed/fodder service
Fisheries	Pond management/hatchery service
Food processing	Micro-processing unit
Logistics	Aggregation/cold-chain service
Quality/testing	Sampling and traceability service

Create district Agri-Skill and Enterprise Hubs linked to KVKs, universities, ITIs, polytechnics and private industry. Training should be competency-based and include business plans, bookkeeping, digital payments, food safety and customer acquisition.

A state Rural Agri-Startup Challenge can annually identify scalable technologies and business models and provide field-validation support.

34. Research, Education and Innovation Architecture

The research system should be aligned with the 2047 mission. ICAR institutes, IGKV, KVKs, agricultural universities, biotechnology institutions and private R&D should jointly define a state agricultural research agenda.

- Create a Chhattisgarh Agricultural Innovation Council.
- Annual challenge grants for priority problems.
- Multi-location trials across the three agro-climatic zones.
- Participatory varietal selection with farmers.
- Fast-track validation of proven technologies.
- Research on biotic stress, climate resilience, water productivity and post-harvest technology.
- Data-sharing protocols among research and departments.

Priority research themes should include rice diversification, pulses/oilseeds, millets, horticulture, plant health, livestock genetics, fish productivity, natural-resource management, carbon and circular bioeconomy, digital agriculture and food processing.

Research impact should be measured through adoption, income, productivity, resilience and commercialisation—not publication count alone.

35. Extension Reform: From Advice to Decision Support

The extension system should become a continuous decision-support service. Farmers need timely information at crop stage, not only periodic training.

- Village advisory calendars linked to weather and crop stage.
- Local-language voice and WhatsApp/SMS services.
- KVK and FPO demonstration clusters.
- Lead farmer and rural service-provider networks.
- Digital content libraries with validated recommendations.
- Feedback loops from farmers to researchers and departments.

Extension should increasingly use 'train the service provider' models. One well-trained rural entrepreneur can serve hundreds of farms with machinery, soil testing, spraying, veterinary or fishery services.

The state should measure extension through adoption and outcome indicators: technology adoption, yield gap reduction, input-use efficiency and farmer income.

36. District Agricultural Transformation Plans

Every district should prepare a five-year Agricultural and Allied Transformation Plan nested within the 2047 roadmap. Plans should begin with a resource and market diagnosis and end with investment-ready projects.

Planning step	Output
Resource mapping	Soil, water, climate, land capability
Livelihood mapping	Farm types and income sources
Market mapping	Demand, price, processors, logistics
Gap analysis	Yield, infrastructure, skills, finance
Commodity selection	3–5 priority value chains
Project pipeline	Bankable investments
Outcome targets	Income, productivity, value addition
Review	Annual dashboard + 5-year independent evaluation

District plans should be prepared jointly by agriculture, horticulture, animal husbandry, fisheries, forestry, rural development, water resources, industries, universities, KVKs and farmer organisations. This integrated planning is essential because value chains cross departmental boundaries.

37. Phase I: Foundation and Acceleration, 2026–2030

The first phase should focus on fixing foundational constraints and demonstrating visible income gains.

- Complete verified farmer/crop/irrigation datasets.
- Launch Rice-Fallow Transformation Mission.
- Prepare district value-chain plans.
- Expand quality seed and soil testing systems.
- Modernise irrigation command areas and water budgeting.
- Scale dairy, goatery and fishery service networks.
- Establish horticulture packhouse and cold-chain clusters.
- Professionalise high-potential FPOs.
- Create Agriculture Transformation Fund.
- Launch Plant Health Intelligence Network.
- Establish Agri-Skill and Rural Enterprise Hubs.
- Create 100–200 demonstration clusters for integrated farming and climate resilience.

Illustrative 2030 targets: at least 1 million ha of additional rice-fallow utilisation; meaningful expansion of assured rabi irrigation; 25–30% increase in productivity in priority crops; substantial reduction in post-harvest losses in selected commodities; and measurable improvement in real farm income. Final numerical targets should be calibrated after a 2026 baseline survey.

38. Phase II: Scale and Value Addition, 2031–2040

The second phase should shift the centre of gravity from basic productivity to value chains and enterprise scale.

- Large-scale horticulture and high-value crop clusters.
- Major expansion of dairy and fish processing.
- Statewide pulse/oilseed processing network.
- Integrated cold chain for perishables.
- Export-oriented quality systems.
- AI-enabled advisories and digital traceability.
- Advanced breeding and biotechnology pipelines.
- Carbon-smart and water-efficient agriculture.
- Large-scale agroforestry and biomass utilisation.
- Professional rural service enterprises.

By 2040, the state should have a mature network of producer organisations, processing enterprises, cold chains and market platforms. Agricultural growth should increasingly be driven by productivity, diversification and value addition rather than area expansion.

The second phase should also include a mid-course review in 2035, allowing targets and commodity priorities to change as markets, climate and technology evolve.

39. Phase III: Global Competitiveness and Bioeconomy, 2041–2047

The final phase should consolidate Chhattisgarh as a high-value agricultural and bio-resource economy.

- Globally competitive specialty rice, millet, pulse, oilseed, horticulture and natural products.
- Advanced food processing and nutraceutical/functional-food industries subject to regulatory standards.
- High-productivity dairy, fishery and livestock value chains.
- Digital twin/AI-supported agricultural planning.
- Large-scale circular biomass and bioenergy systems.
- Agroforestry and ecosystem-service markets with robust safeguards.
- Export-quality testing and traceability infrastructure.
- Research-driven rural innovation clusters.
- High-skilled rural employment.

The 2047 agriculture economy should be less dependent on raw commodity sales and more dependent on knowledge, processing, branding, genetics, services and intellectual property. This is the route by which a predominantly agrarian state can create high-value rural employment while protecting its natural-resource base.

40. Indicative 2047 Targets and KPI Framework

The following targets are proposed planning ambitions. They should be finalised after a comprehensive 2026 baseline and reviewed every five years.

Indicator	2026 baseline direction	2030	2040	2047
Agriculture/allied real value	Baseline established	+20–25%	+60–70%	~2× baseline
Rice-fallow productive area	Baseline mapping	+1 M ha	+1.5–2 M ha	2 M+ ha
Net/assured irrigation	~23% cultivated (ICAR reference)	Significant expansion	Major expansion + efficiency	High reliability in viable zones
Cropping intensity	~119% reference	130%+	145%+	160%+ where water permits
High-value/allied income share	Baseline survey	+10 pp	+25 pp	Majority of incremental income
Value-added marketed output	Baseline survey	20%+	35%+	50%+
Farm income volatility	Baseline survey	-15%	-30%	-50%
FPO economically active members	Baseline audit	2×	4×	Institutionalised
Fish production	8.73 LMT (2024–25)	10+ LMT	14+ LMT	18+ LMT*
Milk production	20.76 LMT (2024–25)	25+ LMT	35+ LMT	50+ LMT*

*Indicative planning ambitions, not forecasts. Species mix, resource carrying capacity and market demand must be considered.

41. Investment Priorities and Financing Architecture

Agricultural transformation will require public investment, private capital, cooperative finance and blended finance. Public money should concentrate on public goods and market failures; private capital should increasingly fund commercially viable processing and services.

Investment block	Priority
Water	Watersheds, command areas, micro-irrigation, recharge
Farm productivity	Seed, soil, mechanisation, plant health
Allied sectors	Breeding, veterinary, fish infrastructure, feed
Post-harvest	Warehouses, cold chains, packhouses
Processing	Cluster plants, common facility centres
Digital	Data platforms, sensors, advisory
Research	Breeding, biotechnology, climate and food tech
Skills	Agri-service and enterprise hubs
Remote areas	Blended finance + viability gap support

A dedicated Agriculture Transformation Fund could pool state allocations, central schemes, development finance, CSR where appropriate, private investment and climate finance. Projects should be selected through transparent economic and environmental criteria.

Each major public asset should have an operating model and utilisation plan. Capital expenditure without maintenance and professional management should be avoided.

42. Institutional Governance

A high-level 'Chhattisgarh Agriculture and Allied Transformation Council' should oversee the roadmap, chaired at the appropriate senior level of government, with agriculture, horticulture, animal husbandry, fisheries, forestry, water resources, rural development, industries, finance, planning, universities, ICAR institutions and farmer representatives.

- State Council: policy, investment and interdepartmental coordination.
- Mission Directorate: programme management and dashboard.
- District Transformation Cells: project execution and convergence.
- Scientific Advisory Board: technology and research priorities.
- Farmer Advisory Forum: field feedback and institutional accountability.
- Independent Evaluation Unit: outcome and impact assessment.

The mission directorate should maintain a public-facing dashboard with annual targets and outcomes. Departmental silos should be reduced through pooled outcome budgets for cross-cutting missions such as rice fallows, horticulture, dairy, fisheries, water productivity and food processing.

43. Data, Monitoring and Evaluation

The roadmap requires a robust measurement architecture. Existing crop-survey and digital systems can become the foundation of a state agricultural data platform. [8]

Dashboard layer	Core indicators
Farm	Area, crop, yield, input use, income
Water	Irrigation reliability, water use, groundwater
Market	Farm-gate price, spreads, volumes
Value chain	Processing capacity, utilisation, value addition
Allied	Milk, eggs, meat, fish, livestock health
Climate	Rainfall, extremes, crop loss
Inclusion	Women, tribal, smallholder participation
Environment	Soil carbon, nutrient balance, biodiversity
Finance	Credit, insurance, investment
Innovation	Technology adoption and R&D impact

A baseline survey in 2026–27 should establish farm household income by income source, production cost, crop profitability, allied-sector contribution, irrigation reliability and post-harvest losses. Without this baseline, claims about 'doubling income' or transformation cannot be rigorously evaluated.

Independent evaluations should be conducted every five years, with public release of findings and adjustment of targets.

44. Risk Register and Mitigation

Risk	Potential effect	Mitigation
Climate extremes	Yield/income shocks	Diversification + water + resilient varieties + insurance
Over-expansion of water-intensive crops	Groundwater/resource stress	Water budgeting + crop suitability
Price volatility	Income instability	Processing + storage + contracts + market diversification
Fragmented institutions	Slow execution	Mission-mode governance
Weak FPOs	Low market capture	Professional management + working capital
Underused infrastructure	Fiscal waste	Business plans + utilisation-linked support
Pest/disease outbreaks	Rapid crop losses	Surveillance + diagnostics + resistant varieties
Food-safety failure	Market/reputation loss	Testing + traceability
Technology exclusion	Inequality	Shared service models
Ecological degradation	Long-term productivity loss	Landscape planning + safeguards

The roadmap should include a formal annual risk review. New risks—emerging pests, invasive species, commodity shocks, trade restrictions, water scarcity, technology disruption—should be incorporated into rolling five-year plans.

45. Flagship Missions for 2047

Ten flagship missions can provide a simple organising framework for implementation.

Mission	Core purpose
1. Rice + Rice-Fallow Mission	Secure rice productivity and convert suitable fallows
2. Water Productivity Mission	More income per unit of water
3. Pulse & Oilseed Mission	Food/oil security and diversification
4. Horticulture Value Mission	High-value crops + cold chain
5. Livestock Prosperity Mission	Dairy, goat, pig, poultry
6. Blue Rural Economy Mission	Fish production + processing
7. Millet & Tribal Bioeconomy Mission	Nutrition, indigenous crops, MFP
8. Plant Health Mission	Pest/disease intelligence and resilience
9. Food Processing Mission	Local value addition and jobs
10. Digital & Agri-Innovation Mission	Data, AI, research, skills

Each mission should have a five-year investment plan, district targets, a mission director, scientific partners, FPO participation and measurable outcome indicators.

46. First 1000 Days: Immediate Action Agenda

The first 1000 days determine whether the 2047 roadmap becomes an implementation programme or remains a policy document.

- Approve the Agriculture & Allied Transformation Mission and governance structure.
- Commission a 2026 baseline of farm income, land use, irrigation, productivity and value chains.
- Prepare district agricultural transformation plans.
- Launch statewide rice-fallow mapping and pilot 1 million ha programme.
- Identify 25–50 priority horticulture, dairy, fisheries, pulse, oilseed and millet clusters.
- Audit all existing agricultural infrastructure for utilisation and financial viability.
- Create a unified agriculture data architecture using crop survey and land records.
- Launch state Plant Health Intelligence Network.
- Create Agriculture Transformation Fund and project preparation facility.
- Establish Agri-Skill Hubs and rural service-provider training.
- Select 100 model integrated farming clusters.
- Begin five-year outcome-based budgeting.

The first 1000 days should produce visible results in farmer income and service delivery. The roadmap should not wait for all long-term infrastructure to be completed before delivering quick wins.

47. District-Level Commodity Opportunity Matrix

The state's ODOP platform already provides a useful starting point for district-specific enterprise planning. The matrix below is illustrative and should be refined with production, market and infrastructure data. [14]

Region/cluster	Potential anchors	Supporting enterprises
Raipur–Durg belt	Rice, vegetables, dairy, processing	Packaging, logistics, machinery
Dhamtari–Mahasamund	Rice, pulses, fisheries	Milling, cold chain
Bemetara–Balod	Rice, pulses, oilseeds	Seed, machinery, processing
Rajnandgaon–Kabirdham	Soybean, rice, horticulture, sugarcane products	Oil, jaggery, food processing
Bilaspur–Mungeli	Rice, groundnut, black rice	Oil, specialty rice
Bastar–Kondagaon	Millets, tamarind, horticulture, MFP	Tribal processing, branding
Dantewada–Sukma–Bijapur	Millets, MFP, horticulture, fisheries	Local processing, cold chain
Surguja–Jashpur	Litchi, jackfruit, turmeric, potato, livestock	Packhouses, processing
Koriya–Surajpur	Tomato, turmeric, potato, pulses	Dehydration, cold storage
Gariaband–Dhamtari	Rice, MFP, horticulture, fisheries	Processing, eco-value chains

The final district plans should select a limited number of high-potential value chains rather than attempting to promote every commodity everywhere.

48. Conclusion: Chhattisgarh Agriculture @ 2047

By 2047, the objective should be a fundamental change in the structure of rural prosperity. The farmer should no longer depend on one crop, one season or one market. A typical farm household should be able to combine crop production with one or more allied enterprises, supported by reliable water, digital advisories, quality seed, mechanisation services, insurance, storage and organised markets.

The state's natural strengths—rainfall, land, forests, biodiversity, rice diversity, traditional crops, livestock, water bodies and a large rural workforce—can support a much larger agricultural economy if transformed into value rather than merely volume.

The strategic equation is straightforward:

VALUE OF AGRICULTURE = PRODUCTIVITY × CROPPING INTENSITY × DIVERSIFICATION × PRICE REALISATION × VALUE ADDITION × RESILIENCE

No single department can deliver this transformation. Agriculture must connect with water, rural development, industry, logistics, finance, science, education, tribal development, women's empowerment and digital infrastructure.

The roadmap therefore recommends a mission-mode, science-led and farmer-centred approach. If the state systematically closes its yield gaps, uses rice fallows, expands water productivity, builds allied sectors, creates processing and brands, strengthens producer institutions and invests in research and human capital, Chhattisgarh can enter 2047 with a substantially more diversified, resilient and prosperous rural economy.

The final roadmap should be treated as a living document: baseline in 2026–27, five-year implementation plans, annual dashboards, independent evaluations and periodic recalibration to climate, technology and market conditions.

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Data-use note:

This roadmap deliberately distinguishes documented baseline statistics from proposed 2047 planning targets. Baseline numbers come from sources available as of October 2026; where sources use different years or definitions, the roadmap retains the source wording rather than creating false precision. Before formal adoption, the Government of Chhattisgarh should validate all baseline

values against the latest Economic Survey, Directorate of Economics & Statistics, Agriculture, Horticulture, Animal Husbandry, Fisheries, Water Resources and Forest Department datasets.

Recommended next step:

Convert this strategic roadmap into a Government-style Detailed Action Plan with district-wise targets, department-wise responsibilities, year-wise financial requirements and a 2026–30 implementation matrix.

50. Our experiences during VKSA

ICAR-NIBSM Leads the Charge in Empowering Chhattisgarh's Farmers under Viksit Krishi Sankalp Abhiyan

The ICAR–National Institute of Biotic Stress Management (NIBSM), Raipur, has played a pivotal role in the successful implementation of the Viksit Krishi Sankalp Abhiyan (VKSA) in Chhattisgarh. The campaign, held from 29th May to 12th June 2025, marked a significant milestone in India's ongoing efforts to transform its agricultural sector through science-led, farmer-centric outreach.

The inaugural event in Chhattisgarh took place at Bhainsa village, Arang block, Raipur, and was graced by Hon'ble Chief Minister Shri Vishnu Deo Sai, Union Minister of State Shri Tokhan Sahu, State Agriculture Minister Shri Ram Vichar Netam, and other key dignitaries. The event witnessed the active participation of thousands of farmers, symbolizing a collective commitment to inclusive agricultural growth.

Dr. P. K. Rai, Director of ICAR-NIBSM and Nodal Officer for VKSA in Raipur, spearheaded the institute's initiatives under this national campaign. With the support of 18 scientists from ICAR-NIBSM and collaboration with 10 Krishi Vigyan Kendras (KVKs), the campaign reached 1,368 villages across 9 districts, directly engaging over 9,900 farmers, including more than 2,100 women.

Empowering Farmers through Knowledge and Demonstrations

Throughout the campaign, ICAR-NIBSM scientists delivered practical training and demonstrations on sustainable and climate-resilient farming practices. These included:

- Biotic stress management
- Seed treatment and use of quality seeds
- Soil testing and health management
- Biofertilizers, biopesticides, and biocontrol agents
- Natural and organic farming techniques

One of the key highlights was the practical demonstration of Beejamrit and Jeevamrit, vital components of natural farming. Farmers were also introduced to intercropping, vermicomposting, biofloc and backyard ornamental fish farming, light traps, nano urea/DAP usage, and drone-based input application. Moreover, innovative crops like dragon fruit and practices like artificial insemination for livestock improvement were promoted.

Awareness materials, including Krishi Panchang, leaflets, and booklets on farm machinery, crop insurance schemes, and irrigation technologies (e.g., drip irrigation) were widely disseminated.

Identifying Ground-Level Challenges

While the campaign made a significant impact, it also highlighted several challenges that farmers continue to face:

- Limited awareness about improved seed varieties and government schemes.
- Overdependence on chemical fertilizers, leading to soil degradation.
- Shortage of organic inputs and dysfunctional Gouthans affecting vermicomposting.
- Inadequate access to soil health cards and mobile veterinary services.
- Labor shortages and limited subsidy for fencing to prevent crop damage.

In response to these insights, farmers requested better access to organic inputs at Panchayat level, timely distribution of seed kits, and enhanced implementation of flagship schemes like PMFBY, PMKSY, and KCC.

Collective Vision for a Viksit Bharat

In a press briefing, Dr. P.K. Rai emphasized the need for two-way communication between scientists and farmers. He called on the media to amplify VKSA's reach and ensure that scientific knowledge transforms into field-level action. “Our goal is to empower farmers with science, technology, and timely information, helping them increase productivity and improve livelihoods,” he said.

VKSA has proven to be a model for convergence between ICAR institutes, KVKs, State Agriculture Departments, and Indira Gandhi Krishi Vishwavidyalaya (IGKV). The collaborative approach under the guiding vision of 'One Nation, One Agriculture, One Team' showcases how synergy between institutions and communities can lead to a Viksit Krishi and a Viksit Bharat.

The way forward includes institutionalizing farmer feedback, improving last-mile delivery of inputs, digital advisory services, and sustained capacity building. With continued focus and commitment, ICAR-NIBSM and its partners are poised to make Chhattisgarh a beacon of sustainable and resilient agriculture.

Farmers' Expectations from Research Institutes

Farmers have expressed a clear set of expectations from agricultural research institutions to address pressing challenges in crop productivity and sustainability. One of the key demands is the screening and development of high-performing varieties suitable for organic and natural farming systems. Additionally, there is a strong need for identifying high-yielding varieties under Direct Seeded Rice (DSR) that can ensure effective weed management. Addressing weed challenges in organic and natural farming also remains a priority, requiring innovative, chemical-free management strategies.

Farmers are particularly concerned about the management of Yellow Mosaic Virus (YMV) infestation in summer-grown green gram and black gram, and they have called for timely solutions. The unavailability of suitable harvesters for pulse crops has forced the use of herbicides like paraquat and glyphosate—an issue that farmers believe should be mitigated by developing appropriate harvesting equipment. Moreover, there is a pressing need to evolve strategies to manage false smut disease in rice, which is emerging as a serious yield threat.

Chickpea growers have emphasized the importance of developing heat-tolerant varieties that also possess resistance to fusarium wilt and dry root rot. Similarly, the development of climate-resilient soybean varieties that can withstand major pests and diseases is essential to sustain productivity in the face of climate variability. Pigeon pea farmers have urged the development of varieties that are adaptive to micro-climatic conditions, given the strong genotype-environment interactions in the crop. Lastly, farmers have highlighted the urgent need for groundnut varieties resistant to root rot and sterility mosaic virus to secure stable yields and reduce crop losses.

These expectations, if addressed through participatory and location-specific research, can lead to tangible improvements in crop productivity, environmental sustainability, and farmer livelihoods.

Policy issues identified

Several critical policy issues were highlighted during farmer interactions, reflecting the need for systemic reforms to enhance agricultural outcomes. Soybean farmers, in particular, raised concerns about persistently low mandi prices, escalating input costs, and the proliferation of substandard agro-chemicals in the market. These issues demand urgent attention at appropriate policy and regulatory forums to safeguard farmer interests.

Another significant concern was the lack of cold chain infrastructure in production areas, especially for perishable commodities like fruits and vegetables. This gap contributes to substantial post-harvest losses and limits income potential for producers. Strengthening cold storage and logistics at the village or block level could greatly reduce wastage and enhance marketability.

Farmers also advocated for greater promotion of public sector vegetable hybrids, which can help reduce cultivation costs. The high price of private hybrids often discourages smallholders from diversifying into high-value crops. Support for public hybrids can democratize access to improved genetics and ensure affordability.

Subsidy assistance for small farm implements emerged as another important requirement. Smallholder farmers often cannot afford mechanization tools that are crucial for timely operations. Customizing subsidy schemes to support such equipment would enhance operational efficiency and reduce drudgery.

Lastly, farmers expressed difficulty in availing government schemes due to complex

application procedures and inadequate local facilitation. There is a pressing need to simplify application processes and strengthen on-ground support systems to ensure that intended beneficiaries actually receive the support they are eligible for.

These policy interventions, if prioritized, can contribute meaningfully to improving agricultural livelihoods and strengthening rural resilience.

Knowledge and Skill gaps identified

The Viksit Krishi Sankalp Abhiyan (VKSA) brought to light several critical knowledge and skill gaps that are hindering the adoption of modern, sustainable agricultural practices. Foremost among these is the lack of farmer awareness about improved crop varieties and climate-resilient agricultural techniques. This knowledge gap highlights the urgent need for systematic training programs aimed at enhancing farmers' understanding and use of advanced agronomic practices.

Another major area requiring intervention is the capacity building for Integrated Farming Systems (IFS). Such systems not only promote income diversification but also help reduce the risks associated with mono-cropping and climatic uncertainties. However, limited understanding and practical exposure have constrained their widespread adoption among small and marginal farmers.

Inadequate training on post-harvest management and value addition has led to avoidable losses, particularly in horticultural and perishable crops. Educating farmers on proper handling, processing, and storage techniques is vital to increasing farm incomes and reducing waste. Additionally, the lack of strong market linkages and insufficient entrepreneurial skills is hampering the effective functioning of Farmer Producer Organizations (FPOs). This results in poor bargaining power and limited access to remunerative markets.

Furthermore, skill development for natural and organic farming is in high demand. Many farmers are interested in transitioning to eco-friendly cultivation practices but lack the technical know-how for preparing and using inputs such as compost, bio-fertilizers, and botanical pesticides. Bridging these knowledge and skill gaps through regular training, handholding support, and on-field demonstrations will be key to achieving sustainable and inclusive agricultural development.

State Summary

To ensure sustainable agricultural development in Chhattisgarh, several strategic actions have been identified. First, there is an urgent need to diversify the prevalent rice-rice cropping system by integrating pulses and oilseeds. This shift will not only improve soil health but also significantly aid in conserving groundwater resources, which are under growing pressure due to intensive paddy cultivation.

Secondly, the promotion of scientific Direct Seeded Rice (DSR) techniques is essential to

phase out traditional rice broadcasting practices. DSR offers numerous benefits including reduced water usage, labor efficiency, and improved crop establishment, making it highly suitable for the state's agro-ecological conditions.

Another key intervention involves strengthening market linkages for Non-Timber Forest Produce (NTFP)-based products developed by Self-Help Groups (SHGs) and Farmer Producer Organizations (FPOs). These products can be effectively promoted through platforms such as TRIFED, APEDA, and other national and international marketing channels to enhance rural incomes.

Lastly, targeted production incentives should be extended to millet farmers, particularly in Left-Wing Extremism (LWE)-affected and aspirational districts. Millets, being climate-resilient and nutrient-rich, offer a viable alternative for both food security and economic empowerment in vulnerable regions.

Way Forward

Together, these focused strategies can drive holistic agricultural transformation and support the goals of sustainability, inclusivity, and resilience in Chhattisgarh.

The path ahead for strengthening agriculture in Chhattisgarh under the Viksit Krishi Sankalp Abhiyan requires a multi-tiered approach encompassing short-term, medium-term, and long-term interventions.

In the short term, priority should be given to ensuring the availability of seeds of recent high-yielding varieties to facilitate timely seed and varietal replacement. This is critical for enhancing productivity and resilience at the farm level. Additionally, in regions where fertilizer access remains a challenge, the promotion of NPK complex fertilizers can help improve nutrient balance and crop health. Furthermore, efficient crop residue management using bio-decomposers or digesters must be promoted to reduce environmental hazards and improve soil organic content.

Over the medium term, focused efforts are needed to develop and promote disease-resistant varieties—particularly for combating Yellow Mosaic Virus (YMV) in soybean, black gram, and green gram, as well as sterility mosaic virus in groundnut. The establishment of water harvesting structures such as farm ponds and check dams, especially through convergence with existing rural development programs, is essential for ensuring life-saving irrigation during dry spells in the monsoon season. Mechanization support should also be provided for tractor-mounted balers and slashers, enabling effective and timely crop residue handling in larger areas.

Looking at the long-term vision, there is a need to design and implement climate-resilient cropping systems tailored to the vulnerable agro-climatic zones of Chhattisgarh. These systems will play a crucial role in mitigating risks posed by erratic weather patterns and climate change. Additionally, emphasis must be placed on product traceability for Geographical Indication (GI)-

tagged produce, which can significantly boost their visibility and export potential. Finally, large-scale promotion and certification of natural and organic products will help farmers tap into premium markets and enhance their returns, contributing to a more sustainable and profitable farming ecosystem.

This structured, phased roadmap will ensure both immediate improvements and long-term resilience in the state's agricultural sector.

51. Five-Year Comprehensive Action Plan under VKSA for Agricultural and Allied Sector Development in Chhattisgarh (2026–2031)

State: Chhattisgarh

Period: 2026–2031

Nodal Agency: ICAR - National Institute of Biotic Stress Management

Implementing Agencies: IGKV - Indira Gandhi Krishi Vishwavidyalaya, CGKV - Dau Shri Vasudev Chandrakar Kamdhenu Vishwavidyalaya, Mahatma Gandhi Udyanikee Evam Vanikee Vishwavidyalaya, Chhattisgarh State Department of Agriculture, Animal Husbandry, Horticulture and Agro-Forestry, ICAR-Agricultural Technology Application Research Institute, Jabalpur and 28 Krishi Vigyan Kendras (KVKs) in Chhattisgarh.

Introduction

Chhattisgarh, established on 1 November 2000, is located in eastern India between 80°15' to 84°24' East longitude and 17°46' to 24° North latitude. The state is endowed with diverse natural resources, rich biodiversity, and varied farming systems, making agriculture and allied sectors central to rural livelihoods and food security. Geographically, the state is characterized by three distinct agro-climatic zones namely the Chhattisgarh Plains, Bastar Plateau, and Northern Hills Region each possessing unique soil types, rainfall patterns, cropping systems, and livelihood opportunities. These agro-ecological variations necessitate region-specific, climate-responsive agricultural development strategies under the VKSA framework.

Agro-Climatic Scenario

Chhattisgarh is divided into three major agro-climatic zones: the Chhattisgarh Plains (covering about 51% of the geographical area), the Northern Hills Zone (28%), and the Bastar Plateau (21%). The climate of the state is predominantly dry sub-humid with hot summers and moderate winters. The southwest monsoon is the principal source of rainfall, typically setting in by mid-June in southern districts and withdrawing by mid-September, with complete withdrawal by late September. Despite receiving moderate annual rainfall, its uneven distribution and limited water harvesting infrastructure constrain optimal agricultural productivity. The cropping intensity ranges between 119-123%, indicating substantial scope for intensification through rice fallow utilization, irrigation expansion, and crop diversification interventions.

Status of Agriculture and Allied Sectors

Agriculture is the backbone of Chhattisgarh's economy and the principal livelihood source for a majority of its population. The state is widely known as the “Rice Bowl of Central India” due to the dominance of rice cultivation across agro-climatic zones. Major crops include rice, maize, pulses,

oilseeds, and minor millets, reflecting both subsistence and emerging commercial production systems. The state has a net sown area of approximately 4.83 million hectares and a gross sown area of about 5.79 million hectares. Alongside crop agriculture, horticulture, livestock, fisheries, and Minor Forest Produce contribute significantly to household income, nutritional security, and employment generation, particularly among tribal communities. Nearly 80% of the population resides in rural areas, with agriculture and allied enterprises forming the primary economic base.

Irrigation and Water Resource Scenario

Although the state has made progress in irrigation development through canals, tanks, and groundwater structures, a large proportion of cultivated land remains rainfed. To address this, significant emphasis has been laid on water harvesting structures, farm ponds, and minor irrigation schemes. Promotion of micro-irrigation technologies such as drip and sprinkler systems, alongside solar irrigation pumps, has been initiated to enhance Water Use Efficiency (WUE). However, there remains considerable scope for expanding protective irrigation, particularly in rice fallow areas and upland farming systems under VKSA interventions.

Technology Adoption and Extension Systems

Chhattisgarh has initiated the promotion of improved agricultural technologies including high-yielding and climate-resilient crop varieties, integrated nutrient and pest management practices, farm mechanization, and bio-input usage. Krishi Vigyan Kendras, State Agricultural Universities, ICAR Institutes, and line departments play a crucial role in technology dissemination. However, adoption levels remain uneven, especially in tribal and remote regions, necessitating strengthened extension mechanisms, digital advisories, Climate-Smart Villages, and Farmer Field School approaches under VKSA.

Government Initiatives and Institutional Support

The Government of Chhattisgarh has launched several flagship schemes to strengthen agriculture and allied sectors. Initiatives such as the Mukhyamantri Saur Krishi Pump Yojana promote solar irrigation, while the Mukhyamantri Bagwani Evam Bagbagicha Yojana supports horticulture expansion. Credit facilitation and risk mitigation are addressed through schemes such as Krishi Rin Samadhan Yojana. Convergence of these schemes with national programmes on irrigation, livestock, fisheries, and FPO development provides a strong institutional platform for VKSA implementation.

Key Challenges

Despite its vast potential, the agricultural sector in Chhattisgarh faces multiple structural and climatic challenges. These include low mechanization levels, limited irrigation coverage,

fragmented landholdings, inadequate post-harvest infrastructure, weak market linkages, and low value addition. Persistent rice monocropping, underutilization of rice fallows, and climate variability further constrain productivity and farm income. Tribal farmers, in particular, face barriers related to technology access, input delivery, and market integration.

Rationale for VKSA Intervention

Given these challenges and opportunities, there is a critical need for an integrated, cluster-based, and technology-driven agricultural transformation strategy. The VKSA framework aims to enhance productivity, promote diversification, strengthen livestock and fisheries sectors, develop horticulture value chains, and build climate resilience across farming systems. Through institutional convergence, capacity building, and market integration, VKSA will facilitate the transition of Chhattisgarh agriculture from subsistence orientation to a resilient, remunerative, and enterprise-driven system.

Strategic Focus Areas for Agricultural Research, Extension and Development in Chhattisgarh

In alignment with the VKSA framework, the agricultural development strategy for Chhattisgarh will be guided by an integrated research-extension-livelihood convergence model focusing on productivity enhancement, sustainability, diversification, and value chain strengthening. The state's agriculture, which supports nearly 70% of the population, operates within a diverse agro-ecological landscape characterized by 44% forest cover, average annual rainfall of about 1,400 mm, and a predominance of small and marginal farmers (approximately 76%). While Chhattisgarh is a leading rice-producing state, contributing significantly to national rice output, there exists substantial potential to enhance productivity, diversify cropping systems, and strengthen allied sectors.

The strategic thrust will be on biodiversity conservation and genetic resource utilization through characterization, conservation, and climate-resilient crop improvement programmes. Advanced breeding approaches integrating traditional knowledge with modern genomic tools will be promoted to enhance productivity, nutritional enrichment, and stress tolerance. Agronomic interventions will emphasize resource-use efficiency, integrated nutrient and pest management, AI-based pest forewarning systems, and mechanization support tailored to smallholder systems.

Sustainable production systems will be promoted through natural and organic farming, agro-ecological practices, and efficient post-harvest management of grains and crop residues to minimize losses and improve quality. Climate-Smart Agriculture approaches will be operationalized to simultaneously enhance productivity, resilience, and greenhouse gas mitigation. Digital agriculture tools will support precision farming, data-driven advisories, and supply chain optimization.

Agricultural diversification will form a core pillar of VKSA implementation. Expansion of spices, medicinal crops, cotton, and jute will be encouraged alongside specialty agriculture such as floriculture, bamboo cultivation, hydroponics, and energy farming linked to biofuel value chains.

Introduction of high-value and emerging crops including chia, kiwi, date palm, gherkins, and kinnow will be piloted in suitable agro-climatic niches. Agro-forestry systems and economic entomology enterprises such as lac, sericulture, and apiculture will be promoted for livelihood diversification.

Allied sectors including dairy, fisheries, goatery, poultry, and piggery will receive focused attention given their rising contribution to agricultural Gross Value Added. Research–extension convergence will strengthen integrated farming systems and nutrition-sensitive agriculture models.

Macro-level policy support will be leveraged through institutional strengthening, decentralized planning, farmer organizations, and cooperative development. Investments in irrigation infrastructure, water harvesting, rural storage, market yards, renewable energy, and digital connectivity will be converged. Market reforms including e-platform integration, export promotion, and value chain infrastructure will enhance competitiveness. Social inclusion strategies will prioritize women empowerment, youth engagement, financial inclusion, skill development, and social protection mechanisms, ensuring equitable agricultural transformation under VKSA.

1. Vision

To transform Chhattisgarh agriculture into a climate-resilient, market-oriented, nutritionally secure and income-enhancing agricultural state through integrated development of agriculture and allied sectors under VKSA.

2. Mission Objectives

- Enhance farmers' income by 1.0–2.0 times in 5 years.
- Improve production and productivity of major crops.
- Expand irrigation and water-use efficiency.
- Increasing the overall Cropping Intensity.
- Promotion of Oilseeds (Rapeseed, Mustard)
- Promote crop diversification toward high-value sectors.
- Strengthen livestock-based livelihoods.
- Develop horticulture clusters.
- Build climate resilience in tribal and rainfed regions.
- Development of value chain for different agricultural sectors
- Strengthen FPOs, processing and market linkages.

3. Baseline Focus Areas (Chhattisgarh)

- Dominance of rice-based farming systems

- Large rice fallow areas (~1.5–2.8 mha)
- High tribal population
- Rainfed agriculture (~70%)
- Low mechanization
- Weak value addition
- Untapped fisheries & backyard livestock potential

4. Sector-Wise Five-Year Strategy

A. Agriculture Development

1. Crop Production and Productivity Enhancement

Crop production and productivity enhancement will be pursued through the large-scale promotion of high yielding varieties (HYVs) and climate-resilient crop cultivars of rice, maize, pulses, and oilseeds suited to the diverse agro-ecological zones of Chhattisgarh. Stress-tolerant varieties capable of withstanding drought, submergence, and temperature variability will be prioritized. Scientific crop establishment methods such as line sowing, System of Rice Intensification (SRI), and Direct Seeded Rice (DSR) will be promoted to reduce seed rate, labour cost, and water consumption while enhancing yields. Seed village programmes will be established to ensure timely local availability of quality certified seeds and to build farmer seed entrepreneurship. In addition, soil test-based nutrient management will be institutionalized to improve Nutrient Use Efficiency (NUE), reduce indiscriminate fertilizer use, restore soil health, and promote balanced application of macro and micronutrients through customized fertilizer recommendations.

2. Rice Fallow Utilization

Considering the vast rice fallow areas in the state, a focused strategy will be implemented to bring these lands under remunerative second crops during the rabi season. Short-duration pulses such as chickpea, lentil, and lathyrus will be promoted due to their low water requirement and nitrogen-fixing ability, which also improves soil fertility. Oilseed crops including rapeseed, mustard, and linseed will be introduced in suitable pockets to enhance farmers' income and reduce edible oil import dependency. In upland and tribal regions, millets such as finger millet, little millet, and kodo millet will be promoted for their climate resilience, nutritional value, and suitability to low-input conditions. Cluster demonstrations, seed mini-kits, and mechanized sowing support will be provided to scale rice fallow intensification.

3. Irrigation Expansion with Water Use Efficiency (WUE)

To reduce rainfall dependency and stabilize crop production, irrigation infrastructure will be

expanded alongside water-use efficiency measures. Farm ponds and check dams will be constructed and rejuvenated to harvest rainwater and improve groundwater recharge. Solar-powered lift irrigation systems will be promoted, particularly in off-grid tribal areas, to ensure assured protective irrigation while reducing energy costs. Micro-irrigation technologies such as drip and sprinkler systems will be introduced for field crops, oilseeds, pulses, and horticulture crops to optimize water use, improve input efficiency, and enhance productivity per unit of water. Community irrigation models and Water User Groups will be encouraged for equitable water distribution and system maintenance.

4. Farm Mechanization

Farm mechanization will be strengthened to address labour shortages, reduce drudgery, and enhance timeliness of farm operations. Custom Hiring Centres (CHCs) will be established at cluster and FPO levels to provide affordable access to tractors, seed drills, transplanters, harvesters, and residue management equipment. Special emphasis will be given to distributing small, gender-friendly, and location-specific tools for tribal and smallholder farmers, including cono-weeders, millet threshers, and power weeders. Advanced technologies such as Drone- and AI-based input application systems will be piloted for precision spraying of fertilizers and pesticides, crop health monitoring, and acreage mapping, thereby improving efficiency while reducing chemical exposure and input costs.

5. Natural & Organic Farming

Natural and organic farming systems will be promoted extensively in Bastar and other tribal belts where chemical input usage is traditionally low. Cluster-based organic certification, Participatory Guarantee Systems (PGS), and organic value chain development will be supported. Bio-inputs production units at village level will be established for the preparation of jeevamrit, vermicompost, biofertilizers, and biopesticides, ensuring local availability of low-cost inputs. Apiculture will be integrated with cropping systems to enhance pollination, increase crop yields, and generate supplementary income through honey and wax production. In addition, bio-fortified mushroom cultivation (including oyster and milky mushroom) will be promoted as a nutrition-sensitive and women-friendly enterprise, contributing to household nutritional security and livelihood diversification.

B. Horticulture Development

Horticulture development in Chhattisgarh will focus on region-specific high-value crops to promote diversification, nutritional security, and income enhancement. Among fruit crops, mango, cashew, guava, citrus, and jackfruit will be prioritized due to their adaptability to the state's agro-climatic conditions and strong market demand. Vegetable cultivation will emphasize tomato, brinjal, okra,

and cole crops, which offer short-duration returns and employment opportunities for smallholders. Spice crops such as turmeric, chilli, and coriander will be promoted in suitable belts for both domestic consumption and processing potential. In selected pockets with appropriate micro-climatic suitability, plantation crops like coconut will be introduced to diversify perennial income sources and support integrated farming systems.

Key Interventions

1. Area Expansion under Fruits (Cluster Mode)

Area expansion under fruit crops will be undertaken through a cluster-based approach to ensure economies of scale in production, input supply, extension delivery, and marketing. Identified clusters will receive support for land preparation, quality planting material, orchard establishment, and capacity building on scientific orchard management. This approach will also facilitate aggregation, grading, and collective marketing through FPOs, thereby improving farmers' bargaining power and price realization.

2. High-Density Planting

High-density planting systems will be promoted in fruit crops such as mango, guava, and citrus to enhance productivity per unit area and ensure early economic returns. Scientific spacing, canopy management, pruning, and training practices will be introduced to optimize light interception and nutrient utilization. This intervention will be particularly beneficial for small and marginal farmers by enabling higher output from limited landholdings.

3. Protected Cultivation (Polyhouse/Shade Net)

Protected cultivation technologies including polyhouses and shade-net structures will be promoted to enable off-season vegetable production, nursery raising, and cultivation of high-value crops. These structures will protect crops from extreme weather, pests, and diseases while improving input-use efficiency. The intervention will enhance productivity, ensure quality produce, and provide opportunities for year-round income generation, especially for youth and women entrepreneurs.

4. Nursery Accreditation

To ensure the availability of quality and disease-free planting material, nursery accreditation systems will be established and strengthened. Both public and private nurseries will be supported for infrastructure development, mother block establishment, and certification processes. Accredited nurseries will supply true-to-type seedlings, grafts, and saplings, thereby improving orchard longevity, productivity, and uniformity.

5. Drip Irrigation Integration

Drip irrigation systems will be integrated with horticulture expansion to enhance water-use efficiency and fertigation practices. This intervention will ensure precise water and nutrient delivery to the root zone, reduce evaporation losses, and improve crop yield and quality. Drip systems will be linked with solar pumping units wherever feasible to promote energy-efficient irrigation in horticulture clusters.

6. Development of Value Chains

Comprehensive horticulture value chains will be developed covering production, aggregation, processing, branding, and marketing. Farmer Producer Organizations will be engaged in input procurement, collection, grading, and direct market linkage. Processing of mango, cashew, jackfruit, citrus, and spices will be promoted to enhance shelf life and value addition. Market intelligence systems and branding initiatives will further strengthen farmers' market competitiveness.

7. Post-Harvest Infrastructure

Post-harvest management infrastructure will be established to reduce quantitative and qualitative losses and to improve price realization.

- **Pack Houses:** Village-level pack houses equipped with grading, sorting, and packaging facilities will be developed to maintain produce quality and standardization.
- **Cold Storage:** Cold storage units will be established in production clusters to extend shelf life, stabilize market supply, and prevent distress sales during glut periods.
- **Reefer Transport:** Refrigerated transport systems will be promoted to facilitate long-distance movement of perishable horticultural produce while maintaining quality and freshness, thereby enabling access to distant and high-value markets.

C. Animal Husbandry & Dairy

Key Interventions

1. Cattle Breed Improvement

Cattle breed improvement programmes will be strengthened to enhance milk productivity, reproductive efficiency, and herd quality across the state. Expansion of Artificial Insemination (AI) coverage will be undertaken through establishment of new AI centres, mobile breeding units, and last-mile delivery services in remote and tribal areas. Quality semen from proven high-yielding and climate-resilient breeds will be utilized to accelerate genetic upgradation. Simultaneously, conservation of indigenous cattle breeds will be promoted through selective breeding, breed

registration, and support for native germplasm, recognizing their adaptability, disease resistance, and suitability to low-input production systems.

2. Dairy Development

Dairy development initiatives will focus on strengthening village-level milk procurement, chilling, processing, and marketing systems. Village milk collection centres will be established to ensure organized milk pooling, transparent weighing, and direct payment systems for farmers. Bulk Milk Coolers (BMCs) will be installed at cluster levels to maintain milk quality and reduce spoilage during transit. Dairy-based Self-Help Groups (SHGs) and Farmer Producer Organizations (FPOs) will be promoted to manage aggregation, input supply, veterinary services, and collective marketing. Capacity building on clean milk production, feed management, and value addition (ghee, paneer, curd) will further enhance income opportunities.

3. Small Ruminants Development

Small ruminant rearing will be promoted as a low-investment, fast-return livelihood option for landless and marginal farmers. Backyard goatery units will be established with improved breeds, vaccination support, and scientific housing to enhance survival and productivity. Cluster-based sheep rearing will be promoted in plateau and grassland regions where grazing resources are available. Veterinary health camps, deworming drives, and insurance coverage will be integrated to reduce mortality risks and improve flock management.

4. Backyard Poultry

Backyard poultry will be expanded as a nutrition-sensitive and women-centric enterprise. Dual-purpose improved bird varieties suitable for free-range systems will be distributed to rural households to ensure both egg and meat production. Special focus will be given to mobilizing Tribal Women SHGs for poultry-based micro-enterprises. Training on feeding, vaccination, brooding, and housing management will be provided to improve survivability and productivity, thereby contributing to household income and nutritional security.

5. Fodder Development

Fodder development interventions will be undertaken to address the critical gap in year-round availability of quality livestock feed. Community fodder banks will be established for storage and regulated distribution of dry and green fodder during lean periods. Silage pits will be constructed at village and cluster levels to promote scientific fodder preservation and reduce seasonal shortages. Azolla production units will be promoted as a low-cost, protein-rich supplementary feed for dairy animals and backyard poultry. In addition, perennial fodder cultivation and pasture development will be encouraged to ensure sustainable feed resources.

D. Fisheries Development

Key Interventions

1. Tank & Pond Rejuvenation

Tank and pond rejuvenation will be undertaken to restore and enhance the productivity of existing inland water bodies across the state. Activities will include desilting, deepening, bund strengthening, inlet and outlet repair, and water retention improvement measures. Scientific stocking with quality fish seed, liming, and pond fertilization practices will be introduced to optimize fish growth. Priority will be given to community ponds and MGNREGA-converged water bodies to ensure livelihood generation alongside fisheries development.

2. Cage Culture in Reservoirs

Cage culture systems will be promoted in major reservoirs and large water bodies to enable intensive fish production without the need for land ownership. Suitable fish species with high market demand will be stocked in scientifically designed cages. Training will be provided to fisher groups and FPOs on cage installation, feed management, disease control, and harvesting techniques. This intervention will significantly enhance fish yield per unit water area while creating enterprise opportunities for youth and fisher cooperatives.

3. Fingerling Hatcheries

Establishment and strengthening of fingerling hatcheries will be prioritized to ensure timely availability of quality fish seed within the state. Government and private hatcheries will be supported for broodstock management, breeding infrastructure, and nursery rearing facilities. Mobile hatchery units and satellite nurseries will also be promoted in remote districts to reduce seed transportation losses and improve stocking efficiency. Availability of certified fingerlings will directly contribute to higher survival rates and productivity.

4. Integrated Fish Farming

Integrated fish farming systems will be promoted to enhance resource-use efficiency and diversify farmer income. Models integrating fish with duck rearing, poultry, piggery, and horticulture will be demonstrated, enabling recycling of farm waste as pond nutrients. Such systems will optimize land and water utilization, reduce feed costs, and provide multiple revenue streams. Training and demonstration units will be established to scale adoption among small and marginal farmers.

5. Fish Feed Mills

Fish feed mills will be established at cluster or cooperative levels to ensure the availability of

nutritionally balanced and cost-effective feed. Local production of floating and sinking feed will reduce dependency on external suppliers and lower input costs for fish farmers. Training on feed formulation using locally available raw materials will be provided. Development of feed supply chains will further support the expansion of intensive aquaculture practices such as cage and pond culture.

E. Climate Resilient Agriculture

1. Climate-Smart Villages

Climate-Smart Villages will be established as model demonstration sites to promote integrated climate-resilient agricultural practices. These villages will serve as field laboratories for testing and scaling location-specific adaptation and mitigation strategies, including resilient crop varieties, water conservation structures, climate-resilient livestock systems, and diversified farming models. Community participation will be ensured through village climate risk mapping, resource planning, and capacity building programmes, enabling farmers to adopt sustainable practices that enhance productivity while reducing climate vulnerability.

2. Weather-Based Agro Advisories

Weather-based agro-advisory services will be strengthened to provide real-time, location-specific farm guidance to farmers. Advisory dissemination will be carried out through mobile SMS, WhatsApp groups, community radio, digital display boards, and extension networks. Farmers will receive timely recommendations on sowing windows, irrigation scheduling, pest and disease alerts, fertilizer application, and harvesting decisions based on short- and medium-range weather forecasts. This intervention will reduce climate-induced production risks and improve farm decision-making.

3. Drought Contingency Crops

Promotion of drought contingency crops will be undertaken to minimize crop losses during rainfall aberrations and prolonged dry spells. Short-duration, low water-requiring, and stress-tolerant crops such as millets, pulses, and oilseeds will be introduced as contingency alternatives to water-intensive crops. District-level contingency crop planning will be developed, and seed reserves will be maintained for rapid deployment during delayed monsoon or mid-season drought situations, ensuring livelihood continuity.

4. Seed Banks

Community-managed seed banks will be established to ensure timely availability of climate-resilient and locally adapted crop seeds during extreme weather events. These seed banks will store

short-duration, drought-tolerant, flood-tolerant, and traditional varieties that are suitable for contingency sowing. Farmer groups and FPOs will be trained in seed selection, treatment, storage, and regeneration practices to maintain seed viability and genetic purity, thereby strengthening local seed sovereignty and disaster preparedness.

5. Carbon Farming Pilots

Carbon farming pilot initiatives will be introduced to promote agricultural practices that enhance soil carbon sequestration and reduce greenhouse gas emissions. Practices such as conservation tillage, crop residue incorporation, agro-forestry, biochar application, and organic nutrient management will be demonstrated. These pilots will also explore opportunities for carbon credit linkages, providing an additional income stream for farmers while contributing to climate change mitigation and sustainable land management.

F. Extension & Capacity Building

Strategies

1. Farmer Field Schools (FFS)

Farmer Field Schools will be established as participatory learning platforms to promote experiential, season-long capacity building of farmers. Through field demonstrations and hands-on training, farmers will learn improved crop production practices, integrated pest and nutrient management, water management, and climate-resilient technologies. The FFS approach will strengthen farmers' decision-making abilities, encourage peer learning, and enhance adoption of location-specific best practices.

2. Women Farmer Empowerment Programmes

Special empowerment programmes will be designed to enhance the technical skills, leadership capacity, and economic participation of women farmers. Training will focus on nutrition gardens, seed production, value addition, livestock management, and micro-enterprise development. Women Self-Help Groups will be linked with input supply, processing, and marketing activities to strengthen income generation and financial inclusion.

3. Tribal Farmer Exposure Visits

Exposure visits will be organized for tribal farmers to progressive farms, research institutes, KVKs, and successful FPOs to facilitate cross-learning and technology adoption. These visits will showcase best practices in crop diversification, integrated farming systems, organic agriculture, and allied enterprises. Such experiential learning will motivate farmers, reduce technology hesitation,

and accelerate scaling of proven interventions in tribal regions.

4. Digital Advisory Platforms

Digital extension platforms will be leveraged to disseminate real-time farm advisories, market intelligence, and weather information. Mobile applications, SMS services, WhatsApp groups, IVR systems, and web portals will be utilized to reach farmers at scale. These platforms will enable timely dissemination of crop advisories, pest alerts, input recommendations, and government scheme information, thereby improving farm planning and risk management.

5. Community Resource Persons (CRPs)

Community Resource Persons will be developed at village level as last-mile extension functionaries. Progressive farmers, rural youth, and women leaders will be trained to provide technical guidance, mobilize farmer groups, and support implementation of project interventions. CRPs will act as a bridge between institutions and farmers, ensuring continuous handholding, data collection, and feedback dissemination.

6. Drudgery Reduction Technologies to Women Farmers

Drudgery-reducing tools and equipment will be introduced to improve occupational health, efficiency, and productivity of women farmers. Gender-friendly implements such as cono-weeders, seeders, small harvest tools, millet threshers, and fodder choppers will be promoted. Training on usage, maintenance, and enterprise opportunities around these tools will be provided to enhance women's work efficiency and reduce physical strain.

7. Cluster Demonstrations and Front-Line Demonstrations (FLDs)

Cluster demonstrations and Front-Line Demonstrations will be conducted on selected crop varieties, production technologies, integrated farming systems, and climate-resilient practices. These demonstrations will be implemented in a compact area approach to create visible impact and accelerate horizontal spread. Scientific monitoring and yield gap assessment will be undertaken to validate performance under farmers' field conditions.

8. Farmers' Fairs, Exhibitions, and Melas

Farmers' fairs, agricultural exhibitions, and melas will be organized at block, district, and state levels to promote technology awareness and stakeholder convergence. These events will showcase improved varieties, farm machinery, value-added products, and success stories. They will also provide platforms for farmer–scientist interaction, input procurement, market linkage exploration, and public–private partnership development.

G. Post-Harvest & Value Addition

1. Mini Dal Mills

Mini dal mills will be established at village and cluster levels to promote local processing of pulses such as chickpea, lentil, and lathyrus. These units will reduce post-harvest losses, improve recovery rates, and enhance the market value of raw produce through cleaning, grading, and splitting. Promotion of dal mills through Farmer Producer Organizations (FPOs), Self-Help Groups (SHGs), and rural entrepreneurs will generate local employment while ensuring better price realization for pulse growers.

2. Oil Expellers

Small-scale oil expellers will be installed to process locally grown oilseeds such as mustard, linseed, groundnut, and niger. These units will enable farmers to produce cold-pressed edible oils, which fetch premium market prices due to their nutritional value. Oilcake by-products will also serve as valuable livestock feed, thereby supporting integrated farming systems. Cluster-based oil processing enterprises will be promoted to strengthen local edible oil value chains and reduce dependence on external markets.

3. Rice Bran Units

Rice bran processing units will be promoted in rice-dominant districts to utilize by-products of paddy milling effectively. Rice bran extraction will enable production of rice bran oil, a nutritionally rich edible oil, along with value-added by-products such as de-oiled bran for cattle feed. Establishment of such units will enhance profitability of rice milling operations, create secondary revenue streams, and contribute to waste-to-wealth initiatives within the rice value chain.

4. Millet Processing

Millet processing infrastructure including dehullers, graders, flour mills, and value-addition units will be established to support the revival of nutri-cereals in tribal and upland regions. Processing will improve shelf life, consumer acceptability, and marketability of millets such as kodo, kutki, and ragi. Promotion of ready-to-cook and ready-to-eat millet products will create new market avenues while enhancing nutritional security and farmer income.

5. Jackfruit & Cashew Processing

Processing units for jackfruit and cashew will be established in production clusters to tap their high value-addition potential. Jackfruit processing will include production of chips, flour, dehydrated products, and pulp, while cashew units will focus on grading, roasting, shelling, and packaging.

These enterprises will be promoted through women SHGs, FPOs, and rural youth, generating employment and reducing post-harvest wastage while enabling access to premium domestic and export markets.

H. Market Linkages

Key Interventions

1. e-NAM Integration

Integration of farmers and Farmer Producer Organizations (FPOs) with the National Agriculture Market (e-NAM) platform will be strengthened to enable transparent price discovery and access to a wider national market. Regulated mandis across the state will be upgraded with necessary digital infrastructure, assaying facilities, and grading systems to facilitate online trading. Capacity building programmes will be organized to train farmers, traders, and FPO representatives on e-bidding, quality standards, and digital payment systems, thereby improving marketing efficiency and reducing intermediary dependence.

2. Tribal Product Branding

Branding and promotion of tribal agricultural and forest-based products will be undertaken to enhance their market identity and value realization. Products such as millets, tamarind, lac, honey, jackfruit, and organic produce will be aggregated, processed, and marketed under common regional brands. Packaging, labeling, certification, and storytelling approaches highlighting the tribal origin and ecological sustainability will be adopted to attract premium markets. Convergence with TRIFED and state tribal development agencies will be explored for wider outreach.

3. Export Facilitation Cells

Export facilitation cells will be established at state and cluster levels to promote international trade of high-value agricultural and horticultural commodities. These cells will provide technical guidance on export standards, quality certification, phyto-sanitary compliance, packaging norms, and documentation procedures. Capacity building of FPOs and agri-entrepreneurs will be undertaken to tap export opportunities in commodities such as cashew, spices, processed fruits, and organic products, thereby enhancing foreign exchange earnings and farmer profitability.

4. Contract Farming Pilots

Contract farming pilot models will be introduced in selected commodity clusters to provide assured markets, input support, and price security to farmers. Partnerships will be facilitated between

farmers/FPOs and agri-processing companies, retailers, and exporters. These agreements will cover buy-back arrangements, quality parameters, extension support, and risk-sharing mechanisms. Contract farming will be promoted particularly for vegetables, spices, seed production, and processing-grade horticultural crops to strengthen value chain integration.

K. Minor Forest Produce (MFP) Development

Minor Forest Produce will be promoted as a critical livelihood and income source for tribal and forest-dependent communities across Chhattisgarh. The state possesses rich diversity of MFP resources such as tamarind, mahua flowers and seeds, tendu leaves, lac, chironji, sal seed, honey, harra, and bahera, which contribute significantly to household income during lean agricultural seasons. Interventions will focus on scientific harvesting, primary processing, value addition, storage, and market linkage development to enhance returns to collectors. Community-based collection systems and Van Dhan Vikas Kendras will be strengthened to ensure aggregation, grading, and fair pricing.

Capacity building programmes will be conducted for tribal collectors on sustainable harvesting practices, post-harvest handling, drying, and storage to maintain quality standards. Processing units for tamarind, mahua value-added products, lac cultivation, and honey processing will be established at cluster level to improve shelf life and market value. Branding and certification of organic and wild forest produce will be promoted to tap premium niche markets. Institutional convergence with Tribal Development Departments, cooperative federations, and marketing boards will be ensured to streamline procurement and ensure Minimum Support Price (MSP) benefits for notified MFP commodities. This integrated approach will strengthen tribal livelihoods, promote forest conservation, and enhance inclusive rural economic growth.

5. Year-Wise Implementation Roadmap

Year 1 (2026–27): Baseline Survey, Cluster Identification & Pilot Projects

The first year will focus on diagnostic assessment, planning, and pilot testing of key interventions. Comprehensive baseline surveys will be conducted covering farming systems, livestock assets, irrigation status, rice fallow areas, horticulture potential, and socio-economic indicators. GIS-based resource mapping and vulnerability assessment will guide cluster identification for agriculture and allied sectors. Pilot demonstrations will be initiated on climate-resilient crop varieties, SRI/DSR rice, rice fallow pulses, backyard poultry, goatery, and nutrition gardens. Climate-Smart Villages and seed banks will be established on a pilot scale. Institutional mobilization including FPO identification and Community Resource Person selection will also begin.

Year 2 (2027–28): Infrastructure Creation, Seed Systems & Training Scale-Up

The second year will emphasize infrastructure development and capacity building. Custom Hiring Centres, nursery units, fodder banks, milk collection centres, and pond rejuvenation works will be initiated. Expansion of seed village programmes, accredited nurseries, and fingerling hatcheries will ensure quality input supply. Large-scale farmer trainings, Farmer Field Schools, and women empowerment programmes will be conducted. Protected cultivation structures, drip irrigation systems, and solar irrigation pilots will be installed. Digital advisory platforms and weather-based agro-advisory dissemination systems will be operationalized.

Year 3 (2028–29): Area Expansion & Sectoral Scaling

During the third year, successful pilot interventions will be scaled horizontally. Large-scale expansion of rice fallow pulses and oilseeds, millet promotion, and horticulture plantations will be undertaken. Livestock enterprises including dairy units, goat clusters, and backyard poultry will be expanded. Cage culture fisheries and integrated fish farming models will be scaled in reservoirs and ponds. Climate-resilient technologies, micro-irrigation, and farm mechanization services will be extended to new clusters. FPO aggregation activities and input-output business operations will be strengthened.

Year 4 (2029–30): Value Addition & Enterprise Development

The fourth year will focus on post-harvest management, processing, and agri-enterprise promotion. Establishment of mini dal mills, oil expellers, millet processing units, jackfruit and cashew processing centres, and rice bran units will be prioritized. Dairy processing, fish feed mills, and honey processing units will be promoted. FPOs will be supported for business incubation, branding, packaging, and aggregation infrastructure. Skill development for rural youth and women entrepreneurs in value addition and agri-services will be intensified.

Year 5 (2030–31): Market Integration, Export Linkages & Impact Consolidation

The final year will emphasize market strengthening and sustainability. e-NAM integration, contract farming pilots, and institutional procurement linkages will be operationalized. Export facilitation cells will support certification and global market access for horticulture and processed products. Tribal product branding and Minor Forest Produce value chains will be scaled. Impact evaluation, outcome documentation, policy feedback, and sustainability roadmaps will be prepared to institutionalize successful VKSA models across the state.

Year	Major Technologies / Interventions	Responsible Agencies
Year 1	Baseline survey, GIS mapping, Climate-Smart Villages, SRI/DSR pilots, rice fallow demonstrations, backyard poultry, seed banks	ICAR-NIBSM (Nodal), IGKV, CGKV, MGUVV, KVKs, Dept. of Agriculture
Year 2	CHCs, nurseries, fodder banks, AI expansion, pond rejuvenation, drip irrigation, protected cultivation, training programmes	IGKV, CGKV, Horticulture Dept., AH Dept., MGUVV, KVKs
Year 3	Horticulture area expansion, dairy units, goat clusters, cage culture, millet promotion, mechanization scaling	Dept. of Horticulture, AH Dept., Fisheries Dept., IGKV, MGUVV, KVKs
Year 4	Dal mills, oil expellers, millet processing, dairy processing, fish feed mills, FPO enterprises	IGKV, MGUVV, KVKs, FPOs, State Depts., ATARI, KVKs
Year 5	e-NAM linkage, export cells, branding, contract farming, tribal product marketing, impact evaluation	ICAR-NIBSM, Dept. of Agriculture Marketing, Tribal welfare, TRIFED convergence, ICAR Institutes, FPO Federations
Note: ICAR–NIBSM, Raipur, Chhattisgarh, will facilitate the implementing agencies by providing technical backstopping, as well as ensuring effective monitoring and coordination of programme activities. All interventions will be planned and executed in alignment with the funding provisions and operational guidelines of relevant State and Central Government policies and schemes.		

Convergence Strategy	Institutional Framework	Monitoring & Evaluation
- State Agriculture Dept. - NHM / MIDH - PMKSY - NRLM - Rashtriya Gokul Mission - Blue Revolution - MGNREGA (NRM works)	- State VKSA Mission Unit - District Implementation Cells - KVKs & SAUs - ICAR Institutes - Line Departments - FPO Federations	- GIS-based monitoring - Mobile app progress tracking - Third-party evaluation - Annual outcome reviews

Expected Outcomes (By 2031)

1. Farmers' Income Doubled

By the end of the five-year implementation period, farmers' income across project clusters is expected to double through productivity enhancement, cropping intensity improvement, diversification into high-value crops, livestock integration, fisheries expansion, and value addition. Reduction in input costs through mechanization, natural farming, and efficient input use will further contribute to net income gains and livelihood security.

2. Diversified Farming Systems

Rice-dominated monocropping systems will gradually transition into diversified and integrated farming systems incorporating pulses, oilseeds, millets, horticulture, livestock, fisheries, and agro-forestry components. This diversification will improve farm resilience, optimize resource utilization, generate year-round employment, and create multiple income streams for small and marginal farmers.

3. Reduced Rice Monocropping

Focused interventions in rice fallow utilization, millet revival in uplands, and promotion of rabi pulses and oilseeds will significantly reduce the extent of single-crop rice monocropping. Increased cropping intensity and introduction of climate-resilient alternative crops will improve soil health, break pest cycles, and enhance overall farm productivity.

4. Strong Dairy & Fisheries Sector

Scientific breed improvement, dairy infrastructure development, fodder security, and organized milk procurement systems will strengthen the dairy sector. Simultaneously, pond rejuvenation, cage culture, hatchery development, and integrated fish farming will substantially increase fish production. These allied sectors will emerge as reliable income and nutrition sources, particularly for smallholders and landless households.

5. Climate-Resilient Tribal Agriculture

Adoption of climate-smart technologies, resilient crop varieties, water conservation structures, and agro-forestry systems will enhance the adaptive capacity of tribal farming systems. Climate-Smart Villages, seed banks, and weather advisories will reduce vulnerability to droughts, erratic rainfall, and other climatic stresses, ensuring sustainable productivity in rainfed and forest-fringe regions.

6. Women-Led Agri Enterprises

Women farmers and Self-Help Groups will emerge as key drivers of agri-entrepreneurship through

involvement in seed production, nursery raising, mushroom cultivation, backyard poultry, goatery, processing units, and value addition enterprises. Access to drudgery-reducing tools, skill development, and institutional credit will enhance women's economic empowerment and decision-making roles.

7. Export-Ready Horticulture Clusters

Cluster-based horticulture development combined with post-harvest infrastructure, grading, cold chain, and certification systems will create export-ready production hubs. Commodities such as cashew, mango, spices, and processed horticultural products will meet quality and phyto-sanitary standards required for international markets, thereby enhancing farmers' profitability and state agri-exports.

52. ICAR-NIBSM Efforts on Rural Prosperity

1. Farmer FIRST Programme: (2016-26)

Farmer FIRST project being implemented at ICAR-NIBSM to improve the tribal farmer's livelihood through implementing agricultural enterprises integration in rice fallow. The cluster of five tribal villages namely Bakla, Kharaha, Bamhani, Kurraha and Kharri in the Kasdol block of Baloda Bazar district, Chhattisgarh has been adopted for this programme. Total five modules were identified and implemented viz. crop based module, livestock-based module, enterprise-based module, horticulture-based module and NRM based module. More than, 634 tribal farm families benefitted under this programme. Under each module, interventions are selected based on the matrix ranking and agro-ecosystem analysis. As a result, the interventions such as goat farming with *Sirohi*, *Jamnapari* and *Barbari* breeds, backyard poultry farming with *Kadaknath* breed, oyster mushroom production, Farmer Communication Centre (FCCs), low cost *Azolla* production, nutritional home garden through IIHR/TNAU vegetable seed kit, drudgery reduction equipment for women farmers through Custom Hiring Centers (CHCs), Agro Processing Centers (APCs), low-cost poly house with drip and poly-mulching for vegetable production and eco-friendly pest management technologies played vital role in the additional income generation and brought tangible changes in the socio-economic condition of tribal farming community. In economic terms, additional income of Rs. 12,054/- per farm family has been generated through the introduction of crop, livestock, horticulture, enterprise and NRM based modules respectively. In 2023, the sum of Rs. 118.75 lakhs have been generated by the farming community from different enterprises. As a social impact, nearly 49% of farmer's seasonal migration reduced from the adopted villages by this initiative. FFP initiatives attracted 34% of farm women and 20% of rural youth in agricultural activities in the adopted villages. Overall, 24 - 30% of knowledge gain observed among tribal farmers in the selected technologies by the intervention of FCCs, Agricultural Film Shows, Capacity building programmes and social media groups. Significant rate of skill acquisition observed in the adopted technologies such as scientific vegetable production, zero tillage, livestock production and eco-friendly plant protection measures. Woman farmer's drudgery reduced through village level CHCs. Tribal farm families' nutritional level enhanced through nutritional home gardening with IIHR/TNAU seed kits. Total 57 agricultural interventions introduced and sustained in the farmer's field. Cropping intensity has been increased by 120% in the adopted villages. Backward and forwarded production linkages established for crop, livestock and horticulture enterprises. Market linkages established for different commodities produced under this project for the sustainability of the disseminated technologies. In total, 515 capacity building programmes organised and 8417 tribal farmers benefitted under this initiative.

2. DBT Biotech-KISAN Hub (DBT's PAN India Programme): (2020-23)

Establishment of Biotech-KISAN Hub has been implemented in the year of 2020 at ICAR-NIBSM. Under this project, three Aspirational Districts namely Korba, Rajnandgaon and Mahasamund are allotted by DBT to execute the contemplated project objectives in collaboration with concerned district KVKs. The main objectives of this project is to popularization of improved rice varieties such as drought tolerant, BPH resistant varieties, nutri-rich rice varieties (developed through biotechnology approaches), application/use of bioagents (like *Trichogramma spp*, NPV, BT, *Trichoderma viride* and *Pseudomonas*) along with complete package of practice at farmers' level in rice and pulses, demonstration of low-cost protected cultivation of vegetables such as coloured capsicum, cucumber and tomato and demonstration of scientific goat farming. In the first phase, we have covered 150 farm families from 15 cluster of villages and generated Rs. 18.79 lakhs of farmer's income through biofortified rice variety namely *Zinco MS*. Further, we have introduced more than 29 agricultural interventions and farmers fully adopted the technologies in their field. In addition, Lathyrus crop was demonstrated in the rice fallow to generate additional income with minimal input cost. As a capacity building initiative, we have organized more than 680 capacity building programmes including field demonstration, trainings, exposure visit and farmer-scientist interfaces. Total 11,551 farmers benefited under this programme. As an economic impact, additional income of Rs. 56.17 lakhs/ Rs. 37,420 per farm family was generated. Further, we have introduced and demonstrated the promising interventions such as line sowing, transplanting of rice, seedling/seed treatment with biofertilizers, IPM, IWM, IDM, INM and post-harvest technology in the farmer's field. Total 150 hectares of farm land covered with biofortified rice, vegetables and pulses. Out of 150 farm families, 143 males and 7 female farmers are selected under this programme which includes 3 SC and 49 ST farmers. A total of 120 farmers benefitted under the Farmers Fellowship programme from three Aspirational Districts namely Korba, Mahasamund and Rajnandgaon.

3. Foldscope Microscopy initiatives (DST – SYST & DBT (2019-23))

Field level application of “*Foldscope microscopy*” was conceptualized during 2018 at ICAR-NIBSM, Raipur and subsequently we have received the grant from Department of Biotechnology (DBT), Government of India to study the “*Surveillance and minimizing the risk of zoonotic diseases among tribal farmers through Foldscope Microscopy*”. Under this initiative, we have explored the knowledge level of tribal farmers on zoonotic diseases and tribal farmer's attitude towards the use of foldscope microscopy. Total 279 samples were collected from different sources to screen the zoonotic and other relevant pathogens which includes the Fungi (*Aspergillus fumigatus*, *Penicillin sp.*, and *Rhizopus spp.*), pathogenic yeast (*Candida spp.*), Bacteria (*E. coli*, *Pseudomonas spp.*, *Aeromonas spp.* And *Proteus spp.*) and observed through foldscope microscopy for further studies.

As a field level application, foldscope identified as a novel tool to assess the frozen semen quality to reduce the infertility rate and it is a novel application of Frugal Science movement.

In second phase, we have received the grant from Department of Science and Technology, Government of India under Scheme for Young Scientists & Technologist (SYST) for three years (2020-23) to study the *In-situ diagnosis and digital cataloging of plant-pathogenic fungi through Foldscope Microscopy – A frugal science approach*. Under this initiative, foldscope identified as a novel and user-friendly tool to identify the plant pathogenic fungal diseases viz. Powdery mildew, Leaf blight, Leaf spot and post-harvest diseases etc. at In-situ condition. Total 16 fungal diseases and their causal organisms were identified based on morphological structure of pathogen and host species such as *Golovinomyces cichoracearum*, *Erysiphe polygoni*, *Erysiphe cichoracearum*, *Leveillula aurica*, *Penicillium digitatum*, *Ustilago tritici*, *Albugo bliti*, *Fusarium oxysporum*, *Alternaria sp* and *Rhizophus sp*. In addition, five biopesticides has been tested and two bioagent viz. *Trichoderma viride* and *Pacelomyces spp* has successfully observed under Foldscope. We have also tested two fruiting bodies of mushroom and *Pleurotus spp* (oyster mushroom) in-situ observation was successful under Foldscope Microscopy. As a capacity building initiative, 42 Foldscope demonstration cum hands on training on diagnosis of plant pathogenic fungal diseases organized, 1470 participants were benefitted because of these initiatives, in which 305 are college and school students and 93 are agricultural extension officers and Scientist/Professor from the state and central institutions. In addition, 31 rural youth trained as village level trainer to demonstrate the Foldscope microscopy for crop disease diagnosis at village level. More than 297 foldscopic observations and its results has been published in the online platform called *MICROCOSMOS* (<https://microcosmos.foldscope.com?author=2294>) Foldscope Community as a part of global knowledge sharing and free access of foldscopic research findings among scientific community.

D). ICAR-NASF Agripreneurship Project (2023-26)

During the year 2023 - 25, the NASF project made significant progress in promoting innovation-led agripreneurship and sustainable agriculture across Chhattisgarh. Extensive field visits, training programs, and workshops were conducted to identify, document, and promote local innovations among farmers, SHGs, FPOs, and FIGs. A constraints analysis of 150 farm families adopting Kadaknath Poultry and Mushroom Cultivation was done, using Garrett's Ranking Technique, identified Technological Risk (lack of knowledge, training), Production Risk (limited inputs, labour, disease management), and Marketing Risk (low market access, price fluctuations, limited value addition) challenges, guiding priority interventions to enhance adoption, productivity, and income generation.

Twelve innovative farmers, including Mrs. Namrata Ghai, Mr. Pravin Dehri, Mrs. Lakesh Bai Jain, Mr. Aneshwar Verma, and Mr. Ashok Kumar Dewangan, were recognized for contributions

in Mushroom Value Addition, Low-Cost Incubators, Integrated Farming, Kadaknath Poultry, Organic Inputs, And Solar-Based Post-Harvest Processing, directly benefiting over 150 farm families. The project documented and conserved 60 traditional rice varieties (e.g., Dubraj, Badshah Bhog, Ambe Mohar) and 11 wheat landraces (e.g., Sona Moti, Desi Bansi Gehu, Kudrat-11), supporting biodiversity, seed entrepreneurship, and climate-resilient agriculture. An “Innovative Farmers Manual” and a publication on “Traditional Varieties of Paddy and Wheat” highlighted replicable innovations such as low-cost egg incubators, integrated dairy–fishery–goat models, value-added mushroom products, and scientific lac cultivation, with integrated mushroom cultivation scoring highest in the Innovation Index. Training and workshops at KVK Rajnandgaon empowered farmers through hands on learning, farm visits, and scientist interactions to strengthen Integrated Farming Systems. Planned activities include monitoring, workshops on value addition, marketing, and digital tools, success story documentation, and awareness campaigns targeting youth and women. The NASF initiative demonstrated the transformative role of science, technology, and innovation in building a resilient, self-reliant, and sustainable agripreneurship ecosystem in Chhattisgarh.

E). Key Achievements under North Eastern Region (NER) development project: (2019-26)

The initiatives under the North Eastern Region (NER) sub-component of ICAR schemes at ICAR-NIBSM, Raipur, from 2019-2026, have not only transformed agricultural practices but also significantly contributed to the socio-economic upliftment of farmers across the region. Through extensive training programs, skill development workshops, and frontline demonstrations (FLDs), farmers have acquired crucial knowledge in advanced agricultural techniques, biofloc-based fish farming, and sustainable crop management. These initiatives have increased productivity, thereby enhancing farmers' incomes and economic stability.

The provision of essential inputs such as seeds, fertilizers, farm implements, and planting materials has resulted in higher yields and diversified cropping systems, allowing farmers to expand their sources of income. Livestock support through the distribution of honeybee colonies, poultry chicks, piglets, and sericulture inputs have further diversified livelihoods, ensuring year-round income generation for rural households.

Infrastructure development, including biofloc tanks for fish farming and solar dryers for post-harvest management, has enabled farmers to adopt innovative technologies that reduce post-harvest losses and improve product quality, adding value to their agricultural produce. These advancements have empowered farmers to become more competitive in the market, leading to better pricing and improved financial outcomes. Community-level engagement through Kisan Melas, exposure visits, and entrepreneurship development programs has fostered a sense of collaboration and self-reliance among farmers. Training in sericulture, organic agriculture, and value-added

products like mushroom cultivation and biochar processing has opened up new entrepreneurial avenues, especially for women and youth, leading to increased employment opportunities and improved living standards. Over ₹ 3.00 crore has been mobilised for the North Eastern Region (NER) to support societal development initiatives.

Overall, these initiatives have not only improved agricultural productivity but have also led to socio-economic improvements by enhancing income security, diversifying livelihoods, and promoting sustainable farming practices. This comprehensive approach has had a transformative impact on the livelihoods of farmers across the Northeastern states, fostering economic resilience and long-term sustainability in rural communities.

F). Tribal Sub-Plan (TSP) Activities Implemented by ICAR-NIBSM

The ICAR–National Institute of Biotic Stress Management (ICAR-NIBSM), Raipur, Chhattisgarh, has been implementing Tribal Sub-Plan (TSP) activities to improve the agricultural productivity, livelihood security and socio-economic status of tribal farming communities. The programme focuses on technology dissemination, capacity building, the distribution of quality seeds and agricultural implements, promotion of eco-friendly pest management, and support for women's empowerment and rural enterprises. Through these interventions, the Institute has extended agricultural and livelihood support to tribal farmers across five villages in Raipur district, covering the Tilda and Dharsiwa blocks. The initiatives aim to improve access to modern agricultural technologies, reduce drudgery, enhance resource-use efficiency, promote sustainable farming practices and strengthen income-generating activities among tribal households.

TSP Activities and Achievements

Under the Tribal Sub-Plan, ICAR-NIBSM covered five villages Pachri, Madhi, Guma, Bharwadih and Mohadi in Raipur district, Chhattisgarh, across the Tilda and Dharsiwa blocks. The programme reached 738 beneficiary farmers, comprising 492 men, 113 women and 153 youth farmers.

As part of capacity building, one farmers' training programme was organised, benefiting 200 farmers, including 110 men, 60 women and 30 youth farmers. The training covered the application of biocontrol agents and biofertilizers, eco-friendly pest management practices and exposure visits to facilitate the adoption of improved agricultural technologies. To promote efficient crop protection, 200 battery-operated sprayers were distributed to 200 farmers, including 147 men, 8 women and 45 youth farmers, across Pachri, Madhi, Guma and Bharwadih villages. The initiative aimed to improve the timely application of crop protection inputs and reduce manual drudgery. The programme also supported the adoption of improved crop varieties through the distribution of 33 quintals of quality-certified seeds, including Devbhog and Vikram TCR paddy varieties and mustard

seeds for rabi cultivation. This intervention benefited 204 farmers, comprising 145 men and 59 youth farmers, in the Tilda and Dharsiwa blocks.

To strengthen farm mechanisation, eight agricultural implements, including power tillers, threshers, water pumps and land levellers, were provided to support farming operations across the five target villages. This intervention benefited 50 farmers, with the objective of reducing labour requirements and improving operational efficiency. For value addition and improved access to farm machinery, 11 units of Custom Hiring Centre facilities, equipped with mini rice mills and pulverizers, were supported across Pachri, Madhi, Guma and Mohadi villages. These facilities benefited 59 farmers, including 45 women and 14 youth farmers, and were intended to promote local processing, value addition and supplementary income opportunities. To improve post-harvest operations, 100 electric winnowing fans were distributed to 100 farmers, comprising 70 men, 10 women and 20 youth farmers, in Pachri, Madhi, Guma and Mohadi villages. The intervention aimed to facilitate efficient grain cleaning and reduce manual labour.

Women's empowerment and livelihood diversification were promoted through the distribution of 45 sewing machines to women's self-help groups (SHGs) in Pachri village, benefiting 45 members, including 30 women and 15 youth farmers. This support aimed to encourage self-employment and strengthen income-generating activities among rural women. The programme further supported renewable energy and farm mechanisation through the provision of four solar panels, benefiting 40 farmers, and four cultivators, benefiting another 40 farmers, across the identified villages in the Tilda and Dharsiwa blocks. These interventions were intended to promote



energy-efficient agricultural operations and improve farm productivity. In addition to the above, ICAR-NIBSM established a demonstration unit at the Institute featuring a power tiller, thresher machine, sewing machine and cultivator, with one unit of each implement. The unit serves as a practical demonstration facility for showcasing appropriate agricultural machinery and livelihood technologies to farmers, trainees and other stakeholders.

Overall, the TSP activities implemented by ICAR-NIBSM reflect an integrated approach to tribal development by combining farmer training, improved seed access, farm mechanisation, post-harvest management, value addition, renewable energy and women's livelihood promotion. These interventions are expected to contribute to improved agricultural efficiency, enhanced livelihood opportunities and the socio-economic empowerment of tribal farming communities in the target villages.

G) SCSP Activities Implemented by ICAR-NIBSM

The ICAR–National Institute of Biotic Stress Management (ICAR-NIBSM), Raipur, Chhattisgarh, has been implementing the Scheduled Caste Sub-Plan (SCSP) to improve agricultural productivity, livelihood security and socio-economic conditions of Scheduled Caste farming communities. The programme focuses on capacity building, dissemination of improved agricultural technologies, distribution of quality seeds, agricultural tools and implements, farm mechanisation, post-harvest management, value addition, renewable energy and women's empowerment through self-help groups (SHGs). Through these interventions, the Institute aims to enhance farmers' access to modern agricultural technologies, reduce labour and drudgery, promote sustainable farming practices and strengthen income-generating opportunities. The activities have been implemented across six villages in the Arang and Tilda blocks of Raipur district, with emphasis on inclusive agricultural development and livelihood improvement.

SCSP Activities and Achievements

Under the SCSP, ICAR-NIBSM covered six villages Pacheda, Adsena, Beltukri, Bithiya, Mura and Dewgaon in the Arang and Tilda blocks of Raipur district. The programme reached 2,265 beneficiary farmers, comprising 1,100 men, 931 women and 234 youth farmers. To strengthen farmers' technical knowledge and skills, six training programmes were organised, benefiting 400 farmers, including 135 men, 145 women and 120 youth farmers. The training covered the application of biocontrol agents and biofertilizers, eco-friendly pest management practices and exposure visits to promote the adoption of improved agricultural technologies. Under agricultural tools and implements distribution, 190 minor toolkits, each comprising a set of nine items, were distributed to 190 farmers, including 100 men, 60 women and 29 youth farmers. Additionally, 100

hand-operated sprayers were provided to farmers in Pacheda and Adsena villages, benefiting 50 men, 40 women and 10 youth farmers. To improve crop protection practices, 200 battery-operated sprayers were distributed across Adsena, Beltukri, Bithiya, Mura and Dewgaon villages, benefiting 200 farmers, comprising 120 men, 60 women and 20 youth farmers.

To promote safe grain storage and reduce post-harvest losses, 600 seed storage bin boxes were distributed to 600 farmers, including 250 men and 350 women, across the six target villages. The programme also facilitated access to improved planting material through the distribution of 100 quintals of quality-certified seeds, including Devbhog and Vikram TCR paddy varieties and mustard seeds for rabi cultivation. This intervention benefited 340 farmers, comprising 240 men, 90 women and 10 youth farmers, across the identified villages and Ghiwra. Farm mechanisation was supported through the provision of one power tiller in Pacheda village, benefiting 10 farmers. The initiative aimed to reduce manual labour, improve operational efficiency and facilitate timely agricultural operations.

To promote agricultural processing and value addition, 12 units of Custom Hiring Centre and processing facilities were supported across five villages, including mini rice mills and pulverizers. These facilities benefited 90 farmers and were intended to improve access to processing equipment, reduce post-harvest losses and create opportunities for supplementary income. In addition, 100 electric winnowing fans were distributed to farmers in the target villages, benefiting 100 farmers, including 75 men, 10 women and 15 youth farmers, to improve grain cleaning and post-harvest handling. Women's empowerment and livelihood diversification were promoted through the distribution of 100 sewing machines to beneficiaries associated with self-help groups in Pacheda village. The distribution benefited 100 individuals, including 10 men, 80 women and 10 youth farmers, and aimed to encourage self-employment and strengthen household income opportunities. Renewable energy and efficient water management were also addressed under the programme. Eight solar panels were provided to support farming and allied activities, benefiting 80 farmers, including 70 men and 10 youth farmers. Further, 900 units of sprinkler pipes were supplied to support efficient irrigation practices, benefiting 40 farmers, including 40 men and 10 youth farmers, across Pacheda, Beltukri, Bithiya, Mura, Adsena and Bhaisha villages. The beneficiary figures for these activities require verification, as the reported gender-wise counts do not fully match the stated totals.

To encourage agricultural processing and enterprise development, one oil expeller machine was provided in Pacheda village under the Arang block, benefiting 12 farmers. This intervention was intended to facilitate local oilseed processing and promote value addition at the village level.

In addition to the above interventions, ICAR-NIBSM established a demonstration unit at the Institute featuring a rotary tiller, rear attachment, oil expeller, maize thresher, cultivator and sprinkler pipes. One unit of each listed implement was included to demonstrate improved agricultural machinery and technologies to farmers, trainees and other stakeholders.

Overall, the SCSP activities implemented by ICAR-NIBSM reflect an integrated approach to agricultural development and livelihood enhancement among Scheduled Caste farming communities. The interventions combine capacity building, improved seed access, farm mechanisation, grain storage, post-harvest management, value addition, efficient irrigation, renewable energy and women's empowerment. These efforts aim to improve agricultural productivity, reduce drudgery, strengthen local enterprises and promote inclusive and sustainable rural development.





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