

TAKING SCIENCE TO FARMERS: THE VIKSIT KRISHI SANKALP ABHIYAN-2025

Story

From Farmer Voices to Science-Led Solutions



भारतीय कृषि अनुसंधान परिषद
Indian Council of Agricultural Research

भाकृअनुप-महात्मा गाँधी समेकित कृषि अनुसंधान संस्थान

ICAR - MAHATMA GANDHI INTEGRATED FARMING RESEARCH INSTITUTE



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Taking Science to Farmers: The Viksit Krishi Sankalp Abhiyan–2025 Story

From Farmer Voices to Science-Led Solutions in East Champaran and Sheohar

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Preface

Agricultural transformation becomes meaningful when scientific knowledge moves beyond research institutions and reaches the fields where farmers make decisions every day. Equally important is the reverse flow of knowledge—from farmers' experiences, observations, challenges, and aspirations back to scientists and institutions. This continuous exchange between science and society is essential for developing agricultural technologies that are not only scientifically sound but also locally relevant, economically viable, and readily adoptable.

The Viksit Krishi Sankalp Abhiyan (VKSA)–2025 was conceived in this spirit as a nationwide initiative to strengthen direct engagement between agricultural scientists and farming communities. Launched on 29 May 2025, the campaign sought to take improved technologies and scientific advisories directly to farmers while creating opportunities to understand location-specific production constraints, gather farmer feedback, identify emerging researchable issues, and build awareness about agricultural programmes and support mechanisms.

In Bihar, ICAR–MGIFRI, Motihari, with KVKs, RPCAU, and state agriculture department actively implemented the campaign in East Champaran and Sheohar



districts from 29 May to 12 June 2025. Six multidisciplinary teams worked across the two districts, conducting 252 programmes in 252 villages and directly reaching 35,980 farmers.



conducting demonstrations, awareness programmes, technical literature distribution, soil-health activities, and digital feedback/advisory mechanisms created an intensive interface between science and farming communities. Farmers were sensitized to improved and climate-resilient crop varieties, balanced nutrient management, Integrated Farming Systems, (IFS) natural and organic farming approaches, resource-conservation technologies, farm mechanization and agri-drones, livestock and fisheries management, scientific orchard management, protected cultivation, integrated pest management, value addition, and relevant Government programmes.

However, the most significant contribution of the VKSA extended beyond technology dissemination. As scientists travelled from village to village and interacted directly with farmers, the campaign became a large-scale field diagnostic and listening exercise. Farmers highlighted persistent challenges associated with waterlogging, irrigation, quality seed availability, crop diseases and insect pests, mango and litchi orchard health, livestock diseases and reproductive disorders, mechanization, market access, storage, post-harvest losses, and value addition. At the same time, they articulated clear expectations for climate-resilient varieties, site-specific production

technologies, village-level demonstrations, digital advisories, Integrated Farming Systems, improved seed systems, post-harvest infrastructure, These interactions reinforced an important principle: farmers



are not merely recipients of technology; they are partners in agricultural innovation. Their field experiences provide essential evidence for identifying research gaps, refining technologies, setting extension priorities, and informing policy interventions. In this sense, VKSA created a valuable bridge—from farmer voices to research questions, from research questions to science-led solutions, and from solutions to more resilient farming systems.

This publication, *Taking Science to Farmers: The Viksit Krishi Sankalp Abhiyan–2025 Story—From Farmer Voices to Science-Led Solutions in East Champaran and Sheohar*, has therefore been conceived not merely as a record of activities, but as the story of this two-way journey. It brings together the

campaign's outreach, farming-system context, field observations, technologies demonstrated, farmers' concerns and expectations, researchable issues, policy gaps, emerging research priorities, and the collective experiences of scientists and farming communities.

I sincerely acknowledge the guidance and encouragement received from the Indian Council of Agricultural Research, particularly the Director General, ICAR & Secretary, DARE, and I also gratefully acknowledge the contributions of the participating Krishi Vigyan Kendras, collaborating institutions and departments,



scientists, technical and supporting staff, extension personnel, and field functionaries whose collective efforts made the campaign possible.

Above all, I express my sincere gratitude to the farmers of East Champaran and Sheohar. Their enthusiastic participation, openness in sharing field-level challenges, willingness to engage with new

technologies, and valuable feedback gave the campaign its real purpose and meaning.

I congratulate the editors, associate editors, and contributors for bringing together this comprehensive account of VKSA. It is my



hope that the experiences and lessons documented in this publication will extend beyond these 252 villages, inspire stronger farmer–scientist partnerships, contribute to demand-driven agricultural research and extension, and support the larger national vision of Viksit Krishi for Viksit Bharat@2047.

A handwritten signature in blue ink, which appears to be "Dr. Raghavendra Singh".

(Dr. Raghavendra Singh)

Director

ICAR–Mahatma Gandhi Integrated Farming Research Institute,

Motihari, Bihar

The successful implementation of the VKSA in East Champaran and Sheohar districts of Bihar, and the preparation of this publication, represent the collective efforts, commitment, and cooperation of numerous institutions, scientists, extension personnel, field functionaries, and farming communities. The editors take this opportunity to express their sincere gratitude to everyone who contributed directly or indirectly to this important national initiative.



We are profoundly grateful to the Indian Council of Agricultural Research (ICAR), New Delhi, and the Ministry of Agriculture & Farmers' Welfare, Government of India, for conceptualizing and spearheading the VKSA as a nationwide initiative to strengthen the interface between agricultural science and farming communities. We sincerely acknowledge the visionary leadership and encouragement of the Director General,

ACKNOWLEDGEMENTS

ICAR & Secretary, DARE, and the Deputy Director General (Natural Resource Management), ICAR, whose guidance continues to strengthen science-led, farmer-centric research and extension for sustainable and climate-resilient agriculture.



We express our heartfelt gratitude to Shri Radha Mohan Singh, Hon'ble Member of Parliament, Purvi Champaran and Former Union Minister of Agriculture & Farmers' Welfare, for his continued encouragement towards strengthening agricultural development and fostering closer linkages between research institutions and farming communities.

The editors gratefully acknowledge the invaluable leadership, guidance, and support of Dr. S. K. Purbey, the then Director, ICAR–MGIFRI, Motihari, under whose leadership the campaign was implemented. His encouragement, administrative

support, and emphasis on extending scientific knowledge beyond institutional boundaries and addressing farmers' needs through practical, location-specific solutions contributed significantly.

The editors also express their sincere gratitude to Dr. Raghavendra Singh, Director, ICAR–MGIFRI, Motihari, for his continued guidance, encouragement, and institutional support in the compilation, documentation, and publication of this bulletin. His support has been instrumental in bringing the experiences, field-level achievements, and key outcomes of the campaign together in the present publication.



We sincerely appreciate the active collaboration and valuable support extended by KVK, Piprakothe; KVK, Parsauni; KVK, Sheohar; and RPCAU, Pusa, with special appreciation to the scientists, technical personnel, and supporting staff of

PDUCH&F, Piprakothi, for their active participation and field-level support throughout the campaign.

We also gratefully acknowledge the cooperation of the District Agriculture Departments of East Champaran and Sheohar, and other collaborating institutions and stakeholders. Their coordinated efforts were instrumental in organizing village-level programmes, facilitating farmer-scientist interactions, supporting field and crop visits, mobilizing farming communities,

Our deepest gratitude is reserved for the farmers of East Champaran and Sheohar, whose active participation gave the campaign its true meaning. Their willingness to share experiences, field-outreach and impact of the campaign across the two districts. We record our deep appreciation for the dedicated efforts of the scientists, subject-matter specialists, technical officers, technical and supporting staff, administrative personnel, and field functionaries of level challenges, traditional knowledge, expectations, and feedback transformed VKSA from a technology-

dissemination programme into a genuine two-way exchange between farmers and science.

ICAR-MGIFRI and collaborating institutions. Through the collective efforts of six multidisciplinary teams, the campaign conducted 252 programmes across 252 villages and directly reached 35,980 farmers in East Champaran and Sheohar districts.

The questions raised in their fields and villages have provided valuable direction for future research, extension, and policy interventions.





We also acknowledge all those involved in photography, field documentation, data compilation, media coverage, report preparation, editing, designing, and compilation of this publication. Their contributions have helped preserve the experiences and outcomes of the campaign and communicate its larger message to a wider audience.

The publication, *Taking Science to Farmers: The Viksit Krishi Sankalp Abhiyan-2025 Story—From Farmer Voices to Science-Led*

Solutions in East Champaran and Sheohar, is dedicated to the farming communities who welcomed scientists into their villages and fields and demonstrated that meaningful agricultural transformation begins with science that listens, learns, responds, and works alongside farmers.

We hope that this publication will serve not merely as a record of VKSA, but as a resource and inspiration for scientists, extension professionals, students policymakers, development agencies, and farming

communities working collectively towards resilient agriculture, prosperous farmers, and the national vision of Viksit Krishi for Viksit Bharat@2047.

Editors

About Viksit Krishi Sankalp Abhiyan (VKSA)



Agriculture remains central to India's food and nutritional security, rural livelihoods, and economic development. However, farming communities increasingly face multiple and interconnected challenges,

including climate variability, declining soil health, emerging pests and diseases, water scarcity and waterlogging, rising input costs, limited access to quality seed, post-harvest losses, market uncertainties, and

gaps in the timely adoption of improved agricultural technologies. Addressing these challenges requires more than the generation of new technologies; it demands a strong and continuous interface between

scientists and farmers, where scientific knowledge reaches the field and farmers' experiences, concerns, and aspirations inform future research and extension priorities.



Recognizing this need, the VKSA was launched on 29 May 2025 by the Hon'ble Union Minister of Agriculture and Farmers' Welfare, Shri Shivraj Singh Chouhan, from Puri, Odisha. Conceived as a nationwide initiative to bridge the gap between agricultural research and field-level practice, the campaign brought agricultural scientists and extension professionals directly to farming communities. VKSA reflects the broader national vision of Viksit Bharat@2047, with an emphasis on science-led, farmer-centric, climate-resilient, productive, and sustainable agricultural development.

The campaign is founded on a simple but transformative principle: science must reach farmers, and farmers' voices must reach science. Rather than functioning solely as a technology-dissemination

programme, VKSA created a two-way platform through which scientists could share improved technologies and scientific advisories while simultaneously listening to farmers, diagnosing field-level problems, documenting local experiences, collecting feedback, and identifying emerging research needs. The major objectives of VKSA included promoting improved and location-specific agricultural technologies; strengthening farmer–scientist interaction; creating awareness about Central and State Government agricultural schemes; promoting climate-resilient agriculture and Integrated Farming Systems (IFS); encouraging sustainable and eco-friendly farming practices; enhancing the adoption of ICAR technologies; identifying location-specific production constraints; and systematically capturing farmers' feedback for future research planning. The campaign therefore connected technology dissemination, field diagnosis, capacity building, farmer feedback, research prioritization, and institutional convergence within a common framework.

VKSA was implemented through a collaborative institutional framework involving ICAR, the Ministry of Agriculture & Farmers' Welfare, State Agriculture Departments, KVKs, AUs, and allied line departments. In Bihar, ICAR–MGIFRI, Motihari, coordinated the campaign activities in East Champaran and Sheohar districts in close collaboration with KVK Piprakothi, KVK Parsauni, KVK Sheohar, RPCAU, particularly PDUCH&F, Piprakothi,

Agriculture Departments and other associated institutions and stakeholders. This coordinated institutional effort enabled multidisciplinary scientific expertise to reach farmers directly, facilitated effective farmer–scientist interactions and field-level demonstrations, and ensured that farmers' concerns, indigenous experiences, and field observations were systematically documented for developing practical and location-specific solutions.

During the campaign conducted from 29 May to 12 June 2025, six multidisciplinary teams conducted 252 programmes across 252 villages, directly reaching 35,980



farmers in East Champaran and Sheohar. The teams engaged farming communities through farmer–scientist interactions, diagnostic visits, on-field crop observations, agri-drone demonstrations etc. Digital mechanisms were also used to document farmer feedback and field experiences.





The campaign addressed the diverse nature of farming in the region, encompassing rice-wheat, rice-mustard, rice-potato, maize-wheat, rice-maize, rice-wheat-green gram, rice-lentil, maize-lentil, sugarcane-based systems, vegetables, and mango and litchi orchards. Farmers were sensitized to soil-test-based nutrient management, climate-resilient crop varieties, crop diversification, Integrated Farming Systems, resource conservation, natural and organic farming practices, precision technologies such as agri-drones, scientific livestock and fisheries management, protected cultivation, orchard rejuvenation, high-density planting, integrated pest management, and value-addition opportunities.

Importantly, VKSA also functioned as a large-scale field diagnostic exercise. Direct



interactions revealed critical challenges related to waterlogging and irrigation, timely availability of quality seed, crop diseases and insect pests, mango and litchi orchard health, livestock diseases and reproductive disorders, mechanization, marketing, storage, post-harvest losses, and value addition. Farmers simultaneously expressed their expectations for climate-resilient varieties, site-specific production technologies, village seed banks, digital advisory systems, Integrated Farming Systems, zero-tillage and raised-bed cultivation, improved post-harvest infrastructure, and more village-level demonstrations. These voices provided valuable inputs for identifying researchable issues, policy gaps, and future research priorities.

This publication, *Taking Science to Farmers: The Viksit Krishi Sankalp Abhiyan-2025 Story—From Farmer Voices to Science-Led Solutions in East Champaran and Sheohar*, documents this journey from scientific

outreach to farmer interaction, from field observations to problem identification, and from farmer voices to future science-led solutions.



More than a record of programmes and activities, it presents VKSA as a model of participatory agricultural extension in which farmers are not merely recipients of technology but active partners in shaping research, extension, and development priorities. It is hoped that the experiences, technologies, field insights, and lessons documented in this volume will provide a useful reference for scientists, extension professionals, students, policymakers, development agencies, and farming communities, while contributing to the larger national vision of Viksit Krishi for Viksit Bharat@2047.



About ICAR–MGIFRI



The ICAR–Mahatma Gandhi Integrated Farming Research Institute (ICAR–MGIFRI), Motihari, Bihar, is an institute of the Indian Council of Agricultural Research (ICAR) committed to advancing integrated, resource-efficient, climate-resilient, and sustainable farming systems for improving farm productivity, profitability, and rural livelihoods. Located in the historic land of Champaran, the Institute seeks to translate agricultural science into practical solutions that respond to the needs of farmers and contribute to sustainable agricultural development.

Integrated Farming Systems (IFS) constitute a central focus of the Institute's research and development efforts. Through a multidisciplinary approach, ICAR–MGIFRI brings together expertise in crop production, horticulture, livestock, fisheries, soil and water management, agricultural

engineering, natural resource management, agricultural economics, and extension sciences. Such integration enables the development and evaluation of farming-system approaches that make efficient use of available land, water, nutrients, biomass, labour, and other farm resources while creating multiple and more stable livelihood opportunities for farming households.



The Institute places particular emphasis on addressing the emerging challenges confronting agriculture, including climate variability, soil and natural resource degradation, water-related constraints, rising production costs, pest and disease pressures, and the need for sustainable intensification and diversification. Its research and field programmes promote approaches such as Integrated Farming Systems, soil-health management, balanced and integrated nutrient management, resource conservation, crop diversification,

resource recycling, climate-resilient agriculture, farm mechanization, horticulture-based systems, livestock and fisheries integration, and environmentally responsible farming practices.



A defining feature of ICAR–MGIFRI's approach is its emphasis on connecting research with field realities. Scientific knowledge becomes more meaningful when technologies are evaluated under farmers' conditions and refined through their experiences and feedback. Accordingly, the Institute undertakes field demonstrations, adaptive research, diagnostic visits, farmer-participatory activities, technology validation, capacity-building programmes, and scientific advisories to facilitate the movement of knowledge from research institutions to farms and, equally importantly, the flow of farmers' observations and emerging challenges back into research planning.

Extension, capacity building, and technology dissemination therefore form an important part of the Institute's activities. Through collaboration with KVKs, AUs, State Agriculture and allied departments, extension agencies, local institutions, and farming communities, ICAR–MGIFRI facilitates farmer–scientist. Importantly, VKSA also demonstrated the

researchable issues, recommendations, interactions, village-level programmes, demonstrations, trainings, exposure activities, and participatory learning. This collaborative approach strengthens the interface among research, extension, institutions, and farmers and supports wider dissemination of appropriate agricultural technologies.

Through multidisciplinary research, field- The VKSA exemplifies this commitment to taking agricultural science directly to farming communities. In East Champaran and Sheohar, six multidisciplinary teams conducted 252 programmes across 252 villages and reached 35,980 farmers during the campaign.

Farming oriented innovation, institutional



Institute's commitment to listening to farmers as partners in innovation. Field interactions brought forward concerns related to waterlogging, quality seed, crop and livestock health, horticultural production, mechanization, post-harvest management, markets, and location-specific technology needs. These farmer voices were subsequently translated into

policy concerns, and future research priorities—illustrating how agricultural research can become increasingly demand-driven and responsive to local conditions.

As Indian agriculture moves towards the vision of Viksit Bharat@2047, ICAR–MGIFRI remains committed to strengthening the connection between science, farming systems, and farmers.

partnerships, and participatory extension, the Institute seeks to contribute to farming systems that are more productive, profitable, resource-efficient, climate-resilient, and sustainable.

**Science for Sustainable Farming
Innovation for Farmers
Integrated Solutions for Resilient
Agriculture**

Executive Summary



Farmer–scientist interactions under the VKSA brought agricultural science directly to farming communities of East Champaran and Sheohar. Through village-level engagement, field diagnosis, technology demonstrations, and participatory discussions, the campaign created a two-way pathway—from scientific knowledge to farmers and from farmer voices to future research, extension, and policy priorities.

Agriculture remains central to India's food

and nutritional security, rural livelihoods, and economic development. Yet farming communities increasingly face interconnected challenges arising from climate variability, soil and water constraints, emerging pests and diseases, rising production costs, inadequate access to quality seed, post-harvest losses, market uncertainties, and gaps between available agricultural technologies and their field-level adoption. Responding effectively to

these challenges requires not only scientific innovation but also a strong mechanism through which science reaches farmers and farmers' experiences inform science.

Against this backdrop, the VKSA was launched on 29 May 2025 by the Hon'ble Union Minister of Agriculture and Farmers' Welfare, Shri Shivraj Singh Chouhan, from Puri, Odisha. Conceived as a nationwide movement to strengthen the interface between agricultural research, extension,

and farming communities, VKSA sought to take improved technologies, scientific advisories, and information on agricultural programmes directly to villages while simultaneously documenting farmers' problems, experiences, expectations, and emerging technology needs. The initiative reflects the larger national aspiration of Viksit Bharat@2047 through science-led, farmer-centric, climate-resilient, and sustainable agricultural development.



The campaign was built around a powerful two-way philosophy: taking science to farmers and bringing farmer voices back to science. Farmer–scientist interactions were therefore not treated merely as platforms for transferring recommendations. They became opportunities for scientists to observe crops and farming systems under actual field conditions, diagnose location-specific problems, understand adoption constraints, receive direct feedback on technologies, and identify questions requiring further scientific investigation.



This participatory approach transformed VKSA from a conventional outreach programme into a broader exercise in knowledge exchange, field diagnosis, and demand-driven research prioritization.

In Bihar, ICAR–MGIFRI, Motihari, implemented VKSA across East Champaran

and Sheohar districts from 29 May to 12 June 2025. Six multidisciplinary teams were deployed across the campaign area. Collectively, they conducted 252 programmes in 252 villages and directly reached 35,980 farmers, creating an extensive interface among scientists, extension personnel, collaborating institutions, and farming communities.



The campaign adopted a diverse portfolio of field-oriented activities. Farmer–scientist interaction meetings enabled direct dialogue and resolution of farmers' queries; diagnostic field visits and crop observations helped scientists identify location-specific production problems; and technical literature, advisories, and awareness programmes provided farmers with accessible scientific information. Demonstrations and discussions covered soil health, IFS, vermicomposting, natural farming, livestock, poultry, fisheries, resource-conservation technologies, and modern approaches such as agri-drone-based input application. Information on

relevant Central and State Government agricultural schemes was also shared, while digital feedback mechanisms helped systematically document farmers' responses and experiences.



A major strength of VKSA was its engagement with the diversity of farming systems prevailing in East Champaran and Sheohar. The region supports rice-wheat, rice-mustard, rice-potato, maize-wheat, rice-maize, rice-wheat-green gram, rice-lentil, maize-lentil, diversified vegetable systems, sugarcane-based systems, and perennial mango and litchi orchards. This diversity required technologies and recommendations to be viewed through the lens of local soils, water regimes, cropping sequences, farm

resources, and market opportunities rather than through generalized production packages.

Climate-resilient and sustainable crop production constituted an important theme of the campaign. Farmers were sensitized to improved and climate-resilient crop varieties, crop diversification, resource-conservation technologies, balanced and soil-test-based nutrient management, and sustainable approaches to crop production. Particular attention was given to farming situations affected by climatic and hydrological stresses, especially low-lying and waterlogged areas, where conventional crop production frequently becomes vulnerable.



IFS emerged as another major pathway for improving the resilience and profitability of smallholder agriculture. Farmers were introduced to approaches that integrate crops with livestock, fisheries, horticulture, poultry, and other complementary enterprises. Such integration was promoted as a means of improving resource recycling, utilizing farm by-products, generating multiple income streams, reducing dependence on a single enterprise, and

enhancing resilience against climatic and market shocks. In low-lying and waterlogged areas, fish farming integrated with other farm enterprises was highlighted as an opportunity to convert a production constraint into a livelihood resource.

Soil health and scientific nutrient management were promoted through awareness on appropriate soil sampling, soil testing, balanced fertilizer use, organic amendments, vermicomposting, and integrated nutrient management. Farmers were encouraged to move towards nutrient-management decisions informed by soil conditions and crop requirements rather than indiscriminate input application. These interventions were linked with the broader goals of improving nutrient-use efficiency, maintaining soil productivity, reducing unnecessary expenditure on inputs, and safeguarding the natural resource base.

The campaign also brought modern agricultural technologies and mechanization closer to farmers. Agri-drone demonstrations familiarized farming communities with precision application of agricultural inputs and highlighted potential savings in labour, time, water, and chemicals. The concept of Custom Hiring Centres (CHCs) was promoted as a mechanism through which small and marginal farmers could gain access to costly agricultural machinery without requiring individual ownership. Such interventions demonstrated how appropriate mechanization and emerging technologies

could complement traditional farming systems.



Crop protection activities emphasized integrated and environmentally responsible pest management. Farmers were introduced to natural pesticide formulations, Trichoderma-based biological approaches, light traps, sticky traps, pheromone traps, and other integrated pest-management tools. Scientific advisories also addressed recurring crop and horticultural problems encountered during field visits, creating an opportunity for immediate interaction between farmers and subject-matter specialists.



Horticulture and orchard management received particular attention because mango and litchi constitute important components of the agricultural landscape of the region. Farmers were sensitized to scientific orchard management, rejuvenation of old mango and litchi orchards, high-density planting approaches, protected cultivation, and improved management of pests and diseases. The campaign also documented field concerns such as mango dieback and sudden wilt, fruit fly, stem borer, irregular bearing, fruit drop, cracking, and other production constraints requiring continued scientific attention.

Livestock, poultry, and fisheries were treated as integral components of farm livelihoods rather than secondary enterprises. Farmers received information on year-round fodder production, livestock vaccination, animal health, livestock-based IFS models, and fish farming in lowland areas. At the same time, farmer interactions brought attention to practical problems including mastitis, Foot & Mouth Disease, repeat breeding, anestrus, and mortality in goats and poultry chicks, highlighting the importance of stronger animal-health services and locally appropriate livestock technologies.

VKSA also recognized the importance of farm women and household-level entrepreneurship. Activities related to mushroom cultivation, herbal rose products, value addition of tomato and potato, and candle making were introduced

as potential income-generating enterprises. Such interventions expanded the campaign beyond crop production and demonstrated the role of diversification, processing, and value addition in strengthening rural livelihoods.

Perhaps the most significant outcome of the campaign was what scientists heard and observed in farmers' fields. Recurring concerns included waterlogging, irrigation



shortages, soil erosion, non-availability and delayed supply of quality seed, high seed costs, crop diseases and pests, horticultural disorders, livestock health problems, inadequate mechanization, low prices for agricultural produce, limited storage and processing facilities, weak market linkages, and insufficient FPO support.

These field realities demonstrated that improving agricultural productivity requires simultaneous attention to technology, infrastructure, institutions, markets, and policy.

Farmers also clearly articulated what they expected from the agricultural research and extension system. Their priorities included climate-resilient and waterlogging-tolerant crop varieties, site-specific production technologies, timely availability of quality seed, village seed banks, IFS models, zero-tillage and raised-bed cultivation, digital agro-advisories, post-harvest infrastructure, crop-residue management solutions, continued capacity building, and more village-level demonstrations. These expectations provide an important farmer-defined roadmap for future interventions.

Importantly, the campaign translated these field observations into a set of researchable issues and scientific priorities. Waterlogging experienced by farmers generated questions around tolerant varieties, raised-bed cultivation, drainage management, and location-specific IFS models. Seed shortages highlighted the need for decentralized seed production and village seed banks. Problems such as mango dieback, chilli leaf curl, tomato wilt, and the short post-harvest life of litchi emerged as specific areas requiring scientific intervention. Similarly, livestock diseases

and reproductive disorders highlighted the need for improved surveillance, diagnostics, and low-cost management technologies. Thus, farmer problems were progressively transformed into research questions capable of guiding future scientific programmes.



The field evidence also highlighted broader policy and institutional priorities, including village-level Custom Hiring Centres, stronger Farmer Producer Organizations, improved convergence among ICAR, KVKs, State Departments and extension agencies, drainage and waterlogging-management

infrastructure, fishery development, strengthened livestock value chains, better rural markets, and accessible post-harvest and processing facilities. VKSA therefore generated insights extending well beyond immediate technical recommendations to the enabling environment required for sustainable agricultural transformation.

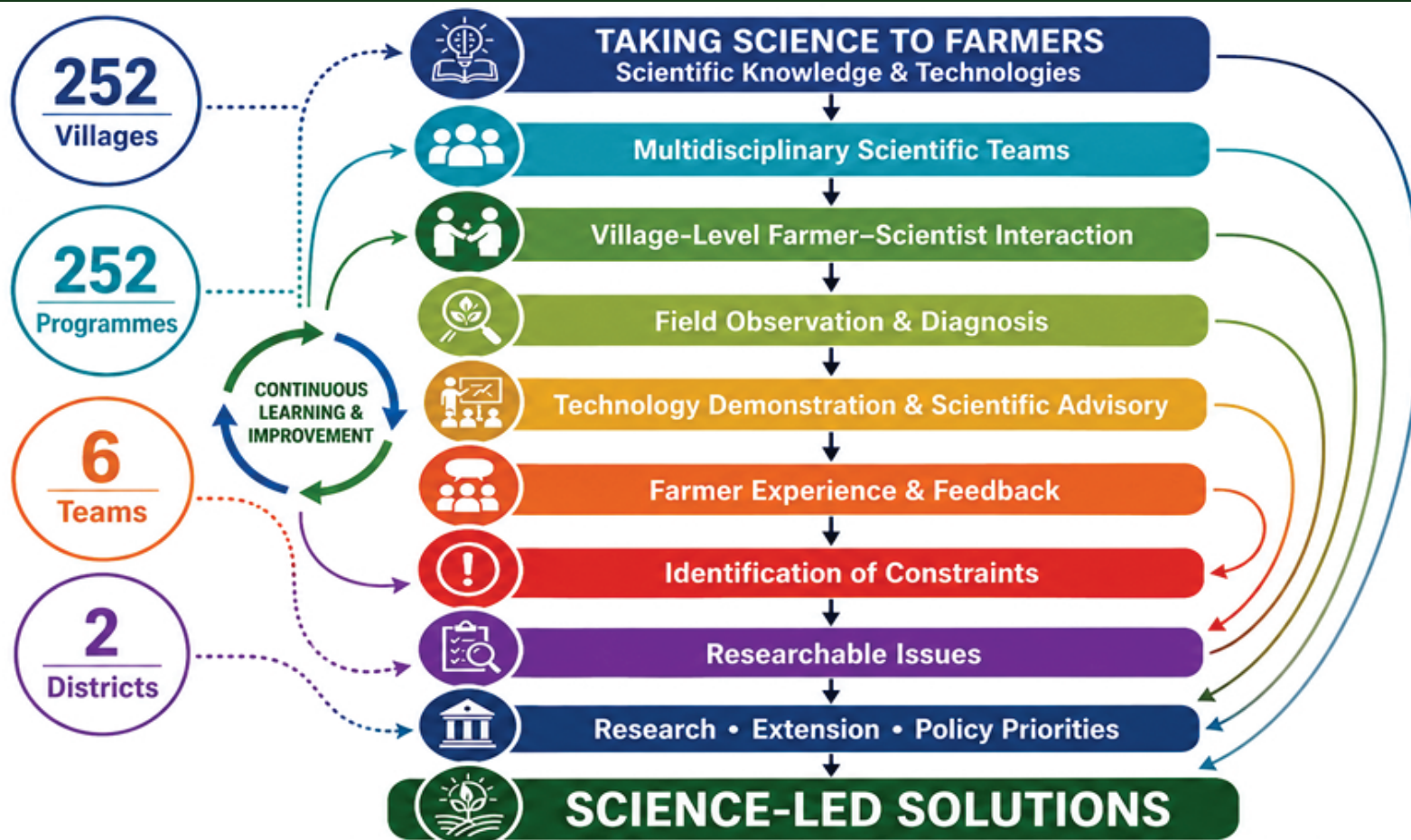
The experience of VKSA reinforces a fundamental lesson for agricultural development: farmers are not simply end-users of technologies; they are essential partners in the innovation process. Effective agricultural research begins with understanding the field, listening to farmers, diagnosing problems scientifically, adapting solutions to local conditions, and maintaining a continuous dialogue between research and practice.

In this sense, the campaign's achievement extends beyond the impressive outreach of 35,980 farmers in 252 villages. Its greater contribution lies in strengthening a pathway through which science travelled to the villages, farmers' voices travelled back to research institutions, and field realities began shaping future science-led solutions.

This two-way partnership provides a strong foundation for demand-driven research, responsive extension, resilient farming systems, and the broader national aspiration of Viksit Krishi for Viksit Bharat@2047.



Farmer–scientist interactions during the VKSA in East Champaran and Sheohar, Bihar. Six multidisciplinary teams travelled across 252 villages, directly engaging 35,980 farmers through field visits, diagnostic interactions, technology demonstrations, scientific advisories, and participatory discussions. The campaign created a two-way knowledge pathway—taking science to farmers while bringing farmers' experiences, challenges, and expectations back into research, extension, and policy planning.



This infographic illustrates the two-way knowledge pathway followed under VKSA, connecting scientific knowledge with farmers' field realities. Multidisciplinary scientific teams engaged directly with farming communities through village-level interactions, field observations, diagnostic visits, technology demonstrations, and scientific advisories. Farmers' experiences and feedback helped identify production constraints, technology gaps, and emerging researchable issues. These field-based insights were subsequently translated into priorities for research, extension, and policy. The pathway highlights VKSA as a participatory model in which scientific knowledge reaches farmers while farmers' voices simultaneously guide future innovation, ultimately enabling locally relevant, practical, and science-led agricultural solutions.



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CHAPTER 1

The Sankalp: Taking Science to the Fields

A national mission connecting agricultural science with farmers, their fields, and their aspirations



Agricultural progress depends not only on developing new technologies but also on ensuring that those technologies reach farmers in forms that are relevant, practical, affordable, and suited to local conditions. At the same time, agricultural research becomes more responsive when scientists directly understand the challenges farmers face in their fields. The VKSA was conceived

around this vital connection bringing science closer to farmers while bringing farmers' experiences and expectations closer to the research and extension system.

National Mission Reaches the Village:

The VKSA was launched on 29 May 2025 by the Hon'ble Union Minister of Agriculture and Farmers' Welfare, Shri Shivraj Singh

Chouhan, from Puri, Odisha. Envisioned as a nationwide movement, the campaign sought to bridge the gap between agricultural research and field-level practice by creating direct interaction among scientists, extension personnel, government agencies, and farming communities.

VKSA was implemented through a collaborative framework involving the ICAR, Ministry of Agriculture & Farmers' Welfare, State Agriculture Departments, KVKs, AUs, and allied line departments.



This convergence created a mechanism through which scientific knowledge and improved agricultural technologies could move beyond research institutions and reach farmers directly at the village level.

For farmers, the campaign created opportunities to interact directly with scientists, discuss field problems, understand improved agricultural practices, learn about new technologies, and obtain scientific advice relevant to their farming situations. For scientists, every village visit became an opportunity to observe agricultural problems under actual field conditions and understand farmers' experiences, priorities, and expectations.

VKSA was therefore not simply about taking a message to the village. It was about

creating a conversation between science and the field.

Why VKSA?: Agriculture is becoming increasingly knowledge-intensive. Farmers must make decisions related to varieties, seed, nutrients, water, crop protection, mechanization, livestock, horticulture, markets, and changing climatic conditions. Yet the effectiveness of a technology depends greatly on whether it is appropriate for the farmer's soil, farming system, available resources, and local production environment.



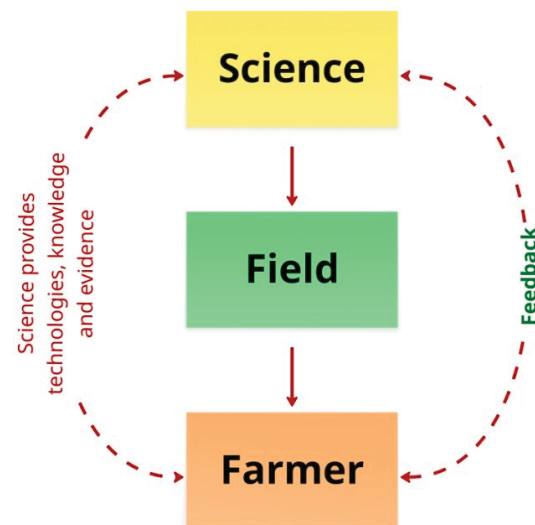
The farming situations encountered during VKSA in East Champaran and Sheohar demonstrated this complexity. The region supports diverse systems ranging from rice-wheat, rice-mustard and rice-potato to maize-based systems, pulses, vegetables, sugarcane, and mango and litchi orchards. Farmers simultaneously confront problems associated with waterlogging and irrigation, seed availability, crop pests and

diseases, livestock health, orchard management, mechanization, marketing, and post-harvest management.

Such diversity means that a single generalized recommendation cannot address every farming situation. What is required is an extension approach in which scientists see the field, understand the problem, interact with the farmer, and connect appropriate science with local needs.

The Sankalp: At the heart of the campaign was a commitment to make agricultural development increasingly farmer-centric, science-led, climate-resilient, and sustainable.

The campaign sought to strengthen the connection between four essential elements:



- SCIENCE provides technologies, knowledge and evidence.
- The FIELD provides the real environment in which those technologies must perform.
- FARMERS contribute experience, observations and local knowledge.
- FEEDBACK reveals constraints, technology gaps and emerging needs.
- SCIENCE responds again through improved research, technologies and recommendations.

This continuous cycle is the essence of the VKSA approach.

From Technology Transfer to Two-Way Knowledge Exchange:

Traditional extension is often viewed as a one-directional pathway:

Research → Extension → Farmer

VKSA demonstrated a broader approach:

Research ⇌ Extension ⇌ Farmer ⇌ Field

Scientists did not visit villages only to explain technologies. Through farmer–scientist interactions, diagnostic visits and on-field crop observations, they also documented field problems and location-specific constraints. Farmer feedback was collected, including through digital mechanisms, while success stories and promising practices were identified for wider learning.

Consequently, the campaign generated two

important flows of knowledge:

Science to Farmers: improved technologies, scientific advisories, climate-resilient practices, Government schemes, resource-conservation approaches and improved management practices.

Farmers to Science: field problems, technology gaps, adoption constraints, expectations, local experiences and emerging research questions.

This two-way exchange ultimately became one of the most valuable outcomes of VKSA.

Objectives

- Connect Farmers Directly with Scientists
- Take Improved Technologies to the Field
- Promote Climate-Resilient Agriculture
- Identify Location-Specific Constraints
- Listen to Farmers
- Promote Integrated Farming Systems
- Encourage Sustainable Farming
- Accelerate Adoption of ICAR Technologies
- Create Awareness of Government Programmes

These objectives are consistent with those documented in the VKSA campaign material.

From National Vision to Local Action: The strength of VKSA lay in converting a national initiative into village-level engagement.



In Bihar, ICAR–MGIFRI, Motihari, coordinated campaign activities in East Champaran and Sheohar. The Institute's involvement enabled multidisciplinary scientific expertise to interact directly with farming communities and helped ensure that technologies and recommendations were discussed within the context of local farming conditions.

The approach was straight forward:

- Go to the village.
- Meet the farmer.
- Walk through the field.
- Listen to the problem.
- Diagnose scientifically.
- Discuss practical solutions.
- Document what science still needs to answer.

This approach transformed villages from merely destinations for technology dissemination into important sources of knowledge for future research and extension.

A Sankalp Takes Root

- From laboratories to landscapes.
- From scientific knowledge to farmers' fields.
- From farmers' questions to research priorities.
- VKSA began a two-way journey between science and the farmer.



CHAPTER 2

The Journey: 252 Villages, One Mission

15 Days 2 Districts 6 Teams 252 Villages 35,980 Farmers



A visual representation of the stepwise field engagement process under VKSA, illustrating the journey from village entry and farmer-scientist interaction to field observation, problem diagnosis, technology demonstration, scientific advisory, awareness of Government support mechanisms, farmer feedback, and identification of emerging researchable issues for developing science-led solutions.

The VKSA moved from vision to action through an intensive village-level campaign across East Champaran and Sheohar districts of Bihar. Between 29 May and 12 June 2025, multidisciplinary teams of scientists and extension professionals travelled across the campaign landscape, meeting farmers in their villages and fields, observing local farming situations, discussing production constraints, demonstrating technologies, and providing

scientific advisories.



The scale was substantial: 252 programmes were conducted across 252 villages, directly reaching 35,980 farmers. Behind these numbers was a much larger story—of scientists travelling to farming communities, farmers openly sharing their concerns, technologies being discussed under real field conditions, and each interaction contributing to a better understanding of local agriculture.

From Sankalp to the Village: The strength of VKSA lay in taking the campaign directly to the places where agricultural decisions are made—the village, the farm and the field.

Rather than depending solely on centralized training programmes, the campaign adopted a decentralized outreach approach. Scientific teams travelled across the two districts and interacted directly

with farming communities. Farmer meetings were complemented by diagnostic field visits, crop observations, technology demonstrations, technical advisories, awareness activities, and collection of farmer feedback.

This field-oriented approach enabled the campaign to address two objectives simultaneously:

- Taking science outward—bringing improved technologies, knowledge and scientific advice closer to farmers.
- Bringing knowledge inward—documenting farmers' experiences, field constraints, expectations and emerging research needs.

Thus, every village visited became both a place for technology dissemination and a source of evidence for future science.

The Campaign Landscape: represented diverse agricultural situations, cropping systems, resource conditions, and production challenges. East Champaran and Sheohar support intensive cereal-based agriculture alongside pulses, oilseeds, vegetables, sugarcane, horticulture, livestock and other allied enterprises.

The farming systems documented during the campaign included rice–wheat, rice–

mustard, rice-potato, maize-wheat, rice-maize, rice-wheat-green gram, rice-lentil, maize-lentil, sugarcane-based systems, diversified vegetables, and mango and litchi orchards.

This diversity made the two districts particularly valuable for farmer-scientist engagement. The questions raised in one village could differ considerably from those encountered in another. A farmer managing a low-lying rice field faced different challenges from an orchardist managing mango or litchi, a vegetable grower dealing with pest pressure, or a livestock farmer concerned about animal health.



One campaign therefore encountered many agricultures.

Understanding this diversity became an important part of the VKSA journey.

Six Teams, One Mission: The extensive geographical coverage of VKSA was made possible through the deployment of six

multi disciplinary teams, drawing expertise from ICAR-MGIFRI, Krishi Vigyan Kendras and collaborating institutions.



Multidisciplinary Science on the Move: Agricultural problems rarely belong to a single discipline. A crop showing poor growth may involve soil fertility, water management, disease, seed quality or crop management. An orchard problem may involve nutrition, insect pests, disease, canopy management and weather conditions simultaneously. Likewise, improving farm income may require integrating crops with livestock, fisheries, horticulture, mechanization and market opportunities.

The deployment of multi disciplinary teams therefore enabled VKSA to view farmers' problems from a broader farming-system perspective.

The scientific teams engaged farmers on issues spanning:

- Crop production
- Soil health
- Horticulture
- Crop protection
- Livestock

- Fisheries
- Integrated Farming Systems
- Mechanization
- Natural resource management
- Post-harvest management
- Government programmes

This multi disciplinary character helped shift the conversation from individual crop recommendations towards whole-farm solutions.

- **More Than a Farmer Meeting:** a distinguishing feature of the campaign was the diversity of activities undertaken during village visits.
- **Farmer-Scientist Interactions:** direct discussions enabled farmers to ask questions and scientists to understand the practical realities of agricultural production.
- **Diagnostic Field Visits:** Scientists moved from the meeting place into farmers' fields to observe crop health, production conditions and location-specific constraints.
- **Technology Demonstrations:** Practical demonstrations provided farmers with opportunities to see technologies rather than merely hear about them.
- **Scientific Advisories:** Field observations were connected with appropriate management recommendations and improved practices.
- **Knowledge Materials:** Leaflets, folders

and advisories provided farmers with technical information for subsequent reference.

- **Government Scheme Awareness:** Farmers were informed about relevant agricultural support, subsidy, insurance and welfare programmes.
- **Farmer Feedback:** Feedback mechanisms, including digital

documentation, helped capture farmers' responses, technology needs and field experiences.

- **Success Stories:** Progressive farmers and promising practices were documented to facilitate wider learning and replication.

These activities collectively made each VKSA programme a multidimensional

learning platform, rather than a conventional awareness meeting.



CHAPTER 3

Understanding the Fields: Farming Systems of East Champaran and Sheohar

Every field tells a different story. Understanding that diversity is the first step towards delivering the right science to the right farmer:



The journey of VKSA across East Champaran and Sheohar revealed an agricultural landscape characterized by diversity. Rice-dominated fields coexist with maize, wheat, pulses, oilseeds, sugarcane, vegetables, mango and litchi

orchards, while livestock, fisheries and other allied enterprises contribute to household livelihoods. Farmers operate under contrasting conditions—from low-lying and waterlogged fields to intensively cultivated uplands and perennial

orchards. Understanding these farming systems was essential because the effectiveness of any agricultural technology depends on the environment in which it is applied. Crop choice, water availability, soil conditions, farm resources, labour,

livestock, market opportunities and climatic risks collectively influence what farmers grow and how they manage their farms.



VKSA therefore provided scientists with an opportunity not only to introduce technologies but also to observe the farming landscape before prescribing solutions. The campaign documented several important cropping systems across the two districts, including rice-wheat, rice-mustard, rice-potato, maize-wheat, rice-maize, rice-wheat-green gram, rice-lentil, maize-lentil, diversified vegetable systems, sugarcane-based systems, and mango and litchi orchards.

One Region, Many Farming Systems:
Agriculture in East Champaran and Sheohar

cannot be represented by a single crop or production system. Farmers combine crops and enterprises according to their land situation, access to irrigation, seasonal water availability, household resources and livelihood requirements.

The major systems encountered during the campaign can broadly be viewed as:

1. Cereal-based systems; Rice-wheat
Maize-wheat Rice-maize
2. Cereal-pulse systems; Rice-lentil
Maize-lentil Rice-wheat-green gram
3. Cereal-oilseed systems; Rice-mustard
4. High-value systems; Rice-potato
Vegetable-based production
5. Commercial crop systems; Sugarcane-based farming
6. Perennial horticultural systems: Mango
Litchi Other fruit crops
7. Diversified farming systems/IFS; Cop +
livestock + fisheries + horticulture and
other complementary enterprises

This diversity created both opportunities and challenges for science-led agricultural development.

Rice: The Anchor of the Farming Landscape: Rice occupies a central position in the farming systems encountered during VKSA. It forms the kharif-season foundation of several important crop sequences, including:

Rice → Wheat

Rice → Mustard

Rice → Potato

Rice → Maize

Rice → Lentil

Rice → Wheat → Green gram

The crop therefore influences not only kharif productivity but also the timing, establishment and performance of subsequent rabi and summer crops.



Story message—In much of the campaign landscape, the farming year begins with rice—but the success of the entire cropping system depends on what happens before and after it.

Climate-resilient varieties

1. Rice: Swarna Sub-1, Sahbhagi Dhan, Rajendra Bhagwati, R. Mansuri, R. Sweta, R. Kasturi, Sabour Ardhjal, S. Deep, S. Shree, S. Sampann, S. Harsit, Swarna (MTU 7029), Samba Mahsuri (BPT 5204), MTU 1010, Naveen, Prabhat, Pusa 44, Pusa Basmati 1121; 1509; 1718; 1847; 1885, Arize 6444 Gold, 27P31, 27P37, DRR Dhan 42, DRR Dhan 44.
2. Wheat: HD 2967, HD 3086, HD 3226, HD 2851, HD 3271, HD 3298, HD 3385, DBW 187 (Karan Vandana), DBW 222, DBW 252, DBW 303 (Karan Vaishnavi), DBW 327, DBW 332, DBW 371, PBW 343, PBW 550, HI 1563, HI 1612, Shriram 303.
3. Mustard: Pusa Mustard 25; 26; 29; 30, Pusa Double Zero Mustard 31, Varuna, Kranti, Pusa Bold, Rohini and Rajendra Sufalam.
4. Maize: Pusa HM4, Pusa HM8, Pusa HM9, Pusa HM10, NK 6240, NK 6802, NK 7884, P3355, P3388, DKC series.
5. Green gram (Mungbean): Pusa Vishal, Pusa Ratna, Pusa 9531, Pusa 0672, Pusa 0871, Pusa 1431, Pusa 1371, SML 668,

SML 832, IPM 02-3, IPM 02-14, IPM 2-14, HUM 16, HUM 12, Samrat, Virat and Shikha.

6. Pigeonpea (Arhar): Pusa 9, Pusa 991, Pusa 992, Pusa 2001, Pusa 2002, Pusa Arhar 16, Pusa Arhar 19, UPAS 120, Bahar, Narendra Arhar 1, Narendra Arhar 2, IPA 203, IPA 15-1 and Rajendra Arhar 1.
7. Lentil (Masoor): Pusa Vaibhav, Pusa 4076, Pusa 4077, Pusa Ageti Masoor, Pusa Shivalik, Pusa Masoor 5, Pusa Masoor 6, Pusa Masoor 7, L 4076, PL 406, PL 639, HUL 57, IPL 81, IPL 316, KLS 218 and DPL 62.

Water Shapes the Farming System—One of the strongest messages emerging from field interactions was the influence of water availability and excess water on agricultural choices.

Farmers reported two apparently contrasting constraints:

Too much water—Waterlogging in low-lying areas can restrict conventional crop production and affect crop establishment and productivity.

Too little water—Irrigation shortages can constrain crop intensification and limit the adoption of improved production practices. VKSA therefore highlighted the need for solutions adapted to different hydrological situations, including:

- Waterlogging-tolerant varieties
- Raised-bed cultivation
- Improved drainage
- Efficient irrigation
- Water-saving technologies
- Fish farming in low-lying areas
- Location-specific IFS

Beyond Crops/IFS: The Whole Farm Matters

The VKSA journey also reinforced that a farm cannot always be understood through crops alone.

For many households, livelihoods are built through combinations of:

Crops + Horticulture + Livestock + Fisheries + Poultry + Farm Enterprises

This whole-farm perspective is central to the concept of Integrated Farming Systems (IFS).



The campaign promoted IFS models integrating crops with livestock, fisheries, horticulture and other complementary enterprises. Such integration was presented as an opportunity to improve resource recycling, diversify income sources and enhance farm resilience.

For low-lying and waterlogged areas, integration of fishery with other farm enterprises was particularly relevant.

A constraint can become an opportunity when the farming system is redesigned around the resource.

From Farming Systems to Farmer-Specific Solutions- The diversity observed across East Champaran and Sheohar reinforced one of the fundamental principles of VKSA:

There is no single technology for every farmer, because there is no single farming situation: A technology appropriate for an irrigated rice-wheat field may not suit a waterlogged lowland. An orchard requires a different scientific approach from a vegetable field. A smallholder integrating livestock and crops requires different interventions from a specialized crop producer.



CHAPTER 4

Science Meets the Farmer

Conversations, field observations and participatory learning at the heart of VKSA



The true character of the VKSA emerged when scientists and farmers came together in villages and fields. The campaign moved beyond one-way communication and created opportunities for dialogue, observation, diagnosis, demonstration and feedback. Farmers could discuss their problems directly with subject-matter

specialists, while scientists could see the conditions under which agricultural decisions were actually being made.

The campaign used farmer-scientist interactions, diagnostic field visits, on-field crop observations, distribution of technical literature, awareness on Government schemes, technology demonstrations and

digital feedback mechanisms to create this direct interface.

The approach was simple: Meet the farmer. Listen to the question. Visit the field. Understand the problem. Share the science. Learn from the response.

When Scientists Reached the Village:

VKSA brought scientific interaction closer to farmers by organizing programmes directly within farming communities. Village-level meetings created accessible platforms where farmers could interact with scientists, raise questions, describe production constraints and seek technical

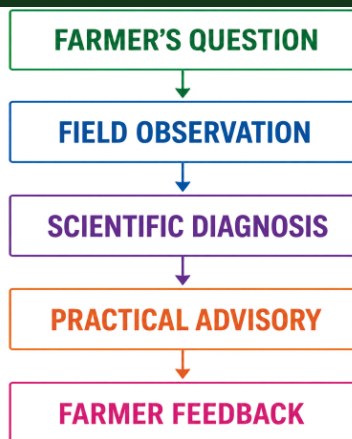
guidance relevant to their own farming situations.

These interactions were especially important because farmers' concerns often extended beyond a single crop or discipline. Discussions could move from seed and varieties to nutrient management, crop

protection, water, horticulture, livestock, fisheries, mechanization or Government support within the same interaction.



The Farmer–Scientist Dialogue: interactive farmer–scientist sessions provided a platform for farmers to directly discuss field-level concerns related to crop varieties, pest and disease management, waterlogging, fertilizer use, orchard rejuvenation, livestock health, and Government support prog. These two-way interactions enabled scientists to understand farmers' practical challenges and provide location-specific scientific advisories, strengthening participatory learning and the pathway towards Viksit Krishi.



Farmer-Scientist Problem-Solving Pathway under VKSA. The flowchart illustrates the participatory process through which farmers' questions were followed by field observation, scientific diagnosis, practical advisory, and farmer feedback. This two-way approach enabled scientists to understand field-level challenges, provide locally relevant recommendations, and use farmers' experiences to strengthen future research and extension priorities.

From the Meeting Place to the Field:

Some agricultural problems cannot be fully understood through conversation alone.

For this reason, diagnostic field visits and on-field crop observations formed an important part of the campaign. Scientists moved into farmers' fields to observe crop conditions and understand problems within their actual production environment.

This allowed field-level concerns to be viewed in relation to local management and growing conditions rather than in isolation.

Every Field Had a Question: The diagnostic interactions brought scientists face-to-face with diverse agricultural concerns. The campaign documentation records field-level problems across crop production, seed systems, water management, horticulture, livestock, mechanization, marketing and post-harvest management.

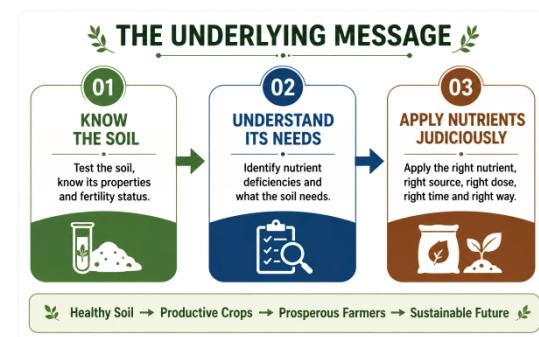
Crop-related discussions included diseases such as bacterial leaf blight and blast in paddy, pest problems in vegetables and cucurbits, rat damage, and concerns in mango orchards such as fruit fly and alternate bearing. Farmers also raised issues relating to waterlogging, irrigation shortages and soil erosion.

- Soil Health Card-based nutrient management
- Natural and balanced fertilizer use
- Integrated Farming Systems
- Improved and climate-resilient crop varieties
- Resource-conservation technologies
- Animal husbandry
- Fisheries and poultry as allied income sources
- Crop diversification
- Sustainable agricultural practices

- Relevant Government schemes
- The emphasis was therefore not simply on providing more information, but on connecting scientific knowledge with decisions that farmers make throughout the agricultural year.

Soil Health: Understanding Before Applying: Soil health formed an important component of farmer awareness under VKSA. Farmers were sensitized to Soil Health Card-based nutrient management and balanced fertilizer use, linking crop nutrition with the condition and requirements of the soil.

The underlying message was straight



forward:

Know the soil → Understand its needs → Apply nutrients judiciously

Discussions on soil health were complemented by awareness of sustainable nutrient-management approaches and practices intended to improve the efficiency of farm inputs.

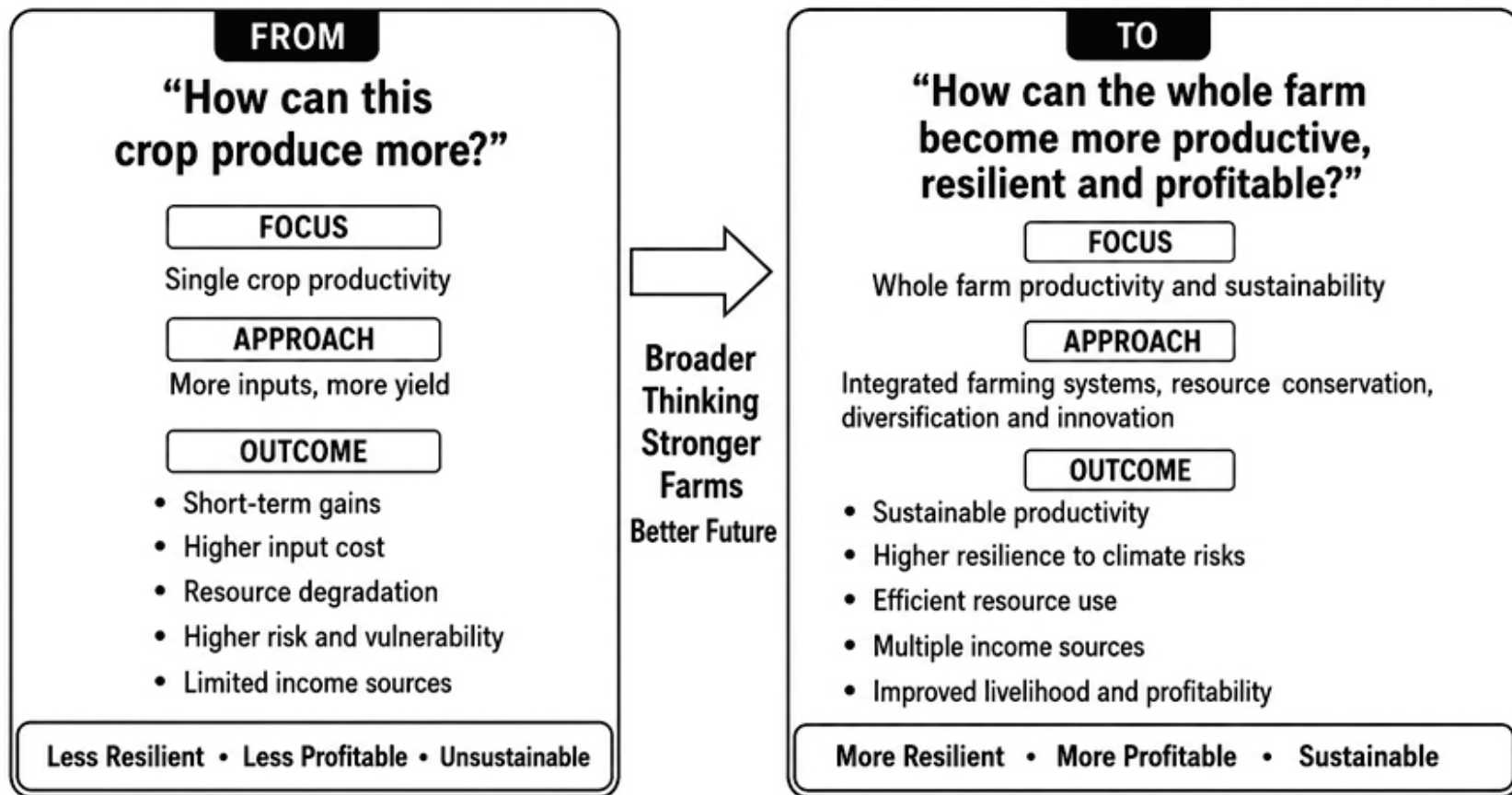
01**Soil Health Card-based
nutrient management****02****Natural and balanced
fertilizer use****03****Integrated
Farming Systems****04****Improved and climate-resilient
crop varieties****05****Resource-conservation
technologies****06****Animal
husbandry****07****Fisheries and poultry as
allied income sources****08****Crop
diversification****09****Sustainable agricultural
practices****10****Relevant Government
schemes**

Key Messages Delivered during VKSA. Major scientific and developmental messages communicated to farmers during the campaign included Soil Health Card-based nutrient management, balanced fertilizer use, Integrated Farming Systems, climate-resilient crop varieties, resource-conservation technologies, animal husbandry, fisheries and poultry, crop diversification, sustainable agricultural practices, and awareness of relevant Government schemes.

Looking Beyond a Single Crop: VKSA encouraged farmers to consider the farm as an integrated production and livelihood system.

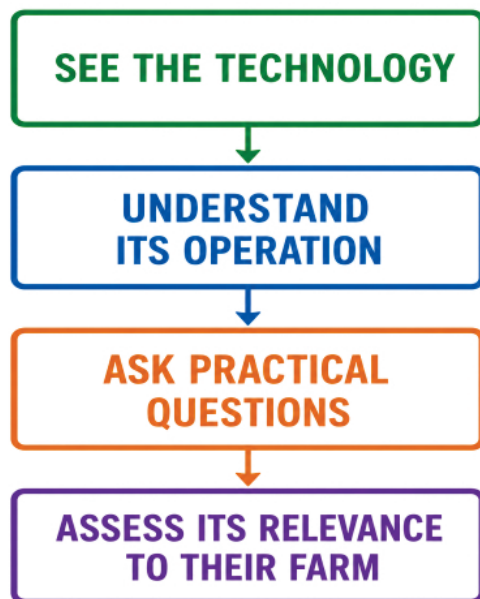
Discussions on IFS highlighted the potential for combining crop production with enterprises such as livestock, poultry, fisheries and horticulture. The campaign's

stated objective was to encourage better use of farm resources, diversify income sources and improve resilience against climatic and market shocks.



From Crop-Centric Thinking to Whole-Farm Prosperity. The figure illustrates the shift from focusing primarily on increasing the productivity of a single crop to a whole-farm approach that integrates multiple enterprises, resource conservation, diversification, and innovation. This systems perspective aims to enhance overall farm productivity, resource-use efficiency, climate resilience, profitability, and long-term sustainability.

Learning by Seeing: Technology demonstrations formed an important bridge between knowing about a technology and understanding how it works.

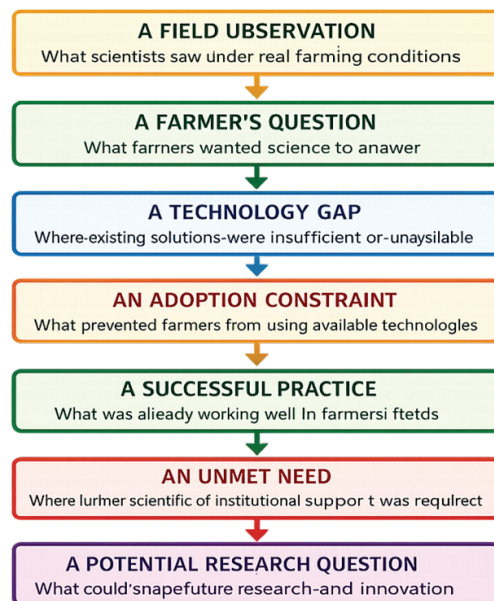


The figure illustrates the participatory learning pathway in which farmers first observe a technology, understand its operation, raise practical questions, and finally assess its relevance and suitability to their own farming conditions.

Connecting Farmers with Government Support: VKSA also served as a platform for creating awareness about Central and State Government agricultural schemes and welfare programmes.

The campaign material specifically refers to awareness regarding programmes such as PM-KISAN, Pradhan Mantri Fasal Bima Yojana (PMFBY), Soil Health Card Scheme, Kisan Credit Card (KCC), PM Krishi Sinchayee Yojana, and State-specific subsidy and input-support programmes.

This component was important because technology adoption is often influenced by farmers' access to credit, insurance, irrigation, inputs, machinery and institutional support.



VKSA therefore connected three elements: Scientific Knowledge + Technology + Institutional Support

From Village Conversations to Scientific Inquiry under VKSA. Farmer-scientist interactions generated field observations, farmers' questions, technology gaps, adoption constraints, successful practices, unmet needs, and potential research questions. These field-level insights travelled back with the scientific teams, strengthening the two-way knowledge pathway between farmers, research, and extension.

Village Interaction Became Much More: For a strong landscape infographic, show a farmer-scientist interaction photograph in the centre and surround it with eight elements:

- LISTEN**-Farmer questions and experiences
- OBSERVE**-Fields, crops and farming conditions
- DIAGNOSE**-Location-specific constraints
- ADVISE**-Scientific and practical recommendations
- DEMONSTRATE**-Technologies and improved practices
- INFORM**-Government programmes and opportunities
- DOCUMENT**-Feedback and field observations
- LEARN**-Emerging research and extension needs



Science Under the Village Tree: Farmer–Scientist Interaction during VKSA. Farmers and scientists engaged in an interactive village-level meeting under a tree, discussing local agricultural challenges, field experiences, improved technologies, and practical solutions. Such informal and participatory interactions brought agricultural science closer to farming communities, encouraged open dialogue, and strengthened two-way knowledge exchange between farmers and scientists.

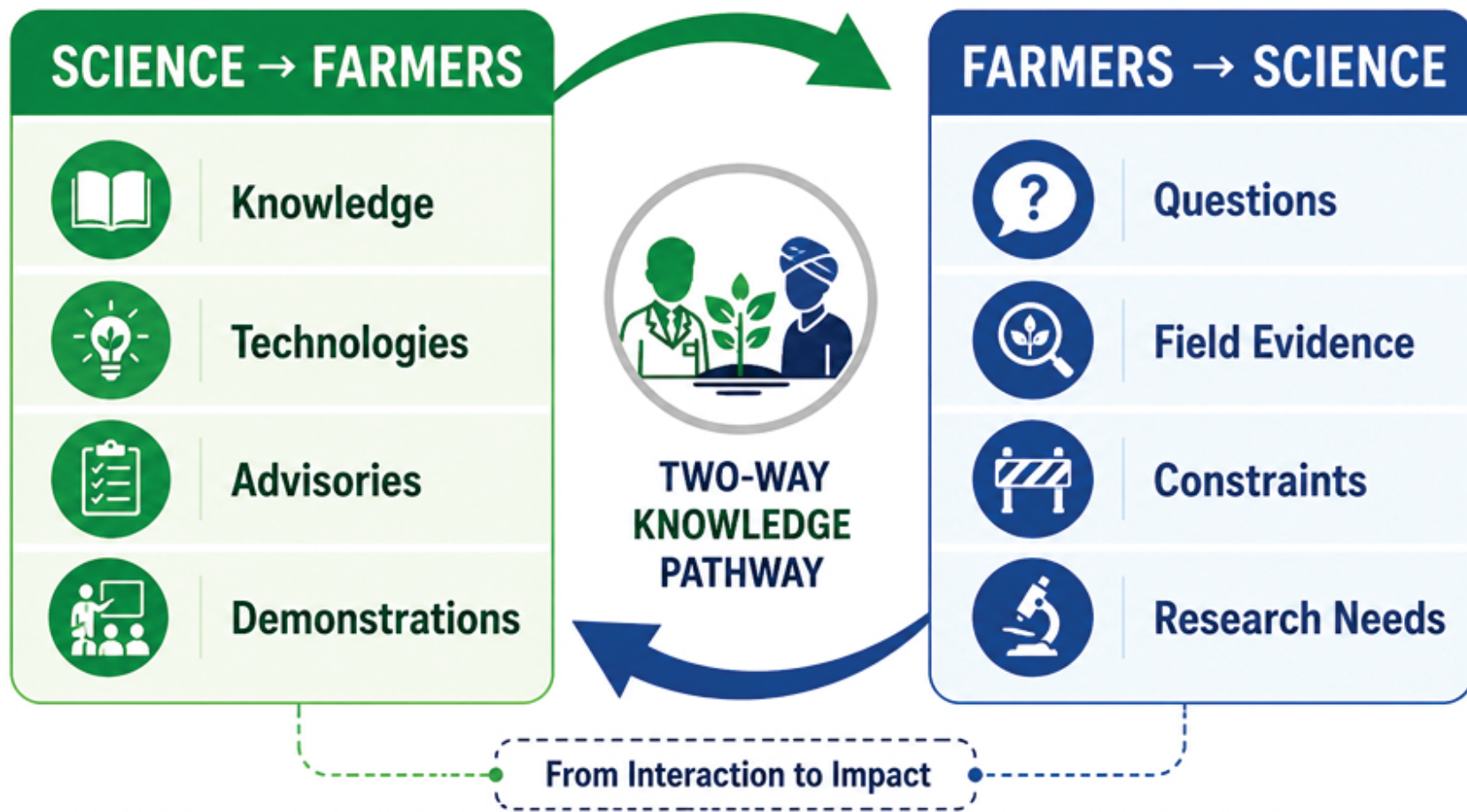
From Conversation to Confidence: Direct interaction also helped make scientific institutions more accessible to farming communities. Farmers could discuss practical concerns directly with specialists, clarify doubts and understand why particular practices or technologies were being recommended.

At the same time, scientists gained first-hand exposure to the complexity of farmers' decision-making.

This interaction helped build a relationship based not simply on technology transfer, but on communication, observation and collaborative problem-solving—the

approach envisioned in the campaign's objective of strengthening farmer–scientist interaction.

The Conversation Did Not End in the Village: Every interaction generated something that could travel back with the scientific teams:



Two-Way Knowledge Pathway under VKSA: The figure illustrates the reciprocal exchange between science and farming communities during the campaign. Scientific knowledge, technologies, advisories, and demonstrations reached farmers, while farmers' questions, field evidence, production constraints, and research needs travelled back to the scientific system. This two-way dialogue transformed farmer–scientist interaction into a pathway for identifying locally relevant challenges and guiding future research, extension, and science-led agricultural solutions.



CHAPTER 5

From Technology to Transformation

Science-led solutions demonstrated and promoted under VKSA



The value of agricultural science is ultimately realized when knowledge can be translated into practical solutions in farmers' fields. During the VKSA, farmers

across East Champaran and Sheohar were introduced to a broad portfolio of improved technologies and management practices covering crop production, soil health, IFS,

mechanization, crop protection, horticulture, livestock, fisheries and value addition.

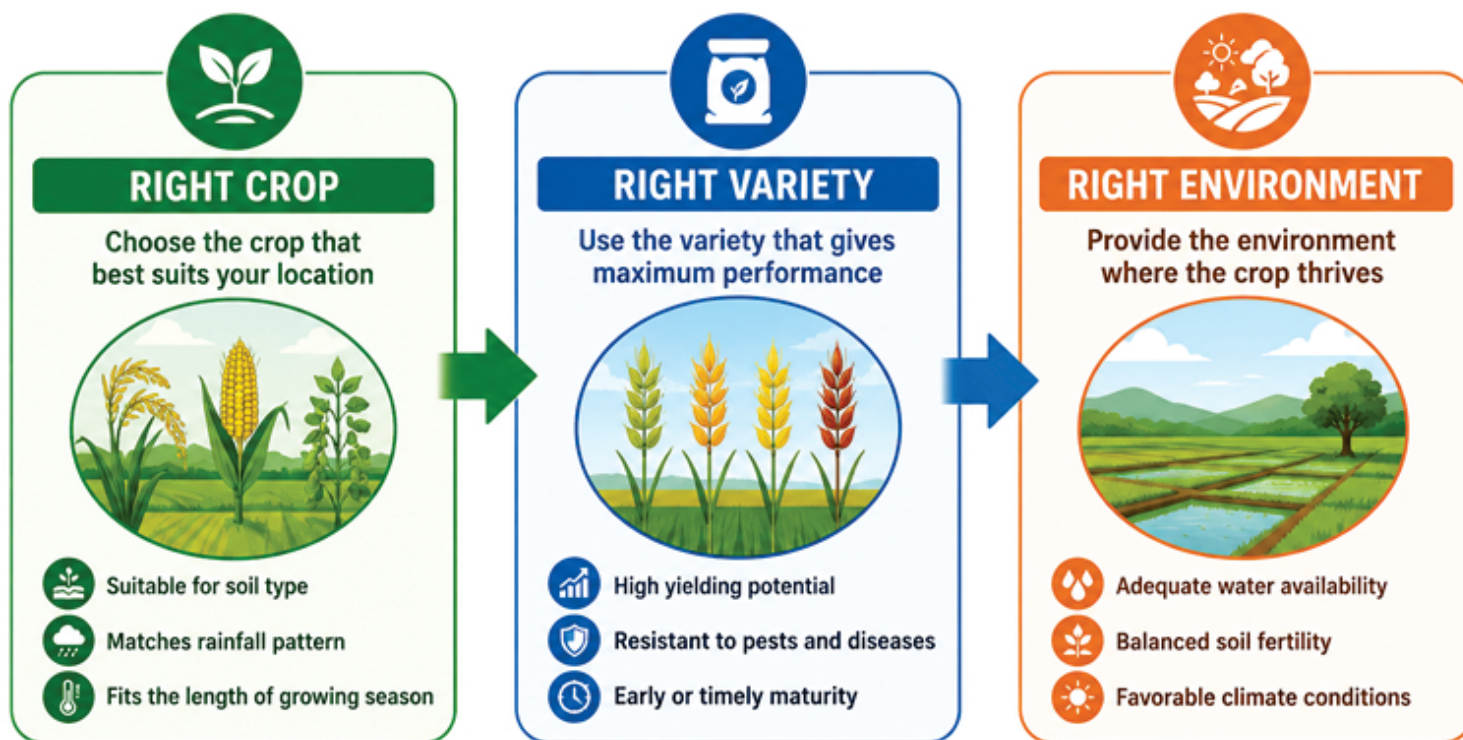
The campaign did not promote technology as an isolated input. Instead, it emphasized combinations of better varieties, improved management, efficient resource use, diversification and appropriate mechanization suited to different farming situations. Technologies demonstrated and discussed included agri-drones, Custom

Hiring Centres, IFS, vermicomposting, natural farming, soil-test-based nutrient management, resource-conservation practices, crop-protection tools, orchard rejuvenation, protected cultivation, livestock and fisheries management, and women-oriented enterprises.

Better Seed, Stronger Beginnings; Improved

and climate-resilient varieties: Good crop performance begins with the right variety. VKSA promoted improved and climate-resilient varieties of major crops suited to different production situations.

Right crop. Right variety. Right environment.



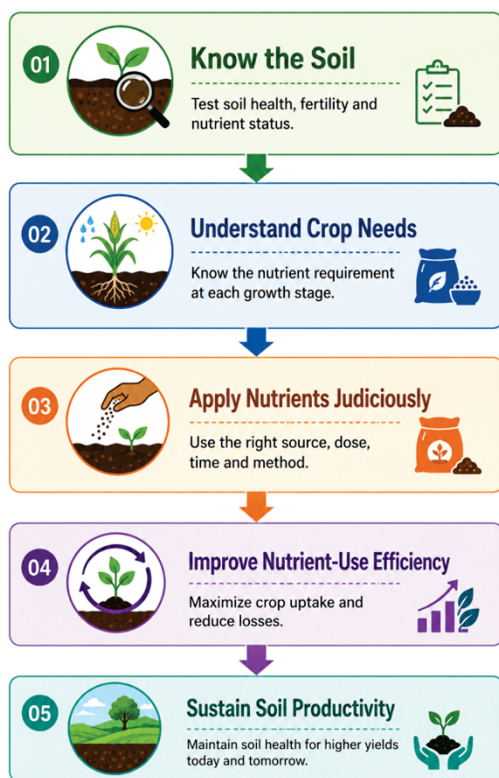
Right Crop, Right Variety and Right Environment for Climate-Resilient Agriculture. The figure illustrates the importance of matching suitable crops and improved varieties with local soil, rainfall, water availability, growing season, and climatic conditions. This location-specific approach supports higher productivity, improved resource-use efficiency, greater climate resilience, better farm profitability, and long-term agricultural sustainability.

Soil First: From Input Use to Scientific Nutrient Management

Healthy and productive crops begin with informed soil management. Farmers were sensitized to Soil Health Card-based nutrient management, balanced fertilizer use and

integrated approaches to maintaining soil fertility. The campaign encouraged farmers to move away from indiscriminate input application and towards nutrient decisions guided by soil condition and crop requirement.

Organic inputs and biological processes were also emphasized through vermicomposting and natural farming demonstrations, linking nutrient management with recycling of locally available farm resources.



Soil- and Crop-Based Nutrient Management Pathway under VKSA. The figure illustrates a systematic approach to sustainable nutrient management, beginning with understanding soil fertility and crop nutrient requirements, followed by judicious nutrient application. This science-based pathway aims to improve nutrient-use efficiency, minimize nutrient losses, maintain soil health, and sustain crop productivity over the long term.

More Than a Crop: Integrated Farming Systems for Resilient Livelihoods

The campaign promoted crop–livestock–fishery–horticulture integration to improve resource use, diversify income and enhance resilience to climatic and market shocks.

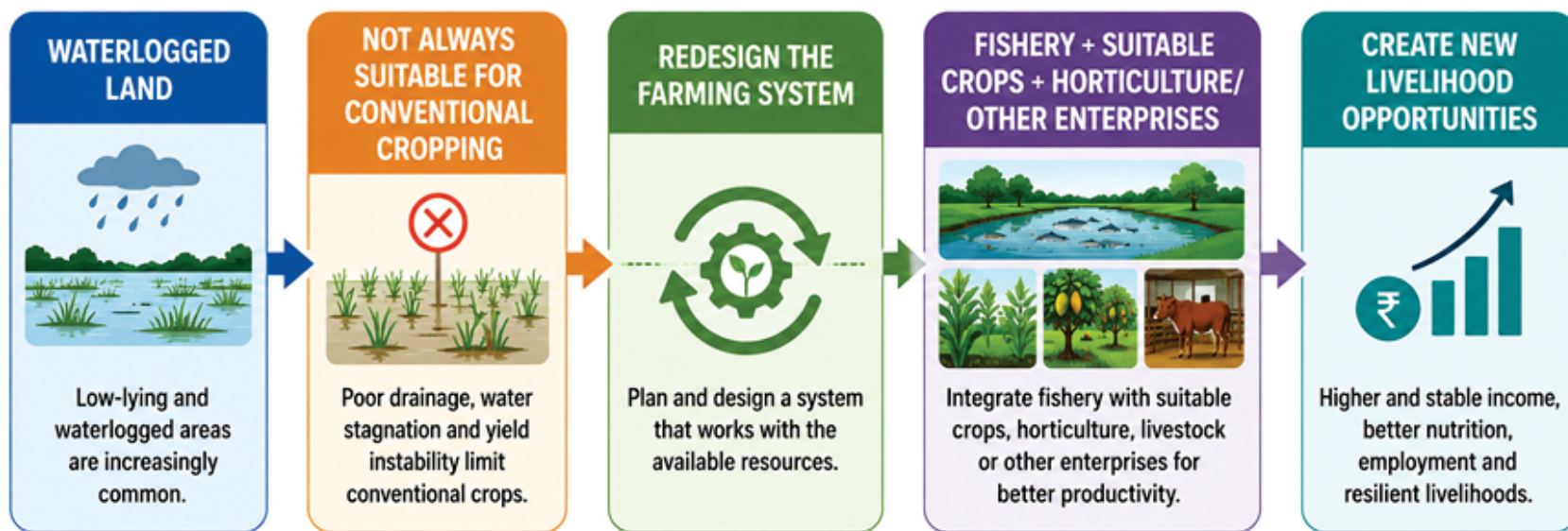
The strength of IFS lies in the connections among enterprises.

- Crop residues may support livestock.

- Livestock manure can contribute to nutrient recycling.
- Farm ponds can support fisheries.
- Pond resources may support horticultural production.
- Vegetable and fruit enterprises can diversify food and income.
- Together, these interactions can make the whole farm more diversified than a

single-enterprise production system.

Turning water logging into opportunity fishery and integrated farming in low-lying areas- Waterlogging emerged as an important field-level constraint during farmer interactions. VKSA also demonstrated that low-lying areas need not always be viewed solely as a production disadvantage.



Transforming Waterlogged Areas into Productive and Resilient Farming Systems. The figure illustrates a climate-resilient approach for utilizing low-lying and waterlogged areas by redesigning conventional cropping systems around available land and water resources. Integrating fisheries with suitable crops, horticulture, livestock, and other enterprises can enhance resource utilization, diversify income, improve nutritional security, and create more resilient livelihood opportunities for farm households.

Conservation in practice (RCT) doing more with resources: RCT were promoted to improve the efficiency of crop production while reducing unnecessary use of resources.

Zero Tillage: Reduced soil disturbance can facilitate timely crop establishment and reduce tillage operations where the technology is appropriate.

Raised-Bed Cultivation: Raised-bed approaches can provide an option for crop establishment and water management in suitable farming situations.

Water-Saving Practices: Climate-resilient

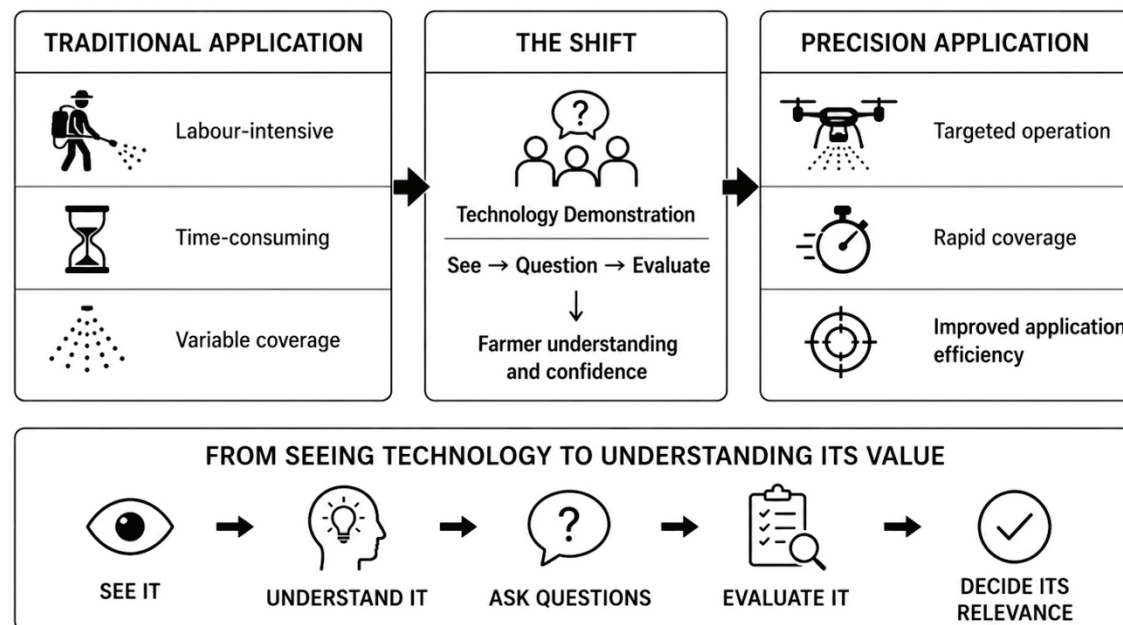
agriculture under VKSA included awareness of water-saving irrigation approaches and improved management under variable rainfall conditions.

The underlying objective was: Less unnecessary disturbance. Better resource use. Greater resilience.

Drones take to the fields-Precision Technology within Farmers' Reach. One of the most visible modern technologies demonstrated during VKSA was the agri-drone. Farmers were introduced to the use of drones for precision application of agricultural inputs.



New technology becomes less distant when farmers can see it, question it and evaluate its relevance themselves.



From Traditional to Precision Application: Making New Technologies Visible to Farmers. The figure highlights the transition from labour-intensive and time-consuming conventional application methods towards targeted, rapid, and more efficient precision operations. Technology demonstrations under VKSA provided farmers an opportunity to observe new technologies, understand their operation, ask practical questions, and assess their relevance under local farming conditions.

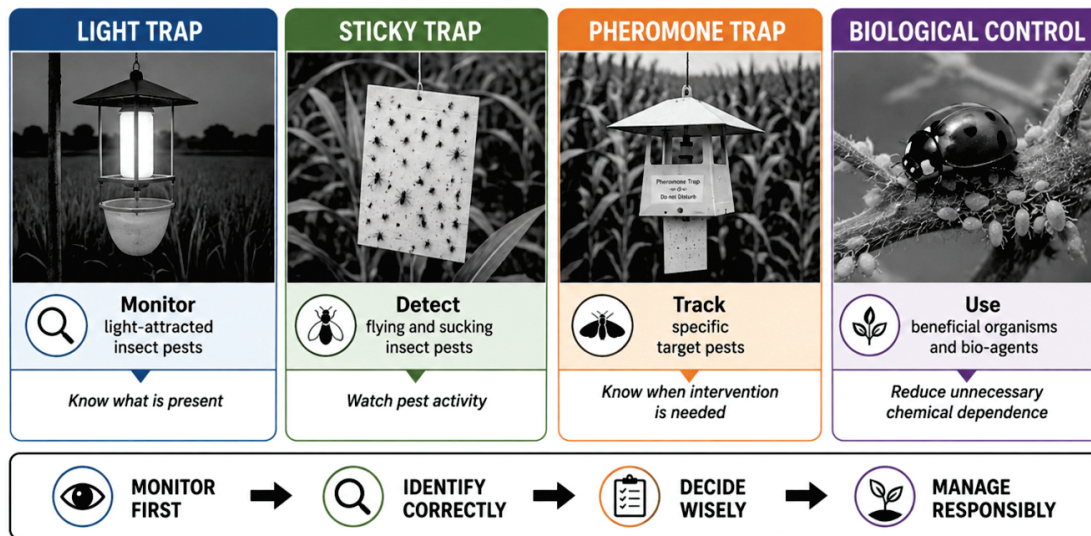
Custom Hiring Centres for Smallholders- Farm mechanization can improve timeliness and operational efficiency, but individual ownership of machinery is often difficult for small and marginal farmers.

VKSA promoted Custom Hiring Centres (CHCs) as a mechanism for providing access to machinery without requiring every farmer to purchase expensive equipment individually. The campaign also identified expansion of village-level CHCs as an important policy priority

inputs and eco-friendly pest-management approaches.

The campaign highlighted:

- Rejuvenation of old orchards
- Scientific canopy and orchard management



VKSA promoted scientific orchard management and rejuvenation of old mango and litchi orchards to address declining productivity and improve orchard performance.

Nature-based solutions (NbS)- Natural and organic farming approaches also formed part of the VKSA technology portfolio. The campaign demonstrated and discussed natural farming, vermi composting, organic

- Integrated nutrient management
- Pest and disease management
- High-density planting of fruit crops

More Fruit from Less Space-High-density planting of fruit crops was introduced as a Rather than positioning any individual practice as a universal solution, the campaign's wider farming-system approach emphasizes the importance of

selecting management options according to local resources, cropping systems, farmer capacity and field conditions.

See the Pest Before You Spray: Promoting Need-Based Pest Management under VKSA. Light traps, sticky traps, pheromone traps, and biological-control approaches were highlighted as tools for pest monitoring and eco-friendly crop protection. Field-based observation and correct pest identification can support timely, need-based interventions while encouraging more judicious use of plant-protection inputs.

modern horticultural approach for more intensive utilization of available land.

The VKSA material identifies mango, guava, papaya and citrus among the crops discussed under high-density planting systems.

For farmers with limited land resources, appropriate high-density systems can create opportunities for improved land-use efficiency when accompanied by suitable varieties and scientific canopy, nutrient and water management.

Healthy Animals, Stronger Farms-Livestock provides food, income, manure and livelihood support and forms an important component of diversified farming systems.

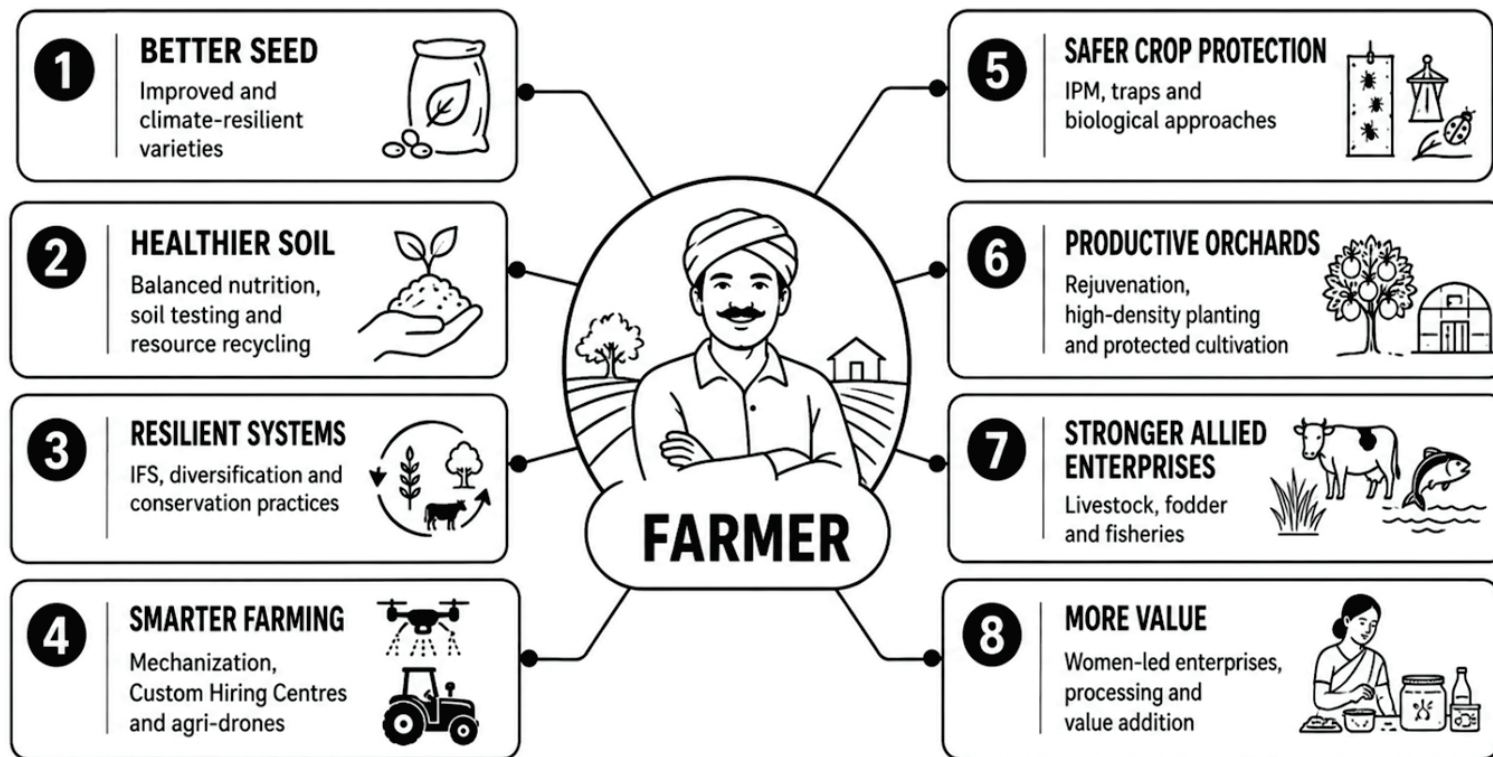
- Year-round fodder production
- Livestock vaccination
- Animal health management

• Livestock-based Integrated Farming Systems

Farmers also reported challenges including mastitis, Foot & Mouth Disease, repeat breeding, anestrus and mortality among goats and poultry chicks, highlighting the

importance of continued animal-health support.

The campaign therefore linked livestock technology with the broader objective of strengthening whole-farm resilience and livelihood security.



Pathways to Agricultural Transformation under VKSA. The figure summarizes eight interconnected pathways—better seed, healthier soil, resilient farming systems, smarter farming, safer crop protection, productive orchards, stronger allied enterprises, and value addition—with the farmer at the centre. Together, technology, scientific knowledge, and local adaptation create opportunities for higher productivity, diversified livelihoods, improved resilience, and sustainable agricultural transformation.

CHAPTER 6

Listening to the Fields

Problems, constraints and farmer voices from East Champaran and Sheohar



First-half of the VKSA journey was about taking science to farmers. The next—and equally important—part was about listening to what farmers had to say. As multidisciplinary teams travelled through East Champaran and Sheohar, farmer–scientist interactions and diagnostic field visits revealed that agricultural challenges rarely occur in

isolation. A farmer may simultaneously face crop disease, delayed availability of quality seed, waterlogging, inadequate machinery, livestock-health problems and uncertain markets. These interconnected constraints influence not only productivity, but also profitability, technology adoption and the resilience of the entire farming household.

The problems documented during VKSA emerged directly from farmer feedback and field observations. They covered crop production, seed systems, water management, marketing, livestock and horticulture and therefore provide an important field-based foundation for future research and extension planning.

What Farmers Told Us: Across the

campaign landscape, farmers repeatedly brought attention to a set of interconnected challenges:

- Crop diseases and insect pests
- Quality and timely availability of seed
- Waterlogging and irrigation shortages
- Soil erosion and declining soil fertility
- Mango and litchi orchard problems
- Livestock diseases and reproductive disorders
- Limited access to mechanization
- Low and uncertain market prices
- Storage and post-harvest constraints
- Weak institutional and FPO support

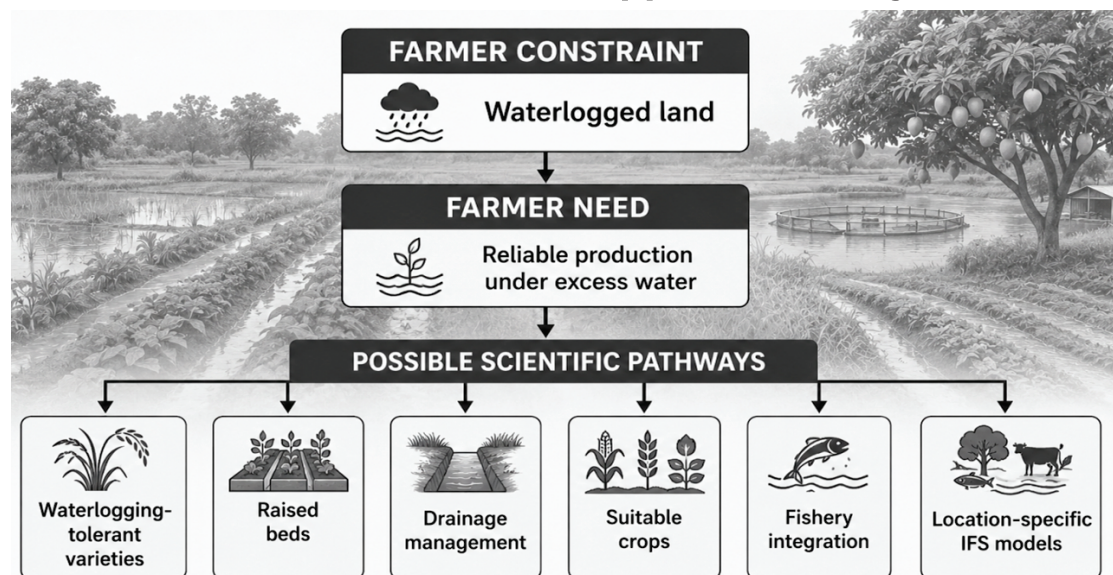
These concerns demonstrate that agricultural development cannot be achieved through crop-production technologies alone. Farmers

require a system in which technology, inputs, water, machinery, animal health, markets, infrastructure and institutions work together.

Waterlogging: deserves particular emphasis because it repeatedly appears across the VKSA documentation—as a farmer constraint, an expectation, a researchable issue and a future research priority.

Farmers specifically sought water logging-tolerant rice and other crop varieties suitable for flood-prone and low-lying fields. They also expressed interest in raised-bed cultivation and Integrated Farming System models adapted to such conditions.

From Water logging Constraint to Climate-Resilient Farming Opportunities. The figure illustrates the pathway from farmers' concerns over waterlogged and low-lying land to science-led solutions, including water logging-tolerant varieties, raised-bed cultivation, drainage management, suitable crops, fishery integration, and location-specific Integrated Farming Systems (IFS). The approach emphasizes adapting farming systems to excess-water conditions to achieve reliable production, diversified livelihoods, and greater climate resilience.



Orchards Under Stress-Mango and litchi orchards presented a particularly diverse set of problems.



Farmers reported sudden wilt/dieback and rust disease in mango, while both mango and litchi orchards were affected by red-banded beetle, fruit fly and stem borer. Fruit drop, cracking and irregular bearing were also commonly reported and were associated with reduced orchard profitability.

These problems are particularly significant because an orchard represents a long-term investment. Unlike an annual crop, a poorly performing perennial tree cannot simply be replaced every season without substantial time and cost.

The farmer's concern therefore extends beyond the current harvest:

How can the productive life of the orchard be protected?

VKSA interactions highlighted the importance of scientific diagnosis, orchard rejuvenation, pest and disease management, and improved production practices, while also identifying several orchard problems requiring further research.



Vegetable Production: High Opportunity, High Risk-Vegetables offer opportunities for higher-value production but farmers also reported substantial biological and market risks. The campaign documented:

- Leaf curling in chilli
- Yellow vein mosaic virus in papaya
- Stem/root rot in papaya

- Early and late blight in potato and tomato

Such problems can affect both yield and produce quality.

But the challenge does not end when a healthy vegetable crop is harvested. Farmers also reported price volatility, inadequate storage and limited market access, creating a second layer of risk after production.

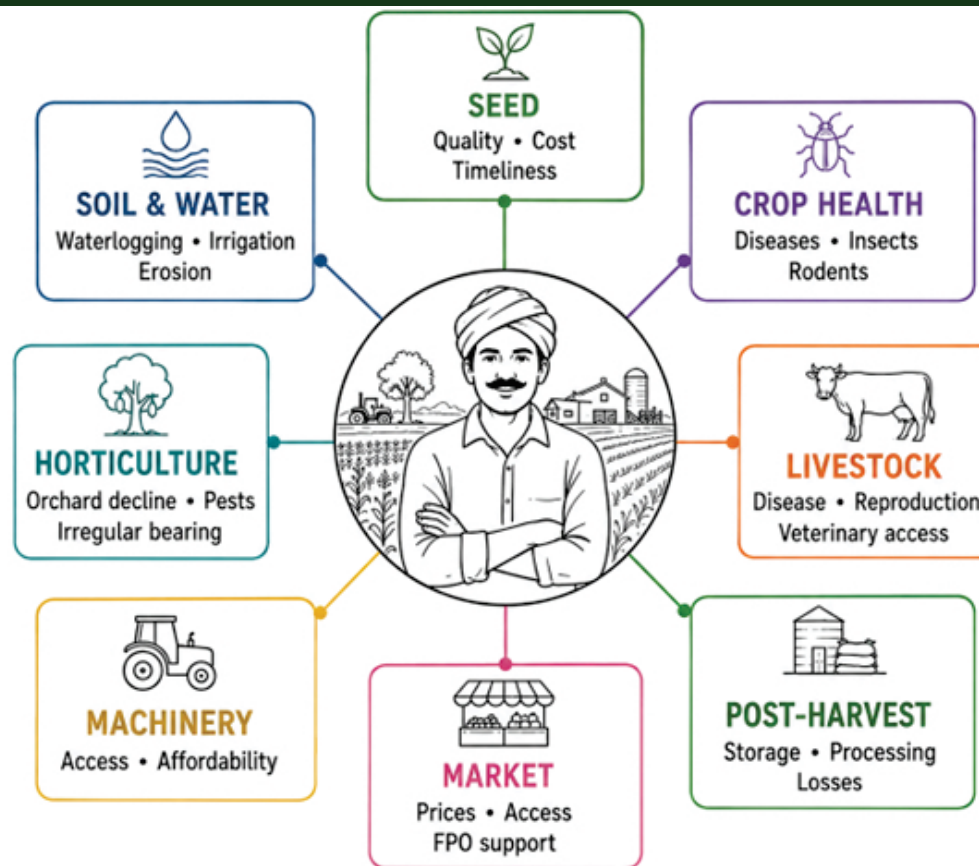
vegetable: Production Risk + Post-Harvest Risk + Market Risk = Farmer Risk

Scientific production technologies must consequently be connected with post-harvest management and markets.

Livestock: The Unseen Risk to Farm Livelihoods-Livestock is an important component of diversified farm livelihoods, but animal-health problems can quickly reduce household income. Farmers reported:

- Mastitis
- Foot & Mouth Disease (FMD)
- Repeat breeding
- Anestrus
- High mortality in goats
- High mortality among poultry chicks

The campaign documentation further notes inadequate access to timely and affordable veterinary services in rural areas as a compounding constraint.



One Farmer, Many Constraints: The Need for a Farming-System Approach. The figure illustrates the interconnected challenges faced by farm households across seed, soil and water, crop health, horticulture, livestock, machinery, post-harvest management, and markets. Their simultaneous and interacting nature highlights why farmer problems require multidisciplinary, location-specific, and whole-farm solutions rather than isolated technological interventions.

Their expectations reflected a desire for farming that is more resilient, remunerative, location-specific and technology-enabled. Major expectations emerged:

Climate-resilient crop varieties- Farmers sought varieties capable of maintaining performance under erratic rainfall, temperature extremes and other climatic stresses, with particular demand for water

logging-tolerant crops for low-lying areas.

Site-specific production technologies- Farmers wanted recommendations adapted to their soil types, water regimes and local agro-climatic conditions, rather

than only generalized packages.

Digital advisory systems- Farmers expected improved mobile-based access to weather forecasts, pest and disease alerts, and market information.

Quality seed and village seed banks- Timely availability of quality seed remained a major expectation, together with village-level seed banks.

Integrated farming systems- Farmers showed interest in integrating crops, livestock, fisheries and horticulture and sought technical guidance for implementing such systems.

Zero tillage and raised-bed cultivation-

Greater exposure and support were sought for technologies that farmers viewed as opportunities to reduce cultivation costs, improve drainage and enhance input-use efficiency.

Post-harvest infrastructure- Farmers requested accessible storage and basic processing facilities, particularly for perishable commodities such as litchi, tomato and potato.

Continued capacity building- There was demand for structured programs on new technologies, scientific practices and skill

development.

Crop-residue management- Farmers wanted adoptable alternatives to residue burning that could simultaneously support soil health and reduce environmental impacts.

Village-level demonstrations- Farmers emphasized that hands-on demonstrations and direct field exposure were more effective in building confidence than theoretical training alone.



CHAPTER 7

From Farmer Problems to Research Questions

When the field begins to shape science



One of the most important outcomes of the VKSA was that farmer–scientist interactions did not end with immediate technical

advice. The campaign also created an opportunity to identify problems for which existing recommendations were

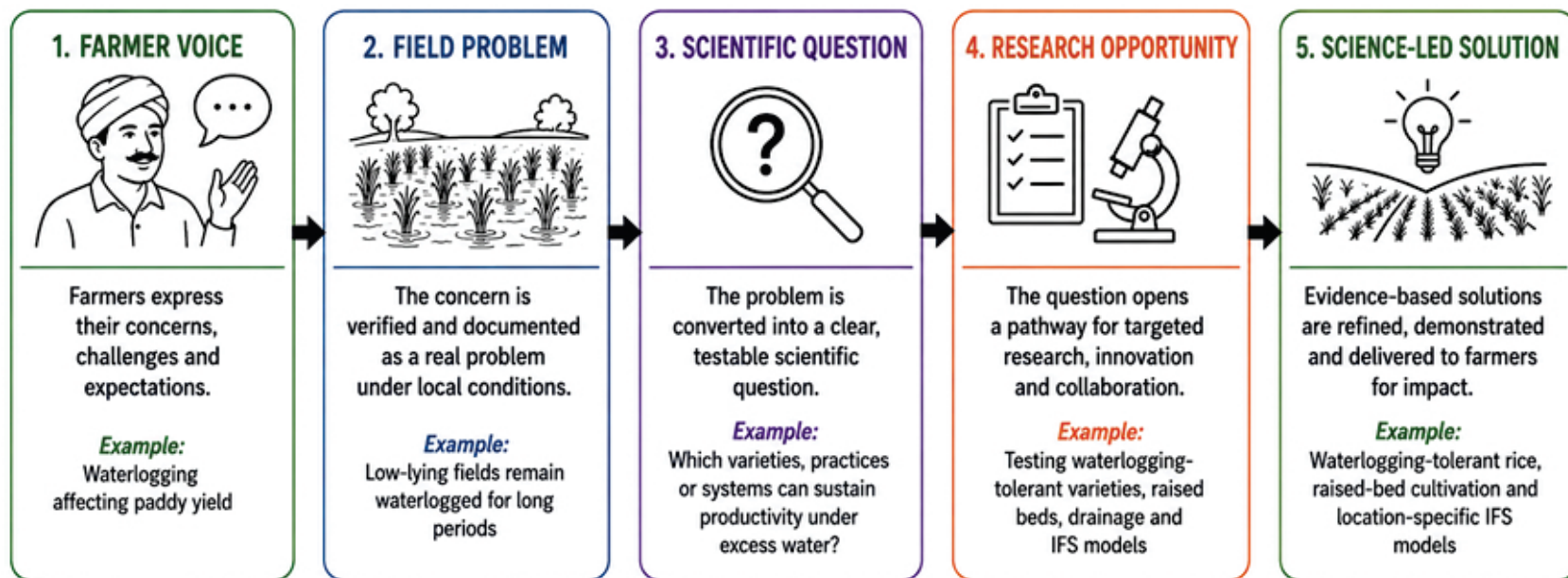
insufficient, inaccessible or not adequately adapted to local farming conditions. These problems became researchable

issues—questions emerging directly from farmers' fields that could guide future agricultural research.

Across East Champaran and Sheohar, farmers raised concerns related to waterlogging, seed availability, crop

diseases, orchard decline, livestock health, mechanization, post-harvest losses, markets and location-specific production technologies. The campaign documentation subsequently translated these observations into research priorities covering crop

improvement, seed systems, climate resilience, IFS, soil and water management, crop protection, horticulture, livestock, fisheries, mechanization, post-harvest management, markets, extension and policy research



The figure illustrates how farmers' concerns and field-level problems identified during VKSA can be translated into scientific questions, targeted research opportunities, and evidence-based solutions. This farmer-centred pathway connects field realities with research, innovation, and location-specific interventions for more resilient, productive, and profitable farming systems. This represents an important transition in the VKSA story:

When a farmer's problem becomes a research question: Not every field problem requires a new research project. Many can be addressed through existing technologies, improved extension or better access to inputs and services.

But when a problem is recurrent, location-specific, inadequately understood, difficult to manage with existing recommendations, or associated with an important technology gap, it can become a researchable issue.

VKSA—provided an opportunity to

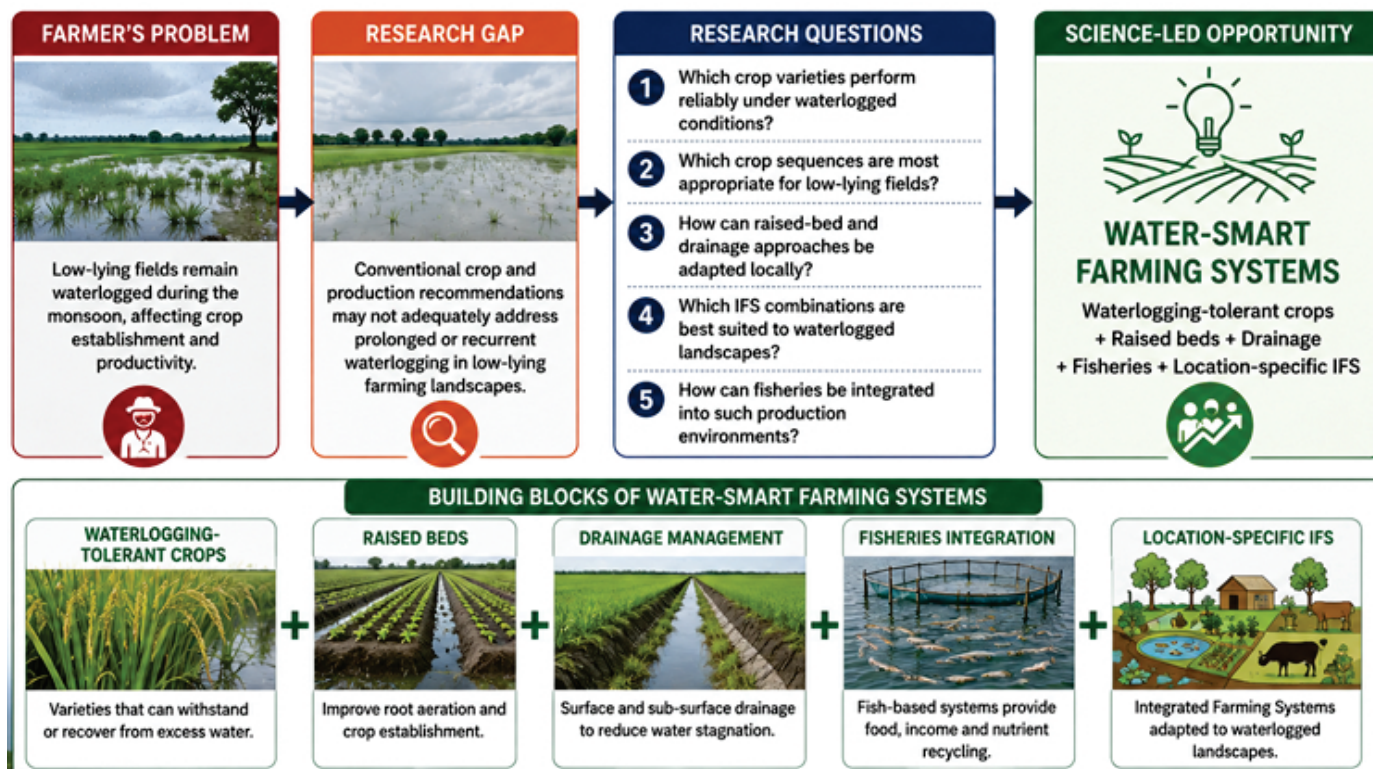
distinguish among these needs.

- Some problems needed better extension.
- Existing knowledge needed to reach farmers more effectively.

Waterlogging: emerged as one of the most prominent field-level challenges. Farmers in low-lying areas reported crop damage during the monsoon and sought

technologies capable of maintaining production under excess-water conditions. Farmers specifically expressed demand for waterlogging-tolerant rice and

other crop varieties, along with raised-bed cultivation and IFS approaches suited to flood-prone and low-lying environments.

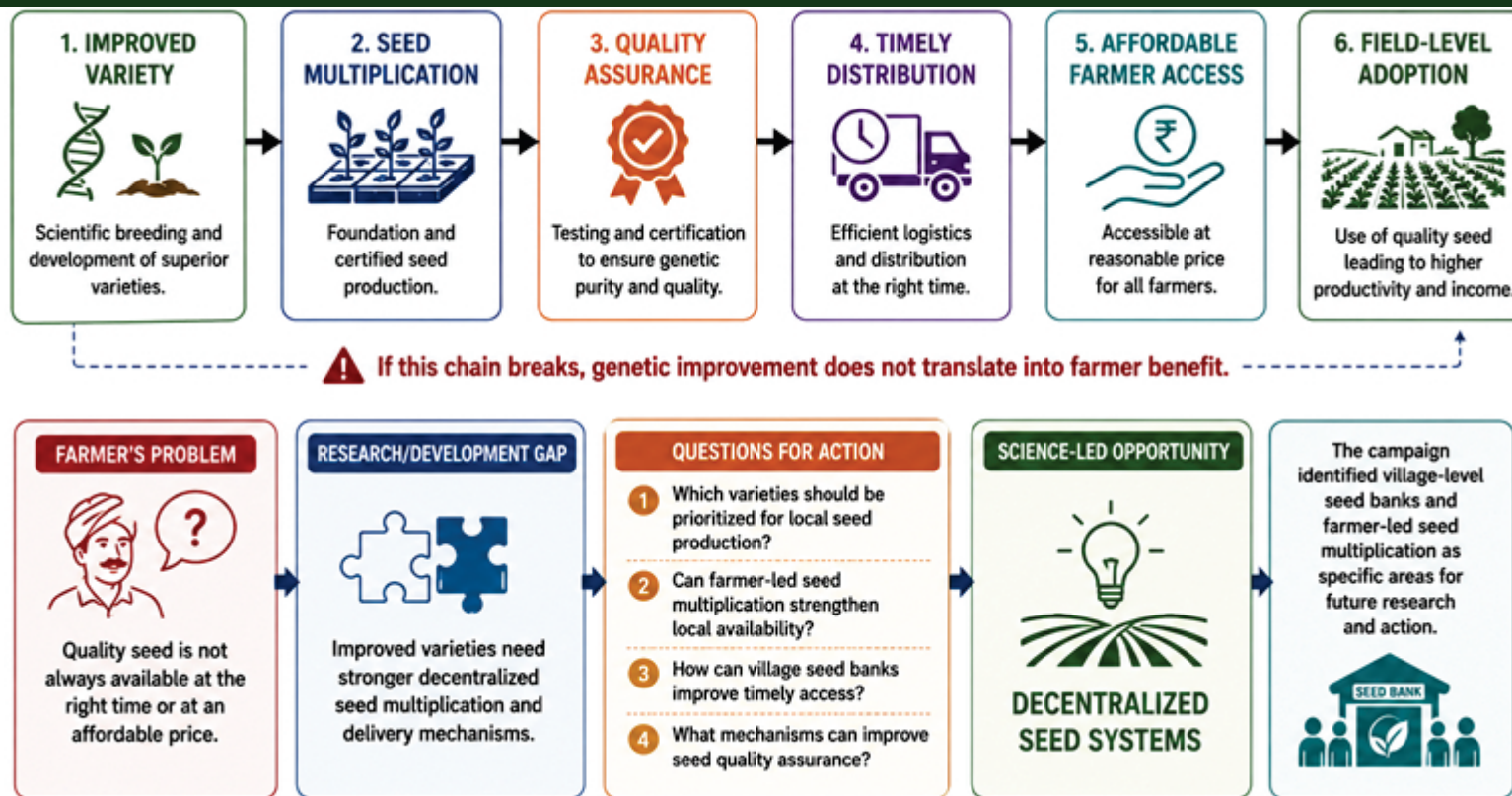


From Waterlogging Constraint to Water-Smart Farming Systems. Farmer experiences documented during VKSA identified waterlogging as an important researchable challenge in low-lying areas. The pathway integrates waterlogging-tolerant crops, raised-bed cultivation, drainage management, fisheries, and location-specific Integrated Farming Systems (IFS) to transform a recurring production constraint into an opportunity for climate-resilient and diversified farming.

Quality Seed-Farmers repeatedly reported non-availability, delayed supply and high cost of quality seed, particularly for improved and hybrid crops. This reveals an

important distinction between variety development and seed-system effectiveness. Developing an improved variety is only the first step. The campaign

identified village-level seed banks and farmer-led seed multiplication as specific areas for future research and action.



From Improved Variety to Field-Level Adoption: Strengthening the Seed Delivery Chain. The figure illustrates how genetic improvement must be supported by seed multiplication, quality assurance, timely distribution, and affordable farmer access to achieve field-level adoption. It further highlights decentralized seed systems, including farmer-led seed multiplication and village-level seed banks, as opportunities to strengthen local seed availability and ensure that improved varieties reach farmers at the right time.

Climate resilience varieties- Farmers sought varieties capable of performing under erratic rainfall, temperature extremes and water logging, demonstrating the growing importance of climate resilience in varietal development and evaluation.

From general recommendations to site-specific farming- A clear expectation from farmers was for production technologies tailored to local soil types, water regimes and agro - climatic conditions, rather than only generalized recommendations. This is particularly relevant in a landscape where

irrigated uplands, low-lying waterlogged fields, cereal-based systems, vegetable farms and perennial orchards can occur within the same broader region.

Mango Dieback- farmers reported sudden wilt/dieback among the orchard problems encountered during VKSA. The campaign

subsequently identified mango dieback and sudden wilt as a researchable issue requiring scientific investigation.

Chilli Leaf Curl- farmers reported leaf curling in chilli, and the issue was specifically carried forward into the campaign's list of researchable problems.



Tomato Wilt: Tomato production was affected by wilt-related problems, while the VKSA documentation identifies tomato wilt among issues requiring research on resistant varieties and integrated management



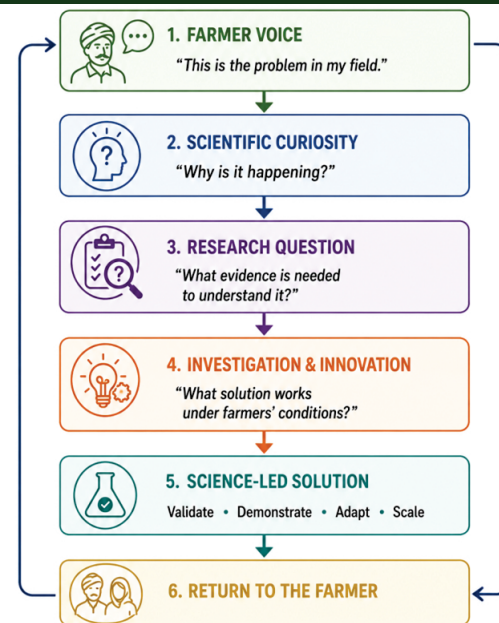
Litchi: Protecting Value After Harvest-Not every research problem begins in the field.



The VKSA documentation identifies short post-harvest life of litchi as a specific researchable issue and highlights the need for improved packaging and storage technologies.

Livestock Health: Farmers reported mastitis, Foot & Mouth Disease, repeat breeding, anestrus and mortality among goats and poultry chicks, together with inadequate access to timely veterinary support.

Mechanization for Small Farms- Farmers expressed interest in zero tillage, raised-bed cultivation and greater access to farm machinery, while the campaign also emphasized Custom Hiring Centers.



A Question from the Field Can Shape the Future of Science. The figure illustrates the farmer-centred research pathway emerging from VKSA, where farmer voices stimulate scientific curiosity, define research questions, guide investigation and innovation, and ultimately lead to validated science-led solutions that return to farming communities. This continuous cycle of listening, questioning, investigating, innovating, and returning solutions to farmers strengthens the connection between field realities and future agricultural research.

The VKSA Research Question Matrix: From Farmer Voice to Science-Led Research

Farmer Voice / Field Evidence	Research & Development Question	Science-Led Direction
Waterlogged fields	How can farming remain productive under excess-water conditions?	Waterlogging-tolerant varieties Raised beds Drainage Fish-based IFS
Quality seed unavailable	How can quality seed reach farmers at the right time and at an affordable cost?	Village seed banks Farmer-led seed multiplication Decentralized seed systems
Need for local recommendations	Which technologies perform best under different farming situations?	Site-specific production packages Adaptive validation
Declining mango orchards	What factors are associated with mango dieback, wilt and orchard decline?	Scientific diagnosis Orchard rejuvenation Integrated management
Chilli leaf curl	How can field incidence and associated losses be reduced?	Resistant/tolerant material Vector management Integrated disease
Tomato wilt	Which varieties and management practices are effective under local conditions?	Resistant varieties Soil and crop-health management Integrated approaches
Rapid litchi deterioration	How can post-harvest marketable life be extended?	Improved packaging Storage Post-harvest technologies
Livestock health problems	How can animal-health losses be reduced under village conditions?	Diagnostics Disease surveillance Preventive and low-cost management
Machinery is costly	How can smallholders gain affordable access to mechanization?	Custom Hiring Centres Scale-appropriate machinery
Need for timely information	How can location-specific advisories reach farmers faster?	Digital agro-advisories Weather-based decision support
Crop-residue management difficulties	How can residues be converted from a burden into a farm resource?	Recycling Conservation technologies Resource recovery
Low prices & post-harvest losses	How can farm production generate greater and more stable value?	Storage Processing FPOs Aggregation Value-chain development

CHAPTER 8

From Field Evidence to Action

A research, extension and policy roadmap emerging from VKSA



The VKSA generated much more than awareness and technology demonstrations. By bringing scientists into direct contact with farmers and their fields, the campaign revealed where existing technologies could be scaled, where extension needed strengthening, where institutional support was missing, and where new research was required.

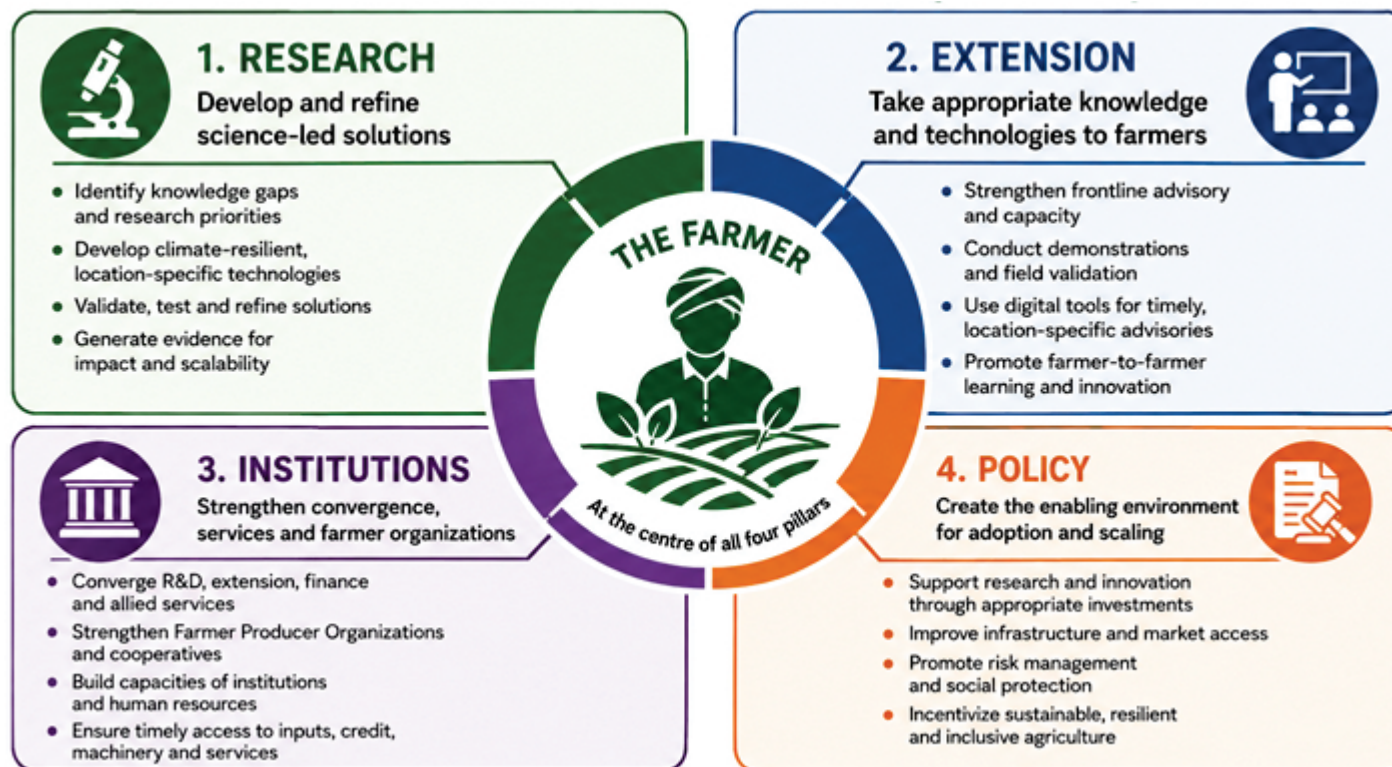
The issues identified across East Champaran and Sheohar ranged from water logging, quality seed and crop health to livestock services, mechanization, post-harvest management, markets and Farmer Producer Organizations. The campaign documentation consequently proposed recommendations spanning research,

extension, infrastructure, institutional convergence and policy support.

From evidence to action-Not every problem identified during VKSA requires the same response. (i) Some challenges require new scientific research; (ii) Some already have technological solutions but require stronger extension and demonstrations; (iii) Others

depend upon infrastructure, institutions, markets or policy support.

The roadmap emerging from VKSA can therefore be organized around four interconnected pillars: **RESEARCH; EXTENSION; INSTITUTIONS; POLICY.**



From Evidence to Action: A Farmer-Centred Roadmap for VKSA. The figure presents four interconnected pillars—Research, Extension, Institutions, and Policy—with the farmer at the centre of the action framework. Together, these pillars translate field evidence and farmer-identified priorities into science-led solutions, effective knowledge delivery, stronger institutional convergence, and an enabling environment for adoption, scaling, and sustainable agricultural transformation.

VKSA identified a broad portfolio of future research priorities extending from crop improvement and seed systems to post-harvest management and socio - economic research.

Future research should increasingly respond to the specific farming situations and problems documented during the campaign.

Climate-resilient crop improvement- Priority should be given to evaluating and developing crop varieties capable of performing under locally important stresses, particularly water logging and climatic variability.

Location-specific production technologies- Farmers requested recommendations adapted to local soil types, water regimes and agro - climatic conditions. Research should therefore strengthen farming-situation-specific production packages rather than relying exclusively on generalized recommendations.

Water logging management- Research needs include water logging-tolerant crops, raised-bed cultivation, drainage approaches and farming systems designed specifically for low-lying areas.

Integrated Farming Systems

Location-specific combinations of crops, horticulture, livestock, fisheries and other

enterprises should be evaluated for productivity, profitability, resource recycling and resilience.

Crop and orchard health- Problems such as mango dieback/sudden wilt, chilli leaf curl and tomato wilt require systematic diagnosis and development of appropriate integrated management strategies.

Livestock and fisheries- Research should support improved animal-health management, diagnostics, disease surveillance, reproductive management, fodder production and fish-based enterprises appropriate for local conditions.

Post-harvest technologies- Particular attention is needed for perishable commodities, including technologies for packaging and storage of litchi and improved handling, processing and value addition of horticultural produce.

More Demonstrations, Closer to Farmers- One of the clearest expectations expressed by farmers was for more village-level demonstrations.

This is important because adoption often begins with confidence.

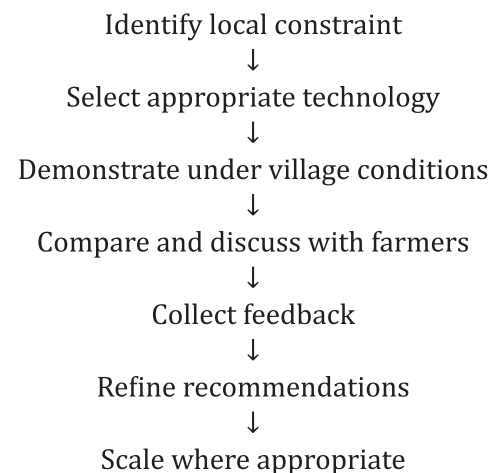
A farmer who sees a technology operating under conditions similar to his or her own farm can evaluate:

1. Does it work here?

2. Can I manage it?
3. What will it cost?
4. What problem will it solve?
5. What changes will I need to make?

Demonstrations should therefore increasingly be designed around locally important farming problems, rather than simply showcasing technologies.

Problem-Oriented Demonstration Model



Seed at the Right Time- Farmers repeatedly emphasized the need for timely access to quality seed, while village-level seed banks were specifically identified among their expectations.

Suitable Variety

→ Local Multiplication

→ Quality Seed

→ Village Availability

→ Timely Sowing

→ Better Adoption

Seed must reach the farmer before the season—not after the opportunity has passed.

Custom Hiring Centres- VKSA highlighted the importance of expanding Custom Hiring Centres (CHCs) at the village level so that small and marginal farmers can access machinery without bearing the full cost of ownership.

This is especially relevant for technologies such as:

1. Zero-tillage machinery
2. Raised-bed equipment
3. Residue-management machinery
4. Crop establishment equipment
5. Other specialized farm machinery

Digital Extension- Farmers expressed demand for mobile-based weather forecasts, pest and disease alerts and market information.

This creates an opportunity to complement physical extension with digital support. An effective digital advisory framework could connect:

WEATHER- What conditions are expected?

CROP- What operation is timely?

PEST & DISEASE- What risk should the farmer watch for?

MARKET- What information may influence harvest and sale decisions?

ADVISORY- What action should be considered?

The important principle is that digital extension should not simply deliver more information.

Stronger FPOs, Stronger Farmer Voice- Weak FPO support was identified as a constraint affecting collective bargaining, input aggregation and value addition.

Strengthening Farmer Producer Organizations can therefore help address challenges that individual farmers may find difficult to overcome alone.

A stronger FPO ecosystem can potentially support:

- Bulk input procurement
- Seed and technology access
- Produce aggregation
- Primary processing
- Value addition
- Storage
- Market linkage
- Collective bargaining

The transition is important:



The VKSA roadmap therefore recognizes farmers not only as producers, but also as participants in organized agricultural value chains.

Beyond Harvest- Farmer feedback demonstrated that increasing production is only one part of improving agricultural livelihoods. Perishable commodities such as litchi, tomato and potato require appropriate post-harvest handling, storage and processing. Farmers specifically expressed a need for accessible storage and basic processing facilities, while litchi post-harvest management emerged as a researchable issue.

The desired value-chain transition is:



Post-harvest infrastructure should therefore be treated as part of the agricultural production system—not as an activity that begins only after agriculture has ended.

Strengthening Livestock and Fishery Value Chains-VKSA highlighted both the potential and the constraints associated with livestock and fisheries.

Farmers require access not only to production technologies but also to animal-health services, vaccination, diagnostics, breeding support, quality inputs, fish seed, technical guidance and market linkages.

The campaign's recommendations include strengthening livestock and fishery systems through improved animal health, fodder management, fishery infrastructure and

integration with farming systems.

Particular opportunity exists in low-lying and waterlogged areas, where fisheries can become a productive component of location-specific IFS models.

Crop + Livestock + Fishery + Horticulture can provide a more diversified livelihood base than dependence on a single enterprise.

The VKSA Action Matrix: Translating Local Problems into Coordinated Action. The matrix connects major field-level constraints identified through VKSA with corresponding research, extension, institutional and policy responses, emphasizing that sustainable solutions require coordinated action across multiple levels rather than isolated interventions.

Field Evidence / Farmer Constraint	Research Action	Extension Action	Institutional / Policy Action
Water logging	Develop and evaluate water logging-tolerant varieties and locally adapted IFS models	Demonstrate raised beds, suitable crops, drainage practices and fish-based systems	Strengthen drainage, water management and support for water-smart farming systems
Quality seed shortage	Evaluate locally suitable, climate-resilient and high-performing varieties	Promote quality-seed awareness and locally suitable varieties	Establish village seed banks and strengthen decentralized, farmer-led seed multiplication
Crop diseases & pests	Diagnose emerging problems and develop integrated management strategies	Strengthen surveillance, field diagnosis and timely farmer advisories	Improve diagnostic facilities and plant-health support systems
Orchard decline	Investigate causes of dieback, wilt and declining orchard productivity	Demonstrate orchard-health management, rejuvenation and improved production practices	Support orchard rejuvenation programs and access to quality planting material
Livestock health disorders	Develop improved diagnostics and affordable preventive and management strategies	Strengthen vaccination, animal-health awareness and farmer training	Improve village-level veterinary services, diagnostics and timely healthcare access
Machinery constraints	Develop and evaluate scale-appropriate machinery for small holders	Conduct machinery demonstrations and build operational skills	Expand Custom Hiring Centers (CHCs) and affordable machinery-access mechanisms

Crop-residue management	Evaluate locally feasible recycling, incorporation and resource-recovery options	Demonstrate practical residue-management and conservation technologies	Improve access to residue-management machinery, services and incentives
Post-harvest losses	Develop appropriate storage, packaging, processing and preservation technologies	Train farmers in scientific handling, storage, processing and value addition	Strengthen local storage, processing, cold-chain and related infrastructure
Weak market linkages	Undertake value-chain, market and profitability research	Improve market intelligence, awareness and enterprise-development skills	Strengthen FPOs, aggregation, market linkages and institutional partnerships
Information gaps	Develop location-specific digital decision-support and advisory tools	Deliver timely mobile-, weather- and need-based agro -advisories	Strengthen digital extension platforms, connectivity and institutional information systems

CHAPTER 9

Beyond the Numbers: Faces, Fields and Stories of VKSA

Behind every program was a conversation. Behind every field was a challenge. Behind every farmer was a story.



The scale of the VKS can be expressed through numbers—252 villages, 252 program, six multidisciplinary teams and 35,980 farmers reached. Yet numbers tell only part of the story. The deeper meaning of the campaign lies in the people who participated, the fields scientists walked through, the questions farmers raised, and the possibilities that emerged from

those interactions. Across East Champaran and Sheohar, each village presented a different farming situation. Somewhere, the conversation centred on water logging; elsewhere, farmers wanted access to quality seed. In an orchard, the concern could be declining mango trees; in a vegetable field, crop health; on a mixed farm, livestock or fishery; and at another gathering, farmers might encounter precision technologies such as agri- drones for the first time.

VKSA systematically combined farmer-scientist interactions, diagnostic field observations, technology demonstrations, soil-health awareness, Integrated Farming Systems, resource-conservation technologies, allied enterprises and farmer feedback. The campaign records also specifically included documentation of progressive-farmer success stories for wider learning.

The Water logged Field-For farmers cultivating low-lying land, excess water can determine what can be grown, when a crop can be established and whether an entire season succeeds. During VKSA interactions, water logging emerged repeatedly as an important production constraint.

Standing beside such fields changes the scientific conversation.

The question is no longer simply:

“How can we increase the yield of this crop?”

It becomes:

“What kind of farming system belongs in this landscape?”

Farmer interactions pointed towards the need for water logging -tolerant crops, raised-bed cultivation, improved drainage, fisheries and location-specific Integrated Farming Systems.

This represents a fundamental change in perspective.

Instead of viewing every water logged field only as degraded cropland, science can ask whether its land and water resources could support a different combination of enterprises.

The Farmer Looking for the Right Seed-A good technology is useful only when it arrives on time

Imagine the beginning of a cropping season.

- The land is prepared.
- The sowing window is approaching.
- The farmer knows which improved variety is required.
- But the seed is unavailable.

VKSA interactions revealed that farmers were concerned about non-availability, delayed supply and high cost of quality seed. The issue was particularly important for farmers seeking improved and hybrid varieties.

The conversation therefore moved beyond

variety development towards seed delivery systems.

THE PROBLEM

Quality seed unavailable at the right time



THE FARMER'S EXPECTATION

Reliable and timely local access



THE SCIENCE-INSTITUTION RESPONSE

Local seed multiplication Quality assurance Village seed banks



Better Seed Systems, Better Beginnings

This story reminds us that agricultural innovation involves not only what science develops, but also whether farmers can access it when they need it.

A Mango Tree Raises a Question-A mango tree represents years of investment.

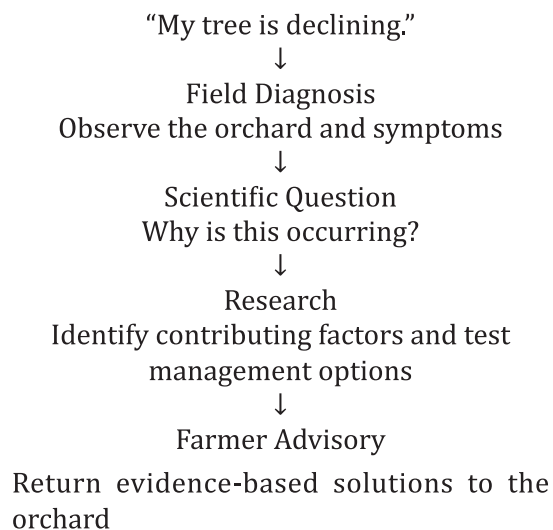
When a farmer notices declining branches, dieback or sudden wilting, the concern is therefore much greater than the loss of a single season's crop.

During VKSA field interactions, farmers brought attention to problems affecting mango and litchi orchards. Some of these observations—including mango dieback and sudden wilt—were subsequently identified as issues requiring further scientific investigation.

Sometimes the scientifically responsible response is to ask better questions:

1. What is happening to the tree?
2. How widespread is the problem?
3. What factors are associated with its occurrence?
4. Can it be detected earlier?
5. Which management approaches can reduce the risk?

Farmer Observation



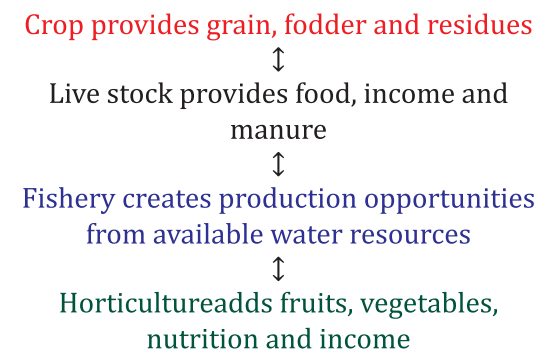
Drone Came to the Village- For many farmers, advanced agricultural technologies can appear distant until they are seen operating in a familiar field.

Agri-drone demonstrations conducted during VKSA provided precisely such an opportunity. The campaign used demonstrations to introduce farmers to

modern precision technologies for agricultural input application.

One Farm, Many Enterprises- VKSA promoted Integrated Farming Systems combining crops, livestock and fisheries, together with other allied enterprises, as a pathway towards farm diversification. Such demonstrations were among the campaign's major field-oriented activities.

The strength of the approach lies in the relationships among components:



The story is therefore not about adding enterprises simply to increase their number.

For small and marginal farmers facing climatic and market uncertainty, diversification can provide a broader livelihood base than dependence on a single enterprise.

The Livestock Farmer's Question- Livestock farmers raised issues relating to animal health and reproduction, reinforcing

the importance of considering livestock as an integral component of the farming system.

For a farming household, an unhealthy animal can mean:

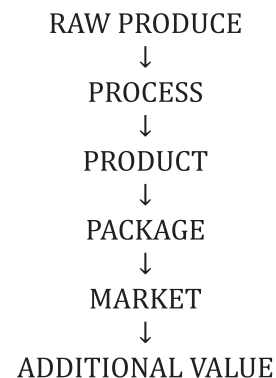
- Loss of production
- Additional treatment expenditure
- Reduced reproductive performance
- Loss of an important household asset

The lesson was important: A Resilient Farm Needs Healthy Crops and Healthy Animals.

From Produce to Product- For many farming households, the opportunity to increase income does not end at harvest.

Activities highlighted through VKSA included mushroom cultivation, herbal rose-based products, value addition of tomato and potato, and other household-level enterprises, with particular relevance for expanding livelihood opportunities.

The transition can be simple but powerful:





This approach is particularly important for perishable agricultural commodities, where processing and value addition can provide alternatives to immediate sale.

Learning also travels from farmer to farmer- VKSA included the recording of success stories of progressive farmers so that promising practices and experiences could be documented for wider replication.

This recognizes an important dimension of agricultural learning:

Scientists teach farmers—but farmers also teach farmers.



A practice demonstrated successfully by a neighbouring farmer may carry a different kind of credibility because other farmers can see:

1. where it was implemented,
2. how it was managed,

3. what resources were required, and
4. whether it appears relevant to their own conditions.

Progressive farmers can therefore act as local knowledge multipliers, complementing formal research and extension.

Science → Progressive Farmer → Village → Wider Adoption

This farmer-to-farmer pathway can substantially strengthen technology dissemination.

Behind that number were farmers managing different crops, farm sizes, resources, risks and livelihood strategies.

- Some were looking for a better variety.

- Some wanted help with crop health.
- Some were concerned about water.
- Some were managing orchards.
- Some depended heavily on livestock.
- Some wanted machinery.
- Some wanted better market opportunities.
- And some simply wanted agricultural science to remain connected with their villages after the campaign ended.

The campaign's value therefore lies not only in the number of farmers contacted but in the diversity of experiences brought into the farmer–scientist dialogue.





CHAPTER 10
The Sankalp Continues
From 252 villages towards Viksit Krishi



The VKSA began as a nationwide effort to bring agricultural science closer to farmers. Across East Champaran and Sheohar, that national vision took shape in villages, crop fields, orchards and farming households through direct interaction between scientists and farming communities.



Over 15 days, from 29 May to 12 June 2025, six multi disciplinary teams conducted 252 programmes across 252 villages and directly reached 35,980 farmers. Farmers were introduced to improved technologies and scientific advisories, while scientists gained first-hand understanding of production constraints, technology gaps, local innovations and farmers' expectations.

Yet the real significance of VKSA lies beyond these numbers.

The campaign demonstrated that agricultural transformation becomes more meaningful when science reaches the field, listens to the farmer, responds to local realities and carries those experiences back into research, extension and policy.

VKSA was a campaign of 15 days, but the partnership it strengthened must continue far beyond the campaign.

What the Journey Taught Us- The VKSA journey through East Champaran and Sheohar generated several important lessons for agricultural research and development.

Farmers need solutions, not isolated technologies: The problems documented during the campaign were interconnected. Water logging influenced crop choice; seed availability affected timely sowing; diseases affected productivity; inadequate machinery constrained farm operations; livestock-health problems influenced household livelihoods; and post-harvest and market constraints determined whether higher production translated into greater income.

The experience therefore reinforced the need to move from individual technologies towards integrated, farming-system-based solutions.

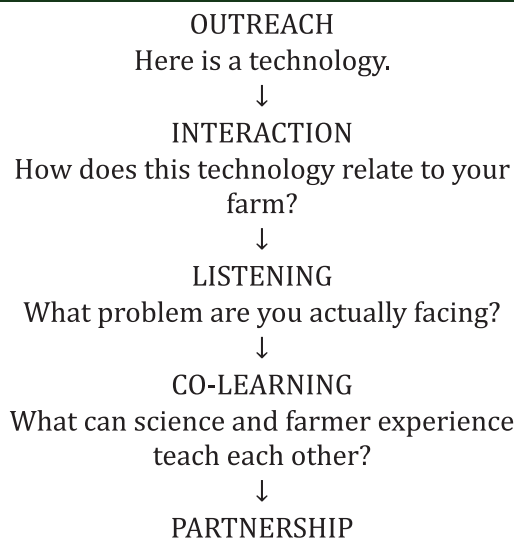
Location Matters: Farmers explicitly sought technologies adapted to their own soil, water regime and agro-climatic conditions. A technology suitable for an irrigated cereal system may not be appropriate for a waterlogged lowland, vegetable farm or perennial orchard.

Seeing Builds Confidence: Farmers expressed a preference for more hands-on demonstrations and village-level exposure to technologies. Direct observation enables farmers to understand, question and evaluate an innovation before deciding whether it fits their farming situation.

Listening Creates Better Science: The campaign identified researchable issues directly from farmers' fields, including water logging management, seed systems, mango dieback and sudden wilt, crop-health problems, livestock constraints and post-harvest management.

- These lessons collectively reinforce one principle:
- Good extension takes science to farmers.
- Great extension also takes farmers' questions back to science.

From Outreach to Partnership: Conventional agricultural outreach can sometimes end once information has been delivered. VKSA demonstrated the value of going further.



This progression transforms the farmer from the final recipient of technology into an active participant in agricultural innovation.



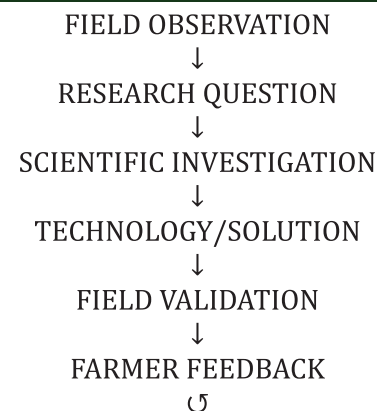
The Farmer at the Centre: A Collaborative Model for Agricultural Research and

Extension. The figure illustrates a farmer-centred framework in which research, extension, technology, institutions, markets, and policy work together to address field-level needs. Their effective convergence can improve access to knowledge, technologies, services, markets, and enabling support, thereby strengthening farm productivity, profitability, resilience, and sustainable agricultural transformation.

Research Must Begin in the Field- VKSA demonstrated how field observations can contribute to research prioritization.

1. A farmer showing a waterlogged field can initiate research on stress-tolerant crops and water-smart farming systems.
2. A farmer reporting difficulty in obtaining quality seed can lead to questions about decentralized seed systems and village seed banks.
3. A declining mango orchard can generate research on diagnosis and integrated orchard-health management.
4. A farmer losing produce after harvest can stimulate work on storage, packaging, processing and value addition.
5. Livestock-health concerns can guide improved diagnostics, surveillance and low-cost management approaches.

In this way:



This continuous loop should become one of the lasting legacies of VKSA.

From Recommendations to Precision in Extension- The future of agricultural extension will increasingly require recommendations that respond to where the farmer farms, what the farmer grows, the resources available, and the risks faced.

The farmer expectations documented through VKSA included demand for:

- Climate-resilient crop varieties
- Site-specific production technologies
- Digital agro-advisories
- Timely quality seed
- Village seed banks
- Integrated Farming Systems
- Zero tillage and raised-bed cultivation
- Post-harvest infrastructure
- Capacity building
- Crop-residue management solutions

More village-level demonstrations



From Campaign to Continuum: The VKSA Legacy and Action Matrix. Connecting field experiences, lessons learned and future actions towards Viksit Krishi.

VKSA Experience	What It Demonstrated	What Must Continue	Towards Viksit Krishi
15 Days of Intensive Outreach	Focused campaigns can rapidly connect science with farming communities	Convert short-term campaigns into sustained farmer–science engagement	Responsive agricultural system
6 Multi disciplinary Teams	Farmer problems often cross disciplinary boundaries	Strengthen multi disciplinary and farming-system approaches	Integrated solutions
252 Villages Reached	Village-level engagement reveals location-specific realities	Maintain village linkages and expand successful approaches to new locations	Locally adapted agriculture
35,980 Farmers Reached	Direct interaction creates opportunities for knowledge exchange at scale	Build continuing advisory, feedback and farmer-to-farmer learning networks	Empowered farmers
Farmer–Scientist Dialogue	Farmers are both users and sources of agricultural knowledge	Institutionalize regular mechanisms for listening to farmer voices	Farmer-centred innovation
Field Diagnosis	Problems are better understood when scientists observe them under actual farm conditions	Strengthen field diagnostics, surveillance and rapid technical response	Evidence-based decisions

Technology Demonstrations	Farmers can better assess technologies when they see and discuss them	Expand participatory demonstrations and on-farm validation	Technology-enabled farming
Farmer Feedback	Local experience reveals technology gaps, adoption barriers and emerging needs	Systematically document and integrate feedback into research and extension	Demand-driven innovation
Researchable Issues Identified	Farmer constraints can generate scientifically important research questions	Incorporate priority field problems into institutional research programmes	Responsive research
Extension Needs Identified	Many available technologies still require stronger last-mile delivery	Strengthen KVKs, digital advisories, demonstrations and capacity building	Knowledge-connected farming
Institutional Constraints Identified	Adoption depends on access to seed, machinery, services, finance and organizations	Strengthen convergence among ICAR, universities, State departments, FPOs institutions and local KVKs,	Accessible support systems
Market & Value-Chain Concerns	Higher production alone does not higher farm income	Strengthen aggregation, storage, processing, value addition and market linkages guarantee	Profitable agriculture
Climate & Resource Challenges	Waterlogging, soil health and resource constraints require locally adapted solutions	Promote resilient crops, diversified IFS, efficient resource use and climate-smart practices	Climate-resilient agriculture
Science–Society Interface	Agricultural transformation becomes stronger when science and farmers learn from each other	Build a continuous cycle of listening, research, validation, feedback and scaling	Science with Farmers





Towards Viksit Krishi: A Farmer-Centred Framework for Agricultural Transformation. Key dimensions for building productive, profitable, climate-resilient, resource-efficient and farmer-centred agriculture towards Viksit Bharat@2047.

VKSA Experience	What It Demonstrated
Viksit Krishi Must Be	What It Means for the Farmer
Productive	Reliable production and food and nutritional security
Profitable	Better returns, value addition and dignified livelihoods
Climate-Resilient	Capacity to withstand climatic and production risks
Resource-Efficient	Judicious use of soil, water, nutrients and energy
Diversified	Multiple farm enterprises, income sources and livelihood opportunities
Technology-Enabled	Practical access to modern, affordable and appropriate technologies
Market-Connected	Stronger links between production, aggregation, processing and markets
Farmer-Centred	Research and innovation driven by farmers' realities and needs

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