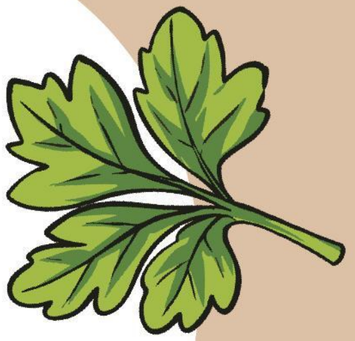
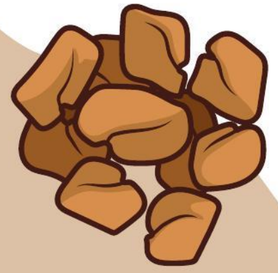




Seed Spices Story

Transforming Rajasthan's Seed Spices Sector

A Reflective Field Dialogue Between Bhagirath Choudhary & Shrishail Kulloli


June 2026

SOUTH ASIA BIOTECHNOLOGY CENTRE

Seed Spices Story

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www.biotechkisan.org / www.nabard-aefc.org

Seeds, Science and Stories from the Field

A field-based conversational narrative documenting the evolution of Rajasthan's seed spices ecosystem through science, partnerships, biodiversity conservation and farmer-led innovation.

June 2026

About This Conversation

This publication is not merely a technical report or an institutional documentation exercise. It is a reflective narration of a shared field journey undertaken across the arid landscapes of Rajasthan during one of the most challenging periods in recent history.

Through extensive village visits, farmer interactions, biodiversity mapping, technology demonstrations, residue-awareness campaigns and market engagement under Biotech KISAN Hub initiatives, the South Asia Biotechnology Centre (SABC), Jodhpur and ICAR-National Research Centre on Seed Spices (NRCSS), Ajmer & ICAR - Central Arid Zone Research Institute (CAZRI) in partnership with the Regional Office (Rajasthan) of the Spices Board of India gradually became part of a larger movement aimed at transforming Rajasthan's seed spices ecosystem.

Presented in the form of a conversation between Dr Bhagirath Choudhary of South Asia Biotechnology Centre and Dr Shrishail Kulloli of the Spices Board of India, this publication captures not only scientific interventions and institutional collaborations, but also the lived experiences, grassroots realities and collective aspirations of farmers, scientists, farmer producer organisations (FPOs), farmer producer companies (FPCs), entrepreneurs, small agri-businesses and policymakers who contributed to this evolving journey.

The dialogue reflects how small field-level interventions during the COVID-19 pandemic eventually expanded into a broader ecosystem focused on quality production of seed spices, biodiversity conservation, residue-free production systems, farmer empowerment, export readiness and positioning Rajasthan as a globally trusted hub for premium seed spices.

In summary, this publication narrates the evolution of an informal yet highly impactful collaboration between the South Asia Biotechnology Centre (SABC), Jodhpur and the Regional Office (Rajasthan) of the Spices Board of India during and after the COVID-19 pandemic. Presented in the form of a dialogue, the document highlights how science-led grassroots interventions, institutional collaboration, biodiversity conservation, farmer engagement and market integration helped reposition Rajasthan as an emerging hub for pesticide residue-free and globally compliant seed spices.

More importantly, the publication highlights a deeper lesson that sustainable agricultural transformation becomes possible when institutions move beyond project-based approaches and begin walking alongside farmers as equal partners in innovation, conservation and market integration.

The experiences and outcomes documented in this publication are based on extensive field work undertaken between 2020 and 2025 under the Biotech KISAN Hub programs supported by the Department of Biotechnology (DBT), Government of India and the Agri Export Facilitation Centre (AEFC) supported by the National Bank for Agriculture and Rural Development (NABARD), Government of India.

Bhagirath Choudhary & Shrishail Kulloli
South Asia Biotechnology Centre & the Spices Board of India


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GAMERS

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What began as field visits during a Covid-19 crisis gradually evolved into a statewide Ecosystem for Science-led Seed spices Transformation!

Part I – Background
Rajasthan, Seed Spices and India's Emerging Global Leadership

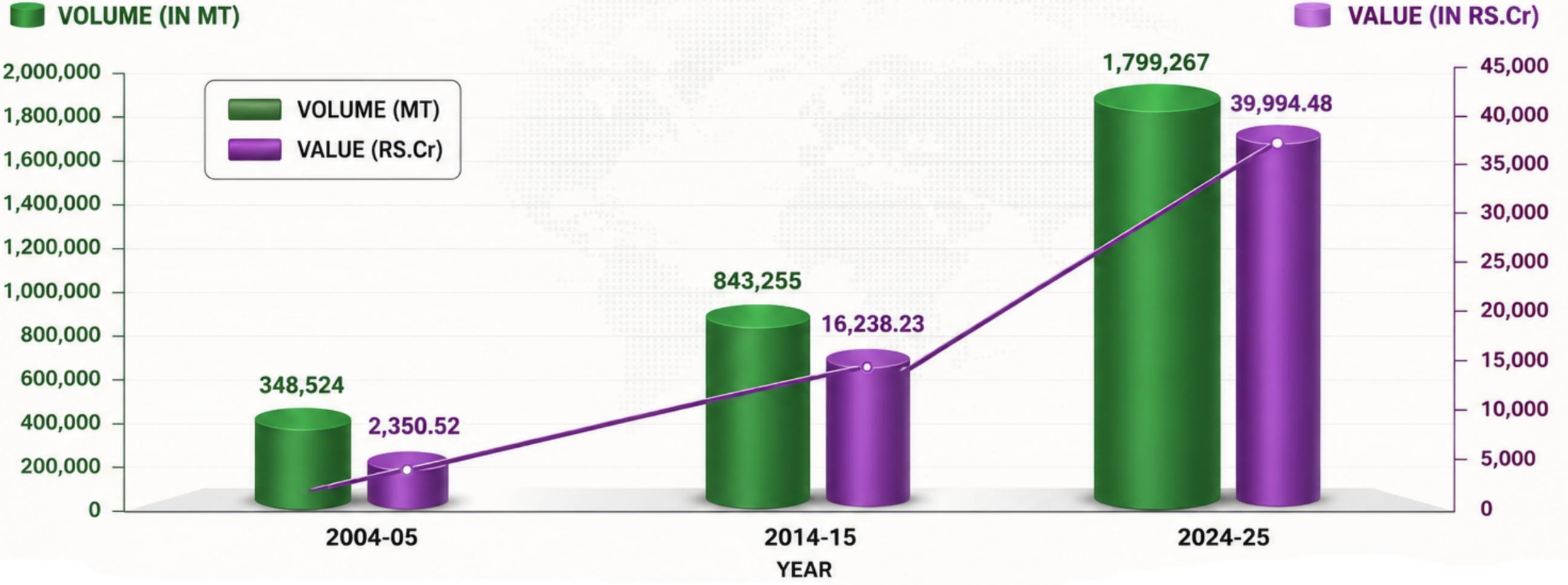
The world is increasingly looking towards India, and particularly Rajasthan, as a trusted source of cumin, coriander, fennel, fenugreek, ajwain, Nagauri paan methi and several other seed spices and medicinal plants such as isabgol and ashwagandha that form the backbone of global food systems, nutraceutical industries and traditional medicine markets. In the coming decades, the future of Indian agriculture will not be shaped by staple crops alone, but also by high-value, climate-resilient and export-oriented commodities such as seed spices, medicinal and aromatic plants and sustainable agri-food systems. Rajasthan, with its vast arid and semi-arid ecologies, rich biodiversity and deep-rooted traditional knowledge, is rapidly emerging as a strategic hub for premium-quality and residue-compliant seed spices and medicinal plants.

India today remains the global capital of spices. During 2024-25, spices were cultivated across nearly 47 lakh hectares with a production exceeding 118 lakh tonnes. The country exported about 17.99 lakh tonnes of spices and spice products valued at nearly ₹40,000 crore (US$ 4.72 billion), demonstrating the growing strategic importance of the sector in agricultural diversification, rural livelihoods and export growth. Among exported spices, chilli led the basket with exports exceeding ₹11,404 crore, while cumin alone contributed over ₹6,178 crore. Seed spices collectively contributed more than ₹8,000 crore to India's spices export, underlining their increasing importance in the export economy.

Trend in Export of Spices from India over Decades (Volume in MT, Value in Rs Crore)

VOLUME GROWTH
5.2X
(2004-05 to 2024-25)

VALUE GROWTH
17.0X
(2004-05 to 2024-25)




किसान मेला
आई.पी.एम. जीरा उत्पादन
11 फरवरी 2022
ग्राम : बुढी, अर्जुनपुरा (नागौर)
दसवाणा परिवार आपका हार्दिक स्वागत करता है।
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Within India's spice ecosystem, seed spices occupy a uniquely strategic position. Out of the 54 scheduled spices (53 in schedule-1 & 1 in schedule-2 of the Spice Board of India) recognized in India, 12 belong to the seed spices category. These crops are particularly important in dryland agriculture because of their adaptability to arid conditions, comparatively lower water requirements and high market value. Crops such as cumin, coriander, fennel and fenugreek serve as economic lifelines for millions of smallholder farmers across Rajasthan, Gujarat and Madhya Pradesh.

Among them, cumin dominates both acreage and export value. India cultivates cumin over nearly 11.9 lakh hectares with a production of about 8.6 lakh tonnes. Rajasthan alone accounts for more than 6.5 lakh hectares under cumin cultivation, making it one of the largest cumin-producing regions in the world. Yet, Rajasthan's average productivity remains significantly lower than Gujarat, highlighting enormous opportunities for scientific interventions, climate-resilient technologies, quality seed systems and improved agronomic practices.

Rajasthan is also an important producer of coriander, fennel and fenugreek. Beyond major crops, the state possesses extraordinary diversity in minor and traditional seed spices such as Nagauri paan methi, ajwain, dill, kalonji, celery and anise. These crops are deeply interwoven with Rajasthan's traditional food systems, dryland farming ecologies and cultural heritage while also offering enormous opportunities for exports, premium branding and value-added processing.

However, the sector also faces serious challenges. Climate change, emerging pests & diseases, erratic rainfall, terminal heat stress, pesticide residue concerns, weak seed systems, low mechanization, market volatility and increasingly stringent international food safety standards are threatening the sustainability and competitiveness of seed spices cultivation. Global markets are now demanding traceable, residue-free & import-compliant spices with strict adherence to maximum residue limits (MRLs), microbial safety, contamination-free processing and transparent value chains.

The COVID-19 pandemic further exposed the vulnerabilities of smallholder farmers and fragile agri-value chains. Yet, it was during this difficult period that a remarkable grassroots movement began to take shape in Rajasthan.


Field Day cum Training Programme
on
"Promoting GAP & IPM in Cumin"
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Part I – Background

The Biotech KISAN Hub During/Post COVID-19: A Lifeline for Smallholder Farmers in Rajasthan

The Biotech KISAN Hub initiative of the Department of Biotechnology, Government of India, implemented by the South Asia Biotechnology Centre (SABC), Jodhpur, in collaboration with ICAR–National Research Centre on Seed Spices (NRCSS), Ajmer and ICAR - Central Arid Zone Research Institute (CAZRI) with an active engagement with the Regional Office (Rajasthan) of the Spices Board of India, gradually evolved into a transformative ecosystem for Rajasthan's seed spice sector. What initially began as crisis-response interventions during the pandemic eventually developed into a broader movement focused on science-led farmer empowerment, biodiversity conservation, residue-free production systems, export-oriented value chains, food safety awareness and global market integration.

Through decentralized field outreach, adaptive field demonstrations, on-farm group meetings, farmer fairs, community engagement, biodiversity conservation, registration of farmer varieties, community gene banks, residue management training, market linkages and direct engagement with exporters and private companies, the initiative helped reposition Rajasthan as an emerging global hub for premium-quality and globally compliant seed spices.

The following conversation between Dr Bhagirath Choudhary, Founder & Director of the South Asia Biotechnology Centre (SABC)- a DSIR recognized Scientific and Industrial Research Organization (SIRO) based at Jodhpur and Dr Shrishail Kulloli, Field Officer, Regional Office (Rajasthan) of the Spices Board of India, captures the evolution of this remarkable journey from small interventions during the COVID-19 crisis to the emergence of a robust ecosystem for farmers, innovation and global markets in Rajasthan's seed spice sector.


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GAMERS

DEPARTMENT OF BIOTECHNOLOGY
Government of India

#IndiaAt75

BIOTECH-KISAN HUB FOR

Western Dry Region helping farmers adopt GAP and IPM based production system

TO IMPROVE INCOME AND LIVELIHOOD

- The Hub has identified farmers from Nagaur District, Rajasthan to demonstrate the Good Agriculture Practices (GAP) and Integrated Pest Management (IPM) to improve the quality of cumin and isabgol, popularize adoption of GAP and IPM to substantially reduce use of pesticides and register farmers directly with exporter to increase farmers' income.

- An EoI was signed between Farmers SHG and M/s SRK Spices Pvt Ltd's on 12th March 2021. Immediately after this, M/s SRK Spices bought first batch of IPM cumin produced under Biotech-KISAN Hub at a record price of Rs 16,000 per quintal against the prevailing market price of Rs 13,000.

Part II- Beginning
When Commitment Meets Crisis

Shrishail Kulloli:

Dr Choudhary, when I look back at the last several years, it feels extraordinary how a difficult phase like the COVID-19 pandemic eventually became the foundation for transforming Rajasthan's seed spices ecosystem. My association with you began on 20 August 2020, during one of the most uncertain periods in recent history. Lockdowns had paralysed normal extension systems, farmers were anxious, markets were disrupted and movement itself was restricted. Yet, despite these unprecedented challenges, you and the South Asia Biotechnology Centre (SABC) continued to work relentlessly in the field. What I witnessed during that time was not just agricultural extension, it was a mission-driven effort to ensure that farmers were not abandoned during the crisis.

Bhagirath Choudhary:

The pandemic tested every institution and every individual associated with agriculture. But one thing became very clear to us that agriculture cannot stop and farmers cannot wait. Farmers cultivating cumin, coriander, fennel, fenugreek and Nagauri paan methi in remote arid regions of Thar desert were facing uncertainty related to markets, input availability and crop management. We felt it was our responsibility to stand alongside them. At that time, the Biotech Kisan Hub initiative supported by the Department of Biotechnology became much more than a project. It evolved into a lifeline for smallholder farmers across Western Rajasthan.

We realized that if scientific support did not reach the field during the crisis, the consequences for farmers would be severe. Our philosophy was simple yet powerful, "Science must reach the soil before it reaches the shelves."

That belief guided our entire approach. We decided that even during lockdowns, farmers must continue receiving technical advisories, integrated pest management support, residue management guidance and market linkage assistance.

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DR SANDIP AGALE

Shrishail Kulloli:

What impressed me most was that SABC did not work in isolation. Instead, you built a collaborative ecosystem involving ICAR-National Research Centre on Seed Spices (NRCSS), the Spices Board of India, progressive farmers, Farmer Producer Organisations (FPOs), exporters, local entrepreneurs, and private companies.This convergence became the strength of the movement.

Bhagirath Choudhary:

Agricultural transformation cannot happen through isolated efforts. Collaboration is the backbone of sustainable change. The informal yet highly effective partnership between SABC and the Regional Office of the Spices Board of India in Rajasthan created a strong field-level institutional mechanism. We brought together diverse stakeholders from the value chain system including private sector companies such as ITC Ltd, Rapid Organics, SRK Spices, Janta Global, PJM, BKB and Swani Spice Mills. A handful of FPO including Green Desert FPO, Mundwa Marwar FPO, Nagaur, Balaji FPO, Pali, FPO Jaitaran and Ambuja Cement Foundation also join the hands along with Federation of Indian Spice Stakeholders (FISS), Rajasthan Association of Spices (RAS), Isabgol Processors Association and Mandore Industries Association. Together, we ensured that farmers received:

- Scientific crop advisories
- Integrated Pest Management (IPM) support & Good Agricultural Practices (GAP) awareness
- Exposure to residue-free production systems & Market linkage opportunities
- Technical guidance during periods of uncertainty

This collective effort gradually evolved into a larger mission to reposition Rajasthan as a globally trusted hub for premium, traceable and pesticide residue-free seed spices.


कृषि विज्ञान केन्द्र (श्योर) दांता, बाड़मेर
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Part III – Science Meets the Fields

Reaching Remote Farmers and Border Areas

Shrishail Kulloli:

One of the earliest and most memorable initiatives during the pandemic was the on-farm cumin training programme at Zhinzianili village in Girab, Barmer district, on 31 October 2020. Even reaching the village itself was difficult due to restrictions and the remote border-region conditions.

Yet the programme was successfully organised through the joint efforts of SABC and the Spices Board.

Bhagirath Choudhary:

Yes, that programme reflected our commitment to ensuring that even the most remote farming communities remained connected with science and institutional support. Farmers in border and arid regions often remain disconnected from scientific institutions. Therefore, we consciously took science to the villages through field demonstrations, IPM campaigns and interactive farmer meetings. Our approach was not limited to technology dissemination, we at Zhinzianili-Girab region, focused equally on building trust and confidence among smallholder farmers during a period of fear and uncertainty.

- Demonstration of Integrated Pest Management (IPM)
- Distribution of IPM kits directly to farmers
- Scientific pest and disease management in cumin
- Sustainable and cost-effective production systems
- Farmer awareness on reducing indiscriminate pesticide use

The participation of progressive farmer Sh Suresh Choudhary, cultivating nearly 3000 bigha of cumin, also helped create confidence among neighbouring farmers.


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SOUTH ASIA
BIOTECHNOLOGY CENTRE
दक्षिण एशिया जैवप्रौद्योगिकी केन्द्र
Department of Biotechnology Govt. of India
NRCSS
स्पाइसेस बोर्ड भारत
SPICES BOARD INDIA
Ministry of Commerce & Industry, Govt. of India
ON-FARM TRAINING OF CUMIN
जीरे की खेती
किसानों के लिए खास जानकारी
Stick-a-Fly
BIOCURE

Shrishail Kulloli:

Another important aspect was the involvement of exporters and private companies such as PJM Export. That was perhaps one of the earliest examples of backward integration where farmers were directly connected with market players.

Bhagirath Choudhary:

Exactly. We always believed that agricultural transformation is incomplete without market integration. Our core philosophy is that a farmer empowered with knowledge and market access becomes self-reliant and not dependent. That philosophy shaped many of our subsequent interventions across western Rajasthan.


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Part III – Science Meets the Fields

Expanding Field Activities Across Rajasthan

Shrishail Kulloli:

What was remarkable was the speed at which field activities expanded after Girab. Within days, programmes were organised at Sanchore, Kurki, Bhavi and several other locations.

Bhagirath Choudhary:

The objective during the COVID-19 was continuity. Farmers needed reassurance during the pandemic. Farmers needed reassurance, scientific guidance and institutional support at a time when uncertainty had gripped every aspect of rural life. Agriculture could not pause simply because the world had come to a standstill. Seed spice cultivation, particularly cumin, was at a critical stage and any disruption in field operations, advisory services or input delivery could have seriously affected farmer livelihoods across western Rajasthan.

During that difficult period, many farmers were anxious not only about production risks but also about market uncertainties, labour shortages and disruptions in supply chains. Therefore, one of our most important responsibilities was to build farmer confidence. Through continuous field interactions, localized advisory support and regular communication, we tried to assure farming communities that institutions were standing firmly with them and that scientific agriculture would remain the pathway to resilience and recovery.

As the activities expanded to villages in Sanchore, Barmers, Jaisalmer, Jodhpur, Nagaur and Pali districts, the initiative gradually evolved into a much larger farmer-centric learning ecosystem. We strongly believed that demonstration-based learning would be far more effective than conventional advisory approaches. On-farm demonstrations on scientific cumin cultivation enabled farmers to directly observe improved agronomic practices, IPM strategies, crop health management and productivity-enhancing interventions under real field conditions.


Field Day cum Training Programme
on
"Promoting GAP & IPM in Nagauri Pan Methi"
Friday, 21st January, 2022


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SOUTH ASIA
SPICES BOARD INDIA
किसान मेला : जैविक एवं आईपीएम जीरा उत्पादन
डीडीटी - एसएचीसी बायोटेक
किसान हब, जोधपुर
गांव - बूटी अर्जुनपुरा, जिला - नागौर
शुक्रवार, 11 फरवरी 2022


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Field Day cum Training Programme
on
"Promoting GAP & IPM in Cumin"
Friday, 29th January, 2021
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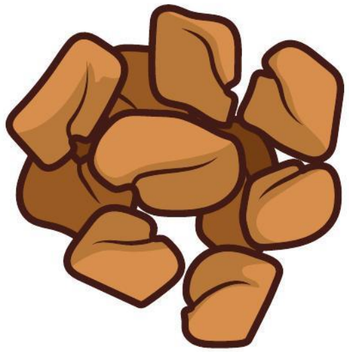
Training Programme
IPM in Nagau
Friday, 21st January, 2022


Field Day cum Training Programme
REDMI NOTE 9 PRO
DR SANDIP AGALE
2022/1/2


स्पाइसेस बोर्ड ऑफ इंडिया का 35वां गौरवशाली वर्ष
कोरल जुबली समारोह का आयोजन
जनता सेवा संस्थान, शिव (बाड़मेर)
द्वारा आयोजित
स्पाइसेस बोर्ड ऑफ इंडिया व नाबार्ड की सहभागिता
किसानों को मसालों की खेती और निर्यात के सम्बंध में जानकारी एवं
वृष्टि मंत्रालय भारत सरकार से सीधा किसान संवाद कार्यक्रम
दिनांक : 26 फरवरी 2022 स्थान - ऊण्डू, तह. शिव (बाड़मेर)
आयोजक - जनता सेवा संस्थान, शिव (बाड़मेर)
JantaGlobalAgri
35 Glorious Years
स्पाइसेस बोर्ड का 35 वां स्थापना दिवस
प्रवाल जयंती उत्सव का आभासी उद्घाटन समारोह
35TH ANNIVERSARY OF SPICES BOARD
VIRTUAL FUNCTION TO INAUGURATE THE CORAL JUBILEE CELEBRATIONS
श्री पी.आर.मैमोरियल
स्कूल ऊण्डू
मसालों
Regional seminar



Bhagirath Choudhary continues....

Equally important were the farmer group interactions that emerged around these demonstrations. These interactions created platforms for collective learning, problem-solving and exchange of local experiences among farmers themselves. The collaborative engagement with Farmer Producer Organisations (FPOs), local stakeholders and progressive growers further strengthened the outreach process and helped build trust-based networks at the grassroots level.

As I repeatedly emphasized during meeting after meeting that "true agricultural transformation begins when we walk alongside farmers, not ahead of them."

Looking back today, what may have initially appeared as small and localized interventions during the pandemic were actually the foundational steps toward building a much larger ecosystem for sustainable, residue-aware and globally competitive seed spice cultivation in Rajasthan.


Farmers First Orientation


मसालों पर क्षेत्रीय संगोष्ठी
Regional seminar on Spices

Part IV – Knowledge Empowers

Digital Knowledge Outreach During Pandemic Restrictions

Shrishail Kulloli:

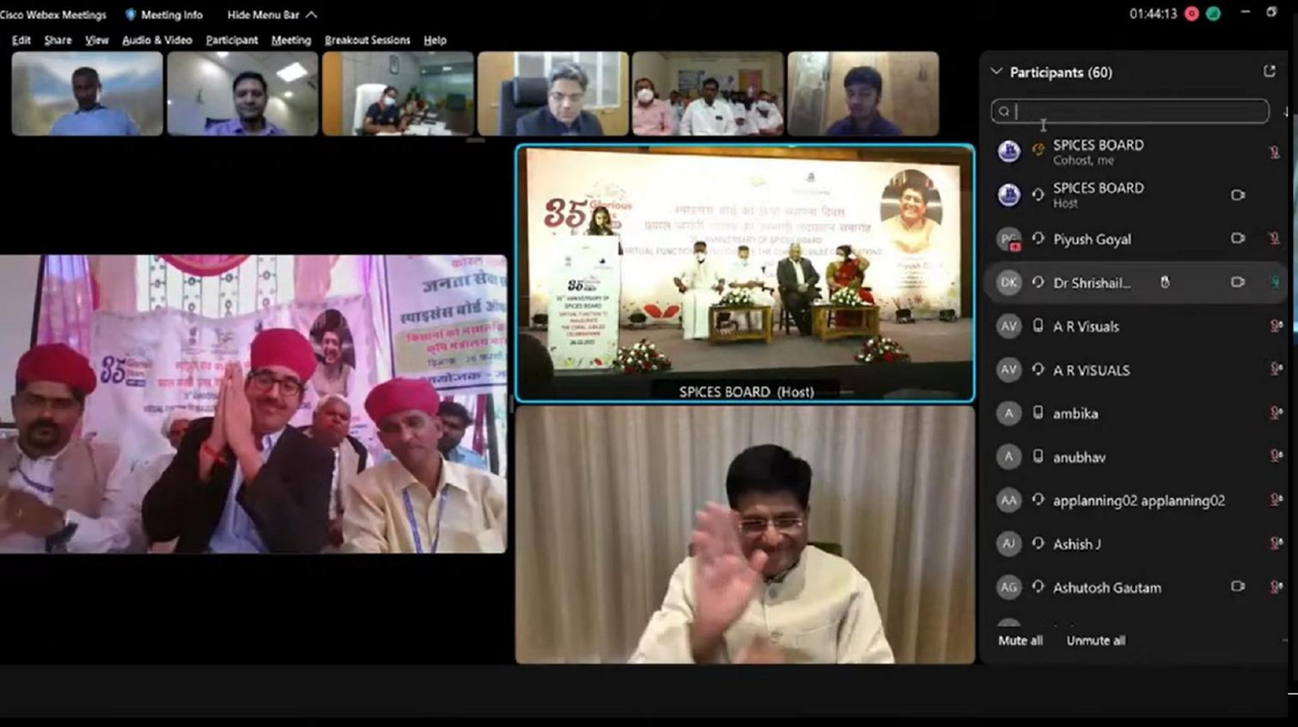
When physical meetings became difficult, SABC also rapidly adapted to digital outreach including webinars and online technical sessions.

Bhagirath Choudhary:

Yes, we realized that if farmers could not come to field schools during the pandemic, scientific knowledge had to reach their homes.

To maintain continuity in extension outreach, we organized a series of technical webinars on cumin, coriander and other seed spices involving farmers, extension workers, scientists, officials and other stakeholders.

These virtual platforms ensured uninterrupted scientific advisory services, disease and pest management guidance, residue management awareness and continuous knowledge sharing among stakeholders despite severe mobility restrictions. In many ways, the pandemic accelerated our understanding that technology-enabled extension systems and digital farmer engagement would become increasingly important for the future of Indian agriculture.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Participants (60)
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Piyush Goyal
Dr Shrishail...
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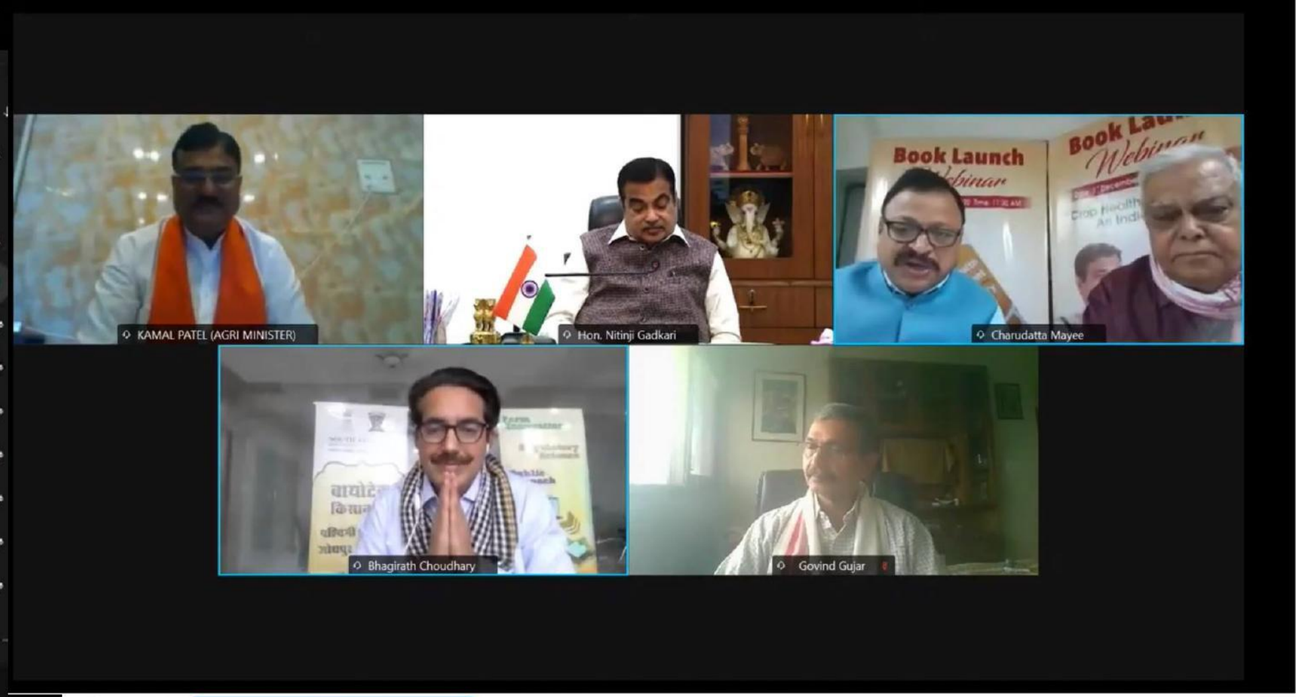
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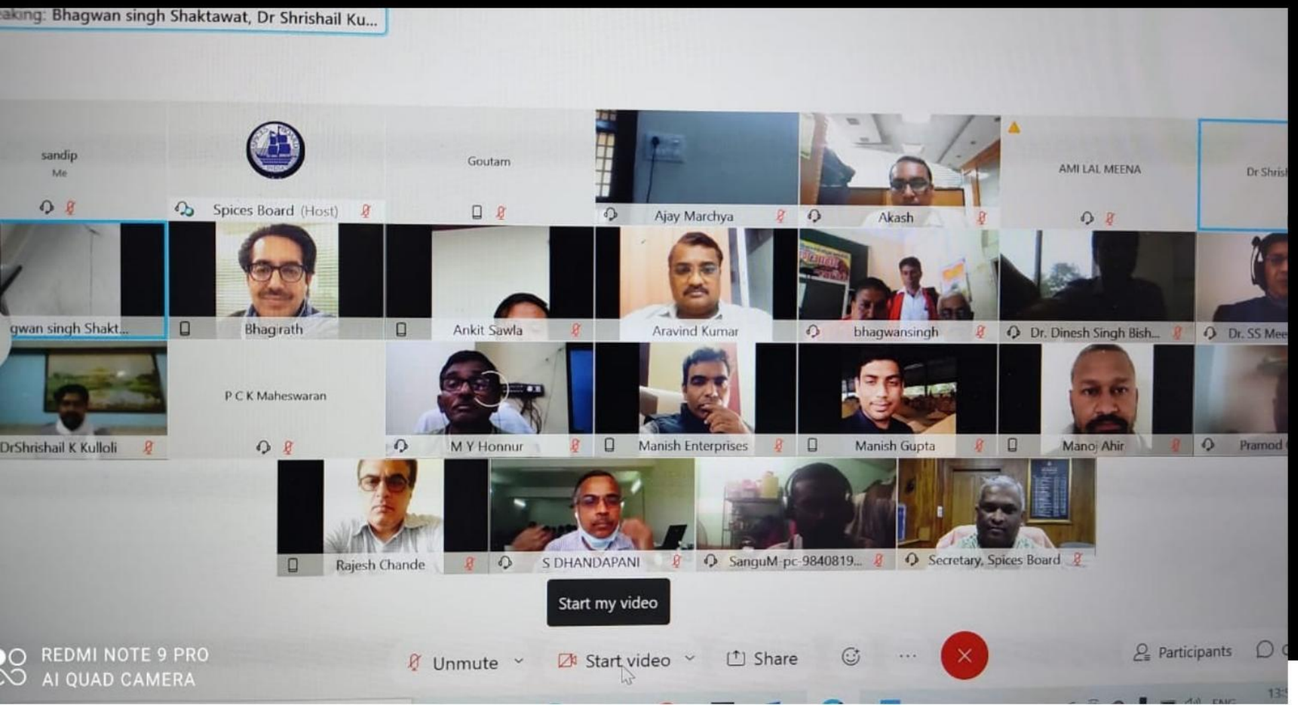
Hon. Nitinji Gadkari
Book Launch
Webinar
Charudatta Mayee
Bhagirath Choudhary
Govind Gujar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Spices Board (Host)
Ajay Marchya
Akash
AMI LAL MEENA
Bhagirath
Ankit Sawla
Aravind Kumar
bhagwansingh
Dr. Dinesh Singh Bish...
Dr. SS Mee
P C K Maheswaran
M Y Honnur
Manish Enterprises
Manish Gupta
Mano Ahir
DrShrishail K Kulloli
Rajesh Chande
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Secretary, Spices Board
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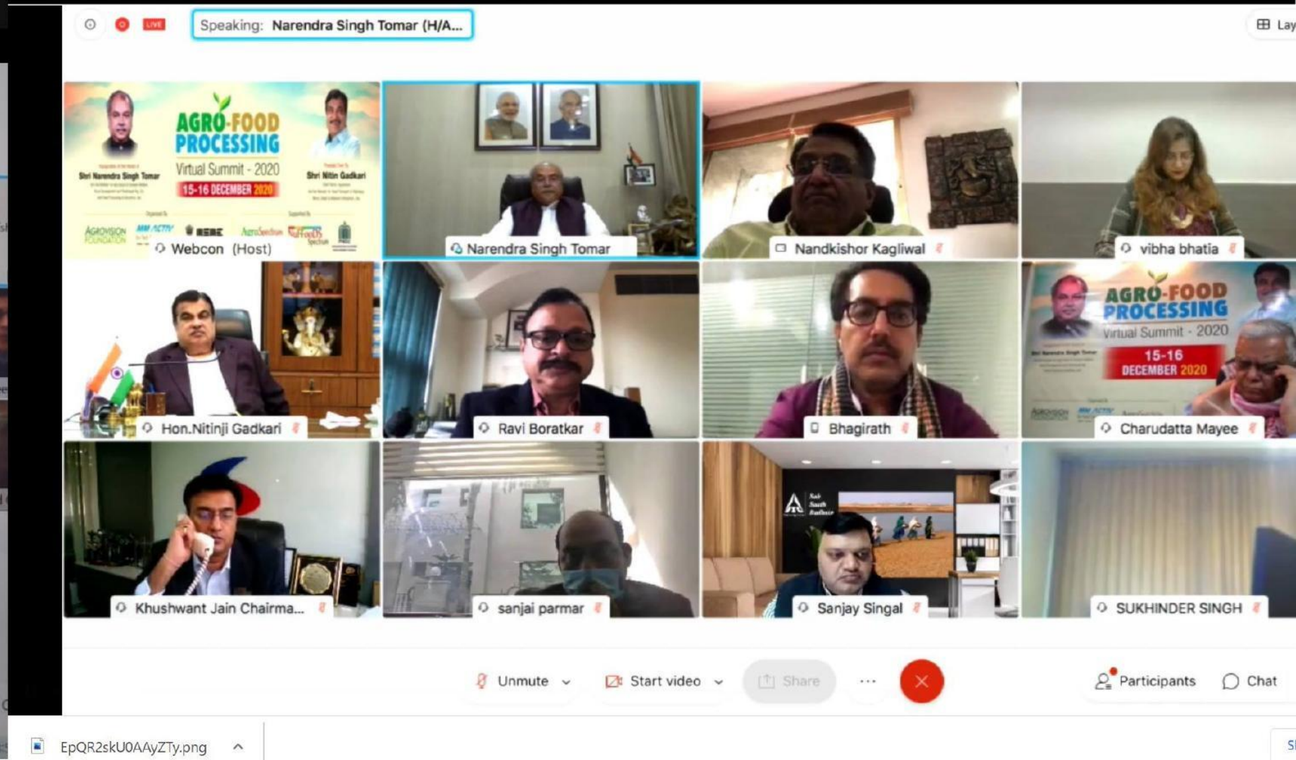
Speaking: Narendra Singh Tomar (H/A...
AGRO-FOOD PROCESSING
Virtual Summit - 2020
15-16 DECEMBER 2020
Webcon (Host)
Narendra Singh Tomar
Nandkishor Kagliwal
vibha bhatia
Hon.Nitinji Gadkari
Ravi Boratkar
Bhagirath
Charudatta Mayee
Khushwant Jain Chairma...
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Sanjay Singal
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Part IV – Knowledge Empowers
Capacity Building, Farmer Exposure and Institutional Convergence

Shrishail Kulloli:

Over time, the interventions evolved from isolated programmes into a much larger ecosystem-building effort.

Bhagirath Choudhary:

That is absolutely correct. Gradually, we moved beyond conducting individual activities and began focusing on building an integrated ecosystem capable of sustaining long-term transformation.

This evolving ecosystem brought together multiple stakeholders, including women farmers, Farmer Producer Organisations (FPOs), scientists, exporters, private industry, research institutions, financial agencies and policy stakeholders. The idea was to create stronger linkages between production, technology, markets and institutional support systems.

The support received from NABARD through the Agri Export Facilitation Centre further strengthened these efforts by helping us connect farmers with export-oriented value chains, quality awareness programmes and market opportunities. At the same time, the Biotech KISAN Hub initiatives in aspirational districts such as Sirohi and Jaisalmer significantly expanded our grassroots outreach and field-level engagement.

Farmer exposure visits, Kisan Samriddhi yatras, Kisan Shodh yatra, field demonstrations, stakeholder consultations and direct buyer interactions gradually became important instruments for scaling impact and building farmer confidence. We consistently observed that experiential learning created the strongest and most lasting impact among farming communities.

"Seeing is believing and learning from fellow farmers creates the strongest impact."


किसान सम


समन्वित कीट प्रबंधन
Enduring Value
मसालों पर क्षेत्रीय संगोष्ठी
Regional seminar on Spices
Organized by Regional Office, Jodhpur
स्थान/Place: Burhaan Ka Tala


STDF


सुस्वागत/ खम्मा घणी/ WELCOME
SPICES BOARD


Seed Spices
Organized by Regional Office, Jodhpur

Part V – Conserving Biodiversity and Community Knowledge
Conserving Farmer-Bred Varieties

Shrishail Kulloli:

One of the unique contributions of SABC has been the identification and registration of farmer-bred varieties such as Abu Saunf-440. This has generated considerable interest among farming communities.

Bhagirath Choudhary:

Rajasthan possesses extraordinary biodiversity in seed spices and medicinal plants. Many traditional farmer-bred varieties adapted to arid ecologies were at risk of being lost. Through extensive field visits, scientific evaluation, documentation and community engagement, we identified valuable farmers' bred variety and facilitated their registration under the Protection of Plant Varieties and Farmers' Rights framework.

The Biotech Kisan hub project implemented in collaboration with ICAR-CAZRI, we secured farmers' rights for 'Abu Saunf-440' variety bred and developed by progressive biotech kisan farmer Ishaq Ali under the PPV&FRA framework in September 2025.

दैनिक भास्कर
सिरोही-आबूरोड भास्कर 19-09-2025

भास्कर एक्सक्लूसिव सिरोही के किसान इशाक अली के प्रयास आखिरकार हुए सफल

आबू सौंफ-440 का पेंटेंट, सूची में शामिल होने वाली देश की ये पहली किसान किस्म

राजवाधेला | सिरोही

सालों के मेथड़ ऑफ सलेक्शन में इशाक ने 100 से ज्यादा सौंफ की किस्में बनाईं

भारत सरकार के पौध किस्म और कृषक अधिकार संरक्षण प्राधिकरण (पीपीवीएआरए) ने आधिकारिक रूप से आबू सौंफ-440 को किसान किस्म के रूप में रजिस्टर्ड किया है। यह विशेष सौंफ किस्म सिरोही राजस्थान के बायोटेक किसान इशाक अली ने विकसित की है। इसका पंजीकरण प्लांट वैरायटी जर्नल ऑफ इंडिया में प्रकाशित हुआ है। इशाक को पंजीकरण प्रमाण-पत्र भारत सरकार के पौध संरक्षण प्राधिकरण की ओर से नवंबर 2025 में दिया जाएगा। यह उपलब्धि डीबीटी बायोटेक किसान हब पहल की बड़ी सफलता है। अली को पीपीवीएफआर अधिनियम 2001 के तहत कानूनी अधिकार और पहचान दिलाई और राष्ट्रीय मान्यता मिली है। पंजीकरण आवेदन दक्षिण एशिया बायोटेक्नोलॉजी सेंटर (एसएबीसी) जोधपुर की ओर से तैयार किया गया और काजरी क्षेत्रीय अनुसंधान केंद्र (आरआरएस) पाली की ओर से अप्रैल 2024 में प्रस्तुत किया गया। यह प्रयास सिरोही और जैसलमेर आकांक्षी जिलों के बायोटेक किसान हब के तहत एसएबीसी, काजरी आरआरएस पाली और आरआरएस जैसलमेर की ओर से संयुक्त रूप से किया गया था।

काछोली गांव में डीबीटी बायोटेक किसान ईशाक अली की ओर से आबू सौंफ-440 तैयार की गई।

सालों की मेहनत और नवाचार से मिली पहचान

वर्षों की मेहनत और नवाचार से पैदा हुई। इसके लिए मेथड ऑफ सलेक्शन से कई सालों तक अलग-अलग बीज तैयार किए। इसमें से ही निकली आबू सौंफ-440 सिर्फ मेरी नहीं, बल्कि पूरे सिरोही के किसानों की पहचान और गर्व है। भारत सरकार के पौध संरक्षण प्राधिकरण में इसका पंजीकरण यह साबित करता है कि छोटे किसान भी अपनी लगन, परंपरा और पारम्परिक ज्ञान के बल पर देश-दुनिया में पहचान बना सकते हैं।
- इशाक अली, प्रगतिशील किसान, काछोली सिरोही

पीपीवीएफआरए ने दी आबू सौंफ-440 को मान्यता

दक्षिण एशिया बायोटेक्नोलॉजी सेंटर (एसएबीसी) जोधपुर के संस्थापक निदेशक डॉ. भागीरथ चौधरी ने बताया कि 3 से 4 वर्षों से टीम इशाक अली के साथ मिलकर किसान किस्म 'आबू सौंफ-440' की विशेषताओं का मूल्यांकन कर रही थी। फील्ड आधारित मूल्यांकन के आधार पर हमने आबू सौंफ-440 किस्म के डीयूएस लक्षणों का आवेदन तैयार किया।

राष्ट्रीय स्तर पर मान्यता इसलिए

आबू सौंफ-440 सिरोही जिले के माउंट आबू की उपजाऊ तराई क्षेत्र में करीब 9 हजार हेक्टेयर में उगाई जाती है। इशाक अली की ओर से विकसित आबू सौंफ-440 एक विशेष हरी एवं मोटे दानें वाली सौंफ की किस्म है, जिसमें प्रति पौधा 80 से अधिक एम्बेल (छत्रकों) के साथ उच्च उत्पादकता, रोग प्रतिरोधक क्षमता और बेहतर अनुकूलनशीलता और विशिष्ट सुगंध, चमकीला हरा रंग और स्वाद के लिए जानी जाती है।

इसमें मोटे दाने, विशिष्ट सुगंध, स्वाद, चमकीला हरा रंग के साथ हाई प्रोडक्टिविटी का उल्लेख किया गया। पीपीवीएफआरए ने आबू सौंफ-440 के पंजीकरण को मान्यता दी। यह भारत सरकार के पीपीवीएफआरए की ओर से किसान की ओर से विकसित पहली सौंफ की किस्म का पंजीकरण है। अगला लक्ष्य आबू सौंफ के लिए भौगोलिक संकेतक (जीआई) प्राप्त करना है।

किसान हब ने परीक्षण किए

सिरोही आकांक्षी जिला बायोटेक किसान हब ने किसान किस्म को रजिस्टर्ड करने के लिए परीक्षण किए। किस्म के आवश्यक लक्षणों का निर्धारण किया। फील्ड डाटा बनाए और एरोमेटिक कम्पाउंड प्रोफाइलिंग के जरिए आबू सौंफ-440 में एनेथोल, फैंचोन और मिथाइल चैविकोल की मात्रा का आकलन किया, जो अन्य क्षेत्रों में उगाई जाने वाली सौंफ की तुलना में अधिक है। इससे इसका सिरोही क्षेत्र से विशिष्ट संबंध स्थापित होता है।

Part V – Conserving Biodiversity and Community Knowledge
Nagauri Paan Methi: From Traditional Crop to National Recognition

Shrishail Kulloli:

One of the most significant journeys that began during this period was the recognition movement for Nagauri Paan Methi.

Bhagirath Choudhary:

For us, Nagauri Paan Methi represented far more than just as a pasture herb and locally traded as "patta methi". It symbolized farmers' heritage, aromatic spices, age-old biodiversity, traditional wisdom and the unique regional identity of Rajasthan's dryland agriculture. We recognized early that notifying such traditional crops as a spice in the schedule-1 of the Spices Board of India will give its true recognition. Furthermore, the registration of the seed variety of Nagauri Paan Methi as a community variety by PPVFRA would secure rights to those farmers who nurtured it over half a century. These steps were indispensable to prepare a solid ground for filing application for the geographical indication (GI) of Nagauri Paan Methi.

Our initial interventions with Ambuja Cement Foundation at Marwar Mundwa in January 2021 therefore focused on creating farmer awareness, documenting traditional cultivation practices, scientifically validating local knowledge systems, collecting historical evidence and building institutional support for long-term conservation and recognition.

At the heart of these efforts was a simple but powerful belief that every traditional crop carries a story of communities, landscapes and generations of farmer innovation and our responsibility as institutions is to ensure that these stories receive the scientific recognition and policy support they deserve.


REDMI NOTE 9 PRO
DR SANDIP AGALE
2022/1/21 11:56


Regeneration of Nagauri Paan Methi for
Enhancing Farmers' Income a Livelihood Security
through Quality Seed Production &
Value Chain Development

Shrishail Kulloli:

The subsequent Kisan Melas, farmer meetings, field based varietal characterisation and documentation efforts gradually transformed this into a structured movement..

Bhagirath Choudhary:

Yes, and after years of sustained grassroots engagement, scientific documentation and institutional collaboration, these efforts ultimately culminated in national recognition for Nagauri Paan Methi. It was a powerful example of how grassroots initiatives can eventually shape public policy. Some of the key milestones, listed chronologically, are as follows:

- The Krishi Upaj Mandi Samiti (APMC), Nagaur included "Nagauri Paan Methi" in the expanded Gaun Mandi Yard at Mundwa on27 October 2021. Subsequently, the District Collector of Nagaur allocated 80 bighas of land to establish APMC mandi at Mundwa exclusively for Nagauri Paan Methi. on 12 November 2021.
- The Bureau of Indian Standards (BIS), during the third revision of the "Spices, Culinary Herbs and Condiments" terminology in 2023, adopted a resolution to include Nagauri Paan Methi as a recognized spice.
- The Indian Council of Agricultural Research (ICAR) in its 250th Governing Board Meeting on 30 August 2022, emphasized the need to strengthen R&D related to germplasm characterization, varietal improvement and technology development, while enhancing scientific support for farmers cultivating Nagauri Paan Methi.
- The Ministry of Commerce and Industry, through a Gazette Notification dated 23 May 2025, included "Nagauri Paan Methi" at Serial No. 53 in Schedule-I of the Spices Board Act, 1986.
- The Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA), through its Plant Variety Journal dated 2 February 2026, published the registration of "Nagauri Paan Methi" as a Community Farmers' Variety, thereby granting legal recognition and rights to the farming communities of Nagaur, Rajasthan.


Azadi Ka Amrit Mahotsav
नागौरी पान मेथी पर
किसान मेला

Bhagirath Choudhary continues.....

These were not merely a legal and policy milestone, they were a historic recognition of farmers' collective knowledge, traditional seed stewardship and indigenous genetic heritage preserved across generations in Rajasthan's dryland ecosystems.

The achievement also demonstrated how scientific institutions and farming communities can work together to transform neglected traditional crops into symbols of biodiversity conservation, cultural identity and future economic opportunity.

Part V – Conserving Biodiversity and Community Knowledge
Abu Saunf Community Gene Bank

Shrishail Kulloli:

India already has the National Gene Bank at New Delhi, which conserves nearly 4.7 lakh accessions of plant genetic resources, and the Government of India has also announced the establishment of a second National Gene Bank. In such a scenario, what inspired you to think about creating a localized community gene bank and why was Sirohi in Rajasthan chosen for this initiative?

Bhagirath Choudhary:

While working closely with saunf (fennel) farmers in Rajasthan, we realized that many valuable local varieties and traditional seed lines were still being conserved informally by farming communities, but there was very little systematic follow-up after field demonstrations or skill development activities. Farmers participated enthusiastically, yet the long-term conservation and documentation of their indigenous germplasm remained largely unattended.

During our field engagement in Sirohi district, we observed an extraordinary diversity of fennel cultivated across different villages and micro-climatic regions. The variations in seed size, aroma, colour, maturity duration and adaptation clearly indicated the presence of rich indigenous genetic resources that deserved scientific attention and conservation. We felt that unless these valuable landraces were collected, documented and conserved locally, much of this biodiversity could gradually disappear.

This led us to conceptualize a community-led gene bank model rooted within the farming ecosystem itself. We discussed the idea extensively with local farmers and stakeholders. Among them, progressive biotech kisan Ishaq Ali showed keen interest & generously came forward to provide space for establishing the Abu Saunf Community Gene Bank.


INNOVATION IN FENNEL (SAUNF) PRODUCTION


ABU
SAUNF
COMMUNITY

Abu Saunf Community Gene Bank

Bhagirath Choudhary continues.....

The establishment of the Abu Saunf Community Gene Bank significantly strengthened efforts towards germplasm conservation, varietal characterization, future registration initiatives and sustainable utilization of indigenous fennel diversity. More importantly, it created a sense of ownership among farming communities towards biodiversity conservation.

"Preserving seeds is not just conserving crops, it is safeguarding the future of agriculture."


विश्व खाद्य दिवस:
आबू सौंफ कम्युनिटी जीन बैंक का
नवाचारी किसान सम्मान


Dr. Bhagirath Choudhary
PI - SABC, Jodhpur
Dr. J.C. Dagar
Assistant Director General
Dr. A.K. Shukla
Head & PI, PAU


SOUTH ASIA
BIOTECHNOLOGY CENTRE
ABU SAUNF
COMMUNITY GENE BANK
Farmer: Ishaq Ali
Village: Kachholi, Teh: Pindwara
District: Sirohi, Rajasthan
BIOTECH KISAN HUB FOR ASPIRATIONAL DISTRICT (SIROHI)
Implemented by: South Asia Biotechnology Centre, Jodhpur & CSZRI - RRS, PALI

Part VI – Markets and Exports

Strengthening Farmer–Market Linkages

Shrishail Kulloli:

One of the major turning points in Rajasthan's seed spice sector was the systematic effort to connect farmers directly with buyers and industry.

Bhagirath Choudhary:

Absolutely. Farmers cannot benefit unless they are integrated into transparent and quality-conscious value chains. Therefore, we actively facilitated interactions between farmers, exporters, spice processors and major companies. The Spice Board helped a lot to on board many private companies from the big, medium to small ones. We also focused on traceability, residue testing awareness, quality grading and post-harvest management. This collaboration gradually helped create confidence among buyers regarding Rajasthan's potential to supply premium-quality, pesticide residue free and globally compliant seed spices.

Through collaborations with companies such as ITC Limited, Rapid Organics, BKB, SRK Spices, exporters and FPOs, we worked on farmer-buyer interfaces, buyback arrangements, quality-linked procurement, traceability systems, residue awareness programmes and export-oriented production systems. These initiatives helped farmers understand that quality and compliance directly influence profitability.

"The true success of farming lies not only in production, but in profitable marketing".


Expert Consultation
on
Accelerating Export of Seed Spices:
Challenges and Opportunities
Monday, 22 November, 2021 : 14.00-17.30 hrs
भा.कृ.अनु.प. – राष्ट्रीय बीजीय मसाला अनुसंधान केन्द्र, तबीजी, अजमेर-305206 (राजस्थान)
I.C.A.R.- National Research Centre on Seed Spices, Tabiji, Ajmer-305206 (Rajasthan)


AGRI EXPORT
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CENTRE (AEFC)
NABARD
Farmers
Organic
Food
Safety


ખેતીવાડી ઉત્પન્ન બજાર સમિતિ,ઊંઝા.
સ્થાપના તા.૨૩.૧૦.૧૯૫૪
LEVI'S


राष्ट्रीय बागवानी अनुसंधान एवं विकास प्रशिक्षण,
क्षेत्रीय अनुसंधान केंद्र पिंपेगाव,नाशिक
AGRI EXPORT FACILITATION CENTRE (AEFC)
NABARD
SOUTH ASIA
Agri-Export Workshop & Exchange Program
Empowering Women Farmers
& FPOs for Global Trade
7-8th April, 2025
Nashik, Maharashtra


KRUSHAK
KRUSHI UTPADAN SANRAKSHAN KENDRA
HINDUSTAN AGRO

Part VII – Building an Ecosystem

Challenges Facing Seed Spices in Rajasthan

Shrishail Kulloli:
Despite the significant progress achieved in recent years, the seed spice sector in Rajasthan continues to face several serious challenges. How do you view these emerging concerns, and what strategies are needed to address them?

Bhagirath Choudhary:
Absolutely. While Rajasthan possesses tremendous potential to emerge as a global hub for premium seed spices, the long-term sustainability and competitiveness of the sector will depend on how effectively we address three deeply interconnected challenges of climate change, market volatility and food safety compliance.

The first and perhaps most serious challenge is climate change. Farmers are increasingly facing untimely and unseasonal rainfall, prolonged dry spells, hailstorms, early terminal heat stress and hot western winds during critical crop growth stages. These changing weather patterns are also altering pest and disease dynamics, resulting in increased incidences of wilt, blight, powdery mildew and sucking pests across major seed spice crops.

The second major concern is market volatility. Crops such as cumin and isabgol frequently witness extreme price fluctuations, creating uncertainty for farmers and destabilizing supply chains. At the same time, there remains a significant power imbalance between farmers and buyers, while existing market systems often fail to ensure transparent and fair price discovery mechanisms for producers.


REDMI NOTE 6 PRO
MI DUAL CAMERA

Bhagirath Choudhary continues.....

The third major challenge relates to compliance and food safety. Global markets are becoming increasingly stringent regarding Maximum Residue Limits (MRLs), Ethylene Oxide (ETO) restrictions, microbial contamination, traceability and export documentation. Another emerging area of concern involves contamination from Mineral Oil Saturated Hydrocarbons (MOSH) and Mineral Oil Aromatic Hydrocarbons (MOAH). Unfortunately, residue testing infrastructure and compliance support systems are still inadequate in many producing regions.

To address these challenges, we need a much stronger ecosystem approach. This includes strengthening seed systems, increasing seed replacement ratios, improving access to quality bio-inputs, expanding organic and Integrated Pest Management (IPM)-based production systems and developing robust residue testing infrastructure closer to production clusters.

Equally important is the development of farmer-oriented digital advisory and early warning systems capable of delivering timely scientific guidance directly to farmers.

Ultimately, the future competitiveness of Rajasthan's seed spice sector will depend on our ability to combine climate resilience, scientific production systems, food safety compliance and farmer-centric market reforms into one integrated framework.


गौण मण्डी प्रांगण ओसियां
जोधपुर
कृषि मंडी व्यापार संघ
ओसियां
आपका हार्दिक स्वागत करता है।
Regional seminar on
Spices


Welcome Delegates
(FAO)

Part VII – Building an Ecosystem

Building an Ecosystem for Residue-Free Seed Spices

Shrishail Kulloli:

Over time, the collaboration moved beyond extension activities and gradually evolved into a broader ecosystem approach. How did this transition happen?

Bhagirath Choudhary:

The experiences gained during COVID-19 helped us realize that sustainable transformation in seed spices requires an integrated ecosystem rather than isolated interventions.

We therefore expanded our activities towards efficient production system, biodiversity conservation, food safety awareness, traceability systems, market linkages and export preparedness.

Farmers were educated about pesticide residues, Maximum Residue Limits (MRLs), microbial contamination and emerging export compliance requirements.

Our objective was to position Rajasthan as a globally trusted source of pesticide residue-free seed spices.


SABC
CAZRI
RMGB
NABARD
LDM
AGRI DEPT
SPICES BOARD


Food and Agriculture Organization of the United Nations
STDF
STANDARDS and TRADE DEVELOPMENT FACILITY
PROJECT RESULTS DISSEMINATION WORKSHOP
Strengthening Spice Value Chain in India and Improving Market A
through Capacity Building and Innovative Interventions
27 September 202
The Park Hotel, New Delhi
Dr Alka Rao
Dr Vinay Bhardwaj
Mr Ramkumar Menon
Dr Bhagirath Choudhary
PROJECT RESULTS DISSEMINATION WORKSHOP
Strengthening Spice Value Chain in India and Improving Market Access through Capacity Building and Innovative Interventions
27 September 2024
The Park Hotel, New Delhi


AGRI EXPORT FACILITATION CENTRE (AEFC)
NABARD
Farmers
Organic
EXPORTERS
PROCESSORS
CAZRI
SABC
RMGB
NABARD
LDM
AGRI DEPT
SPICES BOARD


AGRI EXPORT FACILITATION CENTRE (AEFC)
NABARD
FINANCING OF FPO, FPC & AGRI-BUSINESSES IN RAJASTHAN
17 APRIL 2025
CONTACT US
Visit Our Website: www.nabard-aefc.org

Part VIII – Rajasthan's Global Future
Nurturing a Globally Competitive & Sustainable Seed Spice Ecosystem

Shrishail Kulloli:

Despite the multiple challenges confronting the sector, Rajasthan also holds extraordinary opportunities in seed spices.

Bhagirath Choudhary:

Indeed. Rajasthan today stands at the centre of India's emerging seed spice revolution. From cumin and coriander to fennel, fenugreek, ajwain, celery, kalonji and Nagauri Paan Methi, these crops along with medicinal and aromatic plants such as isabgol and ashwagandha are no longer viewed merely as traditional commodities.

Over the last few years, we have increasingly realized that seed spices possess the potential to redefine the future of dryland farming systems in Rajasthan.

However, the future success of Rajasthan's seed spice sector will depend on how effectively we combine climate-smart agriculture, AI-enabled advisory systems, precision farming technologies, residue-free and import-compliant production systems, strong traceability and certification mechanisms, biodiversity conservation approaches and farmer-centric innovation ecosystems. Simultaneously, strengthening seed systems, quality testing infrastructure, processing facilities and direct farmer-market linkages will be essential for enhancing global competitiveness.

We strongly believe that if Rajasthan successfully integrates science, sustainability and market intelligence with its rich traditional seed spice heritage, the state can emerge as the world's most trusted hub for premium-quality, residue-free and globally compliant seed spices.

"The future of Indian agriculture will not be shaped only by food security, but also by quality, traceability, biodiversity and global market leadership."


Welcome Delegates


Federation of Indian
FISS
Spice Stakeholders
APMC UNJHA


SEED SPICES
Task Force Committee Meeting


STDF
प्रशिक्षकों का प्रशिक्षण कार्यक्रम/ TRAINING OF TRAINERS PROGRAMME

Part IX – Reflection
From Baby Steps to a Transformational Movement

Shrishail Kulloli:

Looking back, what initially began as emergency field support during the COVID-19 pandemic gradually evolved into a much larger transformational movement for Rajasthan's seed spices sector.

Bhagirath Choudhary:

Yes, the journey from small grassroots interventions to ecosystem-level transformation has been both remarkable and deeply meaningful. During the difficult pandemic years, our immediate priority was to ensure continuity of agricultural activities, provide scientific support to farmers and sustain confidence in rural communities. However, over time, these field-level interventions expanded far beyond crisis management.

What makes this journey truly special is that it was built collectively through the shared commitment of farmers, scientists, institutions, exporters, entrepreneurs, farmer producer organisations (FPOs), private companies and policymakers working together towards a common vision.

Step by step, Rajasthan began evolving into:

- A centre for scientific seed spices cultivation
- A major hub for residue-free and export-oriented spice production
- A leader in farmer-led biodiversity conservation
- A platform for recognition of traditional farmer innovations
- An emerging model for traceable, sustainable and globally compliant agriculture


बाजीय मसाला किसान मेला - 2022
स्वच्छ एवं सुरक्षित उत्पादन - उत्तम स्वास्थ्य तथा अधिक आय
दिनांक : 11 मार्च, 2022
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बाजीय मसाला किसान मेला - 2022
स्वच्छ एवं सुरक्षित उत्पादन - उत्तम स्वास्थ्य तथा अधिक आय
दिनांक : 11 मार्च, 2022
NRCSS

Bhagirath Choudhary continues.....

The transformation was not driven by infrastructure alone, but by trust, collaboration and continuous grassroots engagement. Field demonstrations, farmer meetings, biodiversity documentation, market linkages, training programmes and institutional partnerships collectively created a strong foundation for long-term agricultural transformation.

Most importantly, farmers themselves became central stakeholders in this process. Their traditional knowledge, resilience, seed stewardship and willingness to adopt scientific practices shaped the success of the entire movement.

Going forward, our priority must be to translate grassroots interventions into measurable gains in productivity, quality and exports. Rajasthan should aim to increase cumin productivity from the current 520 kg/ha to the national average of 750 kg/ha and ultimately approach Gujarat's benchmark of nearly 980 kg/ha. Similar efforts are needed to reduce yield losses in fennel and coriander through effective management of major constraints such as gummosis in fennel and stem gall in coriander.

With science-led solutions, stronger farmer support systems, large scale adoption of pesticide residue free IPM seed spices and export-oriented value chains, Rajasthan can play a pivotal role in helping India achieve the ambitious target of US$2 billion in seed spices exports by 2030-31.

"Agricultural transformation is complete only when nation trade quality spices, farmers gain income, recognition, rights and a lasting legacy."


REDMI NOTE 9 PRO
AI QUAD CAMERA


स्टेट क्रेडिट सेमिनार 2025-26
नाबार्ड, राजस्थान


NABARD
ILOCAL GLOBAL
THE AGRI EXPORTER'S
ROADMAP


REDMI NOTE 9 PRO
AI QUAD CAMERA

Part X – Conclusion
A Shared Vision for the Future

Shrishail Kulloli:

This remarkable journey clearly demonstrates the power of collaboration, institutional commitment and farmer-centric innovation. Looking ahead, where do you see the future of farming and agriculture in Rajasthan?

Bhagirath Choudhary:

The transformation of Rajasthan's seed spices ecosystem is still evolving, but the foundation for a long-term and sustainable movement has now been firmly established. What began as localized field interventions during a period of crisis gradually evolved into a broader ecosystem built on science, trust, institutional partnerships and farmer participation.

The collective efforts of the Department of Biotechnology (DBT), National Bank for Agriculture and Rural Development (NABARD), the Spices Board of India, Agricultural and Processed Foods Export Development Authority (APEDA), the South Asia Biotechnology Centre (SABC), ICAR-National Research Centre on Seed Spices (NRCSS), ICAR-Central Arid Zone Research Institute (CAZRI), Farmer Producer Organisations (FPOs), progressive farmers, exporters, researchers and private stakeholders have demonstrated an important lesson that when scientific institutions and farming communities work together with a shared vision, agricultural transformation becomes both scalable and sustainable.


AGRI EXPORT
FACILITATION
CENTRE (AEFC)
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SOUTH ASIA
BIOTECHNOLOGY CENTRE
सिरोही किसान समृद्धि यात्रा


Azadi Ka
Amrit Mahotsav
Glorious Years
SPICES BOARD INDIA
SPICES" across INDIA
Foundation Day
ebruary 2023)
तारीख/Date 27/02/2023

Bhagirath Choudhary continues.....

The future of Rajasthan's agriculture will increasingly depend on how effectively we strengthen:

- Residue-free and export-compliant production systems
- Traceability and food safety infrastructure
- Farmer-owned institutions and decentralized value chains
- Conservation of traditional crop diversity and indigenous germplasm
- Climate-resilient and precision farming systems
- Export-oriented processing, branding and market linkages
- Farmer empowerment through knowledge, skills and ownership

At the same time, agriculture must move beyond production alone. The next phase of transformation will require integrating biodiversity conservation, digital agriculture, AI-enabled advisories, climate adaptation and rural entrepreneurship into mainstream farming systems.

Most importantly, this journey has reinforced our belief that farmers are not merely food producer but they are innovators, custodians of biodiversity and equal partners in building resilient and globally competitive agricultural food production systems.

"In every farmer lies innovation, excellence and the power to transform agriculture provided institutions choose to walk alongside them."


मसाला और मोटे अनाज पर कृषक संगोष्ठी
Campaign for "CLEAN & SAFE SPICES" across INDIA

Part XI – Acknowledgement

The authors acknowledge the invaluable contributions of farmers, farmer producer organisations (FPOs), farmer producer companies (FPCs), scientists, research institutions, Department of Biotechnology (DBT), National Bank for Agriculture and Rural Development (NABARD), the Spices Board of India, Agricultural and Processed Foods Export Development Authority (APEDA), ICAR-National Research Centre on Seed Spices (NRCSS), ICAR-Central Arid Zone Research Institute (CAZRI), State Agricultural Universities (SAUs), Krishi Vigyan Kendras (KVKs), traders, processers, exporters and numerous grassroots stakeholders whose collective efforts contributed to strengthening Rajasthan's seed spices ecosystem.

Special appreciation is extended to the farming communities of Rajasthan whose farming spirit, traditional wisdom and willingness to embrace scientific innovations continue to inspire this transformational journey.


जीरे की खेती
किसानों के लिए खास जानकारी
NRCSS
स्पाइसेस बोर्ड भारत
SPICES BOARD INDIA
Ministry of Commerce & Industry, Govt. of India
REPUBLIC OF GAMERS

The Future of Seed Spices

The journey demonstrates how institutional collaboration, grassroots science and farmer-centric innovation can transform crises into opportunities for long-term agricultural transformation.

Let us work together to build an ecosystem for farmers, innovation and global markets.


किसान मेला

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