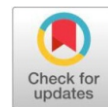


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Khet Bachao Abhiyan 2026 in Changthang: sustainable agriculture in India's highest farming villages



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ABSTRACT

The Khet Bachao Abhiyan (KBA) 2026, a nationwide campaign launched by the Ministry of Agriculture & Farmers' Welfare, Government of India, under the theme 'Healthy Soil – Healthy Crop – Prosperous Farmer,' was implemented in the ecologically sensitive Changthang region of eastern Ladakh during June 1–30, 2026. Krishi Vigyan Kendra (KVK) Nyoma, Leh II University of Ladakh served as the Nodal Institution, implementing the campaign in close collaboration with the Department of Agriculture, Union Territory of Ladakh, with active participation of Junior Extension Officers from the Nyoma, Tangtse and Durbuk blocks. The campaign opened with a technology exhibition at the Vibrant Village of Chumur, coinciding with a visit by the Hon'ble Lieutenant Governor of Ladakh, where bio-inputs (neem oil, bionutrient formulations and Jeevamrit), a curd milk churner and UV-stabilised greenhouse polythene were demonstrated to 240 farmers, delegates and school children. Implementation in this setting was inherently challenging, owing to an extreme cold-arid climate, a short field season, widely dispersed settlements, restricted border-area access, and limited local agri-input supply infrastructure. Subsequent field demonstrations across Changthang covered natural farming inputs (Jeevamrit and Beejamrit preparation), black polythene mulching, oyster mushroom cultivation and the Ladakh Greenhouse Scheme, alongside structured dissemination of PM-KISAN, the Kisan Credit Card, the Compost Pit Scheme, the National Mission on Natural Farming, and Agriculture Technology Management Agency-supported training. Across all documented programme sites, over 350 farmers participated, with distribution of vegetable seedlings, neem oil, bionutrient formulations and Jeevamrit. This paper presents the implementation methodology, key activities, scheme dissemination, farmer responses and challenges specific to the cold-arid high-altitude agro-ecosystem, and discusses the replicability of this convergence-based extension model for frontier zones of India. The principal contributions of this study are threefold: it provides one of the first documented accounts of a national agricultural extension campaign implemented in India's highest farming villages, demonstrates the feasibility of a KVK–Agriculture Department convergence model in an extreme high-altitude setting, and offers a replicable framework linking natural-farming technology transfer with government scheme dissemination for other frontier agro-ecosystems.

Keywords: Natural farming, Jeevamrit, black polythene mulching, mushroom cultivation, Changthang, high-altitude agriculture, KVK Nyoma, Ladakh, sustainable agriculture, cold-arid ecosystem, PM-KISAN, KCC, ATMA, NMNF, Vibrant Village Chumur, bio-inputs, UV greenhouse polythene, agricultural extension, farmer awareness, climate resilience, Himalayan agriculture.

1. Introduction

The Changthang region of eastern Ladakh, situated along the strategic India–China border at altitudes ranging from 4,000 to over 5,000 metres above mean sea level, represents one of the most challenging agricultural landscapes in the world. Home to nomadic and semi-nomadic communities of Changpa, the region is characterised by a hyper-arid cold desert climate, extreme temperature fluctuations, short frost-free growing seasons (typically 90–120 days), and highly alkaline, poorly structured soils with low organic carbon content. The primary livelihood of communities in this region revolves around Pashmina goat rearing, yak herding, and small-scale subsistence

cropping in the limited arable pockets around villages.

Agriculture in Changthang faces a unique set of structural constraints: limited availability of certified seed and planting material, non-availability of manufactured agri-inputs due to logistical bottlenecks, a short cropping season compounded by late thaw and early freeze, and a near-total absence of irrigation infrastructure beyond traditional glacial meltwater channels. Despite these constraints, villages such as Tsaga (at approximately 15,000 feet amsl, among the highest inhabited farming villages in India), Nyoma, Mudh, Korzok, Durbuk and Tharuk continue to support small communities engaged in pea, barley, buckwheat, and vegetable cultivation, often within protected structures (greenhouses and low tunnels).

In this context, the Krishi Vigyan Kendra (KVK) Nyoma, Leh II, established under University of Ladakh, serves as the primary institutional conduit for agricultural extension, technology transfer and farmer capacity building in the Nyoma and Tangtse sub-divisions. Functioning since 2013, KVK Nyoma has developed deep outreach across the Changthang landscape,

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having earlier implemented the Viksit Krishi Sankalp Abhiyan (VKSA) 2025, a 15-day campaign that reached 1,885 farmers across Changthang—939 male and 946 female—covering all 23 Vibrant Villages along the border[1,2].

The Khet Bachao Abhiyan 2026, launched nationally on 1 June 2026 under the aegis of ICAR and the Ministry of Agriculture & Farmers' Welfare, with the theme 'Healthy Soil – Healthy Crop – Prosperous Farmer,' provided a timely and structured platform to deepen and extend this work[3]. The campaign identified 100 districts with the highest Di-Ammonium Phosphate (DAP) consumption and designated them as priority targets, tasking all KVKs with implementing comprehensive outreach programmes that integrated natural farming, soil health management, and balanced nutrient use through demonstrations, Kisan Goshtis, and stakeholder trainings. In addition to technology demonstrations, KVKs were tasked with actively disseminating information on ongoing central and UT farmer welfare schemes so that eligible farmers could access income support, credit and infrastructure benefits alongside new technical knowledge.

KVK Nyoma, Leh II, in collaboration with the Department of Agriculture, UT Ladakh, and with the active deployment of Junior Extension Officers (JEOs) across multiple blocks, implemented KBA 2026 in Changthang through a series of awareness-cum-demonstration programmes opening with a flagship technology exhibition at Chumur and continuing through natural farming input preparation (Jeevamrit and Beejamrit), black polythene mulching sheet technology, oyster mushroom cultivation, and a wider set of bio-input and low-cost infrastructure demonstrations, together with structured dissemination of government schemes such as PM-KISAN, KCC, the Ladakh Greenhouse Scheme, the Compost Pit Scheme, input distribution support, NMNF and ATMA-supported trainings.

Specifically, this study documents the implementation methodology and key activities of KBA 2026 in Changthang; assesses farmer awareness and receptivity to natural farming and other demonstrated technologies; evaluates the relevance and adaptability of black polythene mulching and mushroom cultivation to the cold-arid context; documents the government and departmental schemes disseminated to farmers and their perceived relevance; and examines the immediate outcomes and replicability of this convergence-based extension model for frontier zones of India.

Method

Study area and agro-climatic profile

The study was conducted across multiple villages of the Changthang region, Leh district, Union Territory of Ladakh, during June 2026, with additional outreach to Hanley and several Vibrant Villages under the Tangtse sub-division. Programme sites included Chumur (the campaign launch site), Tsaga, Durbuk, Tharuk, Mudh, Chushul and several other Vibrant Villages along the India–China border. Changthang is a high-altitude plateau forming part of the Trans-Himalayan cold desert biome, characterised by extreme aridity, glacier-fed irrigation, and heightened sensitivity to climate variability[4,5]. Key agro-climatic parameters relevant to this study are summarised in Table 1. Agriculture in Changthang is inherently low-input: the absence of commercially synthesized agrochemical supply chains, combined with a strong traditional organic farming ethos rooted in the use of livestock manure (particularly yak and sheep dung), positions the region as naturally predisposed to natural farming systems.

However, limited scientific guidance on optimised natural input preparation and application has historically constrained productivity. The KBA 2026 sought to address this gap directly through demonstration-based extension, reinforced by scheme-linked financial and infrastructural support.

Table 1: Agro-climatic profile of Changthang, Ladakh

Parameter	Value / description
Altitude range	4,000–5,300 m amsl
Annual rainfall	< 100 mm (hyper-arid)
Winter temperature	–20°C to –30°C
Summer (peak) temperature	10°C to 25°C
Frost-free growing season	90–120 days (June–September)
Soil type	Sandy-loam to loamy, alkaline (pH 7.5–8.5), low OC
Primary crops	Barley, peas, buckwheat, vegetables (in protected structures)
Irrigation source	Glacial melt water channels
Farming system	Subsistence; agro-pastoral (livestock: Pashmina goat, yak, Changluk sheep)

Institutional framework and convergence

Khet Bachao Abhiyan 2026 was implemented in Changthang through an institutionally convergent framework. KVK Nyoma, Leh II served as the District Nodal Institution, with Dr Phuntsog Tundup, Head, KVK Nyoma, functioning as the Nodal Officer for the campaign. The Department of Agriculture, UT Ladakh, provided field-level extension machinery, including Agriculture Extension Officers (AEOs) stationed at Nyoma and Durbuk blocks and Sub-Divisional Agriculture Officers (SDAOs). Junior Extension Officers (JEOs) from the Nyoma, Tangtse and Durbuk blocks were co-deployed at demonstration sites, ensuring block-level coverage and sustainable follow-up beyond the campaign period. Village Nambardars and progressive farmers were mobilised as community anchors for programme organisation, while the Agriculture Technology Management Agency (ATMA) co-organised farmer training events, including a One Day Farmers' Training programme held on 29 June 2026.

This convergence model, first piloted by KVK Nyoma during VKSA 2025, was further strengthened under KBA 2026. The embedding of Agriculture Department personnel—particularly JEOs—within KVK-led demonstration events created a durable institutional interface at the panchayat level and ensured that the technical messages delivered by KVK scientists, together with information on farmer welfare schemes, were reinforced through the block-level agricultural administration.

The ICAR monitoring framework for KBA 2026 required daily reporting on the Kisan Sarathi Portal, covering village coverage, farmer contacts, demonstration conduct and stakeholder meetings. KVK Nyoma complied with this reporting requirement throughout the campaign period, and programme activities were disseminated via the official Instagram page of KVK Nyoma Leh II, ensuring real-time digital documentation and public outreach.

Programme design and implementation approach

Khet Bachao Abhiyan 2026 was implemented over the period 1–30 June 2026 in Changthang. The implementation approach followed the national SOP issued by the Agricultural Extension Division, ICAR Headquarters, adapted contextually to the Changthang setting. Programme delivery followed an awareness-cum-demonstration model—each event combined expert talks, farmer interaction sessions, hands-on field demonstrations, scheme awareness sessions and input distribution, ensuring that knowledge transfer was anchored in direct practice.

Site selection

Programme sites were selected based on village accessibility within the campaign timeframe, presence of active farming households, priority given to Vibrant Villages along the India–China border, and availability of co-located Agriculture Department staff (JEOs/AEOs). Primary documented sites included Chumur (a Vibrant Village and the campaign launch site, visited by the Hon'ble Lieutenant Governor of Ladakh); Tsaga village, Nyoma block (altitude ~15,000 feet amsl, among India's highest farming villages); Durbuk block, together with Mudh, Nyoma Nidder, Sato Kargyam, Phobrang, Nee, Kesar, Kumdok and Chumathang; and Nyoma, Tukla, Liksey, Phulak, Tarchit and Hemya. At each site, the relevant demonstration module (Jeevamrit, mulching, bio-inputs, and/or mushroom cultivation) was implemented with minor adaptations based on local crops and farming-system context, alongside a structured session on relevant government schemes.

Technology interventions

Four categories of technology demonstration were conducted under KBA 2026 in Changthang.

(a) Natural farming input demonstrations – Jeevamrit.

Jeevamrit is a liquid bio-inoculant formulation central to natural farming, prepared using desi cow dung (5 kg), desi cow urine (5 litres), jaggery (1 kg), flour of pulse (1 kg), and soil from the base of a banyan or peepal tree, dissolved in 200 litres of water and fermented for 48–72 hours. In the Changthang context, minor adaptations were explored using locally available livestock inputs (yak dung and urine) as alternatives, consistent with the philosophy of resource-based natural farming systems. At Durbuk and Tharuk, Dr Phuntsog Tundup personally demonstrated the preparation of Jeevamrit and Beejamrit, explaining the underlying soil microbiome science and the economic rationale—particularly relevant in a region where manufactured inputs are expensive and logistically difficult to procure. At Tsaga, the Jeevamrit demonstration was the central activity, with farmers provided hands-on training on preparation and field application methods.

(b) Black polythene mulching sheet technology. Black polythene mulching sheet technology was demonstrated as a critical adaptation tool for the Changthang agro-ecosystem. In this cold-arid region, two principal challenges for crop production are intense solar radiation leading to rapid soil moisture evaporation, and perennial weed pressure from persistent seed banks activated during the brief monsoon period. Black polythene mulching addresses both through soil covering that conserves moisture, suppresses weeds, and—critically in Ladakh's cold climate—accelerates soil warming by absorbing solar radiation, thereby marginally extending the effective growing season. The demonstrations, co-presented by Sub-Divisional Agriculture Officer, Leh, Mr Mohd Ramzan, covered mulch selection and specification, field

preparation and mulch-laying technique, planting-hole punching, inter-row spacing for vegetable crops, and mulch disposal or incorporation at season end. The relevance of this technology for both open-field vegetable cultivation and greenhouse beds was discussed in the context of the Ladakh Greenhouse Scheme.

(c) Mushroom cultivation demonstration. Mushroom cultivation was introduced as a high-value, low-land, indoor enterprise with significant income-generation potential for Changthang communities—an important consideration given the extremely limited arable land in the region and the need for supplementary household income during winter months when outdoor agriculture is impossible. Oyster mushroom (*Pleurotus ostreatus*) production protocols were covered in demonstrations, including substrate preparation (using local straw, barley husk and agricultural waste), spawn inoculation, bag/bed preparation, fruiting-chamber conditions and post-harvest handling. The climate of Changthang dwellings—stone structures that maintain relatively cool and humid interiors even in summer—was identified as naturally conducive to mushroom fruiting, particularly for oyster mushrooms, which thrive at 15–25°C.

(d) Bio-input and low-cost infrastructure demonstrations.

In addition to the three principal technology modules, KVK Nyoma conducted a wider set of bio-input and infrastructure demonstrations across programme sites, most prominently at the Chumur exhibition marking the campaign launch. These included distribution of neem oil and vegetable seedlings as low-cost eco-friendly inputs; a dedicated demonstration on black polythene mulching for moisture conservation and weed suppression; preparation and application of bionutrient formulations combined with neem oil for integrated nutrient and pest management; a curd milk churner demonstration illustrating simple on-farm dairy value addition; and distribution of Jeevamrit to reinforce natural-farming adoption at the household level. Two greenhouse-covering technologies were also demonstrated: UV-stabilised polythene for new-generation greenhouses, and UV film retrofitting for traditional Ladakhi greenhouse structures, both aimed at improving light transmission, durability and season extension in protected cultivation. Dissemination of government and departmental schemes

Alongside the technology demonstrations, each programme site incorporated a dedicated scheme-awareness session in which KVK scientists and Agriculture Department officials briefed farmers on centrally sponsored, central sector and UT departmental schemes relevant to their farming and livelihood needs[6-9]. Farmers were provided information on eligibility criteria, application procedures, and the nearest points of contact (block-level AEOs/JEOs) for enrolment. The major schemes communicated to farmers are summarised in Table 2.

Table 2: Government and departmental schemes disseminated to farmers under KBA 2026

Scheme / Programme	Category	Key provisions communicated to farmers
PM-KISAN (Pradhan Mantri Kisan Samman Nidhi)	Central sector	Income support of Rs 6,000 per year to eligible farmer families in three equal instalments, directly transferred to bank accounts.
Kisan Credit Card (KCC)	Central sector	Provides farmers timely access to short-term institutional credit for crop production, post-harvest expenses and allied activities at subsidised interest rates.
Ladakh Greenhouse Scheme	UT departmental	Supports construction of passive-solar greenhouses to extend the effective growing season and enable off-season vegetable cultivation in the cold-arid climate of Ladakh.
Compost Pit Scheme (under organic farming)	UT departmental	Financial and technical support for construction of farm-level compost pits to promote on-farm recycling of organic waste and livestock manure into quality compost.
Input distribution support	UT departmental	Subsidised/free distribution of vegetable seedlings, improved seed, neem oil, bionutrient formulations and other eco-friendly agri-inputs, alongside demonstration of low-cost farm tools such as curd milk churners, to encourage adoption of low-chemical farming practices.
National Mission on Natural Farming (NMNF)	Central sector	Promotes chemical-free farming through farmer training, cluster-based adoption, and support for preparation of on-farm natural inputs such as Jeevamrit and Beejamrit.
Agriculture Technology Management Agency (ATMA)	Centrally sponsored	Supports farmer training, exposure visits and demonstration programmes (such as the One Day Farmers' Training organised under ATMA) to strengthen extension outreach at the block level.

Scheme awareness sessions were reinforced through printed information material distributed at each site, and farmers were encouraged to approach block-level AEOs/JEOs for follow-up assistance with applications, particularly for PM-KISAN registration, KCC linkage, and the Ladakh Greenhouse and Compost Pit schemes. The One Day Farmers' Training organised under ATMA at Nyoma (29 June 2026) served as a dedicated capstone event for consolidating scheme-related queries raised during the month-long campaign.

Farmer outreach and data collection

Farmer participation data, observation records and interaction-session summaries were documented at each programme site by KVK Nyoma scientists and Agriculture Department officials. Data were recorded in prescribed formats and uploaded to the Kisan Sarathi Portal as per ICAR reporting norms. Additional documentation was maintained through geo-tagged photographs and video records, shared via the official Instagram page of KVK Nyoma Leh II (https://www.instagram.com/kvk_nyoma_changthang) and the associated X (formerly Twitter) handle (https://x.com/leh_kvk50748).

ResultsProgramme launch at Chumur village (Vibrant Village)

Khet Bachao Abhiyan 2026 in Changthang was formally launched at Chumur village, one of the Vibrant Villages along the India–China border, coinciding with a visit of the Hon'ble Lieutenant Governor of the Union Territory of Ladakh to inaugurate developmental works under the Vibrant Villages Programme[10]. On the occasion, Krishi Vigyan Kendra, Nyoma—described in campaign publicity as the highest-altitude KVK in India—mounted a technology exhibition led by Dr Phuntsog Tundup, Head, KVK Nyoma, showcasing climate-resilient farming practices, protected cultivation technologies, improved low-cost vegetable production techniques including low tunnel technology, fodder development initiatives such as demonstrations of the improved fodder variety SFO-01, value addition of farm and livestock produce, and integrated farming systems suited to the cold-arid conditions of Changthang.

The exhibition served as the launch platform for KBA 2026 awareness in the district, with dedicated stalls introducing farmers, delegates and school children to a range of bio-inputs, farm tools and low-cost technologies, including neem oil (distributed as a botanical bio-pesticide for eco-friendly pest management), vegetable seedlings (to encourage kitchen-garden and open-field cultivation), a field demonstration on black polythene mulching for soil-moisture conservation and weed suppression, bionutrient formulations combined with neem oil for integrated nutrient and pest management,

a curd milk churner demonstration illustrating simple on-farm dairy value addition, UV-stabilised greenhouse polythene as a durable covering material for new greenhouse structures, and UV film application on traditional Ladakhi greenhouses as a low-cost retrofit to improve light transmission and structural durability.

Jeevamrit prepared by KVK Nyoma was also distributed to farmers at the exhibition stall, reinforcing the natural-farming message of the campaign. With 240 farmers, delegates and school children in attendance, Chumur registered the highest single-day footfall of any KBA 2026 programme site in Changthang (Table 3), reflecting both the scale of the Vibrant Village event and the strong community interest generated by the Hon'ble Lieutenant Governor's visit. The event was documented and disseminated via the official Instagram page of KVK Nyoma, Leh II[10].

Programme at Tsaga village, Nyoma block

On 4 June 2026, KVK Nyoma organised an awareness-cum-demonstration programme at Tsaga village, Nyoma block—situated at approximately 15,000 feet amsl and recognised as one of the highest inhabited farming villages in India[11]. The programme was attended by 42 farmers, including village representatives. Programme activities included expert interaction on soil health management, crop production challenges in the cold-arid context, a practical demonstration on the preparation and application of Jeevamrit, and a briefing on PM-KISAN, KCC and the Ladakh Greenhouse Scheme. Vegetable seedlings and neem oil were distributed to participating farmers to encourage eco-friendly input adoption. The Junior Extension Officer, Nyoma block, facilitated farmer mobilisation and local logistics for the programme.

Programme at Durbuk and Tharuk village

On 8 June 2026, KVK Nyoma, in collaboration with the Department of Agriculture, UT Ladakh, organised a Kisan Goshti and field demonstration at Durbuk in the forenoon, followed by an awareness-cum-demonstration programme at Tharuk village in the afternoon[12]. The Durbuk programme was attended by 63 farmers, including the village Nambardar and progressive farmers, and was welcomed by the In-charge Agriculture Extension Officer, Durbuk, Ms Chemet Lamo.

Dr Phuntsog Tundup delivered a detailed presentation on the objectives of KBA 2026 and conducted live demonstrations on Jeevamrit and Beejamrit preparation, along with a session on Agnihastra—a natural pest deterrent formulation. Dr Tashi Dolkar, Scientist, KVK Nyoma, covered value addition of vegetable crops, post-harvest management and product diversification as income-enhancement strategies.

Ms Tsering Dolkar, Agriculture Extension Officer, Leh, presented the Ladakh Greenhouse Scheme and its role in extending the cropping season, along with the Compost Pit Scheme under organic farming. Mr Mohd Ramzan, SDAO, Leh, provided information on PM-KISAN, KCC, input distribution support, and the benefits of black polythene mulching technology for moisture conservation and weed suppression. Practical field demonstrations on Jeevamrit, Beejamrit preparation, low tunnel technology and black polythene mulching were conducted at both Durbuk and Tharuk, giving farmers direct exposure to the full suite of KBA 2026 technology interventions and associated schemes.

Farmers' Training under ATMA

As a activity within the Khet Bachao Abhiyaan 2026 campaign window, a One Day Farmers' Training programme was organised by the Department of Agriculture, UT Ladakh under ATMA on 29 June 2026. The training brought together farmers from multiple Changthang settlements for a consolidated session covering natural farming demonstrations, mushroom cultivation, and detailed guidance on PM-KISAN, KCC, the Ladakh Greenhouse Scheme, the Compost Pit Scheme and NMNF-supported input access. The event reflected the close coordination between KVK Nyoma and the Department of Agriculture in delivering a unified extension and scheme-awareness message to farming communities.



Fig.1. Khet Bachao Abhiyaan at Tsaga Village, Changthang, with officials from KVK Nyoma and the Department of Agriculture, Ladakh



Fig. 2. Farmers–scientist interaction during the Khet Bachao Abhiyaan at Mudh Village, Changthang, focusing on crop and farm-related issues and their practical solutions.



Fig. 3. Inaugural day of the Khet Bachao Abhiyaan at Chumur, Changthang, marking the commencement of the campaign with the participation of farmers, scientists and officials.

Summary of programme coverage

Table 3: Khet Bachao Abhiyaan 2026 programme coverage by KVK Nyoma, Leh II in Changthang

Programme site / villages Name	Farmer participants
Chumur	240
Tsaga	42
Mudh	87
Durbuk	41
Chushul	47
Phobrang	21
Kargyam	31
Teri	28
Kumdok	12
Nee	14
Kesar	17
Chumathang	31
Nyoma	21
Liktsey	31
Tukla	13
Phulak	21
Tarchit	28
Hemya	30
Total	755

Technology demonstrations: farmer response and observations

Farmer response to the technology modules varied by prior knowledge and local relevance.

Natural farming inputs (Jeevamrit): Farmer receptivity was notably high. Many participants were familiar with the concept of livestock manure-based soil amendments through traditional practice, and the demonstrations provided a scientific framework for what was already an intuitive practice. The adaptation rationale using yak dung and urine—locally abundant—resonated strongly with farming communities. Farmers expressed particular interest in Beejamrit as a seed treatment, recognizing the problem of seedling loss to soil pathogens in cold, wet soils during early-season establishment.

Black polythene mulching: Mulching technology was received with high interest, particularly at Durbuk and Tharuk where open-field vegetable cultivation is practised. Farmers identified weed management as a major drudgery task, consuming significant labour during the short growing season.

The dual benefit of moisture conservation and weed suppression, combined with the soil-warming effect relevant to the cold-arid climate, made this technology highly relevant. Concerns regarding the cost of polythene sheeting and the need for disposal at season end were raised and addressed by SDAO Leh.

Mushroom cultivation: Mushroom cultivation generated significant curiosity as a novel enterprise. Farmers—particularly women participants—showed keen interest in the potential for indoor cultivation using locally available straw substrates. The economic modelling presented, showing potential yield of 800 g to 1 kg of oystermushroom per kg of dry substrate over two to three flushes, and a market value of Rs 150–200 per kg in Leh, was well received. The primary concern raised was access to spawn and technical support for the first production cycle.

Government and departmental schemes: Awareness of PM-KISAN and KCC was found to be moderate to high among farmers already linked to formal banking, while awareness of KCC benefits specific to allied and horticultural activities was comparatively lower. The Ladakh Greenhouse Scheme and Compost Pit Scheme drew strong interest given their direct relevance to season extension and on-farm input generation. The ATMA-organised training was appreciated as a single-window platform bringing together technology demonstration and scheme information.

Campaign reach and farmer engagement

The Khet Bachao Abhiyan 2026 implementation in Changthang demonstrated effective community mobilisation in a geographically extreme setting. A combined participation of over 755 farmers across the four major documented programme sites (Chumur, Tsaga, Durbuk, Tharuk) reflects meaningful outreach given the sparse population distribution characteristic of Changthang villages with active participation of women farmers—particularly in sessions on mushroom cultivation, value addition and scheme briefings, consistent with the findings of KVK Nyoma's prior extension work.

Village-level farmer feedback

Qualitative feedback recorded by KVK Nyoma scientists and Agriculture Department officials during farmer interactions across programme villages is summarised in Table 5.

Discussion

The convergence model—co-deployment of KVK scientists and Agriculture Department JEOs/AEOs at each programme site, together with ATMA-supported training—proved critical for credibility and farmer trust. Farmers responded positively to the visible collaboration between the university-based KVK and the UT Agriculture Department, interpreting institutional convergence, including joint delivery of technology and scheme information, as institutional commitment. This finding aligns with the broader literature on convergence-based agricultural extension in remote and underserved regions [3,13].

The Changthang region presents a paradoxical but highly favourable context for natural farming transition. On one hand, chemical fertiliser availability is severely limited by supply-chain constraints, creating a de facto natural farming condition in many villages. On the other hand, the absence of structured scientific guidance on optimized natural input preparation and application has resulted in sub-optimal soil nutrition management.

The KBA 2026 demonstrations on Jeevamrit and Beejamrit, backed by NMNF support, filled precisely this gap—providing scientific protocols for inputs that align with existing traditional knowledge and available local resources[8,14,15].

The use of yak and cow dung and urine as primary substrates for Jeevamrit adaptation in Changthang represents a contextually significant innovation. Yak dung is rich in fungal hyphae and bacterial communities adapted to the cold anaerobic conditions of high-altitude pastures, and preliminary evidence suggests strong bio-stimulant activity when applied to cold, poorly structured Ladakh soils. This local adaptation strategy is consistent with the natural farming philosophy of utilizing locally available resources [15,16] and reflects the institution's deep contextual knowledge built over more than a decade of work in the region.

Black polythene mulching in the Changthang context offers benefits beyond those typically documented in temperate or tropical settings. In addition to the standard benefits of weed suppression and moisture conservation, the soil-warming effect of black polythene mulching is particularly valuable in a region where soil temperature in early June (at the onset of the growing season) may be as low as 5–8°C—significantly below the minimum germination temperature for most vegetable crops. Mulch-covered soils under Ladakhi conditions may warm by 3–5°C compared to bare soils, effectively extending the functional growing season by 7–14 days[17,18]. This thermal benefit, combined with the logistical simplification of weed management, makes black polythene mulching one of the highest-value single-input technologies for Changthang vegetable cultivation.

The introduction of mushroom cultivation under KBA 2026 addresses a structural constraint of the Changthang farming system: the near-total cessation of outdoor agricultural activity during the winter months (October–May), which leaves farming households economically inactive and dependent on livestock-based income alone. Indoor mushroom production using locally abundant cereal straw as substrate can feasibly be conducted during this period in the relatively stable temperature environment of traditional stone dwellings, generating additional household income during the agricultural off-season[19,20]. The alignment of this technology with the broader vision of KVK Nyoma—which has consistently promoted income diversification through value addition—makes mushroom cultivation a logical and contextually grounded extension recommendation for Changthang.

The integration of scheme-awareness sessions with technology demonstrations was found to strengthen the overall impact of KBA 2026 in Changthang. Linking PM-KISAN and KCC to the campaign gave farmers a tangible financial-support pathway alongside new technical knowledge, while the Ladakh Greenhouse and Compost Pit schemes provided direct infrastructural pathways for adopting the very technologies being demonstrated. The involvement of ATMA in co-organising a dedicated Farmers' Training reinforced this convergence, indicating that combining technology transfer with scheme facilitation is a replicable model for future campaigns in remote, scheme-underpenetrated regions.

Khet Bachao Abhiyan 2026 built institutionally and operationally on the foundation established by VKSA 2025[1,2,21]. While VKSA 2025 was primarily an awareness and scheme-dissemination campaign—covering 1,885 farmers across 23 Vibrant Villages in 15 days—KBA 2026 adopted a more intensive, demonstration-centred approach, combining

hands-on technology transfer with continued and deepened scheme dissemination at select sites. Together, the two campaigns represent a two-stage extension model—awareness followed by skill-based demonstration and scheme convergence—that is well suited to the Changthang context.

The principal strengths, weaknesses, opportunities and threats identified during implementation are summarized in Table 4. Key strengths include the strong KVK–Agriculture Department convergence model and high farmer receptivity to resource-based technologies rooted in traditional practice; principal constraints include extreme logistics in remote terrain and the absence of a structured post-demonstration follow-up mechanism. Opportunities identified include the potential of an 'Organic Ladakh' branding initiative and mushroom cultivation as a viable winter livelihood, while climate-change-driven glacial retreat and rural youth outmigration were flagged as long-term threats to the sustainability of the model.

Table 4: SWOT analysis of Khet Bachao Abhiyan 2026 in Changthang

SWOT Component	Key Points
STRENGTHS	- Strong KVK–Agriculture Department convergence model - Natural compatibility: traditional organic practices align with natural farming - Institutional continuity from VKSA 2025 platform - High farmer receptivity to resource-based technologies - Availability of local inputs (cow dung, straw and other resources) for natural farming
WEAKNESSES	- Extreme logistics: remote terrain limits site coverage frequency - No follow-up mechanism post-demonstration - Limited mushroom spawn supply infrastructure in Ladakh - Short duration for cultivation of various vegetable types
OPPORTUNITIES	- Organic premium market: Ladakh's "Organic Ladakh" brand potential - Mushroom cultivation as a viable winter livelihood - Vibrant Villages Programme integration for infrastructure support - SHG/FPO formation for collective marketing - WhatsApp and social media for real-time extension support
THREATS	- Climate change: accelerated glacial retreat affecting water availability - Youth outmigration reducing the agricultural labour pool - Growing dependence on tourism/army labour as an alternative source of income - Increasing wild animal depredation of crops

Table 5: Village-level farmer feedback recorded during Khet Bachao Abhiyan 2026

Village(s)	Farmer feedback / key observation
Chumur, Korzok, Nyoma, Mudh, Nidder	Marketing of organic manures identified as a priority need
Tsaga	Farmers keenly interested in natural farming to improve soil biodiversity
Mudh	Aware of natural farming techniques; pest issues reported in greenhouses
Shachukul	Pest issues reported
Durbuk, Tharuk	Quality seed and pest issues reported
Chushul	Aphid infestation reported in Ladakh greenhouses
Phobrang	Marketing issues reported
Kargyam	Practising organic farming since ancestral times; natural farming for the past 3 years
Teri, Kumdok	Mulching needed for soil-temperature moderation and weed management
Nee, Kesar	Already practising both organic and natural farming techniques
Nyoma, Nidder, Mudh, Nyoma TR	Traditional fermented organic manure prepared using locally available sheep and goat manure
Liktsey	Quality seed availability an issue
Tukla	Practising organic farming
Tukla, Phulak	High adoption rate of mulching
Tarchit	High pest infestation of aphids reported
Hemya	Practises wood-ash method of pest management

This study benefits from its coverage of one of India's most remote and previously under-documented high-altitude farming systems, and from real-time triangulation of Kisan Sarathi Portal records, geo-tagged photographic documentation, and social-media dissemination. Nonetheless, several limitations should be acknowledged. First, farmer participation figures were compiled from site-level attendance and Kisan Sarathi Portal records rather than a randomised

survey, and may include some double-counting where farmers attended more than one event. Second, the qualitative feedback summarised in Table 5 was recorded informally during farmer interactions and was not systematically coded or statistically analysed. Third, the one-month campaign window did not permit assessment of medium- or long-term technology adoption, soil-health change, or scheme-enrolment outcomes; a longitudinal follow-up study would be required to establish these. Finally, as an implementation report rather than a controlled trial, the findings describe programme reach and farmer receptivity rather than causally attributable impacts on yield or income.

Conclusion

The implementation of Khet Bachao Abhiyan 2026 by KVK Nyoma, Leh II in the Changthang region represents a successful demonstration of context-specific, convergence-based agricultural extension in one of India's most Geographically and climatically challenging landscapes, consistent with globally recognised traditional mountain farming heritage systems[22]. The campaign achieved meaningful farmer reach across sites spanning altitudes above 14,000 feet, opening with a large-scale technology exhibition at the Vibrant Village of Chumur during a visit of the Hon'ble Lieutenant Governor of Ladakh, and continuing through practical demonstrations of natural farming inputs, black polythene mulching, mushroom cultivation, and low-cost bio-input and greenhouse technologies tailored to the high-altitude cold-arid agro-ecosystem, reinforced by structured dissemination of PM-KISAN, KCC, the Ladakh Greenhouse Scheme, the Compost Pit Scheme, NMNF and ATMA-supported training.

The convergence model—integrating KVK scientific expertise with Agriculture Department field machinery and ATMA-supported training through co-deployed Junior Extension Officers—proved effective in bridging institutional silos and amplifying the impact of demonstrations, building on the institutional relationships and farmer trust established during VKSA 2025.

Future scope: Future extension cycles in Changthang and comparable frontier regions would benefit from a dedicated KVK-coordinated Natural Farming Resource Centre at Nyoma for Jeevamrit, Beejamrit and spawn supply; wider scaling of mulching demonstrations linked to horticulture-mission subsidy support; formal institutionalisation of the KVK–Agriculture Department–ATMA co-deployment model for ICAR campaigns in tribal, border and high-altitude districts; dedicated scheme-facilitation desks at future Kisan Goshtis; Bhoti-language extension content for social-media dissemination; and a longitudinal impact-assessment study tracking natural-input adoption, soil organic carbon, scheme enrolment and crop productivity over a 3–5 year horizon.

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Ethics approval and consent to participate: This paper reports on a government-mandated agricultural extension campaign and does not involve clinical research on human subjects or animals; no ethical approval was required. Farmers, delegates, and officials depicted in campaign photographs consented to participation and documentation at the time of the events.

Data and material availability: Farmer participation records referenced in this paper were compiled from Kisan Sarathi Portal submissions (ICAR) and site-level attendance registers maintained by KVK Nyoma, Leh II, and are available from the corresponding author on reasonable request. Campaign photographs and video documentation are publicly available via the official Instagram page of KVK Nyoma, Leh II (https://www.instagram.com/kvk_nyoma_changthang).

Conflict of interest: The authors declare that they have no competing interests.

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