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INDIGENOUS TECHNICAL KNOWLEDGE (ITK) USED IN AGRICULTURE BY FARMERS IN DARRANG DISTRICT OF ASSAM

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ABSTRACT

ITK is deeply rooted in the cultural heritage and lived experiences of indigenous peoples. Passed down orally from one generation to the next, it encompasses a diverse array of skills and techniques tailored to local environments and resources. From agricultural methods honed to maximize productivity in challenging conditions to medicinal knowledge derived from centuries of observation and experimentation, ITK reflects the symbiotic relationship between indigenous communities and their natural surroundings. Moreover, ITK often embodies principles of community cohesion, reciprocity, and respect for nature, underscoring its holistic approach to sustainable living. In agricultural communities, ITK plays a significant role in shaping farming practices and resource management strategies. This research paper explores the utilization of ITK by farmers in the Darrang district of Assam, focusing on its relevance, effectiveness, and implications for sustainable agriculture. Through a combination of field surveys, interviews, and observations, this study highlights the diversity of ITK practices employed by farmers in the region and their contributions to enhancing agricultural productivity, resilience, and food security. The findings underscore the importance of recognizing and integrating ITK into mainstream agricultural development initiatives to promote inclusive and sustainable farming practices. Twenty respondents from each village of a total of fifteen villages were selected and data were collected from those three hundred respondents during the year 2023. The ITKs were further analyzed and tabulated based frequency and percentage and then ranked accordingly. There were 45 nos. of indigenous practices identified for cereals, vegetables, fruits and trees, storage pest and livestocks etc. which were practiced by different proportions of farmers in the district Darrang.

Keywords: Indigenous Technical Knowledge, Agriculture, Farmers, Darrang District, Assam, Sustainable Development.

I. INTRODUCTION

Indigenous Technical Knowledge (ITK) refers to the traditional knowledge systems and practices that have been developed and passed down through generations within a specific cultural or geographical context. Indigenous technological knowledge refers to the expertise, skills, and practices developed by indigenous communities over generations to interact with their environment, solve problems, and meet their needs. This knowledge encompasses a wide range of fields, including agriculture, architecture, medicine, crafts, and resource management. What sets indigenous technological knowledge apart is its deep connection to local ecosystems, cultural traditions, and community values. It often integrates holistic approaches to sustainability, resilience, and harmony with nature. Indigenous peoples have historically relied on their technological knowledge to adapt to diverse environments, cope with environmental changes, and sustain their livelihoods.

However, it's essential to recognize that indigenous technological knowledge is often marginalized or overlooked in mainstream discourse and development initiatives. Efforts to preserve and promote this knowledge should prioritize indigenous rights, self-determination, and equitable partnerships to ensure its respectful and ethical use.

One of the most compelling aspects of ITK lies in its relevance to contemporary challenges, including climate change, biodiversity loss, and food insecurity. In the realm of agriculture, for instance, ITK offers innovative solutions for enhancing resilience and productivity while minimizing environmental impact. Traditional farming practices such as agroforestry, crop rotation, and terrace cultivation not only promote soil fertility and water conservation but also contribute to carbon sequestration and biodiversity conservation. Similarly, indigenous knowledge systems provide insights into resource management strategies that prioritize the equitable distribution of resources and the preservation of cultural heritage.

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The study and preservation of indigenous technical knowledge are critical for honoring cultural diversity, promoting sustainable development, fostering resilience, advancing scientific innovation, upholding indigenous rights, and addressing ethical concerns related to knowledge sharing and cultural heritage preservation. Indigenous technical knowledge offers insights and solutions for addressing contemporary challenges such as climate change, food insecurity, and environmental degradation. By integrating ITK into development strategies, policymakers and practitioners can promote more sustainable and resilient outcomes that are grounded in local contexts and community needs

Indigenous Technical Knowledge (ITK) encompasses the skills, innovations, and practices developed by local communities over generations to address their specific needs and challenges. In agricultural contexts, ITK plays a crucial role in enhancing productivity, resilience, and sustainability by leveraging traditional wisdom and locally available resources. And hence The identification and documentation of scientifically sound indigenous practices will be critical to the successful implementation of the technology blending programme, as well as for the development of less expensive, appropriate technologies for the benefit of the farmers. The Darrang district of Assam, located in northeastern India, is renowned for its rich cultural heritage and diverse agricultural practices. This research paper aims to investigate the utilization of ITK by farmers in Darrang district, shedding light on its significance in shaping agricultural systems and fostering community resilience.

II. MATERIALS & METHODS

This study employs a mixed-methods approach, combining qualitative and quantitative research techniques to explore the utilization of ITK in agriculture by farmers in Darrang district. Field surveys, semi-structured interviews, and participant observations are conducted to collect data on the types of ITK practices employed, their perceived effectiveness, and the socio-cultural context in which they are embedded. A stratified random sampling method is used to select representative samples of farmers from different villages within the district. Data analysis involves thematic coding, content analysis, and statistical techniques to identify patterns, themes, and correlations within the dataset. The study period pertains to the year 2023. For the study, fifteen villages from the district Darrang were selected randomly. A total of 300 respondents were selected from fifteen villages (twenty nos. from each village) in Darrang district. Respondents were farmers who practiced ITKs in the selected villages. With the help of a checklist of questions administered along the transect walk and during the interviews, the task of identifying indigenous practices was accomplished.

The percentage of farmers practicing a particular ITK is calculated by simple percentage analysis as follows:

Percentage of farmers = (Number of farmers practicing a particular ITK) / (Total number of farmers) × 100

III. RESULTS & DISCUSSION:

The agricultural landscape of Darrang district is shaped by a rich tapestry of traditional knowledge systems, cultural practices, and environmental wisdom. Farmers in the region rely on ITK to address various challenges, including soil fertility management, pest and disease control, crop diversification, and water conservation. ITK practices range from indigenous soil amendment techniques, such as composting and green manuring, to agroforestry systems that integrate trees, shrubs, and crops to optimize resource use and enhance biodiversity. Moreover, farmers employ traditional seed selection and preservation methods to maintain crop diversity and adapt to changing environmental conditions.

It was found from the survey about the socioeconomic information of the selected respondents that the number of male respondents was higher than that of female respondents in all the villages. The average age of the both male and female respondents ranged between 35 years to 55 years. It has been recorded among the farmers involved in farming as primary occupation, nearly 4% of respondent did not have any schooling, 62% had primary schooling and 34% had secondary schooling. The ITKs prevailing in the district Darrang are listed below at table 1, along with the frequency of adopter farmers and then ranked accordingly. Moreover, the probable scientific reasons behind practicing those ITKs are also discussed in the table 1.

(n=300)

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Table 1: ITKs followed in Darrang district of Assam

ITK	Purpose	Remark (Probable Sc. Reason)	Frequency of Adopter Farmers (%)	Rank
CEREALS				
1. Cutting of tips of rice seedling before transplantation	To control stem borer (*Scirpophaga incertulas*) and rice hispa (*Discladispa armigera*)	Stem borers, such as the yellow stem borer (Scirpophaga incertulas) and the rice leaf folder (Cnaphalocrocis medinalis), lay eggs on the rice plant's leaves or stems. By cutting the tips of rice seedlings, the portion of the plant where stem borers typically lay eggs is removed or damaged. This disruption of the stem borer's life cycle reduces the chances of successful egg laying and subsequent infestation. Cutting the tips of rice seedlings is believed to stimulate lateral root growth. By removing the apical dominance, which is the inhibitory effect of the terminal bud on the growth of lateral buds, the plant allocates more resources to lateral root development. This results in a denser and more extensive root system, which can improve nutrient and water uptake and overall plant establishment after transplantation.	89.3%	III
2. Leaves of neem (*Azadirachta indica*) are spread in the field of kharif or summer rice and spraying with Neem leaves and seed extract at early tillering	To control pest and disease especially stem borer (*Scirpophaga incertulas*) and Leaf folder (*Cnaphalocrocis medinalis*)	Neem leaves and seeds contain compounds such as azadirachtin, which have insecticidal properties. Spraying neem leaf and seed extract on rice plants can help control a variety of pests that commonly affect rice during the early stages of growth, including stem borers, leaf folders, and green leafhoppers. Neem also possesses antifungal properties, which can help suppress fungal diseases that may affect rice plants, such as blast and sheath blight. By spraying neem extract on rice plants, farmers can potentially reduce the incidence and severity of fungal diseases, leading to healthier plants and higher yields.	81%	VIII
3. Leaves of turmeric (*Curcuma longa*) are applied to rice field.	Control rice hispa (Discladispa armigera)	Turmeric leaves contain compounds such as curcumin, which possess insecticidal and repellent properties. Applying turmeric leaves to rice fields can help deter pests such as stem borers, leaf folders, and insects that commonly attack rice plants. Turmeric also has	71.7%	X

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		antimicrobial properties, which can help suppress fungal and bacterial diseases that may affect rice plants. By applying turmeric leaves to rice fields, farmers may reduce the incidence and severity of diseases such as blast, sheath blight, and bacterial leaf blight		
4. Crashed rhizome of *Keturi haldhi (Cureuma zedoaria)* at different places of the field at tillering stage	To control stem borer (*Scirpophaga incertulas*) and rice hispa (*Discladispa armigera*)	Keturi haldi, also known as white turmeric, possesses natural pesticidal and antimicrobial properties. Applying crushed rhizomes to different areas of the rice field can help deter pests and suppress diseases that commonly affect rice plants during the tillering stage. The active compounds present in Keturi haldi, such as curcumin, have insecticidal and antifungal properties, which can contribute to pest and disease control. It produces disagreeable odour which prevents pest attack	59.53%	XIV
5. Jute (*Corchorus capsularis*) ropes are dipped in kerosene and pulled across the paddy crop field.	To control Rice caseworm (*Nymphula depunctalis*)	Pulling jute ropes dipped in kerosene across paddy fields can help control pests that commonly affect rice crops. The strong smell of kerosene may repel pests such as insects, rodents, and birds, reducing their presence in the fields. While there may not be direct evidence linking the use of kerosene-dipped jute ropes to disease management, it's possible that the physical disturbance caused by pulling the ropes across the field could help reduce the spread of certain diseases. By breaking up fungal spores or disrupting disease vectors, this practice may contribute to a lower incidence of some rice diseases.	73.2%	IX
6. Application of chopped pieces of colocasia (*Colocasia esculenta*) in the rice field	To control case worm (*Nymphula depunctalis*)	Colocasia develops an anaerobic poisonous condition in rice microclimate. he presence of colocasia plants in rice fields may create a diverse agroecosystem that can support natural enemies of pests and diseases.	65.6%	XIII
7. Application of pumelo (*Citrus maxima*) peel in rice field during vegetative stage	To control rice pest	Insects dies when come in contact with peeled rind of citrus probably due to bitter, aromatic and pungent oil of pumelo repel insects. Pumelo peels contain organic matter that can enrich the soil when applied to rice fields. Organic matter improves soil structure, enhances soil fertility, and promotes microbial activity, leading to better nutrient cycling and overall soil health. This can result in improved rice crop growth and yield	47%	XVII

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8. Application of bamboo T perches in rice field	To control rice pest	Bamboo T perches provide elevated platforms for birds to perch on, rest, and survey their surroundings. Birds play a crucial role in rice fields by consuming pests such as insects, snails, and rodents that can damage rice crops. By providing perches, farmers attract birds to their fields, creating a more diverse and balanced ecosystem that supports natural pest control. Bamboo T perches can also contribute to soil aeration in rice fields. The act of inserting bamboo poles into the soil creates openings that allow air to penetrate the soil profile, improving soil aeration and promoting healthier root growth in rice plants.	100%	I
9. Hanging dead frog in rice field at milking stage	To control rice Gandhi bugs (*Leptocorisa acuta*)	Acts as an attractant. The smells of Dead frog attract the bugs. The adult bug crowded over the bait, avoid egg laying and sucking the soft grains. Dead frogs may also serve as a visual deterrent to other pests that may feed on rice crops, such as insects, snails, and rodents.	83.2%	VII
10. Lightning of diyas/lamp in rice flied at night	To control rice pest	The fire acts as attractant for rice pest specially the Gandhi bugs. The light emitted by the lamps may disrupt the feeding behavior of pests or create an unfavorable environment for them, leading them to avoid the area.	89%	IV
11. Jarmoni (*Eupatorium odoratum*) pat is swept over rice field.	To control rice hispa (*Discladispa armigera*)	Jarmoni pat, also known as Eupatorium odoratum, is believed to possess natural pesticidal properties. Sweeping jarmoni pat over rice fields is thought to release compounds that repel or deter pests such as insects, rodents, and birds. . Jarmoni (Eupatorium odoratum) pat checks the rice hispa (*Discladispa armigera*) population.	39.9%	XVIII
12. Throwing shopped leaves of *Keturi haldhi (Cureuma zedoaria)* and peels of peels of citrus fruit viz. *Robab tenga (Citrus grandis)* in the field during milking to Tillering to stage	To control Gundhi bug (*Leptocorisa acuta*), Case worm (*Nymphula depunctalis*) etc.	It act as repellent. Chopped leaves of Keturi haldi and peels of Robab tenga contain organic matter and nutrients that can enrich the soil when applied to rice fields. the presence of organic matter in the soil can support beneficial microorganisms and contribute to a healthy soil ecosystem. This can indirectly help suppress soil-borne pests and diseases, reducing the risk of infestation or infection in rice crops.	52.54%	XV
13. Throwing cut pieces of stems of *Kola kachu*	To control Case worm (*Nymphula depunctalis*)	It act as repellent. Kola kachu stems contain compounds that are believed to possess natural repellent properties against pests such	67.1%	XII

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(Colocasia esculenta) during tillering stage		as case worms. By scattering cut pieces of kola kachu stems in the rice field, farmers may create an environment that discourages case worms from infesting the crop. It is possible that case worms are attracted to the kola kachu stems as an alternative food source. By providing these stems as bait, farmers may be able to divert case worms away from rice plants, thereby reducing their impact on the crop.		
14. Pouring kerosene oil directly on standing water at tilering stage	To control rice hispa (*Discladispa armigera*), stem borer (*Scirpophaga incertulas*)	It act as repellent. Pouring kerosene oil on standing water creates a thin film on the water surface, which may suffocate insect larvae like rice hispa and stem borer by obstructing their access to air. However, the effectiveness of this method can vary depending on factors such as the concentration of kerosene used, the size of the water body, and the specific life stages and behaviors of the targeted pests.	83.3%	VI
15. Throwing leaves of *Posotia (Vitex hegude)* and *Bihlongoni (Arythyrium spp.)* on standing water at early tillering stage	To control rice hispa (*Discladispa armigera*), Rice caseworm (*Nymphula depunctalis*)	It act as repellent. Leaves of Posotia and Bihlongoni may contain compounds or substances as pulegone, 1,8-cineole, and limonene, that act as natural repellents or deterrents to pests and insects. By spreading these leaves onto standing water, farmers may create an environment that discourages or repels the presence of pests and insect larvae, including those that can harm rice crops.	68.4%	XI
16. Audio tapes, reels of discarded cassettes are tied around nursery plot at maturity period	To scare away birds.	The reels reflect light and produce sound which frighten away birds from the field	88.7%	V
17. Keeping scarecrow in nursery as well as main field	To control bird, pest	Frightens birds and prevents the birds from eating up the seeds	94.2%	II
18. Broadcasting of goat excreta in rice field	To control insect, pest	goat excreta acts as repellent. The odor and composition of the excreta may create an unfavorable environment for pests, reducing their presence or limiting their damage to rice crops.		XVI
VEGETABLES				
19. Application of wood ash in vegetables	To control major vegetable pest	Wood ash has been reported to have insecticidal and fungicidal properties, which can help suppress certain pests and diseases	99%	I

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		in vegetable gardens. The alkaline nature of wood ash may create unfavorable conditions for pests and pathogens, reducing their populations and limiting their damage to crops. Wood ash has an alkaline pH, which can help neutralize acidic soils. Acidic soils (low pH) can inhibit plant growth and reduce nutrient availability. Wood ash contains calcium carbonate, which acts as a liming agent when applied to acidic soils.		
20. Powdered tobacco (*Nicotiana tabacum*) is sprinkled on the foliage of crops like brinjal (Solanum melongena), cabbage (Brassica oleracea).	To control insect pests	Tobacco contains nicotine, an alkaloid compound that exhibits insecticidal properties. When tobacco powder is applied to the foliage of plants, it releases nicotine, which can act as a natural insecticide. Nicotine disrupts the nervous system of insects, leading to paralysis and eventual death. The insecticidal effect of tobacco powder is primarily contact-based, meaning that insects must come into direct contact with the powder on the plant foliage to be affected. The strong odor and taste of tobacco may discourage insects from landing on the foliage or initiating feeding, reducing the likelihood of pest damage	67.32%	V
21. Neem(*Azadirachta indica*) seeds are powdered and then tied in a piece of cloth. Then this is to be dipped in water for 24 hours. Later, that water can be used for spraying crops.	Acts as insect repellent.	Neem seeds contain several bioactive compounds, including azadirachtin, nimbin, nimbidin, and limonoids, which exhibit insecticidal and insect-repellent properties. Among these, azadirachtin is the most widely studied and recognized for its insecticidal effects. The bitter taste and odor of neem compounds are unpleasant to many insect pests, causing them to avoid treated areas or plants.	85%	III
22. A heap of grass is kept in the vegetable fields at night time and burnt at day time.	Killing pests like cutworm (*Spodoptera exigua*).	The presence of the heap of grass acts as a physical barrier or trap for cutworms, which are nocturnal pests that feed on the stems and leaves of young vegetable plants. Cutworms hide under debris or soil during the day and emerge at night to feed on plants. By providing a sheltered environment, the heap of grass attracts cutworms and concentrates their population in one area. Burning the heap of grass during the daytime exposes the cutworms to high temperatures and bright light, which are unfavorable conditions for their survival. Cutworms are sensitive to heat	40.2%	VI

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		and light and may be killed or driven away by the sudden increase in temperature and brightness. Additionally, the smoke produced by burning may disorient or repel cutworms, further contributing to their control.		
23. Pointed gourd (*Trichosanthes dioica*) is pierced in the main stem at 1 ft. away from the base by a stick vertically	To reduce vegetative growth and increase fruiting and bearing.	Piercing the stem may stimulate the plant to produce lateral branches or side shoots from the point of injury. This can promote bushier growth and increase the number of flowering sites, potentially leading to higher yields of pointed gourd fruits.	33%	VII
24. Smoking in cucurbits	To control fruit fly	The smoke produced by burning organic materials may contain compounds or chemicals that act as natural insect repellents. Fruit flies are sensitive to certain odors or chemical cues in the environment, and the presence of smoke may disrupt their ability to locate suitable host plants or fruits for egg-laying.	96%	II
25. Sprinkling honey in canopy ridge gourd	For better pollination in ridge gourd	Honey is known to attract pollinators, such as bees, butterflies, and other insects, due to its sweet aroma and high sugar content. By sprinkling honey in the canopy of ridge gourd plants, farmers aim to attract more pollinators to the area, thereby increasing the chances of successful pollination and fruit set. Sprinkling honey in ridge gourd canopies may be used in conjunction with other pollination enhancement practices, such as maintaining diverse floral habitats, providing nesting sites for pollinators, and avoiding the use of pesticides harmful to pollinators. Integrated approaches to pollination management can help maximize crop yields and promote biodiversity in agricultural landscapes.	26.7%	VIII
26. Cow urine is sprayed in crop field.	To control pests.	Cow urine contains various compounds, including ammonia, uric acid, and volatile fatty acids, which can act as natural repellents or deterrents against pests. The strong odor and taste of cow urine may discourage pests from feeding on crop plants or laying eggs on foliage. Cow urine has been reported to possess antimicrobial and antifungal properties, which can help suppress the growth and proliferation of disease-causing pathogens in crop plants.	73%	IV
27. Powdered	To protect from	Turmeric contains curcumin, a bioactive		

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turmeric applied with potato cultivars during plantation	infestation	compound known for its antimicrobial properties. By applying turmeric powder to potato cultivars during plantation, farmers may help protect the tubers from soil-borne pathogens such as bacteria and fungi. Curcumin's antimicrobial activity can help inhibit the growth of pathogens that cause diseases such as bacterial wilt, blackleg, and fungal rot, reducing the risk of infections that can affect potato yield and quality. Turmeric powder contains compounds that can stimulate root growth and development in plants. When applied to potato cultivars during plantation, turmeric powder may enhance soil microbial activity and diversity.		
FRUITS & OTHER TREES				
28. Smoking under mango (*Mangifera indica*) tree at the time of flowering.	To repel insects like stone borer (*Sternochetus mangiferae*), mango mealy bug (*Rastrococcus invadens*) etc.	Smoke produced from burning organic materials such as dried leaves, twigs, or other plant matter may contain compounds that act as natural insect repellents. The strong odor and composition of the smoke may deter or repel insects that are potential pests of mango trees, such as fruit flies, aphids, or mites. Smoke drives away the insects and prevents them from depositing the eggs. In addition to its repellent effects, the heat generated by the smoke may create unfavorable conditions for certain insect pests. Exposing insects to elevated temperatures can disrupt their physiological processes, behavior, or survival, leading to mortality or reduced population levels.	93.3%	II
29. Wastes of fish are placed below citrus plants	To attract fruits sucking moths (*Othreis fullonia*)	the odor of fish waste may act as a natural repellent against certain pests. The strong smell of decaying fish may deter pests such as rodents, insects, or nematodes from approaching citrus plants or laying eggs in the soil. This may help reduce pest populations and minimize damage to citrus trees.	79.4%	III
30. Placing long hair of women in the crown portion of coconut tree	To control rhinoceros beetle	Placing long hair in the crown portion of coconut trees creates a physical barrier that may hinder the movement of beetles, particularly those that climb the tree trunk to reach the crown. Beetles, such as the coconut rhinoceros beetle or other borers, may encounter difficulty navigating through the tangled hair, which could deter them from reaching the tender tissues or infesting the tree. The strong odor or chemical composition	34%	VI

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		of hair may disrupt the sensory perception of beetles, deterring them from approaching or infesting coconut trees.		
31. Application of salt in coconut	To control trunk borer	Salt acts as repellent. Salt around coconut trees can help deter or control pests, including insects and rodents. The abrasive texture and hygroscopic properties of salt may create an inhospitable environment for pests, discouraging them from approaching or infesting coconut trees. Salt can also be used as a weed control measure in coconut plantations. Sprinkling salt around the base of coconut trees or in inter-row spaces can inhibit weed growth by dehydrating and desiccating weed seeds and seedlings. Salt disrupts the osmotic balance of plant cells, causing them to lose water and eventually die. However, excessive salt application can also harm desirable vegetation, so caution is needed while application	70.2%	IV
32. Straw wrapped around the tree trunks	To control insects from crawling upward	Straw acts as physical barrier for insects. The physical barrier created by the straw can make it more difficult for pests to access the tree trunk and nesting sites.	98.1%	I
33. Injection of kerosene/diesel in citrus stem	To control trunk borer	Injecting kerosene or diesel into citrus tree trunks is believed to suffocate and kill trunk borers present within the stem. The injected liquid creates a barrier within the tree's vascular system, preventing the movement of air and ultimately causing asphyxiation of borers. Kerosene and diesel contain hydrocarbons and other compounds that are toxic to insects. When injected into the citrus tree's vascular system, these substances can directly affect the borers by disrupting their physiological functions, such as respiration or metabolism, leading to their eventual demise. The strong odor and chemical composition of kerosene or diesel may act as a deterrent to trunk borers, discouraging them from infesting citrus trees or laying eggs in the bark. The presence of these substances within the tree may create an inhospitable environment for borers, reducing the likelihood of infestation.	41%	V
STORAGE & RIPENING				
34. Storage of potato (Solanum	To protect seed tuber from potato	Dhekia leaves may possess natural properties that act as repellents against pests and	38%	VI

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tuberosum) seed tubers in between the layers of wild dhekia (*Diplazium esculentum*) leaves.	tuber moth (*Phthorimaea operculella*) infestation.	pathogens that can damage potato seed tubers during storage. The aromatic compounds or chemical constituents present in dhekia leaves may deter insects, fungi, and bacteria that cause decay or rotting of the tubers. This natural pest repellent property helps maintain the quality and shelf life of the stored seed tubers. Placing potato seed tubers between layers of dhekia leaves helps maintain an optimal level of moisture around the tubers, preventing them from drying out or becoming too damp during storage.		
35. Storage of seeds mixed with ash.	Controls storage pests.	Ash has alkaline properties, which can help deter pests and pathogens that may damage stored seeds. The alkalinity of ash creates an inhospitable environment for pests such as insects, larvae, and fungi, reducing the risk of infestation or decay during storage. By incorporating ash into seed storage, farmers can protect their seeds from common storage pests and maintain seed viability. By mixing seeds with ash, excess moisture is absorbed, reducing the risk of fungal growth and maintaining seed quality during storage, particularly in humid environments. The strong scent of ash can act as a deterrent against rodents, birds, and other pests that may attempt to access stored seeds.	67.6%	V
36. Neem (*Azadirachta indica*) leaf is kept in the rice storage structures.	Effective against storage pests.	Neem leaves contain compounds such as azadirachtin, which have insecticidal properties. Placing neem leaves in rice storage structures can help repel common rice pests such as weevils, beetles, and moths. The strong odor and chemical constituents of neem act as a natural deterrent, reducing the risk of insect infestation and damage to stored rice grains. Azadirachtin, the active ingredient in neem leaves, disrupts the growth and development of insect pests by interfering with their hormonal balance and feeding behavior. Neem leaves emit a distinct odor that can help mask the natural scent of rice, making it less attractive to pests and insects.	99.2%	I
37. Applying a layer of cow dung in storage bin	To control rice moth	Cow dung covers the cracks and crevices of storage bin. Cow dung has absorbent properties and can help regulate moisture levels within storage bins. Cow dung acts as a natural insulator and can help regulate temperature fluctuations within storage bins.	97 %	II

		Cow dung contains compounds that help neutralize odors and reduce foul smells associated with stored grains. Applying a layer of cow dung in storage bins can help mask unpleasant odors and improve air quality within the storage space.		
38. Sand cover over the stored potatoes	To control pest	Moth cannot lay eggs on potato due to sand. The dry and abrasive texture of sand makes it difficult for pests to tunnel or burrow into storage piles, reducing the risk of infestation and spoilage. Sand acts as a natural insulator and can help regulate temperature fluctuations within storage piles or bins. Covering stored potatoes with sand creates a protective barrier that helps prevent physical damage during handling and storage.	90.2%	IV
39. Keeping unripe fruit in a airtight container with Wild dhekia (*Diplazium esculentum*), leaves of sonaru tree (Cassia fistula) and straw	For ripening of fruit	Both wild dhekia leaves and leaves of the sonaru tree are known to emit ethylene gas, which is a natural plant hormone involved in the ripening process of fruits. Ethylene acts as a signaling molecule, triggering various physiological changes in fruits, including softening, color development, and flavor enhancement. Placing these leaves in close proximity to unripe fruits helps accelerate the production of ethylene gas, thereby promoting faster and more uniform ripening.	95.3%	III
LIVESTOCKS				
40. Feeding turmeric water to poultry	To prevent poultry dysentery	Turmeric (Curcuma longa) contains a bioactive compound called curcumin, which has potent antibacterial properties. Feeding turmeric water to poultry may help inhibit the growth of pathogenic bacteria in their digestive tract, including those that cause poultry dysentery. By reducing bacterial proliferation, turmeric water can contribute to maintaining a healthy gut microbiota in poultry, thus preventing the onset of dysentery. Curcumin in turmeric also exhibits anti-inflammatory properties.	85%	III
41. Feeding garlic water to poultry	To prevent poultry diseases	Garlic (Allium sativum) contains bioactive compounds, such as allicin, which possess potent antimicrobial properties. These compounds have been shown to exhibit activity against a wide range of bacteria, viruses, fungi, and parasites. Feeding garlic water to poultry may help inhibit the growth and proliferation of pathogenic	81.3%	IV

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		microorganisms in their digestive tract, reducing the risk of infectious diseases. Components of garlic, such as allicin and sulfur-containing compounds, have been found to stimulate immune responses, increase the activity of immune cells, and enhance the production of antibodies.		
42. Feeding bark of Amora (*Spondias pinnata*) to pigs	To prevent swine dysentery	The bark of Amora contains bioactive compounds with antimicrobial properties. These compounds may help inhibit the growth of pathogenic bacteria such as Brachyspira hyodysenteriae, which is responsible for swine dysentery. By reducing the population of harmful bacteria in the gastrointestinal tract, feeding Amora bark may help prevent the onset of dysentery in swine. The bark contains dietary fiber and other nutrients that support digestive function and promote the growth of beneficial gut bacteria. A balanced and healthy gut microbiota can help prevent dysentery and other gastrointestinal disorders in swine by enhancing immune function and protecting against pathogenic invaders.	70.7%	V
43. Feeding paste of Xilikha (*Termenalia chebula*) to pigs	To prevent swine disease	Xilikha is rich in antioxidants, such as tannins and flavonoids, which help neutralize harmful free radicals in the body. Free radicals can damage cells and tissues, leading to inflammation, oxidative stress, and increased susceptibility to diseases. The antioxidant effects of Xilikha paste may help protect pigs against oxidative damage and enhance their immune function, reducing the risk of infectious diseases and promoting overall health. Some constituents of Xilikha have been found to possess anti-inflammatory properties. Inflammatory processes play a role in the development of many diseases in pigs, including gastrointestinal disorders, respiratory infections, and skin conditions. By reducing inflammation, Xilikha paste may help alleviate symptoms, improve tissue healing, and enhance the pig's resistance to disease. The xilikha paste contains dietary fiber and other nutrients that support digestive function, regulate bowel movements, and promote the growth of beneficial gut bacteria.	63.4%	VI
44. Turmeric (*Curcuma longa*)	To repel insects and cure wounds	Turmeric contains a bioactive compound called curcumin, which has potent	98%	I

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paste is applied on wounds on cattle body	in cattle.	antimicrobial properties. Applying turmeric paste to wounds helps inhibit the growth of bacteria, fungi, and other pathogens, reducing the risk of infection. Curcumin can help prevent the colonization of harmful microorganisms on the wound surface, promoting faster healing and preventing secondary infections. Curcumin in turmeric has been shown to stimulate tissue regeneration and repair. It can enhance collagen synthesis, improve wound contraction, and promote the formation of new blood vessels, all of which are essential for wound healing. By accelerating the regeneration of damaged tissues, turmeric paste can help speed up the closure of wounds and reduce the risk of scarring. Applying turmeric paste to wounds may provide local pain relief and improve the animal's comfort during the healing process. This can reduce the animal's tendency to lick or bite at the wound, preventing further trauma and promoting uninterrupted healing.		
45. Fishery ponds are stirred with bamboo poles.	To provide favourable pond environment to fish	Stirring the water in fishery ponds helps increase oxygen levels, which is essential for the survival of aquatic organisms, including fish. By agitating the water surface, the exchange of gases between the water and the atmosphere is enhanced, promoting the diffusion of oxygen into the water. This is particularly important in densely stocked ponds or ponds with limited water circulation, where oxygen levels may become depleted, leading to hypoxia and stress in fish.	93%	III

The effectiveness of ITK practices in agriculture is evident in their ability to enhance soil health, increase crop yields, and improve resilience to climatic variability. Farmers attest to the efficacy of traditional practices such as mixed cropping, intercropping, and crop rotation in mitigating pest and disease outbreaks and reducing dependence on external inputs. Recognizing the value of ITK in agriculture is essential for promoting sustainable development, preserving cultural heritage, and fostering community resilience. Integrating ITK into agricultural extension programs, research initiatives, and policy frameworks can enhance the effectiveness and inclusivity of agricultural development interventions. Furthermore, empowering local communities to document, revitalize, and share their traditional knowledge can contribute to the conservation of biodiversity, promotion of agroecological principles, and adaptation to climate change. By leveraging the collective wisdom of indigenous peoples, policymakers, researchers, and practitioners can co-create innovative solutions to address the complex challenges facing agricultural systems.

IV. CONCLUSION

The utilization of Indigenous Technical Knowledge in agriculture by farmers in Darrang district reflects the intrinsic connection between culture, environment, and livelihoods. Traditional knowledge systems offer valuable insights and solutions to contemporary agricultural challenges, providing a foundation for sustainable

development and community resilience. Moving forward, efforts to safeguard and promote ITK must be guided by principles of equity, inclusivity, and respect for indigenous rights. By embracing the diversity of knowledge systems and fostering collaborative partnerships between stakeholders, we can build resilient agricultural systems that ensure food security, environmental sustainability, and cultural vitality for future generations.

The documented ITKs will serve as a ready reference for the agricultural scientists for further study for proper identification, documentation and scientific analysis of farmers' age old practices to determine their scientific rationality and effectiveness. The result will be helpful in technology blending programme for generation of low-cost, eco-friendly and location-specific technology by modifying already existing technologies for benefits of the farmers.

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