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Illustration by Nawang Tankhe

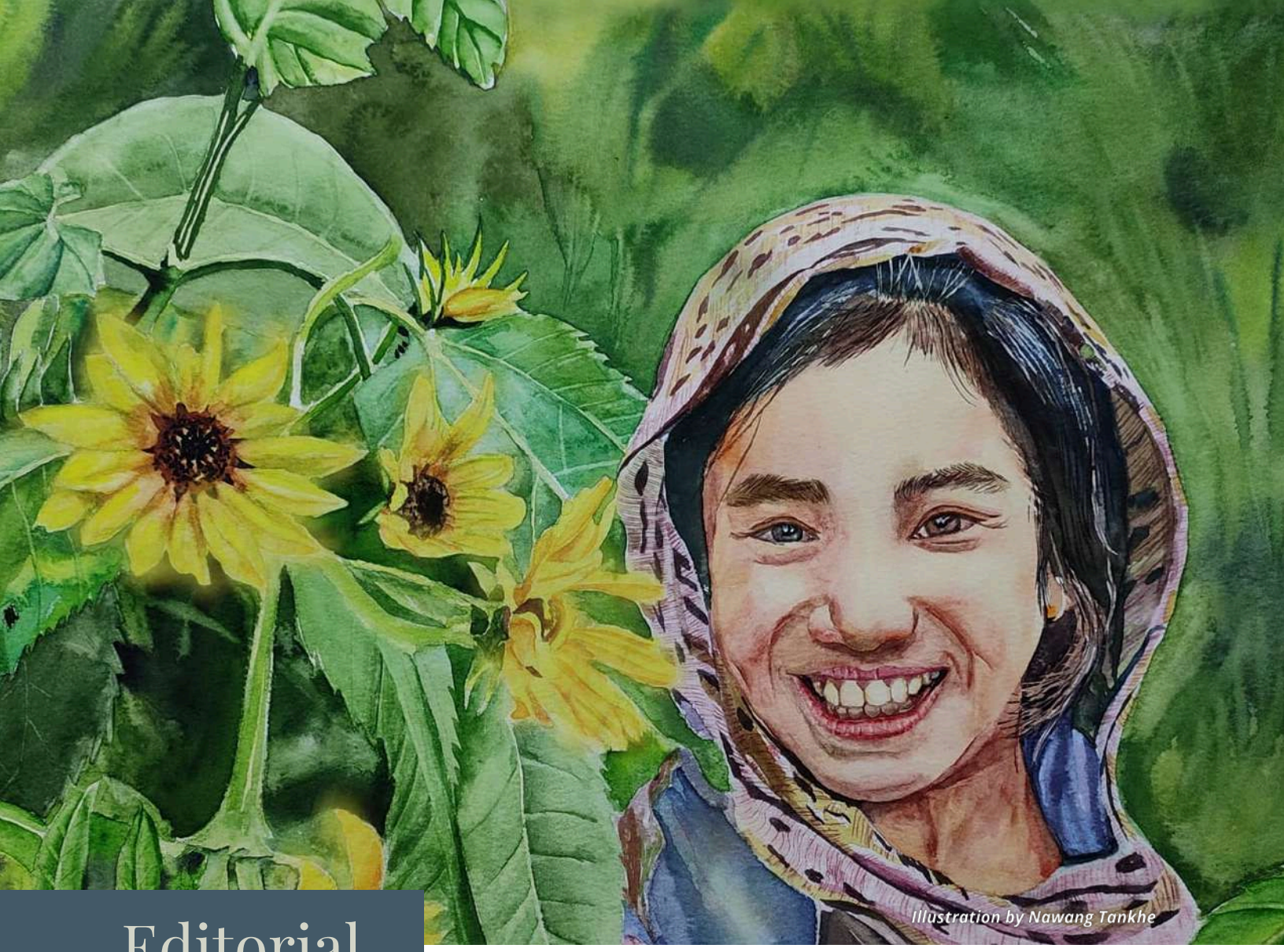


Illustration by Nawang Tankhe

# Editorial

The change from winter to spring is a dramatic one. As the days get longer, so do people's activities. The short summer is a busy time as most people get busy working in the fields. That's what we cover in our Spring edition. Agriculture and livestock rearing have been a way of life for people in the hills, or at least so we are given to believe. Is it still relevant, or have people moved on to newer vocations?

How has agriculture changed over time? This makes for an interesting exploration. We begin this edition with a story in which Alex Norbu and Kunzang Deachen highlight how farming has transformed across Ladakh. This is followed by our feature article by Biju Negi from Uttarakhand in which he brings to light some of the fundamental shifts in agriculture and in the way it was, and is now.

Following this we delve into what long-term weather data from the Himalaya point to and what that means for farmers, in an article shared by Akshata Anand. Finally, we move to Himachal Pradesh and look at how farming has evolved from subsistence crops to lucrative cash-crops, based on discussions with over 20 farmers from Lahaul-Spiti and Kinnaur.

Do read the articles to see how farming has evolved in different directions across different parts of the western Himalaya.

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Illustrated by Nawang Tankhe(Kaza, Spiti)





*Illustration by Nawang Tankhe*

# Changes in Agriculture in Ladakh

*Alex Jensen and Kunzang Deachen*

The rapid shift away from agriculture to other economic activities is a common trend in many agrarian economies globally, often driven by factors such as urbanization, changing lifestyles, and economic opportunities outside the agricultural sector. Agriculture in Ladakh is no exception.

In the traditional Ladakhi farming and food system, the sun provided the primary energy, enabling plant growth, muscle-based labour power and fast-flowing water for milling and irrigating. The fertility of the soil and crops came from recycling of manure and compost (*lut, chulut*, and the like) into the fields and from minerals in the glacial melt-water. 'Packaging' – if any – was in the form of hand-made woollen sacks, wooden and clay vessels, willow baskets, and masonry granaries, all of which could be safely returned to the soil after they wore out. Transportation of the crops was done with muscle power, and cooking done with local renewable fuels like dung cakes or wood sticks. Care was taken to conserve pasturelands through rotational grazing, and farmers tried to minimise harm done even to insects in the fields. The ecological footprint – meaning total ecological impacts including energy and water consumption, waste generation, etc. – was very low. In current terms, we could say that the traditional Ladakhi farming and food system was solar-powered, zero-external input, zero-waste, regenerative, closed-loop, and sustainable!

Today, while much of the traditional farming and food system continues to exist, it is steadily being eroded by a number of profound socio-economic changes. The environmental impacts of these changes are

increasing year by year.

One of the important changes has been the decline of villages due to various reasons and the decline in farming-pastoralism systems that sustained them for centuries. The growth of tourism, the army, and competitive education have combined to drain young people, and young men in particular, out of the villages and into Leh, or even further away. As a result, there is less total labour available, and more farming work has fallen on village women and paid labour. Many fields that were once lush and green in the summers today lie fallow for lack of people to work them. With fewer people, livestock herds have decreased significantly, and in the case of goats and sheep nearly disappeared from many villages. While this change may have benefitted wild herbivores to some extent by reducing competition for forage, it has also reduced the amount of rich, organic local manure available for soil and crop nutrition. To make up for this, many farmers turn to the use of synthetic fertilisers which pollute both water and air, and are very energy-intensive to manufacture from fossil fuels.



*Taking livestock to pastures| Source: Wikimedia Commons*

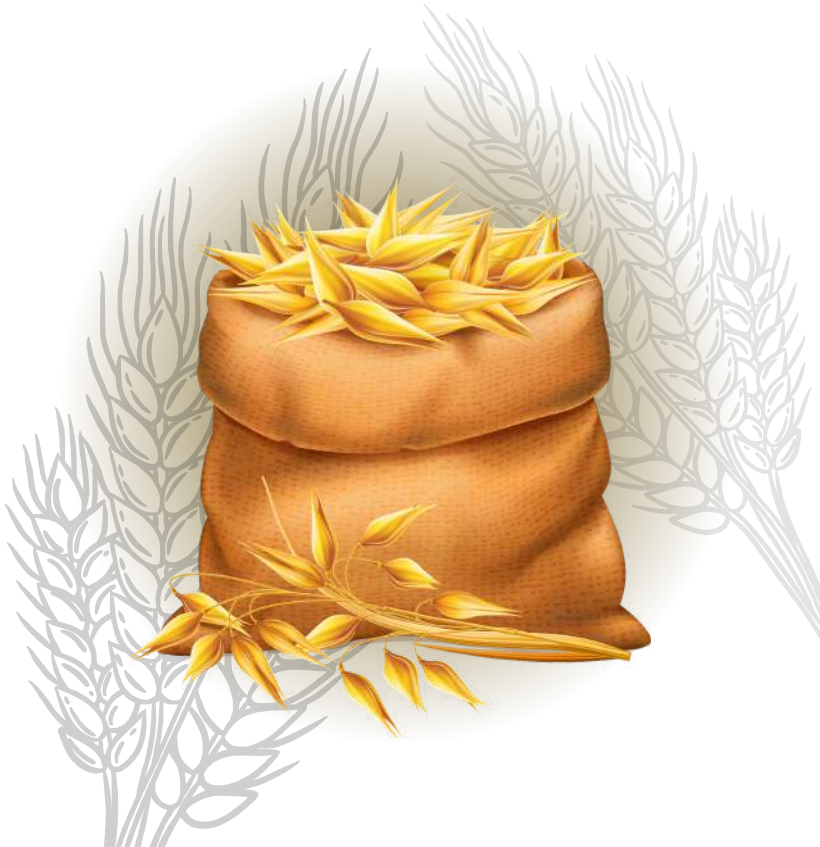
***Crops & Water:***

The decline of agriculture is also seen in the reduction of diversity in crops including pulses, cereals and pseudo cereals like buckwheat (although efforts are slowly being made to bring back buckwheat). Fewer local pulses like the traditional black bean in Ladakhi fields and kitchens diminishes the health of the local diet as well as local soils. Pulses naturally fix atmospheric nitrogen into the soil, so when they are planted there is no need for nitrogen fertilisers.

Without them, however, an important source of natural fertility is lost. In terms of oilseeds, whereas Ladakhis formerly cultivated local mustard more extensively and produced much of their own edible oil, today mustard farming is also declining. Commercial edible oils, packaged in plastic bottles and trucked in from the Indian plains are now widely used in Ladakhi kitchens.

In the 14,000-foot village of Gya, farmers used to cultivate different varieties of barley because the area's climate was conducive to their growth. Because of the region's low temperatures, wheat is rarely grown in Ladakh's eastern region. The people in that same region are currently cultivating over thirty-six to thirty-seven different kinds of grains and vegetables. Acho Urgain, from Gya village, says that this may be because he has access to a wider range of plants these days. He is cultivating new crops like quinoa, and Tse Tse (Foxtail millet), which are native Ladakh millets that are rarely grown these days. Since 2014, green peas have been grown extensively throughout Ladakh because of factors including climate change that favours such crops, but more importantly because of increasing commercialisation of agriculture, as green peas have high market demand inside and outside Ladakh. A variety of relatively novel vegetables are today grown, such as cauliflower, cabbage, beetroot, and various turnip varieties.

One of the many changes in agriculture that people in the mountains are facing is a lack of water, especially during times of great need. It is imperative that water be given to the fields by the end of March or the start of April. Variable weather patterns cause glaciers to hold onto water by not melting during the seeding season. June 21st marks the change of the days, so in July there will still be a water shortage. Another impact of climate change on agriculture is from increasing likelihood and severity of glacial lake outburst floods, which have had catastrophic impacts on downstream villages, such as in Gya village in 2007, 2009, and 2014.





*Chortens and fields of Markah | Source: Wikimedia Commons*

***Land Use:***

The perspective of agri-entrepreneur Rinchen Yutol from Reetsot in Ladakh highlights the rapid changes in the past decade, which may present both challenges and opportunities. The conversion of agricultural lands into concrete structures poses a significant challenge, and reversing this process is often impractical. This irreplaceable loss reduces self-reliance in food and increases dependency on imported foods. Such dependency increases vulnerability in the case of any disruptions (like fuel shortages, or road closures) in the transportation network across the Himalaya. Additionally, the fragmentation of agricultural lands due to nuclear families can further reduce the overall agricultural land use.

***Fertilisers:***

Synthetic fertilisers have been used in Ladakh since about the late 1970s, supplied by the government at highly subsidised rates. Three main synthetic fertilisers are used: urea, DAP (diammonium phosphate), and MOP (Muriate of Potash/potassium chloride).

Data from the Agriculture Department and Mission Organic Development Initiative of Ladakh show that in general, quantities of synthetic fertiliser use are decreasing in Ladakh. This trend is reflective of the Hill Council's new vision to make Leh District fully organic within 10 years. This is very encouraging, since the more fertilisers are used, the more they disrupt the availability of natural nitrogen in the soil, which requires more fertilisers – a chemical addiction!

Besides the loss of livestock manure, the shift to flush toilets and septic tanks accompanying tourism – especially but not only in Leh – is also depriving the soil of rich human manure from traditional compost toilets.

To supplement local supplies, there are new initiatives to bring animal manure from Changthang for use in villages in the farming districts of Ladakh, and the government is

also importing organic manure from Punjab. While this is certainly a welcome change from chemical fertilisers, transporting manure and compost also carries an environmental cost in terms of fuel consumption and diesel smoke exhaust.

A future challenge will therefore be to generate organic manure and compost closer to where it is to be used, to reduce transport costs and pollution, and to keep valuable local nutrients recycling through local soils. Aggressive promotion of compost toilets, restaurant and residential food scrap collection and composting, and other initiatives could play a role in regenerating the local compost economy.

***Seed:***

One of the most crucial factors to consider when examining the changes in any region's agriculture is the seed. The availability of native or local seeds is impacted by the decline in production of native or older crops.The majority of seeds for vegetables that are currently offered by the government or in the market are hybrid seeds, which have the potential to alter the agricultural landscape of Ladakh, and have implications for the food sovereignty of the region and the economic independence of its farmers.

***Mechanisation:***

Dependence on fossil fuel energy has also been increasing in agriculture and pastoralism, as traditional tools, draught animals and techniques are replaced by mechanical, gas-powered threshing machines, mills, ploughs, tractors, etc. In Changthang, pick-up trucks and jeeps are steadily replacing draught animals, which impact the topsoil of the rangelands. This transition also increases dependency on the money economy and outside jobs to pay for hiring or buying the machines and the fuel to power them.

## Conclusion

The shift away from the traditional farming and food system in Ladakh, combined with forces like tourism, is clearly having very undesirable environmental impacts. If both public health and the environment are being degraded by this shift, then maybe it is time to rethink, change direction and regenerate the local food economy. How could this happen?



*Harvesting in Lamayuru | Source: Wikimedia Commons*

The Hill Council's commitment to making Ladakh an organic farming region is a very encouraging first step. Additionally, the optimism and enthusiasm shown by individuals like Acho Urgain and Rinchen Youtol are encouraging. Their deep understanding of the importance of agriculture in the current era, both economically and beyond, suggests a potential for positive change. Initiatives that focus on sustainable and innovative agricultural practices, coupled with educational programs to raise awareness about the significance of agriculture, can contribute to the revival and retention of this essential sector. In what other ways can the government and local people support such a change, discouraging packaged junk food while encouraging a return to traditional crops, restoration of livestock herds, village renewal, and so on? How can arable land be protected in perpetuity for farming? Can modern farm machines be powered by local, renewable energy? How can young people addicted to junk food rediscover and revalue healthy local foods? What role can tourists play in supporting local, organic food and farming? These and many other questions that will need to be urgently answered.



## Alex Jensen

Alex Jensen is a Researcher and Project Coordinator at Local Futures. He has worked in the US and India, where he co-ordinates Local Futures' Ladakh Project. He represents Local Futures on the core group of the Vikalp Sangam/Alternatives India initiative. He has worked with cultural affirmation and agro-biodiversity projects in campesino communities in a number of countries, and is active in environmental health/anti-toxics work.



## Kunzang Deachen

Kunzang is a community organiser supporting young farmers, mindful tourism, and cultural vitality in Ladakh, India. In 2017, she left a job in Delhi and started Infinity Ladakh with a vision to encourage spiritual and physical well-being by promoting yoga, meditation and nature expeditions. Since 2020, she has been coordinating Local Futures' Ladakh Project, developing an ever-deeper commitment to protecting land-based wisdom and traditional skills in the face of globalising forces. She has become a leader of the localization movement in Ladakh.

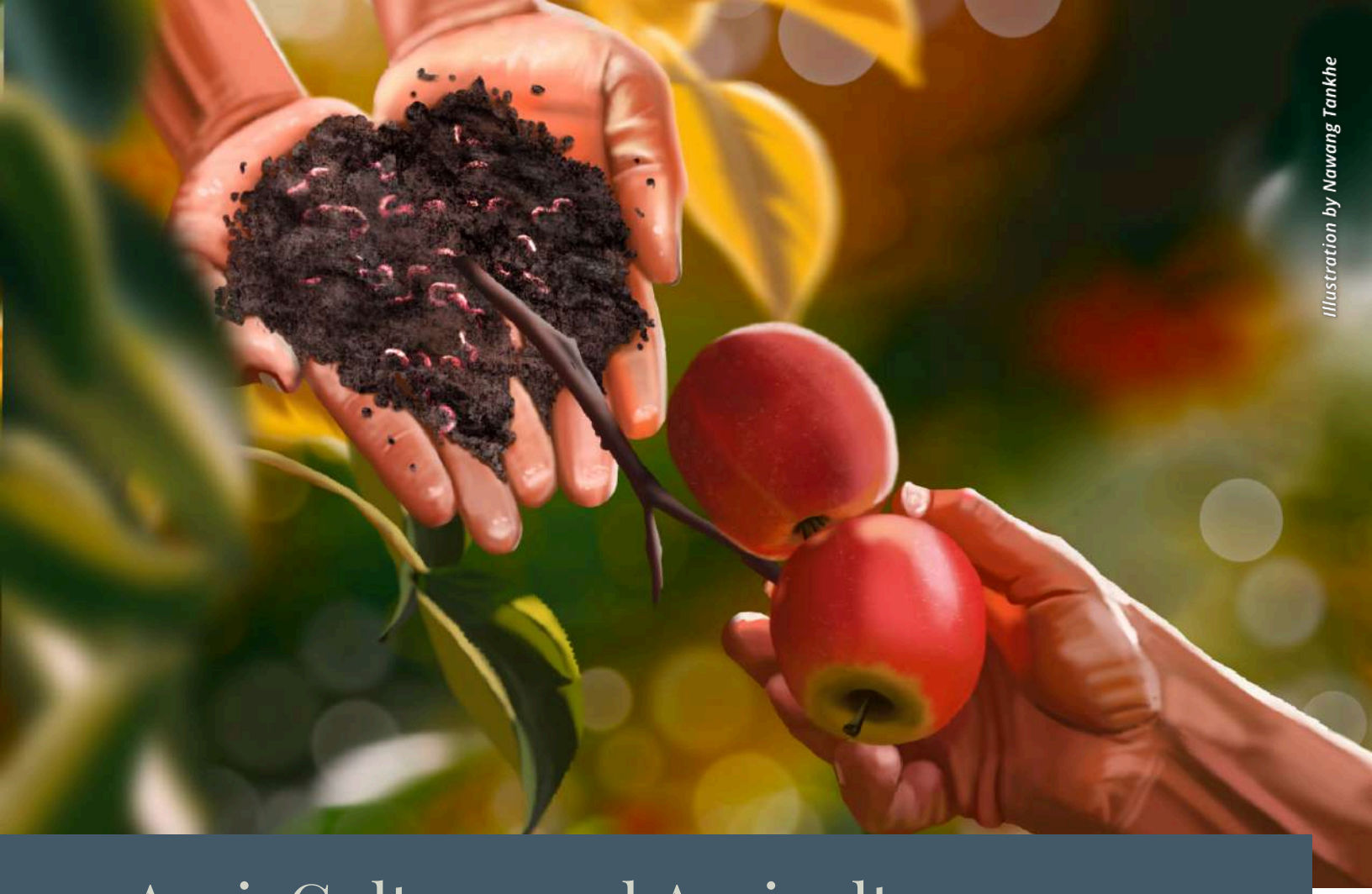


*Illustration by Nawang Tankhe*

# Agri-Culture and Agriculture – The Root Change

*Biju Negi*

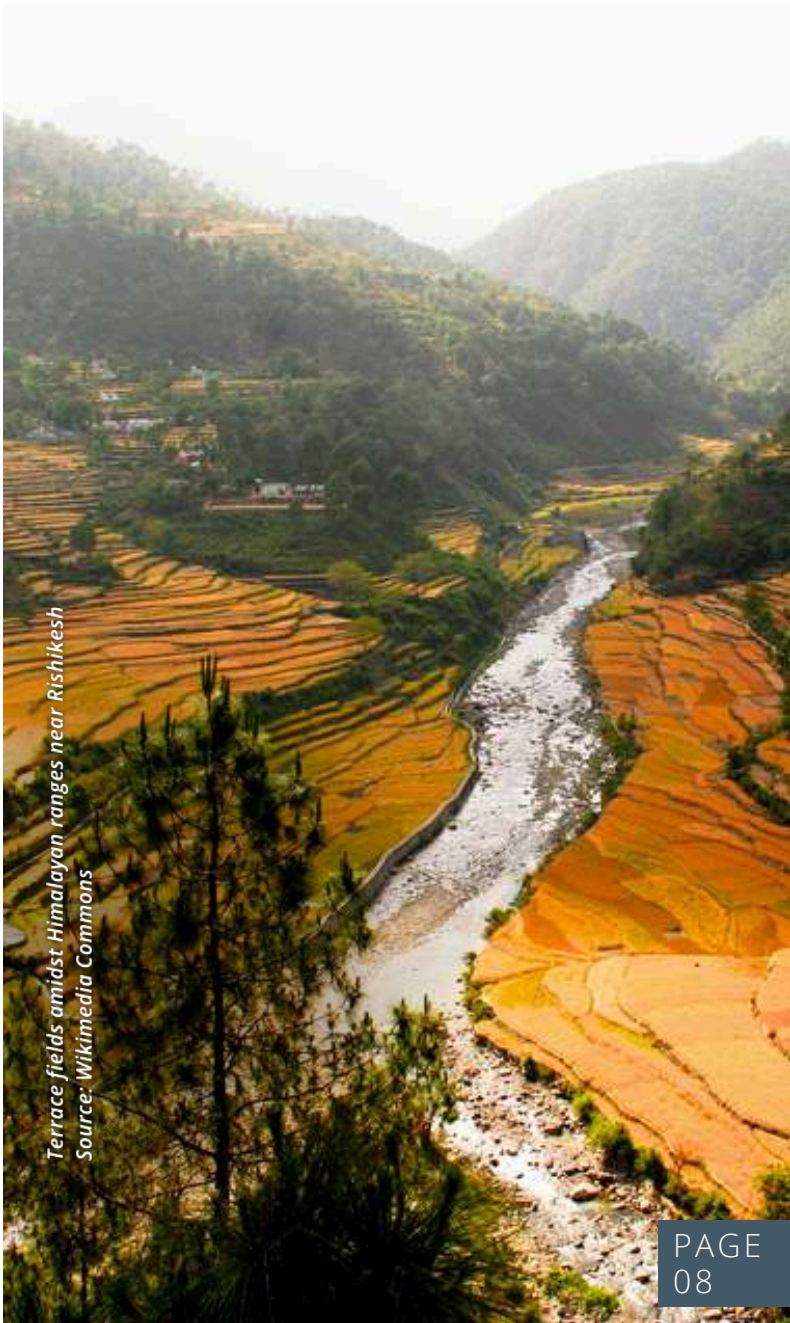
Agriculture on the earth is about 10,000-12,000 years old and it appeared in India about 8000-9000 years ago. From hunting and gathering in the forests, how humans came to produce grains and how the entire process must have grown and spread across migrants, communities, regions and countries – is a fascinating history by itself. But have we ever paused to wonder or ask, what was it about agriculture that so many millennia later, it continues to be the principal foundation of our lives, relevance and survival and the main yardstick of our life's fertility and continuous existence?

The primary significance of agriculture lies in its role as the provider of our food, sustaining our physical well-being and activity. However, its significance extends beyond mere sustenance. For instance, let me ask you, the food that we eat, does that affect us only physically? The straight answer to that is – No! Besides producing food for our physical body, the entire process of agriculture nurtures our minds and souls, transforming us into individuals capable of thoughtful contemplation with wisdom. This, in turn, has given birth to or impacted all aspects of our lives, be these physical, mental or spiritual,

and social, economic and cultural. Just take a look around yourself and you will realize that there is no aspect of our society and lives – be it our meditations on the forests or the water, or our livelihood resources or artistic endeavours – which has not emanated or developed as a result of our agricultural pursuits. In different times and space, struggling through various passages and milestones, agriculture has nurtured human and social survival and our civilizations; and the society too, by making it a major part of one's daily life, thought and sociability. Thus, it has given birth to and developed various aspects of social life and allowed itself to remain relevant.

Here, we are trying to look at the changes that have occurred in agriculture throughout its journey. For this, there are two aspects of agriculture that we need to look at a little closely – (1) Agriculture as the physical aspect or task of growing food crops; and (2) Going beyond the physical act of growing food and assimilating agriculture into the very nature of one's social life, i.e. turning the entire process into agri-culture. For want of appropriate terminology let us call these as Agriculture and Agri-culture (Agri as Culture).

Can you see the difference between the two – difference between the act of growing food and making the act as part of one's culture? When we look from such a perspective, we can see that, if agriculture had remained just the physical act of growing food, then it would have become a mere profession but by developing it into agri-culture it has become a vocation and occupation that is at the very centre of our entire life. By turning it into agri-culture, an interactive bond developed between it and the society, leading to both learning and feeding from and giving to each other. This is why, no society ever, defined agriculture as a profession or trade nor treated it as such, but turned it into a life-style, which did not allow agriculture to remain stagnant and rooted but imbued it with the trait of "renewability", enabling it across time and space, down to the needs and traits of every local community, in accordance with local experience, wisdom and sensibilities that enable it to remain relevant, alive and forever in step with the times. The trait of renewability developed into a natural trait which gave society the "vardaan" of the everlasting – and which we call development.



*Terrace fields amidst Himalayan ranges near Rishikesh*
*Source: Wikimedia Commons*

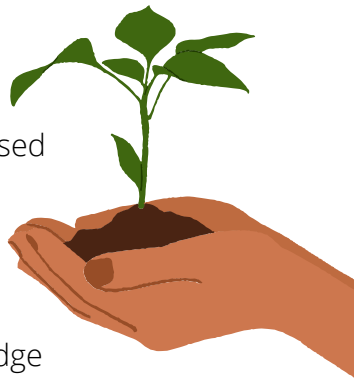
By harping on this difference, and seeking to use the two terms “change” and “renewability” with two different meanings, I wish to see and analyse the changes that we are seeking to understand. It might be appropriate that we analyse the dimensions and meanings of these two terms, for a clearer understanding of the change that we are discussing.

Are the terms “change” and “renewability”, synonyms?

I think not, and this is what I am seeking to understand and explain. Further, if we can see “agriculture and agri-culture” and “change and renewability” in the context of each other then we may be able to grasp better the essence of change in this sector in the last fifty odd years. For this, we may need to compare these in two distinct time eras. The changes that have happened in agri-culture in the last 50 or so years are actually the consequence of changes in society that began with the advent of industrial revolution in Europe about two-three hundred years ago. That period provides a distinct dividing line across which we can clearly see an overall difference in the basic nature, belief, concept, action and result between agriculture and agri-culture.

We can then clearly understand the cause and the impact of the changes that we have been witnessing in the last four-five decades.The pre-industrial revolution 10-12 thousand years saw countless small and big changes. However, those changes happened in different times, in different places and amidst different communities and in accordance with retaining the balance of and in cooperation with the five elements.

The genesis of those changes happened at specific local levels and no change was sudden but happened slowly as a result of close observation and experience over a long period. In other words, those changes had elements of deep reflection and experiment, wherein some experiments may have been fruitful and some not successful, immediately or over time, on the basis of which the society would have accepted, rejected, corrected or improved upon those. And such a process continued constantly. In fact, this entire process of doing, seeing, improving, adding on was what gave agriculture the trait that we are naming and explaining as “renewability” – wherein something new did not happen suddenly but grew on the foundation of the old and which sought to carry the old a few steps ahead.



What was special or specific about any such change or development was that it was based entirely on the experience and wisdom of the local farming community. As a result, there was a development of a repository of traditional knowledge which was not limited to grains and crops but assimilated understanding and knowledge of all natural resources. This encouraged at the local geographical level, diversity of crops growing in the field and the food being cooked in the kitchens.

Not just that, its impact was seen and felt beyond local agriculture practice, on the development of native languages and proverbs, diverse folk arts and culture, and gave birth to the technology of making wood or metal implements and utensils.



*Farming in Uttarakhand| Illustration by Nawang Tankhe*

This is where, agriculture went beyond growing crops and adopted the wide character of what I have termed as agri-culture to become an intrinsic and inherent part of life, to become its lifestyle. It will not be an exaggeration to claim that it was this agri-culture which developed in the humans, observation based scientific temper and process which further developed among the humans, an understanding of climate and weather, botany and zoology, etc. Try to look at basic knowledge in any discipline and you will find that its seeds germinated as a result of and in the general environment created by agri-culture. Indeed, despite its very local nature and characteristics, agri-culture proved to assimilate within itself the vast and global natural vision. It became a close reflection of nature's godly vision, and played a critical role in the existence and continued well-being of this earth.

If we take this entire spectrum together and borrow from the definition of democracy, we can say that the renewability in agri-culture is of the people, for the people, by the people. From concept to planning and execution, the entire responsibility and control remained with the local community.

Agri-culture which was life's philosophy, a lifestyle is today a mere profession and mode of employment. In fact, it is no longer agri-culture and has reverted to being plain agriculture. Today, it is no longer a medium to enhance life but just to stay alive and afloat, to remain economically alive. The agriculture which is being encouraged and propagated today is no longer social but industrial, or in other words, the society no longer owns it but has rapidly been given to or taken over by the industrial and corporate companies. It is not based on the knowledge invented or developed by the farmers on the field, but the entire thought, observation, research and implementation is developed in the laboratory of some institution or company and then served as a package to the farmers. This is not part of agri-culture's renewability emerging from the existing practice and from within the society and indeed, it is not even a change but an intentionally planned campaign (even, a conspiracy), a replacement deliberately imposed from the above and outside, to completely uproot this most important function in society. The cardinal characteristics of agri-culture were then steadily marginalized and erased.

This replacement about 50-60 years ago, which turned agri-culture on its head did not come with the Green Revolution (more appropriately called Greed Revolution) then but was the consequence of what had emerged as the industrial revolution two-three hundred years ago. And it started with de-legitimising traditional society's existence, identity and knowledge by naming it 'backward' and following it up by seeking to shame people's knowledge systems and their seeds. It was crucial and strategic that this society begin to have an inferiority complex about oneself. This was the first essential stage of the conspiracy. Once this was achieved, it was followed by a systematic replacement of the principles, methods, seeds with the means that it had created. As a result, a creative, productive and self-reliant society has today become a dependent slave farmer society.

An important aspect of this change in India was the establishment of the institution of the Zamindari system, wherein the society itself saw its division into two distinct classes. This system, the "divide and rule" confiscated from farmers their independence and creativity and turned them into slaves at the village level itself. So, there is an entire stretch of an exploitative pattern, which later developed into the introduction and dominance of Green Revolution. In the course of the industrial revolution starting from Europe, all aspects of agri-culture were side-lined one by one. This started with terming the entire identity of character of a local society as backward. It was important, in fact, essential for new agriculture to establish itself by downgrading and marginalizing traditional knowledge systems and particularly, its local seeds, and for the people to feel ashamed of their own rich traditions.

Once this was done, it was followed by introducing and establishing its own means and resources. The net result of this was that a productive farming society has today become an enslaved, dependent society.



*Barahnaja was a system of taking 12 crops in a year*
*Source: Beej Bachao Andolan*

Let us try to understand this through an example or two. Earlier, seeds of any grain or produce came from the farmers themselves and whose ownership was theirs, collectively. Any seed needed, in the first instance, came from their own homes, or neighbours, or village, or neighbouring villages. Those were seeds which bred and prospered in the soil and water of the respective village, were acclimatized to the local geographical

conditions and situations, and which were also the reasons that resulted in their tremendous diversity.

Consequently, this diversity enabled the seeds or crops to develop characteristics to suit every season, every taste, every health point of view and which provided them with tremendous disease resistance and ensured the society remarkable prosperity.

This led people to develop their own exchange traditions and practices – seeds travelled from one farmer to another, one community to another, one village to another, one society to another. For instance, a borrower did not have to pay the lender but only later, post-harvest returned to the lender double the amount (or whatever measure the community practiced) they had taken. A typical exchange practice also had a humanitarian aspect to it – for reasons of flood or drought or any other, if the crop failed, the borrower did not feel forced to return the lent amount to the lender – it was an unwritten understanding within the society. What this ultimately meant is that there was regular availability of seeds in the community.



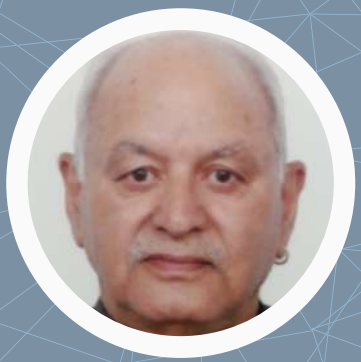
Today, the system has been turned on its head. The control over seeds has been usurped from the farmers' hands to the company's control – and the farmers from the producer and master has become a mere customer bound by the company's many conditions of restriction, rising cost and despair – all that farmers today understand clearly and suffer, but are not in a position to do anything about it. Let us look at another example on this.

Today, as the harvest begins to fall rapidly after a year or more, farmers need to change the seeds – and actually, purchase new ones. This considerably enhances the farmers' input costs. The fall in production, is a basic failing of any crop or seed, which farmers were well aware of. However, earlier, farmers did not need to change their seeds as frequently or rapidly as they do now.

And even then, farming communities had developed their own mechanisms of seed-change. At the first level that would merely change the field (avoid growing a crop in the same field every year), and change seeds only after considerable number of years. The entire system of seed change, from concept to practice was in the farmers' community control, and so it continued to remain even after seed exchange. But today, with what guile and cleverness, this community practice has been taken away from their hands and turned into a practice of excessive profit of the companies.

Likewise, comparing old agri-culture and new agriculture, we can see how a farmer in their practice has gone from being a self-reliant producer to becoming a mere consumer, from being a master to becoming an employee, service provider or servant.

And agri-culture which was critical or foundational to maintain the ecological balance of the earth, has through consumption and exploitation become a trade and profession. Our food crops are no longer a gift of nature but are a market product. Farmers who had a god-like status of being providers of food have today become mere service providers to large companies. Don't you find it strange or doesn't it trouble you that farmers are possibly the only producers who do not determine the price of their produce, unlike manufacturing companies that fix the price of their own manufactured material, and consumers readily pay that price. Not just determine the price but also raise or lower that to suit their convenience, for profit or even as a nefarious act. We normally do not pay attention to this or choose to ignore it. Many institutions and organisations are trying to address these issues. Of late, the growing acceptance of organic food crops have increased the demand for mountain produce – which, in any case, are organic by default, and which have allowed more and more organisations to work with farmers. For a while it appeared that, at last, we will be able to look up to the farmers and regard them for the honour that is rightfully theirs. But, in reality, has it helped? When you look at the wider picture, you realise that this is yet another scenario of the initiative being trapped in the grips of the market and companies. Instead of re-establishing the ecological and natural values of agri-culture, organic is rapidly being assimilated into the market system. What the organisations are doing are ultimately only fighting the market within the existing market concept, instead of looking for their own markets. It is an unequal battle where the rules are laid down by and controlled by the market. How can you battle the market in the latter's arena? As such, earlier the farmers cultivated for their families and communities, today they are essentially cultivating for the market. And a good test can be, to find out how many of such successful farmers wish their children to go in to farming. If we can grasp the essence of the basic differences between agriculture and agri-culture, we will be able to see more clearly the location of local and global changes happening in farming. Hopefully, that would enable us to determine our future course of action better.



Biju Negi

A writer, editor, translator and activist, with a wide range of interests and involvements, but more focussed on Gandhain thought and small farmer/farming issues and concerns, and also the socio-cultural aspects of our lives. A founding member of Beej Bachao Andolan, a non-formal collective and philosophical concept and practice, in existence for close to four decades. Also, founder of Hind Swaraj Manch, inspired by Gandhiji's book "Hind Swaraj" defining his prophetic developmental concern and understanding.



*Climate destruction| Illustration by Nawang Tankhe*

# Navigating the challenges of climate change in the Himalaya

*Akshata Anand*

The heart of the mighty Himalaya is witnessing a profound transformation shaped by the relentless force of climate change. With Himalaya playing a crucial role in shaping the weather patterns across India, climate change is disrupting these patterns. And the Western Himalaya Region comprising of Jammu & Kashmir, Ladakh, Himachal Pradesh and Uttarakhand characterised by complex geography with various local warm and cold zones is affected differently from one location to another.

Climate change refers to long-term shifts in weather patterns that affect local, regional, and global climates on Earth. Most of us are familiar with greenhouses that are commonly used to grow vegetables in winter, because the temperature inside these enclosures stays warmer than outside. A greenhouse keeps the enclosure warm by letting in as much light as possible and then trapping it as thermal energy. Now imagine what might happen if our planet acted similarly? In fact, it is because the earth works like a large greenhouse, that our planet can support such a wide variety of life. This phenomenon is called the greenhouse effect. However, a rapid rise in burning of fossil fuels over the last 150 years has significantly increased the

level of carbon dioxide in our atmosphere leading to increased warming and a rise in unforeseen weather events.

Research findings paint a stark picture of the Himalaya's changing climate. Over the years the region has witnessed a noticeable rise in both seasonal maximum and minimum temperatures. The difference between daytime and night-time temperatures is also getting larger, indicating a warming trend. Snowfall events have shown variability in terms of intensity and timing.

Scientists note a decrease in early snowfall during December and January, accompanied by an extension into February and March. While rainfall intensity remains relatively unchanged, there is a notable shift in its timings. Monsoon rains, once confined up to mid-August, now linger beyond their traditional timeframe, accompanied by a rise in cloudburst events. This shift, intertwined with delayed snowfall, alters the distribution of rainfall and cloud cover across the region.

The impact of this climatic transformation is not an abstract concept but a harsh reality affecting various sectors. Agriculture, the lifeline of many in the region, is particularly vulnerable. In the Kullu valley of Himachal Pradesh, delayed snowfall has cast its icy shadow on apple orchards. The blossoming, bearing, and overall yield of apples have suffered due to altered chilling conditions. Orchards, once thriving in lower elevations, now seek refuge in higher altitudes, affecting not just the geographical landscape but the very quality of the produce.

In Ladakh's western regions, horticulture crops like apricots and walnuts are facing severe challenges.

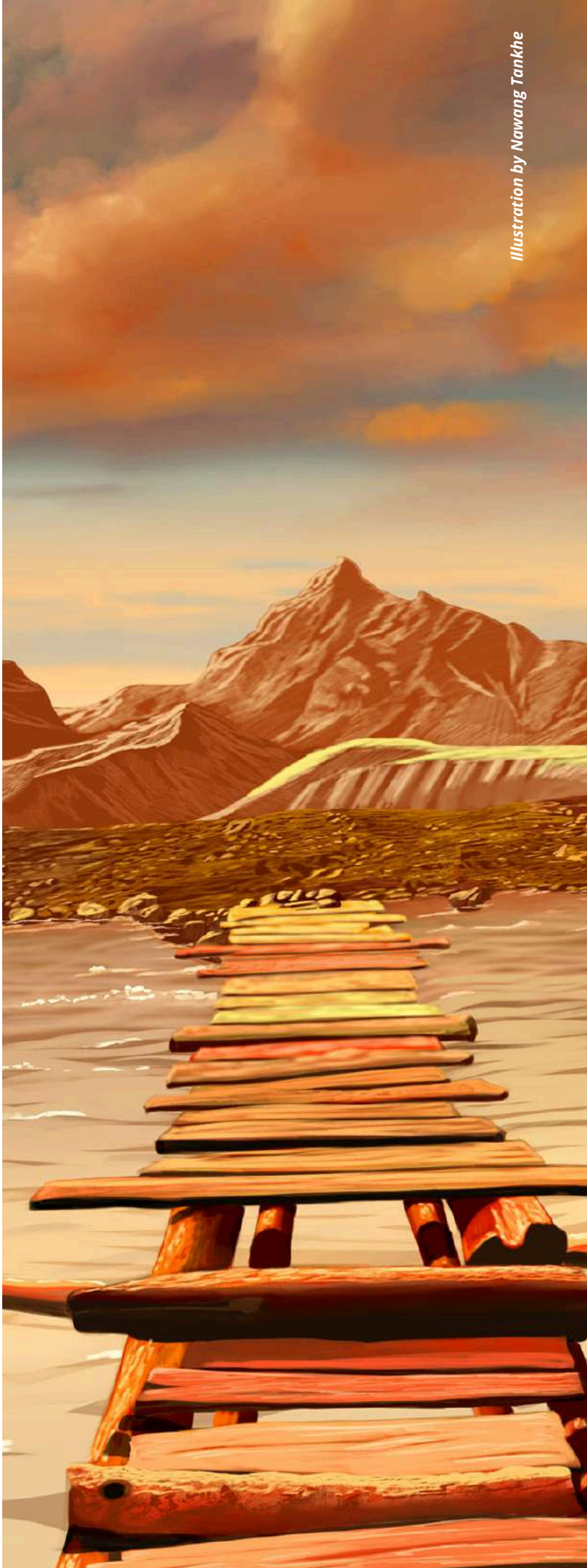


*Illustration by Nawang Tankhe*

Spring seasons are turning cooler, delaying the fruiting process and impacting the quality of the produce. Barley, a locally grown crop, is witnessing a substantial reduction in yield, echoing the broader struggle against a changing climate.

Villagers in Spiti tell a poignant tale of declining green pea production, a crucial revenue-generating crop. This decline, attributed to persistent water scarcity, reached its peak in 2022 when Langza village faced complete crop loss due to the unavailability of water.

The transformation is not confined to the fields; it seeps into the very identity of these regions. Agriculture in Uttarakhand, highly vulnerable to climate change, experiences shift in production dynamics, causing changes in crop yield, reduced diversity, and a surge in pest invasions. In districts like Pithoragarh, Chamoli, and Uttarkashi, climate change is altering the traditional collection period of non-timber forest products, impacting livelihoods.

The farmers, the custodians of the land, echo this change.

***"Summers are more intense and drier now because of which the crops ripen at an early stage without proper grain development."***

An elderly farmer from Uttarakhand

***"Earlier the snow was about a foot high and it used to stay for weeks but now if ever there is snowfall it is less than 5 inches and melts within a day."***

A farmer from Himachal Pradesh



***Earlier, we could not see stars in the sky for the whole of July and August. Continuous rains for days during the monsoon season in old times was good for the soil and the crops. But now, sudden and untimely torrential rains are spoiling the soil as well as the crops. The rains have completely disappointed us.***

A farmer from Uttarakhand

***Every year, we travelled from Zanskar to Kishtwar by crossing the glacier. Over the years, this glacier has been reducing. The new snowfall is not sufficient for settling, posing challenges to our traditional migration routes.***

A pastoralist from Ladakh

The extensive impacts of changing weather patterns for this region are evident in the increased vulnerability of hillside communities. The deterioration of crucial infrastructure caused by extreme weather events magnifies the tragedy. The region stands testament to the severe impacts of climate change, with multiple tragic events acting as stark warnings. The 2023 monsoon, marked by record-breaking rains, landslides, and the looming fear of an almost snowless winter in 2024, vividly reflect the grim reality of climate change in the area. In response, communities are resiliently adapting by altering sowing and harvesting schedules, experimenting with new crops, and exploring innovative technical solutions. Despite these efforts, mountain communities grapple with an uncertain future, facing ongoing risks in the wake of a rapidly changing climate.



Akshata Anand

Akshata Anand completed her masters from Bharati Vidyapeeth Institute of Environment Education and Research, Pune and investigated the enduring impact of climate change on traditional and cash crops in the Spiti Valley, Himachal Pradesh. She now works with the Nature Conservation Foundation in Himachal Pradesh, focusing on community-based conservation.

# Fun in the Fields!

School can be tough, and studies boring. So, this time let's head into the fields to have some fun!





Most of you must have seen your mother, sister, grandma, or an aunt working hard in the fields. Some might even have helped them. Here's a list of activities to watch and participate in during this year's farming season. And if you miss some, never mind, speak with your parents or grandparents and find out more about it.

And don't just ask them, tell us what you found out.
**We will feature the best replies in our upcoming editions!**

# Spring

Spring marks the start of hectic activity in the fields after a long winter. It will soon be time to sow the fields.



## April

Observe what is longer: the days or nights. How are the fields ploughed: with the help of animals or machines? Also check when the date for sowing is in your village and find out how it was fixed.

## May

Check which seeds have been sown in the fields and where these seeds came from. If you find everyone busy working with the soil and removing weeds find out what instruments they are using.

## June

Enter a greenhouse and check what is the first sensation you feel as you walk in. Find out how a greenhouse stays warm. See what else is being grown inside the greenhouse. Also check what flowers are growing around the fields.

# Summer

Summer is a time when the mountains burst into colour, flowers all over.

## July

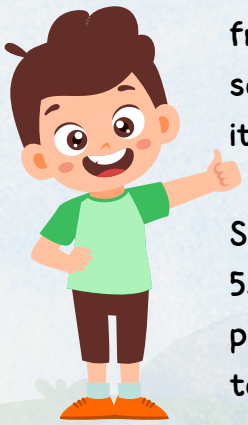
Summer is the most important time to take care of the crops. Find out where the water for the crops is coming from. Also, has it been raining regularly?

## August

When is the crop likely to be ready for harvest? Take part in the harvest and see how it is to work in the fields.

## September

Are there any special festivals celebrated at this time, or any old songs sung in celebration of the harvest?



Go out and explore the fields. You can do it alone, or with your friends. Speak with people who are working hard and offer them some help. Step in the mud, get your hands dirty and find out what it's like to be in the fields!

Send us your pictures, drawings, replies on a WhatsApp (93175 53867). Type your message or leave us a voice message. If you prefer, just call us and share your experience. And don't forget to mention your name and school, when you reply.

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Dhankar| Source: Wikimedia Commons

# Dhankar: From ancient towards modernity

*Tenzin Ganden*

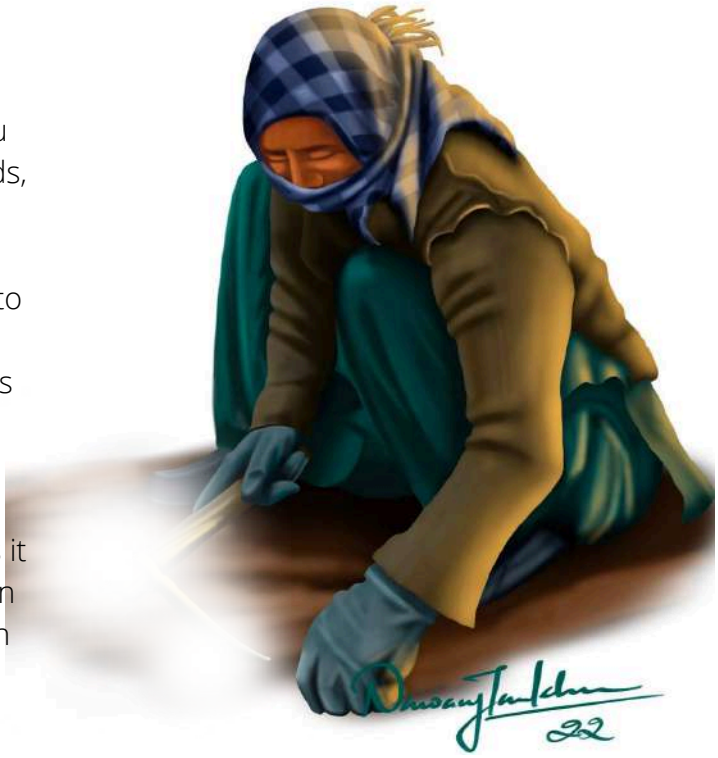
Dhankar is a historical village of Spiti which used to be its capital in ancient times. Where the Namgyal dynasty of Ladakh ruled for centuries. Due to the great distance between Ladakh and Spiti, feudal lords were appointed in Spiti and given the title of Nono. The Nono managed administration of Spiti by appointing people to collect taxes and manage other village-level works. Dhankar witnessed many attacks and looting by external forces.

Even today, one can see signs of these attacks on the walls and pillars of the old palace. After independence, Spiti was first administered by the Punjab government and was subsequently merged into the new State of Himachal Pradesh when it was created. Farming is the chief source of income in Dhankar. The importance of farming can be seen clearly in many of our festivals and rituals. Namkan is a festival celebrated in the seventh and eighth month of the year in

which villagers pray for a good harvest. On that day, people ride horses and throw stones at a fake sheep made of ghee and the winner is given a prize. The crop is harvested a few days after this festival. In our village, agriculture depends on water from the lake above the village. However, the lack of snowfall in winter is affecting our water supply from the lake. The water level has fallen by nearly 50% in the past 20-25 years because of which villagers face a lot of problems with farming. While yak and churu (a yak-cow hybrid) were used to plough fields, they have mostly been replaced by various farm equipment. Power tillers are used to plough the fields, while machines are used to chop crop residue. Earlier the local crops included wheat, barley and mustard. Today's crops include pulses, peas, cauliflower, and potato.

Horticulture is also being adopted widely as it is helping increase farm incomes. In addition to this, people have multiple options to earn a livelihood.

One can earn a respectable amount running homestays and hotels, driving a taxi or working as tourist guides. But despite all these changes, farming remains the primary source of income for the people of Dhankar. And the future of farming depends on our sources of water, which are fast disappearing.





Tenzin Ganden

Tenzin Ganden is a software engineer from Dhankar village in Spiti. He studied at the MLSM College Sundernagar and is keen to learn and write about Spitian culture and tradition. He is currently preparing for competitive exams.



*Potato harvest in Himachal Pradesh| Source: Wikimedia Commons*

# People and their land – agriculture in the high mountains of Himachal Pradesh

*Contributions from farmers from Lahaul, Spiti and upper Kinnaur*

Parts of Lahaul-Spiti and Kinnaur that fall above an elevation of 2500m are home to traditionally agro-pastoral societies. People who have combined farming and horticulture with rearing livestock as a dual source of living. Success at growing barley, a crop that can tolerate cold temperatures, allowed people to farm and hence inhabit high-altitude areas about 3,600 years ago. Agricultural land was historically held through semi-feudal arrangements – by the appointment officials who were given powers to collect taxes.

Over centuries the traditional crops ranged from varieties of barley (at least four varieties that were locally known as *kneu, soa, nenak, and eumo*), to buckwheat (known locally as *ogla and phafda or kaathu)*, and black peas. Horticultural produce included varieties of apricots and apples, especially in Kinnaur. In addition to helping plough farms, livestock were a source of many essentials: protein, dairy, wool and manure. The region's remoteness and sparse population made cooperation in farming essential. Clear rules to manage water, pastures and other

essential village common resources have been practiced for centuries. Farming enabled subsistence with surpluses being traded. Such trade involved barter that was largely regional. Annual trade fairs held at Ladarcha (Spiti), Kullu and Lavi (Rampur-Bushahr) provided occasions for such exchange.

Agriculture began to transform soon after India's independence in 1947. Himachal Pradesh witnessed land reforms in the form of four separate acts that were enacted between 1953 and 1968. In addition to a ceiling on the amount of land that could be owned individually, ownership rights of land were granted to those who had traditionally cultivated them under old semi-feudal arrangements. Land for farming was allotted to landless individuals, a landmark reform referred to as *nautor*. Even though there were discrepancies in land holdings and allotments, the laws ensured that almost every household owned land for agriculture. Another key factor that went on to influence farming was the setting up of cooperative societies with the aim of preventing outsiders exploiting local people because of their isolation.

### *Lahaul*

Set to the north-east of Manali across Rohtang La, Lahaul was the most remote part of this region remaining cut-off during winter. Enterprising Lahaulis set up an informal Muleteers society in Manali in the 1950s, where they used to come in the winters to rent mules or to work as labour. This arrangement let them fix rates they would charge and prevent any exploitation. This ran successfully without any formal support or intervention until the road over the Rohtang La was built in 1967. A Kuth Cooperative Marketing Society, established in 1959, was the first registered cooperative set up by Lahaulis in Manali in order to stabilise kuth prices and explore new markets. The roots of the kuth plant, introduced in Lahaul around 1925 from Jammu and Kashmir, has medicinal values and is a non-perishable item. Kuth cultivation was a success and probably brought local Lahauli farmers their first substantial financial gain by planting 10–15% of their fields with kuth. Though kuth prices started to decline in the 1960s, this success marked the start of the region's experiments with commercial crops which continues to this day.



***Organically grown iceberg lettuce in Lahaul| Photo by Tashi Angroop***



*Lahual potato harvest | Illustration by Nawang Tankhe*

Potato was first introduced into Lahaul in 1860 by Moravian missionaries. Local climatic conditions offered an advantage as it enabled Lahualis to produce off-season vegetables. In 1965, as kuth prices began to fall, a meeting was held in Keylong where a few leading farmers of Lahaul held discussions with scientists and potato growers of Punjab. Some potato growers from Jallandhar assured the purchase of their entire first crop at rates that would give farmers higher returns than kuth. All preparation for potato cultivation were completed months before the closing of the Rohtang pass in winter. In 1966 the first batch of disease-free seed potato was exported from Lahaul.

This led to the formation of the Lahaul Potato Cooperative Marketing Society (or simply, Lahaul Potato Society) in 1966 with just 20 farmers. Farmers had soon realised that potato cultivation would not be financially viable without collective action to influence the market to which all the farmers were vulnerable.

The Lahaul Potato Society thus set out to procure, store and market agricultural and horticultural produce of the region. It worked closely with the Central Potato Research Institute that had come up in Shimla in 1956. These collaborations brought in knowledge of contemporary farming techniques and access to fertilisers. By the mid-1970s potato became the most prominent produce of Lahaul, with very small portions remaining under barley and buckwheat. Seed potatoes were being marketed to Gujarat, West Bengal and Maharashtra with small amounts going as far as Pakistan, Bangladesh and Sri Lanka. By 1975 the Society was not only financially viable but it also started gathering assets and

venturing into other services.

At its peak, the Lahaul Potato Society was India's second largest cooperative after Amul. When prices of potatoes fell in 1979-80 and again in 1984-85, the Society lobbied with the State government to ensure a support price for their produce. The Society supported diversification through the promotion of hops cultivation in 1973-74, and later with the introduction of green peas in 1984. Cultivation of green peas picked up in the following decade, with farmers switching from potato to peas. Since green peas was perishable, the Society's role in its marketing remained limited to offering a support price in the case of a crisis. Farmers initially sold their produce in markets directly by taking heavy risks. In time, private buyers emerged who bought green peas directly from the farms at attractive prices.

This led to the expansion of green peas cultivation across Lahaul, and to surrounding areas. Currently, Lahaulis grow newer off-season vegetables like cauliflower, purple cabbage and iceberg (lettuce) which are more profitable than green peas and are also procured by private buyers. Potatoes are still cultivated, but its acreage remains marginal. The Lahaul Potato Society remains active in the region and continues to work on the principle of pooling prices, costs and risks. In its nearly 60 years of running, the Society managed to prevent political influence in its administration with its management focusing on the broader collective benefit of Lahaulis.

Over the years, farming in Lahaul transformed from being a subsistence-based livelihood to a lucrative cash-crop based occupation.



***Potato flowers| Source: Wikimedia Commons***

### *Kinnaur*

Within Kinnaur we especially focus on the Hangrang valley that falls in upper Kinnaur at elevations above 2500 m. Set around the confluence of the Spiti river and Sutlej, farming in this region faced multiple challenges due to its remoteness even though it remained accessible in winter. Subsistence based farming and livestock rearing were the mainstay in the region, alongside active trade with Tibet via the Shipki La.

The Indo-China war of 1962 led to the development of infrastructure along the border, but affected trade ties that the locals traditionally had with Tibet.



*Apples of Himachal | Source: Wikimedia Commons*

Apple was first introduced in Himachal Pradesh around 1916 and soon these parts were identified for horticultural development. Kinnauras were encouraged to grow temperate fruits such as apples, cherries, apricots, pears, almonds and walnuts. Kinnaur did grow potatoes, also registering a Society in 1962 and one in 1981 for upper Kinnaur, but its cultivation almost always remained marginal. Upper Kinnaur switched to green peas as a cash crop and by the late 1980s, its production was picking up. Kinnaur's economic switch to a cash-crop based economy, thus began to take shape from the late 1980s. In 1988, about 70% of cultivable land in Kinnaur was still under traditional crops such as buckwheat and barley, with green peas providing cash. Hill slopes had begun to be occupied by apple, which took up to 15 years to bear marketable fruits. By the mid-1990s, apple became a prominent source of livelihood. With the adoption of apple, came newer techniques of orchard management and the introduction of synthetic fertilisers and pesticides. Today, green peas cultivation remains restricted in pockets as apple plantations are fast replacing them. Farming in upper Kinnaur has almost completely switched to horticultural produce, with a rising demand for land that can be brought under apple production. This boom in apple production has become possible because of the warming of temperatures due to which the apple belt appears to have migrated higher to this cold and dry mountain zone. It is a rare example of how changing climate may have created opportunities for the community, while also creating several vulnerabilities.

### *Spiti*

Set between Lahaul to one side and Kinnaur to the other, Spiti is probably the highest and coldest part of this region. Though technically Spiti remains accessible in winter, it was the region farthest from any large town of prominence. This reflects in the fact that while Spiti too is moving from subsistence crops to cash crops, its transition is the most gradual. The two prominent crops of this valley were barley and black peas. Spiti too experimented with potato and set up a Society in 1977, but potato production did not pick up as it did in Lahaul. Many Spitian farmers felt that this was likely because the harvest of potatoes overlapped with that of barley, which was a more essential crop for subsistence.

Spiti eventually began to experiment with green peas, and in the 1990s Spitian farmers traveled to Delhi for the sale of their produce. The production of green peas picked up significantly from the 2000s, when private buyers started to purchase their produce from their farms. Around 1990, barley was sown on 55% of the arable land, while peas occupied around 30%. By 2009 barley had fallen to 43% while green peas had risen to 51%, mainly by reducing cultivation of other marginal crops like black peas, wheat, masur dal, rajma and mustard that were cultivated for personal consumption. Today green peas are being cultivated in more than 75% of the fields, and most locals' cultivating barley occasionally in a few years to fulfil household demand.



*Peas cultivation in Spiti| Photo by Prasenjeet Yadav*

The success of apple in the villages closer to Kinnaur has excited farmers to also start experimenting with apple plantation in the hope that apple orchards may eventually move even higher than Kinnaur. In 2023, a few farmers from Kee village succeeded in growing sample apples at an elevation of nearly 4000m, which has further increased hopes.

While Spiti is following a similar trajectory to Lahaul and Kinnaur in switching to cash crops, there is one aspect in which it still remains traditional. While Lahaul and Kinnaur have adopted the use of synthetic fertilisers and pesticides, Spiti has largely resisted this switch. While a decreasing interest in livestock rearing may have left farmers of Lahaul and Kinnaur with little choice, livestock rearing persists in Spiti and most farmers are skeptical of introducing synthetic supplements. Farmers buy organic livestock manure from as far as Changthang in Ladakh and are also buying poultry manure from the plains.



*Peas farming in Spiti| Photo by Prasenjeet Yadav*

### *Agriculture – a story of constant change*

Agriculture in the high mountains of Himachal Pradesh has evolved continuously. Improving access and connectivity made it possible for farmers to take their produce to markets. With connectivity improving over the years, farmers have taken risks with growing perishable cash crops. Sometimes these risks also bring major losses, as they did in 2023 when unforeseen weather events caused widescale damage to infrastructure affecting transportation. However, in regular years the financial returns can be attractive. The advent of technology has further led to the adoption of locally relevant technical solutions. Farmers have diversified cropping and have been open to experiments, which have brought them financial rewards. They have balanced between selling their produce to cooperatives and private buyers. Rising incomes have let them broaden their aspirations, with younger generation getting opportunities for better education and greater exposure. Access to cash has also allowed farmers to hire labour, which was previously not possible. Many parts of Lahaul are now experimenting with various forms of contract farming where the profits are shared between the landowners and the labour who manage them. Remoteness may have brought out the dynamism of the farmers of Lahaul-Spiti and Kinnaur. The success of early experiments

with cash crops by a handful of farmers paved the way for the entire region. Locals were aware of the risks they were exposed to on account of their remoteness, and they countered this challenge by setting up institutions and arrangements that distributed both the risks and rewards. In the process, cultivation of traditional crops has declined and is now limited to very small pockets. Unlike several other Himalayan regions where farming is in severe decline, farming retains its significance in the region. With nearly all households of the region involved in agriculture, it forms a key source of income. And with almost all households owning land parcels on account of land reforms, almost every family has benefited financially, even though the benefits may vary with the size of land holding. This reflects in the fact that the districts of Kinnaur and Lahaul-Spiti rank second and third in terms of per capita incomes among the districts of Himachal Pradesh, and are well above the average per capita income of the country. There is a continuous demand for land to be brought under cultivation through the extension of nautor rules. A lot of this commercial success has also been possible because of the local climate, which has allowed these regions to supply off-season produce that fetch a premium. But with rising uncertainty in weather patterns, farmers and farming stand increasingly exposed to greater risks even as people's relation with their land remains strong.

**The following farmers from Lahaul, Spiti and upper Kinnaur chiefly contributed their views:**



Chhering & Angmo Gaaji of Gumrang



Angail of Chango



Dawa Buthit & Gela Phuntsog of Kee



Dorjay Changez of Kibber



Dorje Chhering of Gumrang



Dorje Zanpo of Sangam



Pema Gyatso and Chhering of Hango



Tomdan of Kee

# In Conclusion

The nature of agriculture has changed from being a way of life to being largely seen as a profession. Then too different regions have moved in different directions based on different social, political and ecological factors. So, while there are stories of out-migration and land falling into disuse, there are also a few examples of how land reforms and people organising themselves into cooperatives may have retained interest in farming in certain parts.

The nature of farming has transformed from what was once subsistence-based into one that has increasing moved towards cash crops. Greater connectivity across these regions may only accelerate this trend.

We also find that newer modes of farming are being explored through the use of technology and novel working arrangements. While the shift from subsistence to cash-crop based is clear, another shift towards perennials is taking place. Perennials may require less labour and intensive care and hence favored given the fall in direct involvement in farming. As such, the shift from agri-culture to agriculture is evident. However, the future is hinged on one critical factor: the weather. With an undeniable trend of changing weather patterns, what trajectory agriculture takes may solely be determined by what the climate holds for the future. That may decide how people's relationship with their lands, and the mountains, evolve.



*Apple orchard in Kinnaur| Source: Wikimedia Commons*

# The Artist



## Nawang Tankhe

Nawang Tankhe is an independent artist based in Kaza (Spiti) and he has studied visual art from Himachal Pradesh University. He likes oil paintings and has participated in many art fairs and exhibitions to showcase his skills. He regularly contributes to Himkatha through his artwork.

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