

Seed Preservation Practices in the Tamang Community: An Ethnographic Study in the Tamang Community of Namobuddha, Kavre

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Abstract: Indigenous seed preservation and practices are deeply rooted in cultural traditions, ensuring seeds are passed down through generations. This study aims to explore how the Tamang community preserves seeds within their local community. A qualitative study was undertaken using observation and key informant interviews with people of different ages in ethnographic settings. The field inquiry involves sun-drying followed by storage in fibre bags and metal containers, with preservation using titepati leaves, which not only maintains seed quality but also reflects cultural identity. Local and traditional seed banks are in practice. By focusing on the Tamang community, this research puts the value of indigenous knowledge of seed preservation in promoting food security. However, the shift towards modern seeds endangered the community's traditional agricultural systems. This paper describes how the people of the Tamang community in Namo Buddha municipality used to preserve the seeds. Indigenous seed preservation practices are slowly shifting towards modern agricultural systems. Despite the threat posed by modern agricultural systems, these local systems play a vital role in preserving local crops.

Keywords: Seed preservation, traditional and indigenous knowledge, preservation, Nepal

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1. Introduction

Indigenous communities have developed intricate seed preservation methods that support food security and preserve unique genetic diversity (Altieri & Toledo, 2011), which is essential for crop adaptation and long-term food security in the face of environmental changes. These practices are deeply rooted in cultural traditions, ensuring seeds are passed down through generations. Community seed banks and farmer-led breeding programs are implemented in America and South Asia to revitalise the traditional seed preservation methods. Seed is a means of production as well as a product, whether a tribe is doing shifting cultivation. (Banu & Thamizoli, 1998). Seed preservation is the technique to preserve the original seeds for future food security.

Seed conservation is important for biodiversity conservation, as Toledo and Burlingame (2006) highlight the importance of conserving biodiversity through seed preservation as a crucial factor in achieving global food security, which aligns with the notion that conservation is vital for biodiversity conservation. Toledo and Burlingame (2006) emphasize the critical role of seed preservation in attaining Sustainable Development objectives.

Agriculture is the major contributor to Nepal's economy by production (GDP 25.8%) and engagement (60.4% population) (Ministry of Finance [MOF], 2021). Although the country records considerable growth in Agricultural production according to the agriculture census 2021/22, it has not been able to ensure food security and decrease poverty (Chemjong & KC, 2020). This differs among communities, cultures, and according to their culture and topography, their crops were different across the geographical region of the country.

Indigenous crops possess significant dietary value and play a crucial role in enhancing the nutritional security of tribal people (Kiran Babu & Rampal, 2024). The way of management of local crops reflects the socio-cultural practices of seed selection, production, and traditional storage techniques with their ancestral knowledge systems. Such systems are integrated with the local farmers worldview that save parts of their products from earlier harvests and store them for planting for the next season or for the following year. Terai plains to the high-altitude Himalayan region offers a diversification in agriculture, encompassing a wide range of crops, livestock, and agroforestry systems.

The traditional seed storage practices include Bhakari for kodo, earthen clay pots (Ghyampo), metal pots (Gagro), and jute bags. The local materials used in seed storage are *A. indica* (neem), *Acorus calamus* Linn (bojo), *Zanthoxylum* spp. (timur), *P. nigrum* spp. (marich), *A. vulgaris* (titepati) leaves/powders for controlling stored grain pests, sun drying of seeds (Paudel et al., 2021). Excessive use of agrochemicals in the vegetable sector poses a significant challenge to achieving sustainability.

Local seed preservation has been dying because of the modern encroachment of the seeds. Nowadays, in Nepal, the heavy use of chemical fertilizer and pollutant technologies has degraded the most common farmlands. From overuse of chemical fertilizers and pesticides to inefficient water irrigation and land degradation, these practices contribute to low productivity. Hybrid seeds and excessive use of chemical fertilizers increase food production but are under great threat. Hybrid seeds have to be changed every time, and its replacement cost is higher compared to the original local seed (Kumari et al., 2024). Currently, this study includes practices such as deforestation and land degradation, chemical inputs, inefficient water management, monocropping, and exploitative livestock farming (FAO, 2017). The increasing number of livestock and overgrazing of pastureland have led to environmental deterioration (FAO, 2020).

Adopting modern agricultural practices and leaving behind traditional methods of seed preservation for future grain production is a significant challenge in Agriculture. Local communities are losing their originality of preserving food. Easy availability of seeds, high production of crops from the hybrid seeds, market rate, and pests in the local seeds are the major reasons to avoid local seeds in the community. Moreover, the shift of agricultural dimensions from subsistence to commercial has resulted in environmental degradation, loss of traditional agricultural practices, and replacement of local species (Toledo & Burlingame, 2006). The agriculture sector in Nepal faces various challenges as unsustainable practices plague it. Unsustainable agricultural practices disturbed long-term food security.

People's perception is changing as per the change in their economic standard, and for that they expect the high production of crops from the farmland. High crop production can be achieved through the use of hybrid crops. Adoption of modern agricultural technologies using inorganic fertilizers, pesticides, insecticides and other chemicals harms human health and the environment.

While numerous studies have acknowledged the significance of indigenous seed preservation for biodiversity and food security, a critical research gap remains in documenting and analysing such practices within specific cultural and ecological contexts, particularly among marginalised groups like the Tamang community in Nepal. Most existing literature emphasises global or regional approaches, often overlooking localised, culturally embedded systems of seed conservation that are rapidly declining under the pressure of hybrid seed adoption, agrochemical dependency, and commercialisation of agriculture. This study addresses that gap by exploring the traditional seed preservation practices of the Tamang people, who possess a rich heritage of crop management, storage techniques, and ecological knowledge suited to diverse Himalayan agro-ecological zones. This study lies in its focus on an underrepresented indigenous group and its aim to bridge indigenous knowledge with sustainable agricultural discourse, offering insights that are both locally grounded and globally relevant. The main purpose of this study was to explore the existing practices of seed preservation among the 'Tamang,' a tribal community.

2. Literature Review

Indigenous people are known for their nature-connected livelihood, which includes their own traditional knowledge to preserve the seeds in their own way with the available local resources.

2.1. Methods of Seed Preservation

Ex-situ and in-situ conservation method are the way to conserve the genetic resources, where In-situ involves the natural habitats and ex-situ involves the lab environment (De Carvalho et al., 2013; Dhillon & Bisht, n.d.). In-situ Conservation is an efficient way of conserving plant genetic resources (Asrat et al., 2010).

There are four classes of storage characteristics by which seeds can be grouped true orthodox seeds can be stored, under low seed moisture contents of 5-10%, for long periods and at sub-freezing storage temperatures; sub-orthodox seeds can be stored under the same conditions but for shorter periods, due to high lipid content or thin seed coats; 'temperature recalcitrant' seeds cannot be dried at all but can be stored for 3-5 years at near-freezing temperatures; 'tropical recalcitrant' seeds cannot be dried and are killed by temperatures below 10-15 C (Bonner, 1990). Cryogenic storage in liquid nitrogen at -196 C holds promise, but require further exploration. Genetic materials can evolve due to farmers' ability to find new diversity, select new traits, and cultivate and exchange selected materials with friends, family, and neighbours in the community (Döring et al., 2011).

With the help of different research institutions, it is verified that the permafrost method is the best technique to preserve the seed in packaging (Musaev et al., 2024). The dependency of farmers has been increased in private seed companies for seeds and planting materials. The Nepal Agriculture Genetic resources Centre (Gene bank, NARC) supported the establishment of Community Seed Bank in 2011 targeting the conservation of local crop genetic resources. Pusa bin is used to as a storage which is a polyethylene sheet is placed in between two brick walls to make air tight and plastered with cement at the bottom to avoid rodent damage. Farmers use metal drums for storing seed and closed tightly to protect from rodent damage and seeds from the pest attack.

2.2. Indigenous methods of Seed preservation

Seed preservation practices are deeply rooted in indigenous knowledge systems and cultural traditions. Indigenous seeds are those seeds which are grown and managed in local area by local people in the local environment, so they are polymorphic and heterogenous in nature (Krishna Joshi, 2021; Marone et al., 2021). Indigenous seeds are well adapted to the growing areas, and have a high nutritional production (Krishna Joshi & Gauchan, n.d.). The traditional seed storages practices include Bhakari for kodo, earthen clay pots (Ghyampo), metal pots (Gagro), jute bags. The local materials used in seed storage are *A. indica* (neem), *Acorus calamus* Linn (bojo), *Zanthoxylum* spp. (timur), *P. nigrum* spp. (marich), *A. vulgaris* (titepati) leaves/powders for controlling stored grain pests, sun drying of seeds (Paudel et al., 2021). Vegetable seeds were stored well under conditions of low temperature and low moisture (Barton L.V., 1963). These practices are not only practical but also deeply linked with the local community's cultural heritage, reflecting their close connection with nature and its resources.

2.3. Tamang Community as an indigenous community

Among several local systems, the Tamang system is one of the most ancient indigenous groups in Nepal. In terms of language, the Tamang people are regarded as Nepal's third-largest tribe (CBS, 2021). Tamang's population density is higher in the hilly regions. Tamang have a strongly situated customary governance in practice, while some of the practices have been adapted to fit the changing times. Their mother tongue is Tamang, a language of Tibeto-Burman origin (Sapkota et al., 2023). Etymologically, Tamang (Ta= horse and Mang=trader) means horse traders are 5.62% (NHPC, 2021) of total population of the nation. Most of them are dependent on agricultural work. Most of the people are from the Tamang community in the Namobuddha municipality as per the Census (CBS, 2021).

Tamang community follow Hindu and Buddhist religion. They are mostly engaged in cultivation of crops, collection of medicinal plants and animal rearing. The study by Pathak et al. (2020) revealed that the people of Tamang community are well known in indigenous knowledge of using different species of plant for medicinal value. Tamang community is very rich in culture and very much related to ethnobiology of environment. Among the Tamang community in Namobuddha Municipality, seed preservation practices are intricately linked to their agricultural livelihoods and cultural identity. Within the Tamang Community, elders play a crucial role in passing their skills to preserve the seeds through storytelling or by involving them in the work.

2.4. Traditional ecological knowledge theory

Seed preservation practices among indigenous communities, such as the Tamang community in namobuddha municipality, can be analyzed through the intergenerational and intragenerational transmission of knowledge. Traditional Seed systems supports the socio-cultural practices and strengthens the network of marginal communities (Montúfar & Ayala, 2019). The intergenerational transmission of seeds preservation practices within the Tamang community. Seed preservation practices in the Tamang community often involves the selection of seeds from the best-performing crops for future planting. Traditional ecological Knowledge (TEK) frameworks provide some insights into the complex interactions between human and their environment, practice sustainable resource management within the indigenous communities like the Tamang (Berkes et al., 2000). Inter-generational learning and ecosystem are central to learn how TEK shapes seed preservation practices and agricultural resilience. Researchers using this theory highlight the necessity of flexible governance structures that can react to unforeseen changes within ecological or social domains.

2.5. Nepalese Policy

In Nepal, the government has recognized the importance of preserving indigenous seed varieties and traditional agricultural practices. National Agriculture Policy, 2061 has put great effort into channelising the seed system legally. National Seed Policy (2056) has been released and implemented to protect the seed system in Nepal. The Seed Act of 2061 (2004) includes provisions for the protection and promotion of local seed systems. Later on, Seed Act was improved and released in 2069 (2013). The Plant Protection Act 2064 (2007) has a legal provision for protecting plant species from illegal export and import, which helps in the conservation of plants. National Seed Vision 2013-2025 (2013), for the well-being of farming families and ultimately helps to increase crop productivity, raise income, and generate employment. These acts are expected to lead towards the development of a sustainable seed system in Nepal. Despite of these policy efforts indigenous seed preservation practices may still face challenges due to land degradation, climate change and socio-economic pressures.

2.6. Empirical Study of Seed Preservation Practices

Seeds are the main form of the genetic biodiversity preservation (Altieri & Merrick, 1987) and also most effective things for the ex-situ conservation of plant genetic resource. Informal seed systems usually consist of several elements, including farmers' saved seed, farmer-to-farmer seed exchange, informal seed storage and the knowledge base of the local seed system. Seeds has all the genotype information from the time of evolution of the species. Liquid nitrogen conservation of plant material technique is used in Ukraine in which it complies with the needs of long-term preservation of plant material without destroying genetic information and while preserving its morphogenetic and germination potential (Arapetyan, n.d.).

In Uganda, farmers used the *Conyza sumatrensis* (kafmube plant) and tobacco to prevent the food storage from pests and diseases (Charles Lwanga et al., 2020). Another case study by (Charles Lwanga et al., 2020), seeds are preserved by soaking in cow urine, cow dung, slurry, animal fat, oils and milk to maintain their dormancy in Uganda as a common practice.

However, there is much literature on seed preservation practices in indigenous communities; there remains a gap in understanding the seed preservation practices among the Tamang community in Namobuddha Municipality. A qualitative investigation of the practice in the described community can provide valuable insights into the cultural, social and environmental factors of seed preservation, as well as opportunities for support and rejuvenation.

3. Materials and methods

3.1. Research design

I used qualitative ethnography as a method of inquiry through the cultural practices, behaviors, and perspectives of specific groups or communities (Yin, 2009). I observed daily activities, rituals, and interactions of the Tamang people. This allowed me to gain firsthand experience and insights into their culture, local social dynamics, and behavioral patterns of the participants in seed preservation.

3.2. Research site

I had selected a Namobuddha Municipality, ward no 1, Phoolbari, which is located in the hilly region of Kavre District of the Bagmati Province of Nepal. The rural municipality covers 102.00 square kilometers. The location has a high population of Tamang people, an indigenous group that possesses a unique knowledge system, particularly in seed preservation. The Tamang and Brahmin communities are prominent in the region (CBS, 2021). Regarding occupation, more than half of the population are farmers, and the rest are engaged in businesses in tourism and foreign employment.

3.3. Data Collection Methods

Employing observation and interviews in a family setting of my research participants, I engaged in conversation and observation. It has provided insight into communication patterns and cultural practices within the family. Participants were selected based on active engagement in farming for at least more than 10 years and an elderly farmers and woman involved in seed preservation and who is willing to share their stories, has a lot of experience, and the younger generation is intent on grabbing knowledge. A total of 15 participants between the age 35-75 were interviewed. Additionally, two Focus Group discussions were conducted in the community involving 16 people in Group discussion. 8 participants of age above 35 in each Group discussion to share their views on seed preservation. Each FGD takes approximately 120 minutes and was guided by semi-structured guide.

During my field visit to Ward 1, Namo Buddha Municipality, at first, I observed the local community, which was the Tamang community. I conducted a transect walk in the community and observed seed preservation practices on the upper floors of local houses. When I went there, mostly the top floor of the houses are used as a storage room. A transect walk in the community helps me observe patterns of seed use and examine the conditions under which seeds are stored. After observing the local community, I preferred data collection through the purposive sampling method, which involved conducting key informant interviews (KII) and Focus group discussions (FGD) within the local community. From the FGD, It allowed me to know how decisions regarding seed preservation are made collectively and how the knowledge are transferred across generations. I had done an in-person interview with the different ages people to gather information on how they used to preserve the seed. I chose mostly the elderly people as they had a prior knowledge of seed preservation techniques. I choose KII because it helps me to understand the personal insights into indigenous seed practices and also, they can freely express their knowledge conversationally.

I had used various tools, including field notes, interviews, and audio recordings, with their consent. I had maintained field notes documenting my observations, interactions, and reflections during fieldwork. I had used these notes for interpretation, capturing expressions that may not be apparent through other methods. I have been very conscious of the cultural sensitivity and reflexivity, acknowledging my own biases, assumptions, and positions of power within the context.

3.4. Data analysis

Various tools were employed, field notes, interviews, and discussions and were transcribed and translated into English. Recording helps me with accurate transcription and analysis. Thematic analysis was used to identify key patterns, preservation criterion, as well as perceptions of hybrid seeds, through this process. Field data were interpreted within the framework of indigenous knowledge systems.

As a researcher, Sensitivity and reflexivity of their cultural settings is maintained. For validity research, A week was spent in the community for cross-referencing of my data. No misleading information was provided and maintained the confidentiality of their values, and transcribed (Creswell, 2017) the data collected using pseudonyms of the participants while presenting them in this research. Professionalism is maintained as a researcher and not build any personal

relationships while in the field and maintain own boundary limits. Identity was disclosed as a researcher very honestly because the research topic came from the depths of heart.

4. Results and Discussions

The entire set of findings comes from the observations and facilitative recall made and shared by participants in the community. Most of the participants were elderly people residing in the Tamang community. When I went there, elderly women were eager to share their past experiences related to seed preservation.

One of the elderly respondents Kanchhi Maya Tamang, age 66, recalls her past and shares, 'People used to preserve the seeds by using one of the indigenous preservation techniques which included a process of selection of seed, drying, storage and make ready for the next season'. The techniques that Mr. Tamang shared included different for different crops. Aligns with the Statement of Kanchhi maya, Harsha man tamang 54 stating that, 'we are following the same technique used by our grandfather and grandmother to preserve the seeds'. Other participants Basanta tamang age 42, dipendra tamang age 41, and Bijay tamang age 49 had supported both of the statement. Mostly the crops like cucumber, French bean (ghiu simi), lady's fingers (chippeko bhindi), chilly (jire khursani), beans(simi), Pumpkin are grown in this community as a vegetable farming. Maize and wheat is produced as cash crops for the selling purpose. I had observed a crop grown in the areas of community.

4.1. Selection of seeds

Selection of new, mature, and healthy seeds has to be preserved from the best performing plants in the field. It is selected based on observation and knowledge of elderly people. One of the respondents, age 49 Bijay Tamang, 'Mostly we are preserving the seeds for my own family only. As a process, we had to select, the selection starts with the first lot of mustard(tori) sown in the field.' The entire harvesting is carried out manually; they pick up the ripe mustard, as the whole plant sheds leaves and the plants turn grey and spread them over a blanket directly from the field, which does not have a physical damage and disease-free means to store as a seed. In case of vegetable (chippeko bhindi) mature lady's finger, cucumber, French bean (ghiu simi) is selected to make a seed'. Explanation given by Bijay tamang is supported by the elderly citizen age 69, kanxa tamang, 'we do the selection process as said by the Bijay'. Other respondents named Sunita Tamang age 63 recalls her memory, 'I always love the job provided by my family to select the seeds since my childhood we had to select the fresh and first lot fresh seeds for the seeds purpose.' This method of selection is supported by the Altieri, (2008), Use of local knowledge and observation over multiple seasons to select disease-free and mature plants as seeds. These systems are resilient and sustainable under changing particular climatic conditions. This indicates that the seeds are carefully selected from the first and healthiest crops, utilising observation and experience, particularly from elders. This manual's family-centred approach ensures the selection of disease-free and mature seeds, contributing to sustainable farming practices. The consistency in responses across age groups underscores the cultural importance and resilience of this method, aligning with scholarly views on the sustainability of indigenous seed selection systems under varying climatic conditions.

4.2. Drying

Vegetables like mature lady's finger (chippeko bhindi), French bean (ghiu simi), onion, garlic (chhyapi) were well sun-dried on clean mats, woven bamboo trays(nanglo), and rooftops for further processing.

One participant basanta tamang reflects his memory, 'we properly put the seeds in the clean mats, or woven trays(nanglo) and spread in thin layers and ensure it to dry. It is done in early morning or late afternoon to avoid overheating.' For the storage.' Ideas of another respondents, bijay also align with the basanta's as he said, 'it's easy to dry and store for long term and I usually distribute among the neighboring people in a community as a seed.' This process helps to remove the moisture content from the selected seeds. Properly dried seeds are more viable for a longer period and also resist infection from diseases (Fao, 2010). Anil Tamang, age 58, 'I used to keep the selected fresh seeds in a thin blanket and left them in the sun. I scattered some mustard seeds and make a thin layer so that it can dry properly and quickly.' I got know that almost all of the respondents follow the same procedure as the Bijay and Anil Tamang's said.

Bijay's explanation shows the informal seed networks, where they shared seed as part of support systems in their own. This sharing mechanism promotes seed security and genetic diversity within the community and adapts to climate change (Vernooy, 2015). It shows the understanding of moisture control in seed preservation. This validates the indigenous ways of preservation is also biologically and practically good. The responses reveal that traditional drying practices among the Tamang community are methodical, environmentally conscious, and rooted in collective knowledge. Seeds are sun-dried on clean surfaces, such as mats, woven trays, or rooftops, in thin layers during the cooler parts of the day to avoid overheating and preserve their viability. These methods ensure moisture removal, enhancing seed longevity and resistance to disease. The process also involves the informal sharing of dried seeds within the community, thereby strengthening seed security and genetic diversity. This practice not only supports sustainable preservation but also demonstrates the biological effectiveness of indigenous knowledge systems.

4.3. Storage

Selected seeds are kept in the jute bags, metal pots, bhakari or in earthen pots in the closed wet and warm environment in the room until the next cultivation. Seeds easily reabsorb moisture so to keep dry it is kept in closed environment. So that the seeds can enhance their life for a long time period. *A. vulgaris* (Titepati) is used to prevent the mustard (tori), maize seeds and many other seeds from the tick and mites. Respondents sonam pakhrin, 'we use jute bags for the storage of mustard seed for another year of cultivation.' Most people in the community used to preserve the local seeds for their own family but to increase the production amount, most of them depend on the easily available seeds provided by the cooperative in the nearby community.

One elderly woman named Sunita Tamang, age 63, preserves the local seeds and always used to distribute little seeds to her neighbour. Local cucumber, ghiu simi, ramtoriya, local onion, garlic is mainly the seeds that I have preserved in the home. I don't like a hybrid seed and I never go the market for the seed. My son doesn't want to do this works, they are in the city to earn money'. These words show how the elderly people are confident and passionate about their own native crops and way of preserving it.

Her statement aligns with the other respondents too. As Nima Tamang, age 56, says, 'I usually store the selected and dried seeds in a warm and closed room as it is needed in the future to sow.' Another one Sumit Tamang age 64, says 'dried seeds are stored in a closed store room of my house'. I personally observed and witnessed that the seeds are stored in a jute bag in the rooftop of their house. Some of the vegetable seeds like matured lady's finger, cucumber, and French beans are preserved in the closed room of elderly women named sunita tamang, age 63 with the wrapped of old cloth. She shares, 'I am convinced that no any seeds were damaged after being followed a process manually, it will be very much easier and best way to preserve the seeds.' It shows that the elderly people were very much conscious and aware of the traditional process to preserve the seeds. The insights gathered highlight that traditional seed storage practices in the Tamang community are deeply rooted in experience and environmental awareness. Seeds are typically stored in jute bags, metal pots, earthen vessels, or traditional bhakaris within warm, closed rooms to prevent moisture absorption and extend viability. Natural repellents, such as Titepati, are used to protect seeds from pests, reflecting a low-cost, eco-friendly approach. Elderly community members, particularly women, play a crucial role in preserving local seeds and maintaining informal seed-sharing networks. Their strong commitment contrasts with the shift toward market dependency and hybrid seeds among younger generations, underlining an inter-generational gap in preserving indigenous agricultural knowledge.

4.4. Shifting towards hybrid seeds

In contrast to the indigenous way of seed preservation, a number of people started to choose the hybrid seeds for mass production which helps them to sell in the market. Most of the youth have migrated to the city area for better opportunities, so there is also a lack of manpower for agricultural-related work.

One participant age 42 Basanta Tamang said 'I had to do all the work alone, my family are stayed in Kathmandu and to fulfill the family expenses, i had to grow more crops so that it would be easier to sell in the market. I don't want to engage my children here in this works, they had to study. I buy seeds from the market and sow them for mass production and sell them in the market.' His narratives explain how the seed preservation practices are shifting towards hybrid seeds from the market due to economic motivation, labour shortages and urban migration. This shifting of agricultural practices is validated by another female participant's laxmi tamnag age 47, 'I am earning good amount of money to feed my children and fulfill their needs from maize crops. The seeds of these crops are hybrid and collected from the seed market. I don't use the traditional way of preservation as it is easy to buy near the market.' Its shows that the Adoption of hybrid seeds and chemical fertilizers is often due to the labor shortages in rural farming (Gartaula et al., 2012). It became necessary to sustain their livelihood expenses, children's education and urban expenses. Market oriented shift of farming reflects that they prefer income generation rather than long term preservation of local varieties. The data reveals a noticeable shift among the Tamang community from traditional seed preservation to the adoption of hybrid seeds, driven primarily by economic pressures, labour shortages, and urban migration. As many youths migrate to cities for better opportunities, the remaining family members opt for high-yield hybrid seeds to ensure quick returns and sustain household expenses. Respondents express a preference for market-sourced seeds due to their ease and productivity, even if it means abandoning indigenous practices. This transition reflects a growing prioritization of short-term income generation over the long-term sustainability and cultural significance of local seed preservation.

I had conducted a focus group discussion in the community, involving elderly women, men, and people of other ages who are active in agriculture. While I was inquiring about the indigenous seed preservation methods in the community with number of respondents in a group. They had their own form of practices where they had their own choice in the seed preservation practice. Among the respondents, one of the eldest farmers kancchi maya tamang, age 66 says, 'I choose indigenous seed preservation practices over hybrid seeds from the market. I always preserve the seeds in my own house. I don't need seeds from the market.' Another participant named mohan tamang age 71, 'in my house we are still preserving the seeds using our traditional way, I don't like hybrid seeds from the market. I use organic manure as a compost to grow vegetable and different crops.' I found that the indigenous seed preservation system is mostly followed by the elderly people rather than the other age group. Apart from the elderly, other aged people prefer an easy way to earn money from crops. One respondent, bimal tamang age 55, 'most of our land are degraded by the chemical fertilizers so the local crops

are not sustained in our farm land, we used hybrid seeds to grow crops and earn money. But we do preserve local seeds in our own traditional way for home use.

Most of the farmers used to buy seeds from the local seeds market which is more productive and efficient. One of the farmers, named dipendra tamang age 41, said, 'I usually buy seeds of maize, wheat from the seed cooperative which gives more production than the local preserved seeds. Local maize is quite tall than the hybrid one it is difficult to protect until the final production so we left these seeds behind the hybrid seeds.' Other farmer Sudip tamang 48 also prefer hybrid seeds over local seeds as he shares his stories, 'I need a mass production of maize to sale in the market, i had to buy a hybrid seed from the market so that it gave a large production of crops.' On his arguments over the indigenous seed preservation practices, another respondent, Sangita Tamang, 52, supports his statement, 'I am alone here and my children don't want to do a same agriculture work that I used to do before and I'm unable to do a hard work alone so, to continue agriculture I choose the easiest way to buy from the market in a cheaper rate which helps to reduce our effort to preserve seeds in our home'. It shows that the farmer chooses the hybrid seeds for better and huge production of crops, which increases the earning opportunities. Crops like maize and wheat, is perceived as efficient and profitable by farmers. This preference is seen all over the globe where hybrid seeds are promoted to increase food production and income

The way of seed preservation by the people reflects the indigenous knowledge. Elderly people value the methods of native crops and the ways of preserving the seeds. The findings align with the Altieri and Toledo (2011), who shares the importance of traditional knowledge in supporting sustainability and biodiversity. Healthy seeds are free from pests, diseases or physical damage and also maintain a uniformity in size and color, which also helps to preserve the genetic biodiversity (Altieri & Merrick, 1987). The practice of seed preservation relies on indigenous ways of preservation methods. Early maturity, disease-free, and physical uniformity are used to ensure the seeds. Traditional farmers rely on the observation and their long-term ecological knowledge for the selection of seeds (Altieri, 2008). Indigenous seeds are preserved and cultivate for family purpose but hybrid seeds from the market replaced the local seeds of their community. Many participants share their stories about the changing pattern of extreme rainfall, hotter climate and pest effects are the major reasons of modifying the crops system. They also claim that the hybrid crops are cost-effective and convenient for the cash market in nature as they give a mass production in the field.

The research also reveals the less involvement of youth in the seed saving practices and agriculture systems may erode the traditional knowledge in future. Though the research is in a small sample and qualitative in nature, it shows the pathway to the further policy development and level of implication.

5. Conclusion

Indigenous seed preservation practices are available in the Tamang community and are preserved by the elderly. Use of indigenous storage methods like sun drying, titepati leaves not only maintains the seed quality but also shows the cultural identity. Despite the threat from modern agricultural systems, these local systems play a vital role in preservation. However, the shift towards modern seeds endangered the traditional agricultural systems in the community. This transition of practices will lead to the endangered of native species and increase dependency on other varieties. By focusing on the Tamang community, this research puts the value of indigenous knowledge in promoting food security.

Preserving and integrating the indigenous/traditional knowledge with modern knowledge systems is important for future food security. The policy intervention should support inter-generational knowledge transfer. This research may fill the gap between scientific methods and traditional knowledge systems, which may offer effective solutions to food security and environmental challenges.

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