

Fallow/Abandoned Land Utilization for Horticultural Crops in Nepal

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Abstract

In Nepal, migration from hills to terai began with the malaria eradication in terai to explore new opportunity in fertile land. Migration to terai and district headquarters was rampant during the long-armed conflict in the country. Lately, rural youths are migrating out to urban centers and foreign countries due to less attractive traditional farming in widely scattered small parcels of land. It has negatively impacted on labor supply and food production in the rural areas. Thus, agricultural lands are increasingly getting abandoned or converted into fallow land all over the Nepal. Consequently, fertile lands in terai and valleys are getting converted into settlements and cultivated lands in remote hills are left fallow/abandoned. Some estimates have shown that over thirty percent of total cultivated land is abandoned and it has impacted on food production and ultimately on food and nutrition security. The land use planning and programs have not addressed these issues effectively. Plantation of horticultural crops would be one of the best solutions owing to its impact on food and money supply in the rural economy as well as long term impact on environment particularly on soil and water conservation. Horticulture, especially modern fruit farming in remote hills, organic vegetables, seed and spices in isolated niche pockets, protected vegetable farming in peri urban and urban fallow lands with technical and financial support would be an instrument in attracting and mobilizing the youths, especially the foreign returnees to utilize abandoned and fallow lands productively and commercially.

Keywords: Fallow/abandoned land, youth, niche, horticulture

Introduction

Cropland abandonment is a process of withdrawing cropland from active agricultural production without a plan for crop cultivation in the immediate future (Baxter & Calvert, 2017). It includes all the landforms in which farming has ceased and is no longer in use as an economic resource. It has been one of the global land-use phenomenon for several decades and has been

increasing in many parts of the world.

At global scale, approximately 472 million hectares of agricultural land in total has been reported abandoned (Campbell et al. 2008; Paudel et al. 2019). The widespread abandonment of cropland poses a serious threat to food security for the growing population in many developing countries, particularly in Asia and Africa. Understanding how the underlying factors influence the process of cropland

abandonment is essential for making new agricultural policies to stabilize agricultural land use for food security.

In Nepal, more than 65 percent of the people depending on agriculture for their livelihoods are in search of alternative options viewing that subsistence agriculture farming is not able to meet the demand for food and income to sustain their families (Paudel, Tamang, & Shrestha, 2014). So far there is no single comprehensive national study on agricultural land abandonment in Nepal. However, different studies conducted by taking few districts or region as pilot sites shows around 24% of the agricultural land has been abandoned during 2001 to 2010 (Chaudhary, et al., 2020), and recently it is assumed to be around 30% (Upadhyay, 2022). To make the proper use of land the Government of Nepal has endorsed the Land Use Act, 2019. However, bringing it into action regarding the control of land abandonment and use of agricultural land for settlement areas is still in dilemma.

Land use pattern in Nepal

Out of the total 147,181 square kilometers land area of Nepal, agricultural land is 28 percent (of which 21 percent is cultivated and 7 percent uncultivated), forest area is about 29 percent, shrub land 10.6 percent, grass land and pasture 12 percent and water and others constitute about 20.4 percent area (MoALD, 2020). It indicates that about 31,94,000 ha of arable land is available and about 3091000 ha of land is under cultivation.

The available agricultural land is divided into 3.7 million holdings (CBS, 2019). Agriculture Census 2011 reported that land holdings of 34, 97,408 families own less than 0.5 hectare and 9, 98,818 families own less than a hectare. Due to uneconomical size of small holding, Nepalese families could not feed themselves year-round from the produce what they get from the land they own (CBS, 2012). In other hand, the existing agricultural infrastructures and extension services provided either is insufficient or unsustainable which promotes for abandoned land.

Situation of abandoned/fallow land in Nepal

The studies done on a case study basis taking few districts, region or watershed areas as pilot sites. Almost all of such studies indicates that the problem of land abandonment is increasing and the findings of such studies are almost similar. The study conducted by (Dahal, Pandit, & Shah, 2020) in Kaski and Parbat districts found that 47 percent of the arable land in the Bhadaure Tamagi area of Kaski and Arthur Dandakharka area of Parbat is abandoned. Similar study conducted by (Bista, et al., 2021) in Bhulmu rural municipality (Kavre) and Bhanu municipality (Tanahun) among 15 community forest user groups found 27 percent of the arable land abandoned (32 percent in Kavre and 40 percent in Tanahun). Similar study conducted by (KC & Race, 2019) in Gausahar, Samibhanjyan and Hiletaksar areas of Lamjung district found that 5 percent of the migrants abandoned Khet and 21 percent of the migrants abandoned Bari. Similar study conducted by (Khanal, 2018) in Madi rural municipality of Kaski district found that 40 percent of the sampled population has kept at least one plot fallow for more than two consecutive years.

Reasons for land abandonment or leaving fallow

Fallow land refers to land which the holder chose not to cultivate during the reference year, with the intention of cultivating it at a later date. Cultivable/cultivated land not cultivated in the last five years and more has been considered as abandoned land (Shrestha & Pokhrel, 2016). From different studies it has been identified the reasons that commonly act to transfer land and cause farmland abandonment. Based on the severity they can be listed as:

- Internal mobility of the people reduces land cultivator in remote village and promote land fragmentation in Peri urban and urban areas.
- Migration from hills to terai began with the malaria eradication in terai to explore new opportunity in fertile land.

- Lack of opportunity to generate cash income from agricultural farming and growing insecurity of land tenure for share cropping.
- Youth out-migration from rural areas.
- Labour shortage due to seasonal or permanent migration.
- Sloppy land with increasing incidence of landslide and difficulties in cultivation and transportation of agricultural products to market leading to higher cost of production.
- Increasing damage of agricultural crops by wild animals in mid hills/buffer zones.
- Inadequate water supply for irrigation.
- Migration to terai and district headquarters was rampant during the long-armed conflict in the country.
- Small to larger land plotter and real estate business owner greedily oriented to lure innocent farmers provoking them to sale fertile land for commercial purposes
- The existing laws anticipate to transact land from any of land revenue offices registered in any of district of the country and a plot can be transacted unlimited times in a single working day meeting minimum legal formality.

National policies in favor of land utilization

The Constitution of Nepal

Policies relating to agriculture and land reforms as mentioned in the Constitution of Nepal, 2072 are:

- To make scientific land reforms having regard to the interests of the farmers, while ending the dual ownership existing in the lands.
- To enhance product and productivity by carrying out land pooling, while discouraging inactive land ownership.
- To make land management and commercialization, industrialization, diversification and modernization of agriculture, by pursuing land-use policies to enhance agriculture product and productivity, while protecting and promoting the rights and interests of the farmers,
- To make proper use of lands, while regulating and managing lands on the basis of, inter alia, productivity, nature of lands and ecological balance
- To provide for the farmers' access to agricultural inputs, agro products at fair price and market.

National land policy

- National land policy 2015 addressing land access issues and the recognition of informal tenure, the policy seeks to improve the regulation, management, use, and governance of land resources.
- The long-term vision is to make optimum use of available land and land resources (LLRs) in pursuit of sustainable social, economic and ecological developments and prosperity of the country. An appropriate land use plans (LUPs) has been envisaged to implement the vision in sustainable manner by developing a systematic land use system.

The land use act

The Land use act, 2019 serves to drive economic development, control the fragmentation of agricultural land, and regulate the land market by effectively classifying the country's land resources for use and management.

- This act classifies the existing land into nine categories viz. agricultural (given special importance by this law), residential, commercial, industrial, mining-mineral, forest, river-lake-wetland, public use and cultural-archeological.
- Local levels ensured to prepare their land use map by the help of provincial ministry of agriculture,

- Provision of local land use council,
- Local governments themselves can formulate policies or procedures and manage land based on the categorization which are appropriate at local level. This act also developed the criterion to control land fragmentation.

Agriculture development strategy (ADS), 2015

ADS reported that the 12-year conflict that concluded in 2006 had adverse effects on the agriculture sector. Hundreds of thousands of rural households left the land behind and moved to the cities-mostly to the Kathmandu Valley; others moved abroad and this trend turns the cultivated land into barren.

Constitution of Nepal, 2072 has opened the access to utilize the agricultural land scientifically. The important aspect is, constitution has focused for land productivity by promoting land pooling and discouraging the inactive land ownership, which ultimately guide to develop land utilization policies and strategies relating

to abandoned land utilization as well. The long-term Land Policy vision guides to improve the regulation, management, use, and governance of land resources, whereas Land Use Act, 2019 categorized existing land in nine categories for proper use and management. ADS coated the major reason of barren land during long conflict in Nepal. Though, these polices are not including any activities for abandoned land utilization but the overall principles are supported to scientific and sustainable land use in Nepal, which ultimately favors to expedite the abandoned land utilization processes.

Reutilization programs of abandoned/fallow land at provinces and local level

Provincial level

The ministry of land management, agriculture and cooperatives of Province No. 1 has formulated the Agribusiness Promotion Subsidy Procedure-2076, which includes the guidelines for encouraging fruit trees cultivation in the fallow land. Different districts have been prioritized for different fruits as follows (DoAD, 2076):

Table 1. Prioritized crops in different districts of Province No.1

S.N.	Districts	Prioritized Crops
1	Taplejung, Panchthar, Illam, Okhaldhunga, Khotang, Bhojpur, Sankhuwasaha, Terhathum, Dhankuta, Solukhumbu, Udayapur	Mandarin, Lime, Kiwi, Litchi, Avocado, Apple
2	Jhapa, Morang, Sunsari, Udayapur	Mango, Litchi, Banana, Lime, Papaya, Pineapple, Areca nut

The ministry of land management, agriculture and cooperatives of Madhesh Province formulated the guidelines for conducting agricultural programs in the fallow land in two consecutive fiscal years 2075/76 and 2076/77 but it still has to be endorsed by the Provincial Law Ministry (Mandal, 2022).

The ministry of land management, agriculture and cooperatives of Gandaki Province realized and formulated the guideline “Encouraging commercial agriculture in the fallow land” in the year 2077. This program was able to bring 112

hectares of fallow land under cultivation in the fiscal year 2077/78. The major crops cultivated under this program were Large Cardamom, Asparagus, Walnut, Ginger, Turmeric, and Chili (Ghimire, 2022). Other provinces have not defined this issue by formulating any policy and guidelines but the regular horticultural programs are being implemented focusing the fallow/abandoned land.

Local Level

Several local levels have ratified acts, guidelines on land use and have approved technical

procedures for conducting agricultural programs in the fallow/abandoned land. However, the allocation of budgets and the impacts of the

programs is still a subject of further study. Some acts and technical procedures approved in different local levels are presented below:

Table 2. Acts and technical procedures for abandoned land utilization in different local levels.

S.N.	Local level, District	Act/ Guidelines/Technical Procedure
1	Aarughat Rural Municipality, Gorkha	Abandoned Land Utilization Subsidy Operation Guidelines-2078
2	Biratnagar Metropolitan City, Morang	Biratnagar Metropolitan City Land Utilization Operation Guidelines-2077 (On the base of Land Use Act, 2076; Articles 18,19 and 20)
3	Chapakot Municipality, Syangja	Land Banking Operation Guidelines-2077
4	Gangajamuna Rural Municipality, Dhading	Abandoned Land Management and Agriculture Business Promotion Act-2077
5	Gulmidurbar Rural Municipality, Gulmi	Land Banking Operation Guidelines-2077
6	Kaligandaki Rural Municipality, Syangja	Land Banking Operation Guidelines-2077
7	Maadi Rural Municipality, Kaski	Madi Gaunpalika Land Utilization Act-2075
8	Makawanpurgadi Rural Municipality, Makawanpur	Makwanpurgadhi Gaunpalika Land Utilization Operation Guidelines-2075 (Ammended)
9	Sandhikharka Municipality, Arghakhanchi	Abandoned Land Management Program Implimentation Guidelines-2077
10	Tribeni Rural Municipality, West Rukum	Land Management Act-2076

Land holding, horticultural cropped area and contribution

The land holding trend of Nepal from 1991 to 2012 is shown in Table 3. The table shows increasing number of holdings whereas decreasing trend of average holding size.

Table 3. Trend of land holdings and parcel size.

Holding Size/Numbers	Year		
	1991	2001/02	2011/12
Number of Land Holding (million)	2.7	3.3	3.7
Average Holding Size (hectare)	0.96	0.8	0.68
Number of Parcels (million)	10.8	10.98	12.09
Average Parcels per holding	4	3.3	3.2
Average parcel size (hectare)	0.24	0.24	0.21

(Source: CBS 2014; MoALD, 2021)

Horticulture sector contributes 28.31% in AGDP and 6.97% in national GDP (MoALD, 2020). Fruits, vegetables, potato, spices, plantation crops and ornamental plants comes in this sub sector and occupies about 731646 ha (Table 4) of cropped area, which is nearly 24% of total cultivated area. Due to diverse climatic ecological zones of Nepal, horticultural commodities have

wider scope to explore commercially, gives comparative advantages as compared to other commodities, generates employment and protects environment and soil. Fruit crop has that potentiality to utilize the fallow/abandoned land generating income and employment with low cultivation practices specially in mid and high hills of Nepal.

Table 4. Horticultural cropped area in Nepal (hectare)

Crop	Province No. 1	Madhesh Province	Bagmati Province	Gandaki Province	Lumbini Province	Karnali Province	Sudurpaschim Province	Total
Fruit	32,766	43,117	22,464	18,576	21,065	20,195	13,135	171,318
Vegetables	48,608	82,727	49,692	23,980	37,276	12,998	25,850	281,131
Potato	56,516	25,398	34711	20208	23569	13222	14474	188,098
Spices	28,756	6,012	9,513	7,588	8,314	5,935	5,542	71660
Plantation Crops and others	16901		992	931	419	10	4	19307
Total	183547	157254	117372	71283	90643	52360	59005	731514
Total Cultivated Area								3091000
Share of Horticulture%								23.66

(Source: MoALD, 2020)

Among the horticultural sub-sectors vegetable occupies the largest share of area (38%) followed by potato, fruits, spices and plantation crops (Figure 1).

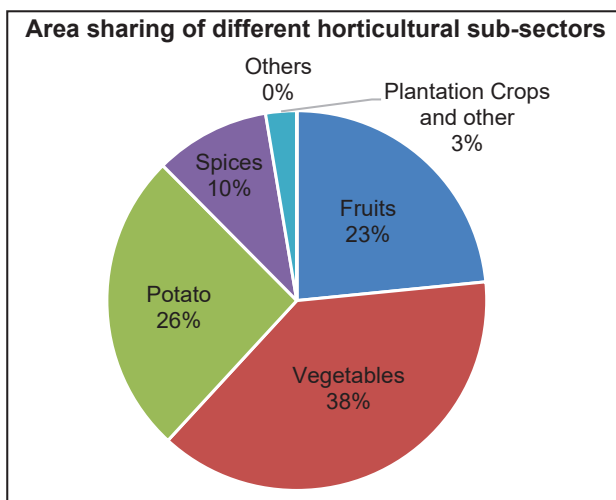


Figure 1. Area sharing of different horticultural sub-sectors

(Source: MoALD, 2020)

Discussion

Absentee population reflects the migration situation of the particular area. The average absentee population of Nepal is about 6.8% (CBS, 2011). Western hill has highest absentee population of 14.1% followed by Far western hill 9.2% and western terai 8.1%. District wise, Gulmi, Arghakhachi and Syangja districts has the highest absentee population of 17.3%, 16.8% and 14.9% respectively (CBS, 2011). The underutilization and abandonment of farmland

was found higher in migrant households than nonimmigrant households (KC & Race, 2019), with subsequently decreased availability of agricultural labor. In other hand, the increasing trend of land holding number (Table 3) and decreasing trend of average land holding size from 0.96 ha to 0.68 ha in three decades discouraged the active farming system. Land fragmentation and labor unavailability both have negative impact on active farming system of economic scale of production and it ultimately promoted the fallow land.

Major horticultural sub-sectors in Nepal are fruits, vegetables, potato, spices, and plantation crops (Figure 1). Vegetables and potato fit in one or more cropping pattern with double cropped area in open fields. Fruits, plantation crops and some spices like big cardamom are of permanent nature with long gestation period and investment, much suitable for fallow and abandoned land utilization with less cultivation practices specially in hills and mountains. However, as the quality and timely supply of input materials prevails as a major constraint in all parts of the country for horticultural farming, now labor unavailability is becoming a major shortfall in overall Nepalese farming system (KC & Race, 2019).

Considering the percentage of fallow/abandoned land to be 30, the total cultivable fallow/abandoned land in Nepal would be around 927300 ha. Out of total fallow land

horticulture sub sector can utilize about 213279 ha (23%) based on the present crop sharing status (Table 4). Considering the annual growth rate of 3 percentages, the yearly coverage will be only about 6398 ha beyond the regular programs, based on the last five years' up-down growth rate of horticultural crops. Thus, a long-term planning with encouraging growth rate of 8-10 percent can address the fallow land issue within 10 years.

The agro-ecology of Nepal, mid and high hills are most potential for fruits and plantation crops. Isolated niche pockets having irrigation sources are suitable for organic vegetables, spices and seed production pockets. Potato and vegetables can be cropped all along the ecology from terai to high hills in all season catching the off-season markets. Protected horticulture can be promoted along the Peri urban and urban areas. So, the horticultural crops potentiality can be explored all over the country to utilize the abandoned land. Due to national policy and food security objective, terai and foothill valleys will not prioritize for fruits or long gestation crops since they are focused for cereal crops.

Existing horticultural programs are fruit orchard establishment through Prime minister agriculture modernization project (PMAMP) and by regular programs. Fresh vegetable and seed production programs, off season vegetable production programs, protected horticulture approaches are being implemented by provincial and local governments. Plantation crops are developed by cooperatives and agribusiness entrepreneurs. Due to resource constraints, very few and scattered sub projects support is not sustainable to attract the youth and entrepreneurs. The fragmented land parcels are not feasible for commercial activity in one hand and in other hand there are no attractive and sustainable approach from public sector to utilize the abandoned land with long term investment.

Agroforestry can be explored to utilize the abandoned land where the cultivated land converted into a permanent pasture and forest

using by community forest groups. It needs a collaboration with community forest groups in support of local governments. Such forest areas have potentiality to accommodate and flourish the local and wild edible fruit crops for community benefits. River banks, public lands of school, clubs and other community organizations' lands are also not utilized properly. Such abandoned land can be utilized locally by local participation and support with clear technical guidelines for plantation and benefit sharing.

Major challenges

- Land consolidation/pooling for commercial farming especially fruit orchard establishment
- Labor shortage (bringing back migrated youths to villages).
- Quality input availability especially fruit saplings and seed
- Control of crop raiding by wildlife especially in buffer zone and mid hills
- Development of irrigation mechanism in unirrigated abandoned lands.
- Youth mobilization/attraction
- Access to finance/subsidized facilities
- Entrepreneurship Development and Protected horticultural technology dissemination
- Value chain development mechanism
- Cold chain and market management
- Lacking integrated approach of development to retain the rural people (crop and livestock; health and school facilities)

Immediate actions recommended

- Organizing a conference among Ministry of agriculture and livestock development (MoALD), department of agriculture (DoA), provincial agricultural ministries, government farms, National agriculture research council (NARC) and private sectors to discuss, internalize and prepare

action plan of abandoned land utilization.

- Urgent need and implementation of land use rules and regulation to implement the Land Use Act 2019 properly.
- Conduct a comprehensive study to find out the real picture of fallow/abandoned land.
- Revisit the prioritization/zonation of horticultural crops considering the abandoned land use. Niche pockets should be explored for niche market/consumers especially organic vegetables.
- Mobilization of migrant returnees in horticultural business with full technical and financial support. Develop a business package and trained for a sustainable business.
- Develop an applicable protected/precision horticulture manual for upcoming entrepreneurs. Ensure input supply and output delivery linkages; cold chain mechanism and value addition and processing units.
- Develop and make available hill and mountain friendly mechanical tools to attract and operate the horticultural business effectively focusing youths.
- Inbuilt a strong collaboration among the NARC, DoA and sub governments wings to develop a research and long-term development plan. Ensure variety/genetic resources- strengthen horticulture research.
- Database collection and analysis to determine the abandoned land of community forest groups with the help of Department of Forest and Local Governments. Implement the agroforestry approach to utilize the permanent pasture of forest.
- Support to local governments to explore and utilize the public land in and around the river banks, parks, schools and other public areas for horticultural activities.

Conclusion

There is an urgent need to endorse land use rules and regulations to manage land issues specially land pooling, banking and consolidation process in secured manner. The study reflected that the fallow/abandoned land is in increasing trend and it directly related with absentee population mostly the youths flying every day to search foreign jobs. The provincial and local level governments have formulated and acted the land use policies and guidelines, some of them have implemented the abandoned land utilization process. In national level a long-term collaborative action plan is necessary to mobilize the governmental organizations and concerned stakeholders. A comprehensive study is lacking to find out the real picture of fallow/abandoned in the country. Horticultural crops can accommodate about one fourth of total abandoned land considering its cropped sharing status and annual growth rate with long term strategy and action plan of ten years having 10 percentage of annual growth. Labor shortage is one of the major challenge which is related with the absentee population of the particular area where the migrant returnee youths have to be attracted and mobilized for horticultural business. A collaborative effort from national to sub national wings is so needy; a joint understanding, ownership and long-term action plan to utilize the fallow/abandoned land in benefit of rural people is must. Overall study revealed that land abandonment is a complex and multidimensional phenomenon associated with social, economic, demographic, biophysical, and environmental aspects of land and resources which need to be addressed urgently.

References

- Baxter, R., & Calvert, K. (2017). Estimating Available Abandoned Cropland in the United States: Possibilities for Energy Crop Production. *Annals of the American Association of Geographers*, 107(5), 1162-1178. doi:<https://doi.org/10.1080/24694452.2017.1298985>

- Bista, R., Zhang, Q., Parajuli, R., Karki, R., Chhetri, B. B., & Song, C. (2021). Cropland Abandonment in the Community-Forest Landscape in the Middle Hills of Nepal. *Earth Interactions*. doi:10.1175/EI-D-21-0006.1
- Campbell, J., Lobell, D., Genova, R., & Field, C. (2008). The Global Potential of Bioenergy on Abandoned Agriculture Lands. *Environ. Sci. Technol.*, 42(15), 5791-5794. doi:https://doi.org/10.1021/es800052w
- CBS. (2011). *Statistical Year Book of Nepal*. Kathmandu: Central Bureau of Statistics. Retrieved from chrome-extension://efaidnbmnnnibpcajpcgiclfndmkaj/https://cbs.gov.np/wp-content/uploads/2019/02/Statistical-Year-book-2013_SS.pdf
- CBS (2012). *Statistical Year Book of Nepal-2013*. Central Bureau of Statistics, National Planning Commission Secretariat. Kathmandu
- CBS. (2019). *Nepal Statistical Year Book*. Central Bureau of Statistics. Retrieved from chrome-extension://efaidnbmnnnibpcajpcgiclfndmkaj/https://cbs.gov.np/wp-content/uploads/2021/01/Statistical-Year-Book-of-Nepal-2019.pdf
- Chaudhary, S., Wang, Y., Dixit, A. M., Khanal, N. R., Xu, P., Fu, B., . . . Li, M. (2020). A Synopsis of Farmland Abandonment and Its Driving Factors in Nepal. *Land*, 9(3). doi:https://doi.org/10.3390/land9030084
- Dahal, G. R., Pandit, B. H., & Shah, R. (2020). Abandoned Agricultural Land and its Reutilization by Adoption of Agroforestry: A Case Study from Kaski and Parbat Districts of Nepal. *Journal of Forest and Livelihood*, 19(1).
- DoAD. (2076). Agribusiness subsidy promotion procedure. Province No. 1: Agriculture Development Directorate. Retrieved from chrome-extension://efaidnbmnnnibpcajpcgiclfndmkaj/https://doad.p1.gov.np/sites/default/files/2021-
- Ghimire, S. (2022). Fallow land Utilization. (S. Subedi, Interviewer)
- KC, B., & Race, D. (2019). Outmigration and Land-Use Change: A Case Study from the Middle Hills of Nepal. Land- MDPI. doi:10.3390/land9010002
- Khanal, U. (2018). Why are farmers keeping cultivable lands fallow even though there is food scarcity in Nepal? *Springer*. doi:doi.org/10.1007/s12571-018-0805-4
- Mandal, A. (2022). Fallow Land Utilization. (S. Subedi, Interviewer)
- MoALD. (2020). *Statistical Information on Nepalese Agriculture 2019/20*. Ministry of Agriculture and Livestock Development.
- MoALD (2021), *Selected Indicators of Nepalese Agriculture*. Agri-Business Promotion and Statistical Division. Ministry of Agricultural Development
- Paudel, B., Zhang, Y., Yan, J., Rai, R., & Li, L. (2019). Farmers' perceptions of agricultural land use changes in Nepal and their major drivers. *Journal of Environmental Management*, 235, 432-441. doi:https://doi.org/10.1016/j.jenvman.2019.01.091.
- Paudel, P. K., Tamang, S., & Shrestha, K. K. (2014). Transforming Land and Livelihood: Analysis of Agricultural Land Abandonment in the Mid Hills of Nepal. *Journal of Forest and Livelihood*, 12(1). Retrieved 5 12, 2022, from chrome-extension://efaidnbmnnnibpcajpcgiclfndmkaj/http://www.forestation.org/app/webroot/vendor/tinymce/editor/plugins/filemanager/files/JFL%20VOI%2012%20%281%29/Paudel%20et%20al.pdf
- Shrestha, B., & Pokhrel, D. (2016). *Increased fallow lands and food threats*. Kathmandu: College of Development Studies. Retrieved from chrome-extension://efaidnbmnnnibpcajpcgiclfndmkaj/https://csrcnepal.org/wp-content/uploads/2019/08/INCREASED-FALLOW-LAND-AND-FOOD-THREATS.pdf
- Upadhyay, B. (2022). Young country, fallow lands. *The Kathmandu Post*. Retrieved from https://kathmandupost.com/opinion/2018/06/12/young-country-fallow-lands