Abandoned Agricultural Land and its Reutilisation by Adoption of Agroforestry: A Case Study from Kaski and Parbat Districts of Nepal

Ganga Ram Dahal[1], Bishnu Hari Pandit[2], and Racchya Shah[3]

[1]Food and Agricultural Organisation, Rome, Italy; [2]Food and Agricultural Organisation Nepal and Nepal Agroforestry Foundation; [3]IUCN Nepal

Corresponding author: dahalganga45@gmail.com

Abstract

Despite agriculture being a major source of livelihood of more than 65 per cent of rural population in Nepal, the agriculture sector is facing a significant challenge in recent years due to increasing trend of agricultural land abandonment. A number of studies and assessments have indicated that more than 37 per cent of arable land in Nepal is abandoned. As a consequence, agricultural production is reduced posing threat to rural livelihoods and food security. Similarly, the Gross Domestic Product contribution of agriculture sector has also gradually declined from 33 per cent in 2011 to 26 per cent in 2018. Against this backdrop, this paper analyses the status of agricultural land abandonment taking the cases of eight villages in Kaski and Parbat districts and explores potential agroforestry options to reutilise and improve production and productivity of abandoned agricultural land. A total of 476 households were identified covering 200 hectare of land to adopt suitable agroforestry practices in the selected districts. A combination of qualitative and quantitative techniques was used to collect and analyse the data. Key methods include: household survey with structured questionnaires, focus group discussions (FGD), key informant interviews (KII), meetings with individual farmers (land owners and tenants).The study revealed that 47 per cent of the arable land in the study sites is abandoned. The study also identified multiple factors with proximate and underlying causes behind land abandonment such as: out-migration of farm labor particularly youths causing shortage of labor to cultivate land, decreasing soil productivity, increasing cost of production, increasing urbanisation, reducing government subsidies, declining water sources, damage of crops by wild animals particularly monkey in the mid-hills, unclear and insecure land tenure policy among others. The study also identified a number of suitable agroforestry options to reutilise the abandoned land such as *Uttis* and cardamom along with lime, banana and fodder species.

Key words: Abandoned agricultural land, agro-tourism, out-migration, reutilisation of abandoned land

INTRODUCTION

Globally, people are looking for more land to produce agricultural commodities, but in contrary, the arable land in Nepal is becoming abandoned in recent years. Studies indicate that on an average, 37 per cent of arable land is abandoned in Nepal (Paudel *et al.* 2014; Ojha *et al.* 2017). The increasing land abandonment in Nepal has been posing multiple threats related to food insecurity, loss of rural livelihoods, reduction in crop production, loss of soil productivity, and damage on ecological landscape. More than 65 per cent of the rural 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 *et al.* 2014; Pandit and Schmidt 2016). The implication of agricultural land abandonment is not limited only at the household level, but has an overall impact on the national economy (CSRC 2012). For example, the Gross Domestic Product

(GDP) contribution of agriculture sector was 33 per cent in 2011, but this figure has reduced to 26 per cent in 2018 (CBS 2018). This exhibits the fact that agricultural land abandonment has emerged as a challenge to the people, economy, and environment at various scales (Basnet 2016; Ojha *et al.* 2017).

So far there is no single comprehensive national study on agricultural land abandonment in Nepal. However, many studies were undertaken on a case study basis taking few districts or region as pilot sites. Most of the studies indicated that the problem of land abandonment in Nepal is multifaceted with a number of proximate and underlying causes behind it. The findings of these studies are mostly similar. The latest study conducted by Ojha *et al.* (2017) in Lamjung and Kavre districts found that land abandonment happens through socio-environmental pathways which operate across scales, yet are deeply rooted in local dynamics of agrarian change. This study identified that the lack of opportunity to generate cash income from agricultural farming and growing insecurity of land tenure for share cropping are some of the factors behind land abandonment. Another study conducted by Chidi (2015) in Andhi Khola watershed of Syangja district found that a large scale of youth out-migration from rural areas is the main reason behind land abandonment, but there are other factors as well such as: sloppy land with increasing incidence of landslides and difficulties in cultivation and transportation of agricultural products to the market, higher cost of production, increasing damage of agricultural crops by wild animals in mid-hills, and inadequate water supply for irrigation among others.

In a similar vein, the study undertaken by Paudel *et al.* (2014) in Kavre, Lamjung, Parbat and Pyuthan districts found three key drivers behind land abandonment namely: socio-political instability that forced people to move out from villages to city centers, reduced agricultural production and productivity, and labor shortage due to seasonal or permanent migration. Furthermore, the study also identified that the land owned by poor households is abandoned as the land owned by them are primarily of poor quality and marginal. It is because poorer households cannot afford for high quality land, which demands for higher price. Hence they do not see any comparative advantage of investing their labor and inputs in crop production. Instead, poor people prefer to work as daily wage labor in city centers or abroad. These findings were also substantiated by other studies conducted by Malla (1992), Chhetri (2014), and Khanal and Watanabe (2006). All these studies have indicated increasing trend of land abandonment in Nepal, but none of them have suggested the ways to reutilise such land and improve production and productivity.

In this context, a field study in Kaski and Parbat districts was designed and undertaken with the objectives to assess the status of agricultural land abandonment and identify an appropriate agroforestry options to reutilise those lands in a way that the crop production is increased and the productivity of land is also improved. This paper attempts to identify the causes of land abandonment which contributes in enhancing the understanding of the phenomenon of land abandonment in the mid-hill context and elsewhere in similar socio-ecological landscapes of Nepal. The expected results of the reutilisation of abandoned agricultural land would be to improve people's livelihoods. This can be achieved only when productivity of abandoned agricultural land is enhanced.

MATERIALS AND METHODS

Study Area

The study was conducted in Parbat and Kaski districts of Western mid-hill of Nepal (Figure 1). The pilot districts were deliberately selected based on the general understanding that the scale of land abandonment in these districts is much higher than other districts. There were eight specific sites identified (Table 1) within these pilot districts to have an in-depth data collection, household survey and identifying the best bet agroforestry options to reutilise the abandoned agricultural land.

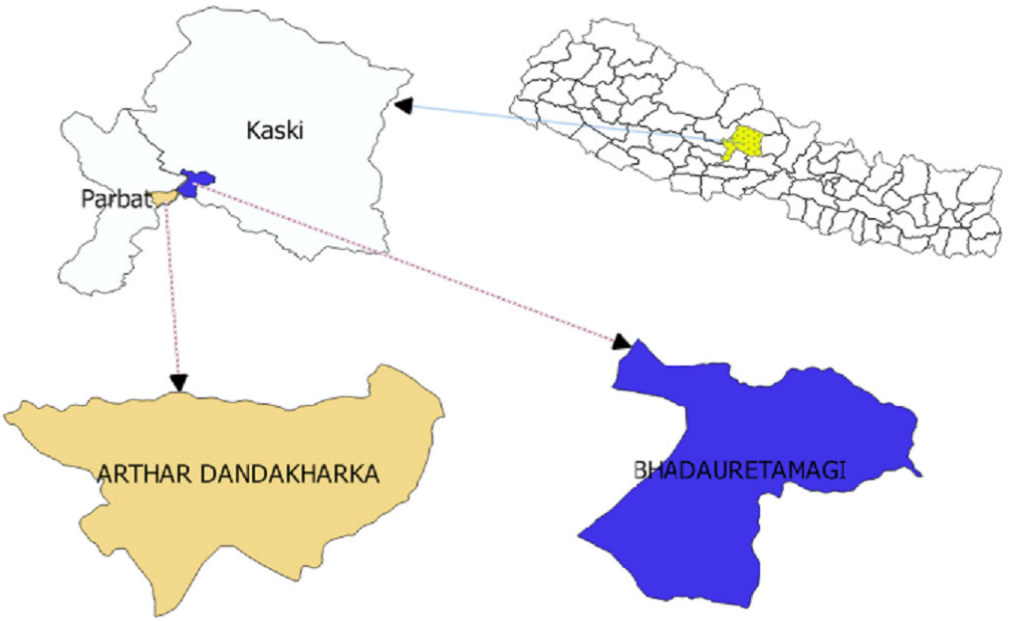

Figure 1: Pilot Sites in Kaski and Parbat districts

Methods of Data Collection

This study applied a multi-pronged approach to collect both quantitative and qualitative information from the selected sites. The quantitative information was mainly collected through household survey using structured questionnaires and qualitative information were obtained through focus group discussions (FGDs), key informant interviews (KIIs), consultation meetings and direct observation at the site level.

Household Survey

Out of the total 572 households in eight pilot communities, 476 households participated in the survey (Table 1). Out of the surveyed households, 88 households were with abandoned irrigated *khet* land,[1] whereas 315 households were with abandoned non-irrigated *khet* land[2] and 419 households with abandoned *bari* land[3].

1 Irrigated *khet* land: is mainly a paddy field, usually well irrigated all the year round, fertile and productive land where two to three crops can be cultivated a year.

2 Non Irrigated *khet* land: is also a paddy field but cannot be irrigated thee whole year round, usually less fertile and away from the homestead.

3 *Bari* land: is upland, rain fed and less fertile land as compared to *khet* in which two to three seasonal crops are grown.

Table 1: Pilot Sites in Kaski and Parbat districts

Study sites	Total households	Participant households	%
Kaski, Bhaudaure Tamagadi area			
1. Kayarbari	49	27	55
2. Damdame	33	31	94
3. Kudbidanda	57	48	84
4. Tallo Sidhane	71	54	76
5. Mathillo Sidhane	56	52	93
Parbat, Arthur Danda Kharka area			
6. Dada Kharka	56	52	93
7. Badagaun	160	128	80
8. Thadswara	90	84	93
Total	572	476	83

Source: Field survey, 2017

Focus Group Discussions

At least one FGD per community was conducted involving the local community members, women groups, *Dalits* to assess the situation of the underutilised/ abandoned agriculture land in the pilot sites. The FGDs was carried out to provide in-depth understanding of the agroforestry development in abandoned and underutilised agriculture lands. For selection of the best bet agroforestry options, specific criteria were used for the reutilisation of abandoned agricultural land in the study sites. These criteria involved local preferences and interest of farmers; low labor demanding and less input requirement; combination of short term, mid-term and long term trees and crops species for increased yield and income; high market value; some evidence of prior existence of these selected species locally; and appropriate in the given microclimate.

Key Informant Interviews

Key informants selected for consultations were mainly local leaders, teachers, social workers, aged farmers and community forest user committee members. A total of 23 KIIs were conducted, and they were asked about abandoned agriculture lands and problems associated with the development of such lands through agroforestry practices.

The information obtained from one source was triangulated with others to cross check and increase the validity and credibility of the collected data. For this, the team also used secondary information obtained through review of the findings of earlier studies of similar nature conducted in various districts of Nepal. The data was analysed to see the scale of land abandonment, find out the proximate and underlying causes of land abandonment, and identify appropriate agroforestry options to reutilise such land.

RESULTS

Status of Land Abandonment in the Study Sites

The percentage of abandoned land in upper part of the study sites (i.e. Tallo Sidhane and Mathilo Sidhane) of Kaski is higher than rest of the sites. This is because these two communities mainly comprise of *Janajati* (Gurung and Magar) ethnic groups whose descendants are mostly employed in the British army. The data shows that on an average 52 per cent of the total land (i.e. 232.6 ha out of 443.5) is abandoned in the study sites (Table 2). This figure is relatively higher compared to the national average of 37 per cent (Ojha *et al.* 2017).

Table 2: Abandoned Agricultural Lands in Study Sites

Study sites	Total Agricultural land (ha)	Total abandoned land (ha)	Per cent of abandoned land
Kayarbari (27 HHs)	27.55	13.75	50
Damdame (31 HHs)	48.55	12.5	26
Kudbidanda (48 HHs)	52.85	26.25	50
Tallo Sidhane (54 HHs)	57.9	44.4	77
Mathillo Sidhane (52 HHs)	62.45	44.1	71
DadaKharka (52 HHs)	50.15	15.35	31
Badagaun (128 HHs)	82.85	52.25	63
Thadswara (84 HHs)	61.2	24.05	39
Total (476 HHs)	443.5	232.6	52

Source: Field study, 2017

Variations in Land Abandonment Across Sites and Land Types

The difference in land abandonment across eight sites and between land types is presented in Table 3. It is surprising to note that *bari* land is least abandoned (36%) than irrigated (55%) and non-irrigated *khet* land (62%). This can also be interpreted as *bari* lands being in proximity to the households. However, compared to irrigated and non-irrigated *khet* lands, people were more interested to cultivate and grow agricultural crops in irrigated land than in non-irrigated land. With the exception of few cases of irrigated *khet* land (Kayarbari, Damdame and Badagaon), all other sites have highest percentage of land abandonment in non-irrigated *khet* land. The reason for higher land abandonment of non-irrigated *khet* land is because of the distant location. The total abandoned irrigated land in the study site is 70 ha, non-irrigated land is 221 ha and the rest is *bari* land (148 ha). Badagaun site is with 93 per cent of abandoned irrigated land, which is the highest amongst rest of the sites and Dandakharka is with 19 per cent of abandoned land which is the lowest amongst all sites. The reason behind higher percentage of abandoned land in Badagaun

is due to increasing rate of people's migration to India to join the army. This has resulted in increased percentage of absentee landlords in Badagaun. During the study, it was also observed that non-irrigated abandoned land is covered with alien invasive species, however in the area near forest has regeneration of woody species such as *Alnus, Schima* and *Quercus spp*.

Table 3: Land Abandonment Across Three Land Types

Study sites	Irrigated khet land			Non-irrigated khet land			Bari land		
	Total ha	Abandoned ha	%	Total ha	Abandoned ha	%	Total ha	Abandoned ha	%
Kayarbari	7.05	3.4	48	15.6	6.5	42	4.9	3.85	79
Damdame	1.8	0.75	42	17.85	5	28	28.9	6.75	23
Kudbidanda	2.7	0.6	22	25.6	18.1	71	24.55	7.55	31
Tallo Sidhane	11.7	7.75	66	32.05	28	87	14.15	8.65	61
Mathillo Sidhane	10.95	7.45	68	31.1	25.65	82	20.4	11	54
DadaKharka	12.05	2.3	19	25.55	9.6	38	12.55	3.45	27
Badagaon	11.7	10.9	93	46.9	32.8	70	24.25	8.55	35
Thadswara	16.85	7.8	46	26	12.2	47	18.35	4.05	22
Total	74.8	40.95	55	220.6	137.8	62	148.1	53.85	36

Source: Field study, 2017

Pattern of Ownership

People in the study sites considered the pattern of ownership as a serious issue as it is an important determinant of who owns and who cultivates. In many cases, tenure arrangement was not clear and secured for land owners and tenants.

Irrigated Land

Study revealed that the land owners are reluctant to go for share cropping at least in the case of irrigated land. Table 4 shows that of the total 476 surveyed HHs, only 86 have irrigated *khet* land. Except Dhadaswora, no land owners have given their irrigated *khet* land on share cropping due to the fear of losing their land. On the other hand, land owners from five sites have taken others' land for share cropping (Table 4).

Table 4: Ownership of Irrigated Land

Sites	Self-cropping		Share cropping of others		Share cropping by others		Total HHs cultivating irrigated land	Total irrigated *khet* land area
	% of HHs	Total area (ha)	% of HHs	Total area (ha)	% of HHs	Total area		
Kayarbari (Total HHs =27)	33	7.05	0	0	0	0	9	7.05
Damdame (Total HHs = 31)	13	1.80	0	0	0	0	4	1.8
Kudbidanda (Total HHs = 48)	8	1.95	2	0.75	0	0	5	2.7
Tallo Sidane (Total HHs = 44)	16	10.65	5	1.05	0	0	9	11.7
Mathillo Sidane (Total HHs = 52)	17	10.9	1	0.05	0	0	10	10.95
Danda Kharka (Total HHs = 52)	27	12.05	0	0	0	0	15	12.05
Badagaon (Total HHs = 128)	16	11.00	1	0.7	0	0	21	11.7
Thandswora (Total HHs = 84)	8	5.40	5	3.05	2	8.4	13	16.85
Total (Total HHs = 476)		60.8		5.6		8.4	86	74.8

Source: Field study, 2017

Non-irrigated *Khet* Land

In terms of non-irrigated land, the owners were open to go for share cropping scheme. As we can see that 26 ha of non-irrigated land (11% of the total land) in the study sites is being cultivated under the share cropping scheme (Table 5). This means, land owners pay less attention to non-irrigated land as it incurs high production cost and low outputs.

Table 5: Ownership of Non-irrigated *Khet* Lands

Study sites	Self-cultivated		Share cropping of others	Share cropping by others	HHs cultivating Non-irrigated *khet* lands (in Number)	Total non-irrigated land (in ha)
	% HHs	Total area (in ha)	Total area (in ha)	Total area (in ha)		
Kayarbari (total hhs- 27)	81	15.6	0	0	22	15.6
Damedame (total hhs- 31)	71	13.95	3	0.9	22	17.85
Kudbidada (total hhs- 48)	48	23.35	2.25	0	23	25.6
Tallo Sidane (total hhs- 44)	61	32.05	0	0	33	32.05
Mathilo Sidane (total hhs- 52)	73	30.65	0.45	0	38	31.1
Dadakharka (total hhs- 52)	75	13.55	1.5	10.45	39	25.5
Badagaun (total hhs- 128)	70	34	2.5	10.4	90	46.9
Thadswara (total hhs- 84)	38	17.2	4.55	4.25	48	26
Total	66	180.35	14.25	26	315	220.6

Source: Field study, 2017

Years of Abandonment

The data presented in Table 6 indicated that the number of years since the cultivated land being abandoned ranges from 1 to 30 years. However, interactions during the FGDs clarified that the abandonment has significantly increased since the last decade. It is clear from these data that agricultural land abandonment is not a recent phenomenon at least in the study sites as it has been happening since the last 30 years. But there is little or no initiatives taken so far to reutilise those lands. Many land owners expressed their desire to reutilise their land but they do not know what the best option could be in terms of taking it forward, in addition to options which is less labor intensive but having high market value and demand.

Table 6: Abandoned Years

Number of abandoned years	N	Minimum	Maximum	Mean
Abandoned irrigated khet land	60	1	30	6.89
Abandoned non-irrigated khet land	198	1	30	8.67
Abandoned bari Land	203	1	30	8.12

Source: Field study, 2017

Migration Trend

The data presented in Table 7 indicates that a number of both men and women have been migrating from villages to the city centers within Nepal or abroad. Badagaun of Parbat district has the highest migration rate (198 out of 1045 individuals). This also shows that 21 per cent of the people (mainly youths) from the study sites have migrated in recent years.

Issues raised during the FGDs also clarified that the pattern of migration from the hill and mountain regions to the plains and valleys has been increasing in the recent years. It is believed that plain area offers better social services, better access, job opportunities and fertile agricultural land. Furthermore, the rate of youth migration to overseas is also equally increasing mainly to the Middle Eastern and Gulf countries.

Table 7: Migration according to Gender

Population	Study sites								Total
	Kayar bari	Dam Dame	Kudbi danda	Tallo Sidhane	Mathillo Sidhane	Dada kharka	Bada Gaun	Thad swara	
Women	1	14	6	25	14	18	34	11	123
Men	17	47	48	63	82	74	164	91	586
Migrant	18	61	54	88	96	84	198	102	709
Total	222	190	973	233	211	159	1045	233	3266

Source: Field study, 2017

Types of Migration

Two types of migration across the study site were identified namely, seasonal migration and permanent migration. More than two-thirds (84%) of the people have migrated from their villages during a particular season, whereas 16.5 per cent of the people have migrated for longer duration or permanently from the study sites (Table 8).

Table 8: Types of Migration

Place of Migration	Study sites								Total
	Kayar bari	Dam Dame	Kudbi danda	Tallo Sidane	Mathillo Sidane	Dada kharka	Bada Gaun	Thad swara	
Seasonal	18	42	44	47	83	88	173	97	**592**
Permanent	0	20	10	41	13	4	25	4	**117**
Migrating Population	18	62	54	88	96	92	198	101	**709**
Total population	222	190	973	233	211	159	1045	233	3266

Source: Field study, 2017

Occupation of Migrants

As indicated in Table 9, the first target of migrant people is to seek job of any kind which will provide safety net for the livelihoods of their families. The second priority is to do business and service sector as a third priority (Table 9). The majority of the people (60%) have migrated in search of job, but still more than 16 per cent of the migrants are unemployed.

Table 9: Occupation of Migrants

Occupation of migrant	Villages								Total
	Kayar bari	Dam Dame	Kudbi danda	Tallo Sidane	Mathillo Sidane	Dada Kharka	Bada gaun	Thad swara	
Agriculture	2	1	0	2	2	1	3	1	12
Business	8	4	8	2	5	4	21	6	58
Job	6	38	28	60	57	69	105	67	430
Service	1	2	6	3	6	5	27	4	54
Wage labor	0	3	0	1	5	3	12	5	29
Caste based work	0	0	1	0	0	2	3	1	7
Unemployed	1	13	11	20	21	8	27	18	119
Total	18	61	54	88	96	92	198	102	709

Source: Field study, 2017

Factors Causing Land Abandonment and Options for Reutilisation

Based on the quantitative field data (HH survey) and FGDs held in all sites, it was found that a number of factors and proximate and underlying causes were responsible behind land abandonment in Parbat and Kaski districts. Table 10 indicates that the shortage of labor for agricultural farming is the most common factor behind land abandonment. The second important factor is the high cost of production and low return followed by lack of irrigation. Based on elaborations

during the FGDs, availability of labor for agriculture is decreasing in all pilot sites, which will further increase the land abandonment ratio.

Table 10: Factors Causing Land Abandonment

Reasons behind land abandonment	Percentage of responses		
	Irrigated *khet* land (in per cent)	Non-irrigated *khet* land (in per cent)	*Bari* land (in per cent)
Shortage of labor	93	69	77
High cost of production	2	17	13
Inadequate irrigation	0	0	1
Inadequate marketing facility to sell the products	1	2	1
Shortage of labor + inadequate market facility+ (inadequate irrigation- bari and non-irrigated)	2	10	5
Others (legal or policy issue)	2	2	3

Source: Field study, 2017

Options for Reutilisation of Abandoned Agricultural Land

Table 11 shows that majority of the respondents wanted to plant trees for reutilisation of their land in the form of private forest or agroforestry (28%). However, 21 per cent of the total respondents still want to grow agriculture crops at least in the irrigated *khet* lands by themselves. The result also indicates that 13 per cent of land owners of irrigated *khet* land would be interested to lease out the land to others under the share cropping scheme.

Table 11: Household Response on Reutilisation of Abandoned Land in Pilot Sites

Reutilisation options	Irrigated *khet* (%)	Non-irrigated *khet* (%)	*Bari* land (%)
Agriculture by own self	21	7	6
Orchard by own self	3	7	19
Private forest by own self	27	32	23
Fodder production by own self	2	2	7
Lease to others	13	14	6
Leave out for doing nothing	6	7	9
Adopt suitable agroforestry option	28	31	30
Total	100	100	100

Source: Field study, 2017

Based on the set criteria and existing cases of successful practices by the local farmers the combination of broom grass with cardamom, *Uttis* tree (*Alnus nepalensis)* and livestock, or a combination of tea/ coffee with tree species such as *Lapsi* (*Choerospondias axillaris*) or *Chilaune* (*Schima wallichii*) and livestock were identified as potential options to increase production and productivity of abandoned agricultural land in the study sites (FGD 2017).

DISCUSSIONS

Context

Nepal is facing increasing problem of abandonment of agricultural land. In the context of food insecurity and poverty across rural communities, the current growing scale of agricultural land abandonment became one of the key development challenges in the recent decades (ADB 2012; Paudel *et al.* 2014; Ojha *et al.* 2017). As a result of this trend, rural hill districts are currently experiencing food insecurity due to less per hectare production and productivity (Pandit and Schmidt 2016; EnLiFT 2016). Moreover, it has created serious threat to feeding growing population. Hence the only way to address the problem of food insecurity is to increase agricultural production and productivity of the available land. In order to address this emerging issue, as per the request and cooperation of the Government of Nepal, Food and Agriculture Organisation (FAO) and International Union for Conservation of Nature (IUCN) has implemented the pilot project, namely 'Enhancing rural livelihoods through agroforestry in abandoned agricultural land' with the objective to identify and assess approaches for implementation of best bet agroforestry options which have potential to generate production and income from abandoned agricultural land.

Agricultural Land Abandonment

In the recent decades, agricultural land abandonment became a common agenda amongst many researchers and practitioners around the world. It is commonly understood that abandoned land will have negative impacts on biodiversity and ecosystem recovery, as well as food security and rural sustainable development. This trend has been a commonly observed trend in the rural mountain areas in many parts of the world for the last seven to eight decades (Ives and Messerli 1989; Harden 1996; MacDonald *et al.* 2000; Khanal and Watanabe 2006). Changes in land use and land cover are critically important to understanding global climate change, food security, soil degradation, ecosystem dynamics, and human-environment interactions (MacDonald *et al.* 2000; Xie *et al.* 2014). Generally, agricultural land use changes include farmland expansion due to land exploitation, farmland abandonment induced by rural-to-urban migration, and conversion associated with urbanisation and industrialisation (MacDonald *et al.* 2000; Khanal and Watanabe 2006). Due to the rapid urbanisation and industrialization, farmland abandonment has become an increasingly critical problem in many countries including Nepal. To promote sustainable land-use management and environmental sustainability is therefore important to understand the socio-economic causes and patterns of farmland abandonment (Ojha *et al.* 2017). The mid-hills of Nepal have witnessed an intense increase in abandonment of agricultural lands in the recent years (Paudel *et al.* 2014)

in similar trend observed in the study sites. Local people indicated that the scale of land abandonment will further accelerate as more and more youths are migrating to city centers within Nepal and abroad in search of jobs. This will eventually result into further shortage of labor for agricultural works in the villages.

Migration is the Issue for Reutilisation of Abandoned Agricultural Land

Significant number of rural households in mid and high hills have been motivated to migrate, either temporarily or permanently to accessible low-land areas because of the increasing commercialization of agriculture through technological development and increased off-farm activities (Khanal and Watanabe 2006; Paudel *et al.* 2014). Depopulation due to high rates of out-migration, reduced scope for enhancement of productivity in traditional agriculture due to fragile mountain environments, reduced economies of scale due to highly fragmented and diversified biophysical conditions, and resistance to adopting modern, market oriented farming practices by mountain people are some of the reasons for the growing trend of land abandonment (MacDonald *et al.* 2000). Increase in abandonment of agricultural land is not quite similar with the changing proportion of population across different ecological zones of Nepal (Chidi 2015) including research sites. This constitutes a depreciation of environmental capital stock and has many, mostly negative, socioeconomic and environmental consequences (Khanal and Watanabe 2006; Chidi 2015).

Pattern of Ownership

People in the study sites considered the pattern ownership as a serious issue as it determines who owns and who cultivates. In many cases, tenure arrangement is not clear and secure for land owners and tenants (CSRC 2012; Ojha *et al.* 2017). Unclear and insecure tenure also contribute towards increase in land abandonment. In the study sites, most of the land is cultivated by the owners themselves, but in some cases the system of share cropping is in practice (8.4 ha out of total 74.8 ha irrigated land is under share cropping scheme). Most of the land owners prefer to hold the irrigated land to cultivate themselves or keep it uncultivated rather than giving it to others under share cropping scheme. This attitude is very common in most of the sites and is due to the fear of losing economically valuable irrigated land if given under the share cropping for longer period of time. During the FGDs, local communities mentioned that people in recent years, local people are reluctant to go for sharecropping as agriculture farming has become more challenging due to inadequate and expensive labor and low return from the land particularly when there is no irrigation facility.

Options for Bringing Back Migrated Youths to their Villages

During the local consultations, it was revealed that youths of rural area prefer to work in non-farm activities compared to agricultural farm activities. Their argument is that agriculture farming demands more physical work, but with little return. Therefore, people always look for easier alternative that could

support their livelihoods. Therefore, the solution is to motivate them by providing high yielding cash generating agroforestry crops as an option for rehabilitation of the abandoned agricultural land. Various options were sought and tested in each of the selected communities. These options included fodder based livestock system and coffee and lime with banana plantation in the lower hills (kayarbari) proximate to Pokhara city. Cardamom and broom based agroforestry with Alnus or *Chorospondias auxilaris* in the upper hills (Sidane and Danda kharka). The profit margin from these products will motivate migrated youth to come back home and invest. This was verified and tested in in Lamjung and Kavre districts of Nepal (Pandit *et al.* 2018).

CONCLUSION

The study undertaken in Parbat and Kaski districts corroborates the prevailing understanding about agricultural land abandonment and confirms that there is an increasing trend and scale of land abandonment. The survey data shows that 47 per cent of abandoned agricultural land exists in the study sites. This percentage is higher than the national average which is estimated at 37 per cent. The study also revealed that land abandonment is a complex and multifaceted phenomena associated with social, political, biophysical, and environmental aspects of land and resources. Youth migration from villages to the city centers is considered as one of the key factors behind land abandonment in all the study sites. However, there are other equally important factors identified through this study such as: declining water sources for irrigation, increasing damages of crops by wild animals as the density of human population has been decreasing in the villages, increasing cost of production, unclear and insecure land and resource tenure both for tenants and land owners, weak or lack of proper systems on marketing of agroforestry products, and weak or lack of policy and legal framework to encourage farmers for agroforestry.

Despite identifying a number of proximate and underlying causes of land abandonment, the study also identified some of the innovative agroforestry options which potentially can be less labor intensive, but could generate substantial income from reutilisation of abandoned land. These models include cardamom and broom grass based agroforestry, coffee based agroforestry, combination of agricultural crops with horticultural and tree species, combination of tea with agroforestry species, livestock based agroforestry, and combination of *Lapsi* with agroforestry species among others. The looming food scarcity and challenges of local livelihoods in Nepal is possible to address only through enhancing crop production and productivity of the agricultural land, mainly of the abandoned land.

The recent increase in the cost of production of agriculture crops compared to the past has also been considered as one of the major factors behind land abandonment. The inadequate investment of quality inputs especially fertilizers, weak system of agriculture extension service delivery, inadequate technical knowhow are also taken as proximate and underlying causes behind land abandonment in the study sites. The study sites have been witnessing increasing incidences of drying up of water sources and facing changing patterns

in rainfall which demotivates farmers from agriculture sector. Furthermore, local communities have indicated that the increasing incidences of wild animal damaging (mainly monkey) the agricultural crops disappoints farmers resulting into abandonment of agricultural land as people found too difficult to protect their crops from the damage.

Many land owners have expressed their interest to get knowledge and information about agroforestry options which are less labor intensive and can give better production. Agroforestry systems such as growing high value plantation crops (e.g. coffee in Kayarbari), fodder trees or trees for timber purposes and grasses, and broom gasses were some of the options local communities have suggested. But still some farmers (6-9%) are willing to leave their lands as abandoned instead of cultivating for agricultural crops as they do not have enough labor to cultivate and the cost of production is too high.

REFERENCES

ADB. 2012. Global Crisis Remittance Poverty in Asia. Asian Development Bank, Manila, Philippines.

Basnet, J. 2016. CSO Land Reform Monitoring Report. Community Self Reliance Centre, Kathmandu, Nepal.

CBS. 2018. Agriculture Statistics. Department of Central Bureau of Statistics, Government of Nepal, Kathmandu, Nepal.

Chhetri, R.B. 2014. Land Policy Instruments in Nepal. *Journal of the Institute of Engineering,* **10**(1): 69–79.

Chidi, C.L. 2015. Impact of Outmigration on Land Use Change in Andhi Khola Watershed of Syangja, Western Hill of Nepal. In: RB Mehta (Eds.), *Environmental Crisis*, Ranchi Institute of Social Development and Research.

CSRC. 2012. Land Ownership and Land Reform in Nepal. Community Self Reliance Centre, Kathmandu, Nepal.

EnLiFT. 2016. Report of First Cycle of Commercial Agroforestry Plantation. Enhancing Livelihoods and Food Security from Agroforestry and Community Forestry in Nepal, Kathmandu, Nepal.

Harden. C.P. 1996. Interrelationships between Land Abandonment and Land Degradation: A Case from the Ecuadorian Andes. *Mountain Research and Development*, **16**(3): 274–280.

Ives, J.D. and Messerli, B. 1989. The Himalayan Dilemma: Reconciling Development and Conservation. London, UK: Routledge and the United Nations University.

Khanal, N.R. and Watanabe, T. 2006. Abandonment of Agricultural Land and its Consequences: A Case Study in Sikles Area, Gandaki basin, Nepal. *Mountain Research and Development*, **26**(1): 32–40.

Malla, Y. 1992. The Changing Role of the Forest Resource in the Hills of Nepal. PhD Thesis, The Australian National University, Canberra, Australia.

MacDonald, D., Crabtree, J.R., Wiesinger, G., Dax, T., Stamou, N., Fleury, P., Lazpita, J.G., Gibon, A. 2000. Agricultural Abandonment in Mountain Areas of Europe: Environmental Consequences and Policy Response. *Journal of Environmental Management*, **59**(1): 47–69.

Ojha, H.R., Shrestha, K.K., Subedi, Y.R., Shah, R., Nuberg, I., Hyojoo, B., Cedamon, E., Jonathan, R., Tamang, S., Paudel, K., Malla, Y. and Phil, M. 2017. Agricultural Land Underutilisation in the Hills of Nepal: Investigating Socio-environmental Pathways of Change. *Journal of Rural Studies*, **53**: 156-172.

Pandit, B.H. and Schmidt H.P. 2016. Strengthening Village Economies through Agroforestry Innovation with Biochar for Carbon Capture and Increased Agriculture Productivity in Middle Hills of Nepal. Nepal Agroforestry Foundation, Kathmandu, Nepal.

Pandit, B.H., Nuberg, I., Shrestha, K.K., Cedamon, E., Amatya, S.M., Dhakal, B. and Neupane R.P. 2018. Impacts of Market-oriented

Agroforestry on Farm Income and Food Security: Insights from Kavre and Lamjung Districts of Nepal. *Agroforestry Systems,* **93**: 1593-1604.

Paudel, K.P., Tamang, S. and 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): 11-19

Xie, H., Wang, P. and Yao, G. 2014. Exploring the Dynamic Mechanisms of Farmland Abandonment Based on a Spatially Explicit Economic Model for Environmental Sustainability: A Case Study in Jiangxi Province, China. *Sustainability,* **6**: 1260-1282. doi:10.3390/su6031260.