

Coffee Production in Kavre and Lalitpur Districts, Nepal

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Received 12 June 2016, Revised 5 January 2017, Accepted 24 April 2017,
 Published 28 April 2018

Scientific Editors: Umesh Acharya, Ram B. KC, Dhruva Bhattarai and Tek Prasad Gotame

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ABSTRACT

Coffee (*Coffea* spp) is an important and emerging cash crop having potential to provide farmers employment and income generation opportunities. This crop is well adapted to the climatic conditions of mid-hills of Nepal. Thus, majority of the farmers are attracted towards cultivation of coffee because of demands in national and international market. Coffee is now becoming integral part of farming system in rural areas. However, information on performance of coffee and farmers response has not been well documented. Therefore, we undertook the present work to analyze demography, ethnicity, household occupation, literacy status, average land holding, coffee cultivation area, livelihood and sources of income of coffee growers, production and productivity, pricing, cropping pattern of the coffee and problems faced by them in mid hill district of Kavrepalanchowk (hereafter 'Kavre') and Lalitpur Districts. All the samples were taken randomly and selected from coffee producing cooperative of Kavre and Lalitpur. Our analysis showed that the male farmer dominant over female on adopting coffee cultivation in both districts with higher value in Kavre. Brahmin and Chetri ethnic communities were in majority over others in adopting the coffee cultivation. Literate farmers were more dominant over illiterates on adopting the coffee cultivation, The mean land holding was less, ranging from 0.15 to 2.30 ha for coffee cultivation, the history of coffee cultivation in Kavre showed that highest number of farmers were engaged in coffee farming from last 16 years. The mean yield of fresh cherry was 1027.20 kg/ha in Kavre, while it was 1849.36 kg/ha in Lalitpur. The study revealed that majority of the coffee plantations were between 6-10 years old. The major problems facing by coffee farmers were diseases spread, lack of irrigation facility and drying of plants. Despite of that the coffee farming was one of the rapidly emerging occupations among the farmers in both district of Nepal.

Keywords: Coffee, Production, Cropping pattern

सारांश

किसानहरूलाई रोजगारी र आय आर्जनको अवसरहरू प्रदान गर्ने क्षमता भएको कफी एक महत्वपूर्ण र उदीयमान नगदे बाली हो। यो बाली नेपालको मध्य पहाडको जलवायु अनुकूल रहेको छ। यस बालीको राष्ट्रिय र अन्तर्राष्ट्रिय बजारमा उच्च मूल्य हुने भएको हुनाले धेरै जसो किसानहरू कफी खेतिबाट आकर्षित छन्। अहिलेको अवस्थामा ग्रामीण क्षेत्रमा कफी खेती प्रणाली एक अभिन्न अंग बन्दै गएको छ। तथापि, कफी खेती बारे देशमा अझ धेरै जानकारी रहेको अवस्था नभएकोले यस बाली सम्बन्धी ज्ञान संकलन गर्ने उद्देश्यले जनवरी २०१६ मा नेपालको काभ्रेपलाञ्चोक र ललितपुर जिल्लाहरूका कफी उत्पादकहरूसँग यो अध्ययन संचालन गरिएको थियो। धेरै जसो किसानहरूले मकै आधारित बाली प्रणाली अवलम्बन गरेको पाइयो। उत्तरदाताहरू मध्ये कफीको चेरीको औषत उत्पादकत्व क्रमशः काभ्रेपलाञ्चोक र ललितपुर जिल्लामा १०२७.२० किलो प्रति हेक्टर र १८७९.३६ किलो प्रति हेक्टर रहेको पाइयो। अध्ययनले कफी बोटहरू प्रायः ६-१० वर्षका रहेका पाइयो। कफी उत्पादन बाहेक किसानहरू पशुपालनमा पनि संलग्न भएको पाइयो, जुन कफी उत्पादकहरूमा आयको अर्को प्रमुख श्रोतको रूपमा रहेको पाइयो। अतः कफी खेति एक महत्वपूर्ण बालीको रूपमा किसानहरूले स्वीकार गरि रहेको अवस्थाको आंकलन गरिएको छ।

INTRODUCTION

Coffee is one of the important cash generative crops in the mid hills of Nepal (Chaudhary et al 2008, Paudel et al 2009, Tiwari 2010, Aoki and Suvedi 2012). It contains 0.1-0.3 % caffeine in instant coffee which stimulates and brings refreshers to human being after drink (Gautam and Dhakal 1994). It is reported that the coffee farming in Nepal was first introduced into Aanpchaour of Gulmi District in Nepal (Paudyal 2012). Then gradually spreading in nearby mid hill location rapidly. The Nepalese coffee has also been able to create market demand abroad (Dahal and Dhakal 2009, Aoki and Suvedi 2012, Khanna 2016) as well in the country probably because of aroma, taste, flavor and healthy and suitable environmental conditions where these coffees are produced from hilly slopes.

Nepali coffee are mostly produced organically (Aoki and Suvedi 2012). Demand of Nepalese coffee is high and it fetch high price in international markets but still the demand has not been fulfilled because of low production. New coffee industries are increasing with anticipation that the production will increase however, it is known that factories are running below their capacity. Previous study (MoAD 2014) has shown that productivity of Nepalese coffee is poor only producing 224.7 kg/ha as compared to other countries like Vietnam, Costa Rica and India. The productivity of Nepalese coffee has been estimated only to be 800 kg per hectare (Gautam et al 2008). In Nepal, coffee is cultivated in limited land under upland conditions without use of external inputs including chemical fertilizers and pesticides (Shrestha et al 2008; Khanna 2016).

Currently, coffee is cultivated in around 40 districts but commercial cultivation is done in around 20-22 hilly districts covering of Mid, Western and Eastern Development Regions of Nepal (MoAD 2014). In Nepal, coffee is predominately grown by resource poor and small scale farmers to sustain their livelihood under marginal upland condition (Shrestha et al 2008; Sharma et al 2015). The past report suggests that coffee is a potential crop which for revenue generation potentialities to poor marginalized farmers especially of mid-hills region enriched with suitable land and climatic condition for growing the coffee successfully (Sharma et al 2015; Paudel et al 2017). Although the expansion of coffee farming is rapid, but assessment of productivity and production from mid hill districts are yet to be carried out in detail. Therefore, we surveyed the status of production, productivity, farmer's perceptions, cropping system and economic analysis of coffee farmers in two mid hill districts located near to Kathmandu

MATERIALS AND METHODS

The present survey was carried out in the month of January 2016 using semi-structure questionnaire to collect the data. Prior to survey, pretesting of questionnaire was done. The survey was focused to coffee farmers group and cooperatives. There were altogether 180 respondents who were involved in coffee farming and allied cooperatives in Kavre and Lalitpur districts of Nepal. All the samples were taken randomly from available six primary coffee cooperatives that were associated with coffee production. Data were analyzed by using SPSS. Secondary data were taken from Ministry of Agricultural Development, Nepal. Compounded annual growth rate (CAGR) for area, production and productivity of Kavre and Lalitpur districts were calculated using formula:

$$Y_t = AB^t, \text{ where, } Y_t = \text{Year}; A = \text{Intercept}; B = \text{Area/Production/Export/Import}; t = \text{Time}$$

RESULTS

Demographic Situation

The general information of respondents in terms of gender, ethnicity, occupation, education, and land holding size were appraised as given in **Table 1**. Out of 180 respondents, majority of respondents (89.44%) were male. Only 10.56 percent were female. The ratio of male to female was higher in Kavre district than in Lalitpur district.

Table 1. Respondents by gender and district (n = 180)

Gender	Kavre		Lalitpur		Total	
	Number	%	Number	%	Number	%
Male	82	91.11	79	87.77	161	89.44
Female	8	8.89	11	12.22	19	10.56
Total	90	100	90	100	180	100

The survey showed that 88.33 per cent of respondents were Brahman and Chettri and only 11.67% were *Janajati* (**Table 2**). Lalitpur have relatively higher number of *Janajati* engaged in coffee production than Kavre.

Table 2. Classification of respondents based on ethnicity system by district (n = 180)

Ethnicity	Kavre (n=90)		Lalitpur (n = 90)		Total	
	Number	%	Number	%	Number	%
Janajati	5	5.56	16	17.78	21	11.67
Brahman/Chettri	85	94.44	74	82.22	159	88.33
Total	90	100	90	100	180	100

The occupational involvement of coffee farming community showed that agriculture was major occupation among majority of the households (**Table 3**). The result showed that 87.78% of respondents were engaged in agriculture while 7.28% were in other services. Higher number of respondents from Kavre was involved in agriculture than Lalitpur.

Table 3. Major occupation of household head by district (n = 180)

Occupation	Kavre		Lalitpur		Total	
	No.	%	No.	%	No.	%
Agriculture	82	91.11	76	84.44	158	87.78
Service	4	4.44	9	10.00	13	7.22
Business	2	2.22	3	3.33	5	2.78
Daily wages		0.00	2	2.22	2	1.11
Others	2	2.22	0	0.00	2	1.11
Total	90	100	90	100	180	100

The survey revealed that there were two categories of qualification level of respondents, one was literate and another illiterate; nearly one fourth of the respondents were illiterate in both districts. Out of 180 respondents, 41 were illiterate and remaining 139 were literate. The number of literate respondent in Lalitpur was higher (72) comparing to Kavre (67) as shown in Table 4.

Table 4. Literacy status of respondents by district (n = 180)

Education status	Kavre (n =90)		Lalitpur (n =90)		Total	
	Number	%	Number	%	Number	%
Literate	67	74.44	72	80	139	77.22
Illiterate	23	25.55	18	20	41	22.78
Total	90	100	90	100	180	100

Our survey showed that the average land holding of respondents were 0.78 ha including both *khet* and *bari* in study location (Table 5). The term *Khet* indicate to irrigated paddy field while *Bari* is the term used for unirrigated farm land. Respondents from Lalitpur districts have more average land size (0.81 ha) than in Kavre (0.74 ha). The range for *bari* land is also higher in Lalitpur. In both districts the majority of the land did not have irrigation facilities developed.

Table 5. Average size of landholding by type of land and district (ha)

Type of Land	Kavre (n =90)			Lalitpur (n =90)			Total		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
<i>Khet</i>	0.00	1.25	0.29	0.00	0.75	0.14	0.00	1.25	0.22
<i>Bari</i>	0.10	1.50	0.47	0.10	2.30	0.69	0.10	2.30	0.58
Total (<i>Khet+Bari</i>)	0.15	2.05	0.74	0.15	2.30	0.81	0.15	2.30	0.78
Nature of land									
Irrigated	0.00	1.40	0.24	0.00	0.75	0.17	0.00	1.40	0.22
Unirrigated	0.00	1.50	0.48	0.00	2.00	0.59	0.00	2.00	0.54

History of Coffee Cultivation

Coffee cultivation in study districts was started from past 40 years. It has been categorized the respondents into four category based on the year of cultivation of coffee. Majority of the coffee producers have 6 to 10 years of coffee cultivation experiences which was higher in both districts as compared to other categories. Study revealed that more number of respondents (16) has started cultivating coffee before sixteen year in Kavre as compared to respondents of Lalitpur. There were significant differences in year of cultivation between two districts.

Table 6. Years of coffee cultivation by district

Years of cultivation	Districts		Total
	Kavre	Lalitpur	
<5 years	26	16	42
6-10 years	28	42	70
11-15 year	22	26	48
>16 year	14	6	20

Chi-square value = 8.7143* (p-value = 0.033) *Significant at 5% level

Area and production of coffee

There was increase in area and production of coffee in Kavre. Annual compounded growth rate of area was 2.35 per cent per year and for production of parchment was 10.80 per cent in Kavre. In case of Lalitpur, annual compounded growth rate (ACGR) for area was higher (10.64%) but the production growth rate was similar to that of Kavre. Although the productivity was higher in Lalitpur but it decreased from 2010/11 (MoAD 2011)

Table 7. Area, production and productivity of coffee in different years by district

Year	Kavre			Lalitpur		
	Area (ha)	Production (mt)	Productivity (kg/ha)	Area (ha)	Production (mt)	Productivity (kg/ha)
2003/04	110	12	109.09	40	21	525.00
2004/05	110	11.25	102.27	40	23.5	587.50
2005/06	115	22	191.30	70	25	357.14
2006/07	115	17	147.83	70	40	571.43
2007/08	116.5	30	257.51	70	30	428.57
2008/09	110	23	209.09	97	46.8	482.47
2009/10	118	26	220.34	104	54	515.04
2010/11	130	35	269.23	115	48	415.65
2011/12	130	35.50	273.08	115	35.50	308.70
2012/13	117	28	239.32	92	27.6	300.00
2013/14	155	36	232.26	120	31.5	262.50
ACGR	2.35%	10.80%	8.45%	10.64%	4.25%	-6.40%

Source: Statistical Information on Nepalese Agriculture 2003-2014. ACGR, Annual compounded growth rate

Production Status

The study showed that farmers planted coffee in an average of 0.224 ha in Kavre and 0.219 ha in Lalitpur. Similarly, the production of fresh cherry by individuals household is on an average of 170.20 kg for Kavre and 283.2 kg for Lalitpur. The productivity is higher in Lalitpur (1849.36 kg fresh cherry per hectare) in comparison to Kavre (1027.20 kg fresh cherry per hectare) during last year. The total productivity in study district is 1440.87 kg/ha. Most of the coffees produced were found to sale and negligible amount were stored for home consumption (Table 8). The average rate for sale of cherry was 103.87 in Kavre, 116.46 in Lalitpur and NRs. 110.13 per kg for all the respondents in study area.

Table 8. Average area, production, productivity and price of coffee by district

District	Area (ha)	Production (kg)	Productivity (kg/ha)	Sale (kg)	Selling Price (NRs/kg)
Kavre	0.224	170.2	1027.20	169.93	103.87
Lalitpur	0.219	283.2	1849.36	282.72	116.46
Total	0.221	227.7	1440.87	223.09	110.13

Cropping Pattern

Coffee producers have found to adopt various cropping pattern beside coffee production for their livelihood. Maize is major crop after coffee and they also prefer potato, mustard and finger millet after maize cultivation (Table 9). Ginger is becoming new crop to the producers in Lalitpur and majority of farmers are adopting ginger because it has high value in market. In focus group discussion with coffee producers, it is found that they were adopting banana as new shade plants which have double advantages first benefit is for shade to the coffee plants and second is earning from banana sale. Some of the major cropping patterns adopted by the coffee producers are as follows.

Maize-Ginger	Maize-Finger Millet
Maize-Mustard	Rice-Potato-Maize
Maize-Potato	Rice-Maize
Wheat-Potato/Mustard- Maize	Rice-Maize-Potato
Rice-Maize-Finger millet/Mustard	

Sources of Livelihoods

Livestock play important role to the coffee producers as study showed they earned on an average NRs. 105150 per year from sale of milk and milk products. Similarly, coffee cultivation is also one of the major sources of income to the farmers. It contributes NRs. 21670 and 31868 per year to the farmers of Kavrepalanchok and Lalitpur, respectively. In total farmers earn average of NRs. 26949 per year from coffee cultivation, which has

been greatly contributing in sustaining their livelihoods. Other source of income includes vegetables, fruits, service, pension and daily wages.

Problems associated with coffee production

Majority of the respondents (45.56%) reported that lack of irrigation was major obstacle for coffee production. Coffee disease especially coffee leaf rust was another problem (30.14%). Other problems related with coffee production were drying of plants, lack of manure, lack of seed materials, and lack of training respectively.

Table 10. Various sources of income and average amount earned by district

Source of Income	Kavre		Lalitpur		Total	
	Amount (NRs.)	Number of Respondents	Amount (NRs.)	Number of Respondents	Amount (NRs.)	Number of Respondents
Coffee	21670.73	82	31868.18	88	26949.41	170
Vegetables	21750.00	16	15727.27	22	18263.16	38
Fruits	6833.33	6	10111.11	9	8800.00	15
Livestock	105150.0	60	53280.00	50	81572.73	110
Others	37545.45	22	9000.00	6	31428.57	28
Services	93894.74	19	162666.67	21	130000.0	40
Business	21285.71	7	87272.73	11	61611.11	18
Daily wages	15038.46	13	115888.89	9	56295.45	22
Pension	60500.00	4	48666.67	3	55428.57	7

Table 10. Different type of problems associated with coffee production

Problem	Districts		Total (n = 180)
	Kavre (n = 90)	Lalitpur (n = 90)	
Coffee Disease	53	76	129 (30.14)
Drying of plants	25	14	39 (9.11)
Earthquake	3	0	3 (0.70)
Lack of irrigation facility	107	88	195 (45.56)
Lack of manure	8	2	10 (2.33)
Lack of training	13	8	21 (4.91)
Insect problem	5	5	10 (2.33)
Lack of seed material	6	2	8 (1.87)
Lack of market	4	0	4 (0.94)
Problem of shade	3	6	9 (2.10)

Figures in the parenthesis indicate the percentage

DISCUSSION

Although coffee cultivation in Nepal started in 1938 AD, its commercial value increases after 2002, at present more than 40 districts have adopted coffee cultivation including Lalitpur and Kavre (NTCDB 2016). The present survey showed that usually per household average coffee plantation area in an average covers 0.224 ha in Kavre while 0.219 ha in Lalitpur. However, the average coffee plantation in Nepal has been reported to be 1.4 ha consisting of *Bari* or uplands. The average mean of fresh coffee yield per hectare in 2007 was 2450 kg, ranging from 250 to 8140 kg per hectare (Kattel 2009). In present study the average productivity is higher in Lalitpur (1849.36 kg fresh cherry per hectare) in comparison to Kavre (1027.20 kg fresh cherry per hectare) during 2015. The total productivity in study districts ranged 1440.87 kg/ha.

Tiwari (2010) showed that about 65% of Nepalese coffee is exported and the rest is processed and supplied in domestic market. Contrarily to such situation Nepal imports coffee from overseas countries to meet domestic demand. Generally instant coffee is imported in Nepal. It is observed that Nepalese coffee is consumed mostly and foreign tourist and residents over the instant ones. This might be one of the reasons why the demand for Nepalese coffee is growing in the domestic market (AEC-FNCCI 2006, Kattel 2017). It is learnt that the Nepalese coffee in the international market require to maintain consistent quality and quantity. According to AEC-FNCCI (2006) world coffee production grew at an annual rate of 3.6% in the last 10 years, but the demand had increased only by 1.3%, suggesting that there is a competitive state in coffee marketing. In our study area the production has increased 10.80 % in (Kavre) and 4.25% (Lalitpur).

The normal life expectancy of a coffee plant has been estimated to be of 45 years or above (Panthi 2014). In Nepal some of the farmers owning the coffee tree since last 40 years, while in the study area majority of farmers

have 6-10 years age of coffee plants Coffee plants requires regular watering especially during the first and second year of plantation for higher productivity. Maintenance of moisture is crucial by applying organic manure, shades management and mulching. However, lack of irrigation facility is a major problem among farmers for declining production of coffee.

According to Panthi (2014), coffee plantation in Lalitpur district was intercropped with fruits, where coffee plants share 33% area with fruits orchard, followed by fodder trees (>24 %), cash crops (>16%), vegetables (>2.5%) and grasses (>1%). In the study area, banana was the major fruits cultivated along with coffee plantation. Other nine different cropping patterns have been identified, which require further to be studied. In general, we found that coffee farmers obtaining an average benefit of NRs. 26949 per year which is in average 5.73% of total income of the respondents in both districts. Previously, the contribution of coffee in annual income reported was 10% Acharya and Dhakal (2014).

Coffee cultivation has important role in livelihood of farmers in Kavre and Lalitpur districts where coffee was under cultivation since 40 years. Majority of farmers are planting and growing more trees to produce coffee in commercial way since last 10 years. Although average area of cultivation (0.224 ha) is higher in Kavre, Productivity of cherry is higher in Lalitpur (1849.36 kg /ha) in comparison to Kavre (1027.20 kg/ha). After coffee, maize is another major crop farmers prefer to incorporate in different cropping system. This study showed that other various other cropping pattern are practiced in study area (Table 9). Coffee producers also earn substantial amount of money from livestock as another source of earning (Table 10). Others sources of earning includes services in governmental and non-governmental organizations, daily wages and business. Although area of coffee cultivation is increasing in study areas however, the production of coffee is low comparatively in Lalitpur. Therefore, major efforts should be directed to find out the solutions to increase coffee production in these districts.

ACKNOWLEDGEMENT

We extend my gratitude to supporting staffs to Ministry of Agriculture, Land Management and Cooperatives for and coffee farmers for supporting in data collection.

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