



## Research Article

# Factors Affecting Coffee Certification Among Rural Farm Households in Nepal

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### Abstract

The study on value chain analysis of coffee was conducted in Palpa and Kaski districts, Nepal during June to August, 2016. The purposive and random sampling technique were used. Semi-structural interview with 160 households (HH) from Kaski and Palpa district (80 samples HH from each district) were conducted. In Palpa district, third party organic certification of coffee has been adopted from company initiation, whereas all coffee from Kaski district has gone through conventional market chain. The coffee cultivated land was 0.85 ropani which was higher among non-certified group (Kaski district) as compared to certified one (Palpa district). Average price of fresh cherry was NRs. 80 per kg which was lower for company initiative third party certification in Palpa (NRs.75/kg) than non-certified area in Kaski (NRs. 85/kg). Average productivity of coffee in study area was found 48 kg per ropani which was very less (13.05 kg/ropani) in certified area than non-certified area (82.96 kg/ropani). The low productivity of coffee and weak value chain structure of coffee was found in third party certified and conventional market chains. Education (49%) and access to credit (67%) were major contributing factors for organic certification of coffee. The land for coffee cultivation had positive and significant impact whereas private company based certification had negative impact on income from coffee subsector. Effective monitoring and premium assessment from certification scheme need to have judged from concerned stakeholders to increase the benefit from certification, to promote proper certification and in coffee market chain in Nepal.

**Keywords:** Coffee; Group based organic certification; Premium assessment; Value chain analysis

### Introduction

Being a prime high value commodity and a popular beverage throughout the world, coffee is one of the emerging cash generating commodities for hill farmers of Nepal (Khanal, 2003). Over 2.25 billion cups of coffee are

consumed in the world every day and one of the interesting thing about coffee is that over 90 percent of its production takes place in the developing countries, while consumption takes place mainly in the developed/industrialized countries (PACT, 2012). Statistics shows that in Nepal there are about

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30 thousand farmers growing coffee in 42 mid-hill districts. According to PACT (2012), Nepalese coffee cultivation practice is environmental friendly and free of harmful pesticides as well as bird-friendly. Nepal has a great potential to produce organic coffee too by utilizing its long back production system called as *organic by default* (Poudel, Nepal, & Dhungana, 2009). According to annual report of CoPP (2007), annual net return from coffee cultivation is 4.33 times higher than maize, 3.30 times higher than millet and 1.87 times higher than maize and millet mixed cultivation.

Nepal produced 270 MT of green beans coffee in 2006/2007, almost five times the quantity in 2001/2002; also, areas of production expanded from 424 ha in 2001/02 to 1400 ha in 2006/2007. Likewise, Nepal produced 463.58 MT green Beans in 2014/2015, 14MT more production than in 2010/2011. Similarly, plantation area is also increasing. In 2010/2011, total coffee plantation area was 1630 ha while it is increased upto 2381 ha in 2014/2015. However, the production and productivity per plant is very low as compared to other countries. The productivity of green bean in Vietnam is 1477 kg/ha, Costarika is 1582 kg/ha, India is 800 kg/ha while it is only 300 kg/ha for Nepal (Dhakal, 2005). It is estimated that with appropriate development efforts, the level of production could be raised by as much as 288 percent (Katuwal, 1999). Interestingly, coffee plantation area is increasing in Nepal however productivity of coffee is not with the pace of coffee covering area. AICC (2015) reported coffee cultivation land increase upto 2381ha in fiscal year 2014/2015 from 1750ha in fiscal year 2012/13, while productivity is decreases from 0.20Mt/ha tp 0.19Mt/ha. . Farmers are growing coffee without any knowledge to maintain healthy plants that produce adequate yields to make their investment viable.

Certification is tool to add value to a product. Certified coffee is may be defined as those coffees which must follow certain standard during the production, processing and marketing which fetch certain price premium and that take into account one or more perspective of sustainability like economic, social and environmental, and those standards are set and verified from third party certification organization (Lentijo & Hostetler, 2012). According to Ponte (2004), several certification schemes comes into action by the turn of the 20th century into global coffee market like: Fair trade, organic, and shade grown. Certification is useful and very important as it allows the consistency of characteristics, secures the market and improves market transparency, and captures price premium for the small coffee farmers (Lyon, 2009). All of the certification schemes pays price premium as incentives to the farmers, fair trade pays the highest premium followed by organic and shade-grown.

Cooperative led group organic certification, private company led organic certifications, producer ownership

third party organic certification is popular in Nepal for ICS and certification purpose (MOAD, 2014). Since organic certification is too costly for an individual small-scale producer, farmers form producer groups join cooperatives to obtain group certification (Rice, 2001). One of the main benefits of cooperative based group certification scheme is the substantial reduction in costs, which makes certification feasible for smallholders with improved market access, which improve farmers' incomes and livelihoods (Myers, 2002). Other benefits are like social or learning benefits. It also creates very strong networks among the farmers, which leads to mutual support, information exchange, advice, and machinery or product sharing (Myers, 2002). All these benefits collectively form a way towards the sustainable growth of coffee production. However the standards and verification programs set by private companies in company led organic certifications are seldom included in sustainability discussions because of three reasons: i) they are under the private control of a company or group of firms that can alter at any time or simply not fully follow the standard or code as they see fit; ii) they may be designed more for corporate needs than for producer sustainability, for example, having questionably effective standards or not using independent third-party certification; and iii) they may not meet the economic needs of producers (one of the pillars of sustainability) by not providing adequate remuneration for sustainable production practices (Giovannucci et al., 2008).

## Materials and Methods

Primary data were collected through a survey conducted in two districts, namely, Palpa and Kaski of Nepal from June to October 2016. A three-stage sampling procedure was used to select districts, VDCs, and small-scale coffee producers. At first stage, Kaski and Palpa were purposively selected based on basis of certification. Palpa was taken as certified district in which produced coffee is certified by private company and Kaski was taken as non-certified district. One hundred and sixty respondents were than randomly selected from Deurali and Bhairavsthan VDCs of Palpa district and Dhikurpokhari and Pachvaiya VDCs of Kaski district. Focus group discussion and key informant interview were taken with farmers group, members of DCPA, DCCU and coffee companies.

Descriptive analysis was done through SPSS and qualitative analysis was done in Stata Logit model was used for assessing adoption behaviour of certification in the study area. Model is used to explore the factors affecting the adoption of certification. Mathematical form of logit model

$$CERTIFICATION_i (Yes = 1) = \delta_0 + \gamma \sum X_{ji} + \varepsilon_i \quad (1)$$

Where, *Certification*= Adoption of organic certification in study area (Yes=1, 0=Otherwise)  $X_{ji}$ = set of explanatory variables like age, gender, education, economically active

household members, migration in logit model.  $\varepsilon_i$  = Error term.

### **Income Regression Model**

The income regression model can be an appropriate statistical tool in determining influence of certification decision on coffee revenue.

$$\ln Y_i = \beta_0 + \beta_1 \text{CERTIFICATION}_i + \varphi \sum X_{ki} + \mu_i \quad (2)$$

Where,  $\ln Y_i$  = Annual household income from coffee sub-sector (NRs. in natural log) in Income Regression Function,  $\text{Certification}_i$  = Adoption of organic certification in study area (Yes=1, 0=Otherwise)  $X_{ki}$  = set of explanatory variables like gender of HH head age of HH head, ethnicity, education, economic active member in number, livestock holding, certification adopted, coffee land, migrated member, credit access in Income Regression Function,  $\mu_i$  = Error term.

## **Result and Discussion**

In the following, first the descriptive and econometric results from the logit model and income regression model are presented.

### **Coffee Cultivation Land, Production of Coffee of Past 3 Years**

Coffee cultivated land in studied area was reported decreased in comparison of year 2013. Coffee cultivated land in 2013 was found 0.63 ropani which was decreased to 0.58 ropani in 2015 in certified area that is in Palpa district. However, coffee cultivated land was seemed increasing in non-certified coffee producer which was 0.98 ropani in 2013 and it was found 1.11 in 2015. Total cherry production was reported decreasing gradually in case of certified area from 25.70 kg per ropani to 12.21kg per ropani in past three years. In non-certified area, cherry production was increased from 98.93 kg per ropani to 122 kg per ropani. Reason behind decreasing in coffee cultivated land and productivity in certified is epidemic of white stem borer and unavailability of organic or bio-fertilizer and bio-pesticides (Table 1).

**Table 1:** Coffee cultivation land, production of coffee of past 3 years

Variable	Total Average (n=160)	Certified (n=80)	Non -certified (n=80)	Mean difference	T value
<b>Total coffee cultivated land (ropani)</b>					
In 2013	0.80 (0.71)	0.63 (0.67)	0.98 (0.72)	-0.35	-3.16***
In 2014	1.20 (5.50)	1.43 (7.70)	0.98 (0.71)	0.45	0.52
In 2015	0.85 (1.05)	0.58 (0.74)	1.11 (1.25)	-0.52	-3.23***
<b>Fresh cherry (FC) production (kg/ropani)</b>					
In 2013	50.74 (63.59)	25.70 (26.31)	75.77 (78.60)	-50.00	-5.44***
In 2014	50.14 (81.96)	18.58 (20.17)	81.63 (105.39)	-62.96	-5.20***
In 2015	48.00 (76.73)	13.05 (16.81)	82.96 (96.35)	-69.00	-6.40***

Note: Figures in parentheses standard deviation. \*\*\*indicate significant at 1% level.

**Table 2:** Household annual income from different sector in study area by certification

Annual income from (NRs)	Total (n=160)	Certified (n=80)	Non-certified (n=80)	Mean difference	t value
Coffee	8152	2081	14224	-12143***	-4.70
Agriculture (except coffee)	9938	13250	6627	6622*	1.89
Livestock sector	46198	62872	29525	33347***	3.08
Wage labour	2137	1075	3200	-2125	-1.14
Service	77462	40875	114050	-73175*	-1.84
Remittance	159512	126400	192625	-6625	-1.07
Total	303402	246553	360252	-113698	1.58

Note: \*\*\* and \* indicates significance at 1 % and 10% levels, respectively.

### Household Income Source

Total annual household income was found NRs. 303,402. Annual household income of non-certified farmers was reported high (NRs. 360,252) in comparison of certified farmers (NRs. 246,553). Revenue from coffee was also found statistically high in non-certified farmers (NRs. 14,224) than certified farmers (NRs. 2081). The comparison of revenue earned from coffee between the certified and noncertified members shows that the noncertified members have achieved higher earnings than their certified counterparts. This goes against the general expectation that certified farmers are expected to earn more from coffee than the non certified ones, difference is statistically significant. There are two reasons, certified farmers in our sample have allocated less land to coffee, hence the yield is lower than that of the noncertified farmers. In fact, the yield rate of coffee reported by the surveyed respondents is highly dispersed across observations. The second reason for lower income from coffee is the farm gate price received by both groups of farmers. The noncertified cooperatives have paid their members NRs. 85/kg for fresh cherry while the certified farmers have received NRs. 75/kg from their cooperatives in company led organic certification scheme. However, agricultural income of certified farmers was found leading (NRs. 13,250) than non-certified farmers (NRs. 6627), which has shown that certified farmers were getting higher revenue from other agricultural enterprise, so they were more interested in other agricultural enterprise rather than coffee or they had not focus coffee as commercial crop. Likewise, annual income from livestock sector was also found high in case of certified farmers (NRs. 62,872) in comparison of non-certified farmers (NRs. 29,525). Reason behind low revenue from coffee is also might be people were more engaged in livestock rearing in certified area. Income from service was reported high in non-certified area (NRs. 114,050) than certified area (NRs. 40875) which was statistically significant at 10 percent level of significance. Similarly, income from wage labour

and remittance was reported high in non-certified area than certified area (Table 2).

### Factors Affecting Certification

To identify the factors influencing company initiative organic certification of coffee, logit model was used. To run the logit model and to know the factors affecting certification, all the important variables were categorized into binary responses.

Among the explanatory variables used in logit model to gauge factors affecting on company initiative organic certification adoption by small scale farmers, education, access to credit were found positively and statistically significance at 1percent level. However, ethnicity, total cultivated land, percentage share by coffee subsector on annual household income were found significant but negative impact of decision for certification scheme (Table 3).

In case of education status of HH head, if HH head was literate the probability of organic coffee certification increased by about 40.9 percent as compared to illiterate HH head. Education was positively associated with adoption of certification process. Finding was in line with D'Souza et al. (1993) where farmers with at least a high school education have a 20 percent increase in the likelihood of adoption. This may be because better educated farmers are able to better understand the value adding technique and benefits from process upgrading.

Access to credit had positively and highly significant impact on certification decision in study area, if farmer had easy access to credit from local cooperatives, micro finance institution and banks, the probability of adoption of coffee certification increased by 53.5 percent than farmers did not have credit access. Similar kind of findings was found in Kattel (2009). Higher the credit access, higher will be the investment in upgrading decision of the commodity/coffee.

Total cultivated land in households had significant but negative impact on certification at 1 percent level if

cultivated land increased by 1 ropani the probability of adoption of coffee certification decreased by 1percent. As the revenue from agriculture sector except coffee and livestock sector was reported more, with the increment in total cultivated land, farmers tend to invest more time and money on livestock and agriculture sector rather than coffee. This might be due to company based certification only or more focused to small holder farmers.

Ethnicity also has negative impact on adoption certification process. Ethnicity here is taken as dummy by taking (Brahmin/chetri=1, others= 0). Ethnic group other than

Brahmin /chetri have less access to education, less access to credit in comparison of Brahmin /chetri.

Similarly share percentage of coffee in HH income had negatively significant effect on certification decision at 1 percent level, if 1 percent increases in coffee share on HH income the probability of certification decreased by 3.3 percent in the study area. It could be commercial coffee grower they have their own market chain in Nepalese specialty niche coffee market with premium price and they relucted company based certification which can create market and price dominance due to low bargaining power of small scale farmers.

**Table 3:** Factors influencing the certification process

Variable	Coefficients	P> z	Standard error	dy/dx	S.E.
Economic active member	0.618	0.674	0.146	0.0134	0.032
Livestock holding	0.166	0.091	0.098	0.036	0.022
Ethnicity#	-1.994***	0.002	0.630	-0.446***	0.135
Education#	4.237**	0.012	1.680	0.409***	0.101
Gender of household head#	-1.219	0.164	0.875	-0.287	0.203
Age of household head	0.028	0.208	0.022	0.006	0.004
Credit access#	3.497***	0.000	0.867	0.535***	0.103
Training received#	-2.805	-0.441	3.637	-0.573	0.392
Total cultivated land	-0.072*	0.065	0.039	-0.015*	0.008
Migrated member#	0.366	0.530	0.583	-0.078	0.119
Coffee Share	-0.1552**	0.025	0.069	-0.033**	0.012
Constant	-2.383	0.546	3.499		
Number of observations	=160				
Log likelihood	= -51.75				
LR chi2(9)	= 118.30.40***				
(Probability > chi2	= 0.0000)				
Pseudo R2	= 0.53				

Note: \*\*\* and\* indicate significance at 1% and 10% levels, respectively. dy/dx indicates marginal change in probability (marginal effects after logit). # indicates dummy variable (1=yes)

**Table 4:** Regression estimates for determinants of income from coffee (NRs. in natural log)

Variables	Coefficients	Standard Error	T	P
Economic active members in number	-0.009	-0.0094	-0.22	0.824
Age of HH head	-0.003	0.005	-0.61	0.541
Gender of HH head (Dummy)	-0.181	0.196	-0.93	0.356
Ethnic group (Dummy)	0.005	0.157	0.04	0.971
Education (Dummy)	0.247	0.259	0.95	0.341
HH_size	0.036	0.029	1.26	0.208
Livestock holding	0.008	0.017	0.52	0.604
Certification adopted (Dummy)	-0.8348***	0.205	-4.07	0.000
Log_coffee_land (Ropani in log)	0.8023***	0.120	6.628	0.000
Migrated member (Dummy)	-0.040	0.146	-0.28	0.783
Credit access	-0.216	0.187	-1.15	0.251
Constant	8.893	0.435	20.44	0.000

\*\*\* indicates significance at 1% level

Number of obs = 158  
 F (10,147) = 18.40  
 Probability> F = 0.0000  
 R-squared = 0.55  
 Adjusted R-squared = 0.5  
 Root MSE = 0.8348

The regression model presented in Table 4 shows that, a ropani increase respondent's land in coffee cultivation, the income from coffee income is increased by 0.8023 units. Certification process adopter farmer household has 0.834 units less coffee income than those farmers have not adopted coffee certification process which is significant at 1percent level. There are also a number of empirical case studies with critical conclusions towards certification on farmers' livelihood. They hint at its theoretical and practical limitations particularly when applied in developing countries' rural contexts. From the results presented by Jena (2012), it becomes evident that certification does not guarantee the members of certified farmers a higher coffee price and higher gross coffee revenues than their counterparts. Price difference between certified and non-certified has also found non-significant.

## Conclusion

Organic farms face many more technical problems than conventionally cropped farms due to which productivity of organic farm decreased than conventional farm. A low and negligible impact of certification on producers' livelihood mainly due to very low productivity of coffee, no price premium, poor access to credit and information from company to the farmers. Effective monitoring and premium assessment from certification scheme need to have judged from concerned stakeholders to increase the benefit from certification, to promote proper certification and in coffee market chain.

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