

# The Impact of Coffee Production on Nepali Smallholders in the Value Chain

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## 1. Introduction

Among the different agricultural products produced and exported from Nepal, coffee is growing as a competitive one with 7.3% share of country's total 15% agricultural export share (FAOSTAT /World Bank, 2006). Coffee is economically more (nearly three times) profitable in the present context among the farmers as compared to other cereal crops (Bajracharya, 2003). In fact, coffee is grown in Nepal at the altitudes of 600 to 1600 meter above sea level and all are Arabica variety. Nepal produced 181 MT of green beans coffee in the fiscal year 2006/07, almost five times the quantity in year 2000/01. It is estimated that coffee production area expanded from 424 ha in year 2001/02 to 1400 ha in year 2006/07 with the involvement of around 12800 farm families (CoPP/Helvetas, 2007; NTCDB, 2009). Annually, total coffee production and area of production of coffee in Nepal is increasing by 35% and 28% respectively (AEC/FNCCI, 2007).

In the context of entering in the global market, Nepali coffee faces upgrading related problems. Participation in international trade with the developed countries will offer great opportunities to Nepal. But, at the same time, quality and upgrading requisite for agricultural products set by these countries are very high that Nepal in many situations fails to meet these criteria due to lack of financial and technical resources (Adhikari & Adhikari, 2005). Meanwhile, Nepal needs to improve the quality of coffee to be recognized as specialty coffee in the international niche market. However, lack of research to identify and recommend upgrading technologies has been a major bottle neck to improve the quality of coffee. On the other hand, different certification schemes have been suggested to improve livelihood status of the smallholder coffee farmers. In fact, certification is new entry for Nepal. The impact of organic production on farmer welfare is an important issue since organic coffee production has been suggested to lower yields and farmer income compared with that can be achieved using conventional methods (van der Vossen, 2005). Thus, the study is equally important to gauge the impact of "Group Organic Certification" on the livelihood strategies of Nepalese smallholder coffee producers.

This study focuses its attention on the case of value chain of coffee in Nepal. The major objective of this paper is to examine the impact of coffee production on smallholders' livelihood taking their integration into the value chain into account. More specifically, the objectives of the study are: (1) to assess the differences between certified and non-certified Nepali coffee producers, (2) to understand the function of the Nepali coffee value chain and investigate whether certification scheme offers additional benefits to the smallholder coffee producers and (3) to assess major entry barriers of Nepali coffee in the international market.

## 2. Materials and Methods

A multi-stage sampling procedure was used to select districts, sub-locations<sup>1</sup> and small-scale coffee producers. The study was conducted in Gulmi and Kavre district from August to October, 2008. One hundred and twenty respondents were selected on a three-stage sampling procedure. In the first stage, Gulmi and Kavre districts were purposively selected based on two considerations: (1) where, Group Organic Certification has been applied in Gulmi district, and (2) the important of Arabica coffee in the export market.

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Group Organic Certification has been applied in each coffee producing sub-locations through initiation of cooperative only in Gulmi district in Nepal, so the randomly selection of smallholder respondents with and without certified from certified district had not been possible. Meanwhile, during the second stage, three villages were purposively chosen in each district according to the criteria: (1) altitude of the coffee farms [high (>1000 m), medium (1000-850 m) and low (<850-700 m)] and (2) small-scale coffee farmers (having less than a hectare of coffee cultivation land). Finally, in the third stage, 120 smallholder coffee producers' households were selected, where average 20 farmers' households were randomly selected from each sub-location. Coffee from Gulmi district is sold through the cooperative that has organically certified while in Kavre district it is sold to the non-certified conventional market chain.

The data were collected by trained enumerators supervised by the first author, using semi-structural questionnaires. Besides personal interviews, a series of formal and informal farmer group discussions was also conducted to complement the household survey. Six focus group discussions were carried out with coffee producers and expert interviews with Coffee Cooperative Federation in Gulmi, two District Coffee Producers' Associations and three traders/exporters were done. Data collected via focus group discussion and expert interview include qualitative on the strengths, weakness, opportunities and threats (SWOT) on coffee production and marketing as well as contractual relationships between farmers and buyers (either cooperative or companies). Data cleaning was conducted after the data entry. It implies detecting and removing errors and inconsistencies in order to improve data quality. Data were analyzed by using SPSS (Version 16).

### 3. Results

#### 3.1 Descriptive and comparative statistics

Table 1 provides a list of the variables that are considered in the study along with their descriptive statistics. The descriptive analysis focuses especially on the differences and similarities between certified and non-certified producers. It is structured according to the characteristics of the coffee farm, upgrading at farm, information and trading.

The average mean of fresh coffee yield per hectare in 2007 was 24.5 quintal, ranging from 2.5 to 81.4 quintal per hectare. Average yield of fresh coffee per hectare was higher in non-certified district (27.8 qq/ha that is equivalent to 4.6 qq/ha green beans) as compared to certified district (20.7 qq/ha. that is equivalent to 3.5 qq/ha green beans) in 2007 that is significant differences between two groups at a 10% level. The variability of coffee yield among the sampled farms may have been partly also due to climatic differences and biennial yield pattern of coffee. Yield of coffee in farm has been influencing by the factors of coffee trees age (potential coffee yield after 7 years of tree age) and agronomical practices with better inputs managements (like cultivation practices, varieties selection, shade tree management, irrigation and training- pruning). The reason of low yield in organic certified farm could be certified farmers facing production related shocks (about 72%), mainly due to the epidemic of white stem borer insect and lack of irrigation facilities. In a pair wise farm comparison, [Lyngbaek, et al. \(2001\)](#) found mean yield drops of 22% on shaded organic coffee farms, compared to conventional shaded coffee farms. [Pülschen & Lutzeyer \(1993\)](#) found mean yield reductions of 28% on an organic shaded coffee farm compared to a neighboring conventional shaded coffee farm in Mexico. Yield reductions were attributed to problems in replacing inorganic nitrogen (N) fertilizers by organic N sources ([van der Vossen, 2005](#)).

Similarly, the average percentage of shade trees cover in coffee farm was 57 which seem higher in non-certified farm (63.8%) than certified ones (50.7%), that is also statistically significant different at 5% level. Regarding additional average income from intercrops and shade trees they are not significant different between two groups. The high productivity and better quality of coffee in shaded system are expected due to the reduction of the pest incidence in coffee orchard like white stem borer ([Muschler, 2001](#)). The average annual household income from coffee was Rs.6056, ranging from Rs.120 to Rs.60000. A comparison of the mean values between the groups clearly indicates that certified farmers have high

annual coffee income (Rs.6140) compared to non-certified (Rs.5966) but there is no significant differences between two groups.

Regarding the Group Organic Certification<sup>2</sup>, certified producers received higher price compared to non-certified ones and that is statistically significant different at 1% level both for fresh coffee cherries and dry parchment (i.e. wet processed) sales. Certified smallholders received about 20% higher price premiums per kg of fresh coffee and 6% per kg of dry parchment than those conventional coffee smallholders received in conventional market chain. Smallholders also experience environmental benefits from certification and group approach certification scheme is seen costs effective for the smallholders and as a passport to entry international markets.

Majority of coffee producers (71.7%) in certified areas were faced coffee production related shocks during last three years due to epidemic of white stem borer pest and other natural disasters compared to non-certified producers (21.7%) that is seemed significant differences between two groups at a 1% level. Regarding the membership of farmers in village level saving and credit cooperatives, 33% certified farmers have had membership compared to 15% non-certified ones and that is also seemed significant difference at a 5% level. With respect to data on wet process upgrading at farm and sale dry parchment, an average 33% coffee farmers were involved in wet processing at farm. The study reveals that most of the non-certified farmers (40%) were involved in farm level wet processing and sales of dry parchment as compared to certified ones (25%) that is statistically significant different at a 10% level. Furthermore, it is interesting that, some certified producers (43.3%) were actively involved for keeping record on coffee production and marketing activities as compared to non-certified ones (18.37%). That is statistically significant different at a 1% level. However, other dummy variables like access to credit, trust and training received for quality enhancing practices are not seemed statistically significant different between two groups.

**Table 1:** Comparison of group organic certified and non-certified coffee producers in study areas

Description of the variables	Certified (n=60)	Non-certified (n=60)	Total (N=120)	Test of significance #
<b>Characteristics of coffee farm</b>				
Yield of coffee cherry in 2007 (qq/ha)	20.7	27.8	24.5	-1.844*
% of shade trees cover	50.7	63.8	57.2	-2.457**
Price received from fresh cherry (Rs.)	30	25.1	27.5	11.195***
Price received from dry parchment (Rs.)	160	151.2	155.6	5.817***
Income from coffee (Rs.)	6,140	5,966	6,056	0.103
Income from shade trees (Rs.)	3,597	2,388	3,008	1.328
Income from intercrops (Rs.)	1,718	1,672	1,696	0.063
Coffee production related shocks <sup>3</sup> (yes=1)%	71.7	21.7	46.7	30.134***
<b>Upgrading at farm and trading</b>				
Wet process upgrading (yes =1) %	25	40	33	3.077*
Training received (yes =1) %	70	58.3	64.2	1.331
Group membership (yes=1)%	33	15	24	5.502**
Book keeping on coffee (yes=1)%	43.3	18.3	30.8	8.792***
Access to credit (yes=1)%	38	45	42	1.739
Trust based agreement (yes=1)%	45	31.7	38.4	2.256

Note: Statistical significance at the 0.01 (\*\*\*), 0.05 (\*\*) and 0.1 (\*) level of probability. # t-test for continuous variables and chi-square test for dummy variables (dummy in %, yes =1).

1 US \$ = Nepalese Rupee (Rs.) 71.06 (in 2007/08).

<sup>2</sup> Group Organic Certification scheme is costs effective because around 30-50 smallholder farmers from same village are involved in certification under Internal Control System (ICS) and have had received group certification license not individually. An Internal Control System (ICS) is the part of a documented quality assurance system that allows an external certification body to delegate the periodical inspection of individual group members to an identified body or unit within the certified operator. This means that the third party certification bodies only have to inspect the well-functioning of the system, as well as to perform a few spot-check re-inspections of individual smallholders. <sup>3</sup>Shocks: mainly due to the epidemic of white stem borer in coffee orchard.

### 3.2 Value chain structure of Nepali coffee

The major actors participating in coffee value chains in the study area were identified. They are the inputs suppliers, the smallholder farmers, village level pulper operators, producers' associations, cooperative and private companies. The next chain after producers in certified chain is either village level pulper operators or cooperative while in conventional chain is either village level pulper operators or Everest Coffee Mill (company). In both chains, more than 50% green beans coffee is sold to the international market mainly Japan, USA, and European countries. Only high quality green beans is sold to export while low and medium classes quality of coffee is sold in domestic market either roasted beans or filter/ground coffee through retailer in hotels and major city markets from both chains. As a whole institutional relationship with producers associations and input suppliers in conventional market chain actors are more closed and mutual than certified chains actors. Thus, the type of trust and power dependence among the actors can determine how information flows and how farms upgrade. Indeed, value chain structure of Nepali coffee reveals weak upgrading function and quality inconsistency as well as low bargaining power to the smallholders due to monopoly market situation in both certified and conventional market chains.

However, as noted previously, the interventions were more comprehensive and extensive than what would be recommended under a value chain approach to sector development where facilitation of market forces to strengthen firms is considered more appropriate than direct assistance. There was very little direct support in the form of institution and capacity building and even institution creating with the unions. Institution building in the form training and technical assistance to improve quality, processing and marketing by farmers, cooperatives, companies and unions was not successfully completed in both certified and conventional market chains. This fact then raises an important question address about the value of combining a strong firm level capacity building program and the value chain approach should be needed in both chains.

### 3.3 Major entry barriers for Nepalese coffee to the international market

Entry barriers of Nepali coffee to integration into the international market chain are higher. Mainly smallholder coffee farmers and exports are facing two main entry barriers to the coffee market, namely quality inconsistency due to lack of grading of coffee according to altitudes and poor farm level product and process upgrading, and secondly low quantity of supply due to low economic scale of production by resource poor farmers. Although these entry barriers apply to all farmers and exporters in two sampled districts, the degree to which they affect them varies. Comparing the value chains of organic certified green beans with the non certified green beans in the international market, one finds that entry barriers are indeed higher in conventional marketing chain.

**Table 2:** Comparison the major entry barriers in different marketing chains.

Major entry barriers to export		For certified chain through cooperative	For conventional chain through companies
1	Consistency in quality	High	High
2	Quantity supply	High	High
3	Relationship buyer	Medium	Medium
4	Certification of origin	Low	High
5	Frequency of supply	Low	Low
6	Initial qualification	Medium	Medium
Thus, inconsistent quality and low quantity supply are the major entry barriers of Nepali coffee in the international market in both certified and conventional market chains.			

*Note: Degree of barrier to entry: High, Medium and Low for different market chains to the exports.*

Source: From expert interview and SWOT analysis (2008).

## 4. Conclusions

The study findings show that product upgrading practices for improving yield and quality of coffee was very low at farm level in both certified and conventional market chains. Also farmers have very few technical knowledge and low financial access for scaling economic of production and product upgrading at farm. It is also observed that organic certified smallholders are more vulnerable due to production shocks mainly due to the epidemic of white stem borer pest, although they have received marketing access through cooperative. Furthermore, a comparison of the mean value between the groups clearly indicated that yield of coffee, percentage of shade tree covers, wet process upgrading at farm, membership, shocks related to coffee production and farm gate price received show significantly different between certified and non-certified coffee farmers.

Findings of the study reveal that most Nepali coffee producers have little bargaining power and trust in trade due to the lack of adequate support in farm level upgrading activities, in addition asymmetric market information. Regarding Group Organic Certification, certified smallholders received around 20% higher price premiums from per kg of fresh coffee and 6% from per kg of dry parchment through cooperative than conventional coffee smallholders received in conventional market chain. However, the price premium to the certified smallholder seems to play less important role for improving their livelihood, instead, certification is seen as a passport to enter international market and farmers experience environmental benefit as well as cost effective for the smallholders. Regarding barriers to entry, inconsistent quality and low quantity supply due to low scale of production are found majors to the international markets for Nepali Arabica Specialty coffee.

Therefore, investment should be made in product and process upgrading by improved production management through extension and research. Furthermore, investment should be done in wet processing according to altitudes for maintaining consistent quality of Nepali coffee in the global market.

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