

## Certification of Orthodox Tea and Its Impact on Farmers' Livelihood in the Eastern Himalayan Corridor of Nepal

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### Abstract:

*This study was conducted to assess the impact of third party organic certification of orthodox tea on tea growers' livelihoods in Eastern Himalayan Corridor of Nepal. A total of 441 sample households were purposively selected (213 certified and 228 non-certified tea growers) and obtained data from cross-sectional household survey including two focus group discussions and key informant interview in Ilam district in 2014. The results revealed that higher land holding (more than 0.5 ha) of tea cultivated land, livestock holding and yield of orthodox tea had positively significant effect on annual household income of tea growers. However, certification of orthodox tea had positive but non-significant effect on annual income of tea growers. Certification was seemed a catalyst to export orthodox tea in international market with quality standard but, farmers could not benefit substantially. Findings showed that the certification of orthodox tea had low impact on tea producers' livelihoods mainly due*

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*to three reasons such as low productivity, minimum price premium, and unavailability of organic fertilizers and bio-pesticides in the study area.*

**Key words:** Orthodox tea, Organic certification, Eastern Himalayan Corridor, Nepal

## INTRODUCTION

Nepal produced 2.3 million kilograms of orthodox tea (NTCDB 2015)<sup>2</sup>. Ilam is the leading district of orthodox tea production, followed by Panchthar, Dhankuta and Terahthum. Despite high global demand, the production of organic orthodox tea is still low in Nepal due to low technical innovation and poor farming practices. The estimated average manufacturing cost was Nepalese Rupee (NRs.) 140 to 200/kg for conventional tea and NRs. 260 to 300/kg for organic tea in 2011 (NEAT 2011). Agriculture Development Strategy (2015-2035) has also focused on tea sub-sector among five identified sub-sectors for value chain analysis and agribusiness development in Nepal (ADS 2014). There are mainly five steps in value chain development of orthodox tea such as input supply, green tea leaves production, processing, marketing and consumption. Firstly, the green tea leaves production requires inputs such as fertilizers, saplings, pesticides, irrigation, labor, land and capital. Secondly, skilful plucking of green tea leaves and collection in collection centres, trading and dropping them to processing industries within 12 hours for quality production of orthodox tea. Thirdly, processing, grading, packaging and labelling are the value addition activities in this stage. Fourthly, efficient marketing channel for the distribution of the orthodox tea is required. Lastly, standard quality and quantity

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<sup>2</sup> NTCDB. (2015). Statistical Record of Nepal tea. International Tea event, 2015. National Tea and Coffee Development Board, Kathmandu, Nepal.

is required for the assurance of end users in international markets. The efficient commercial production, processing and marketing are influenced by the present socio-cultural, infrastructure, support services and government economic policies for export promotion.

Eastern Himalayan Corridor (EHC) of Nepal is the green basket for earning foreign currency, employment generation and environmental protection through commercializing high value crops (HVCs) of agricultural commodities such as tea, cardamom, ginger, cabbage, tomato, mandarin orange, banana and turmeric. EHC is the popular for commercial plantation point of view. Green tea leaves with tips are used for processing of organic orthodox tea and fetching good price in international market. However, the prices of green tea leaves is unstable and lower in the farmers' field and leading low income to tea growers. Certification was originally perceived as a strategy for strengthening the position of orthodox tea producers in the value chain. The organic certification of tea is to encourage supply chain actors such as contractual and regular sales to tea producers; and quality and reliable sources of raw material to the tea processing factories (NEAT 2011).

It was expected that shortening the supply chain through direct interactions with exporters and processors would reduce the transaction costs and market risks and enhance knowledge of good agricultural practices, thus providing suitable incentives for quality upgrading (selling at better prices on premium market segments) and for maintaining scheduled deliveries (to avoid fluctuations occasioned by side sales (CIDIN 2014)). While certification scheme improves production quality standards and labeling generates economic and environmental benefits, conversion to organic farming and entering fair trade marketing arrangements is not without costs to farmers (Waibel and Zilberman 2007). To meet required

production and quality standard product can be demanded, especially from poor resource and educated farmers. A study in Colombia indicated that the certified organic coffee had no higher economic benefit than conventional production (Ibanez and Blackman, 2015). Certified organic farmers had a significantly higher income but participation in fair trade regimes did not generate additional monetary benefits in India (Parvathi & Waibel (2015). This study was done to assess the impact of organic certification of orthodox tea on farmers' livelihoods in EHC of Nepal.

## **METHODOLOGY**

The major orthodox tea growing districts in the EHC are Ilam, Panchthar, Terhathum, and Dhankuta in Nepal. This study was conducted in Ilam district by conducting survey of 441 sampled households (213 certified and 228 non-certified orthodox tea producers) from nine Village Development Committees (VDCs), namely, Shantidanda, Mangalbare, Shakhejung, Maipokhari, Shreeantu, Sunderpani, Kolbung, Fikkal and Kanyam. In addition, two focus group discussions (FGDs) with certified and non-certified tea producers were done separately to collect qualitative information. Additional FGDs were conducted with cooperative members and traders. Key informant interview (KII) with processors, business enabling actors, inputs/service providers were also done. The primary data were entered in Census and Survey Processing System (CSPRO) and analyses were done using statistical package for social science (SPSS) and STATA. Descriptive statistics, inferential statistical tools and income function regression model were used for measuring annual income of tea growers. Income from tea sector was used as a dependent variable which was determined by independent variables such as certification, total land category, tea cultivated land category, livestock

standard unit, log yield, interaction between certification as dummy and tea cultivated land category and access to credit from village level cooperative.

Tea income and tea yield have high variability. To control data deviation and variability, income and yield variables were transferred to the natural logarithm. Following econometric model expression was used to measure the impact of organic certification on annual household income from orthodox tea:

$$\text{LogINCOME}_i = \delta_0 + \delta_1 \text{CERTIFICATION}_i + \delta_2 \text{LAND\_CAT}_i + \delta_3 \text{LAND\_TEA}_i + \delta_4 \text{LSU}_i + \delta_5 \text{LogYIELD}_i + \delta_6 \text{CERTIFICATION} * \text{LAND\_CAT}_i + \delta_7 \text{CREDIT}_i + \mu_i$$

Where,

LogINCOME = Annual income from orthodox tea (NRs. at natural log)

CERTIFICATION= Organic certification of orthodox tea (if certified=1, 0=otherwise) [Positive correlation]

LAND\_CAT= Land category under tea cultivated area (if more than 0.5 ha=1, 0 = otherwise) [Positive correlation]

LSU= Livestock Standard Unit [Positive correlation]

LogYIELD=Annual green tea leaves productivity (kg/ropani in natural log) [positive correlation]

CERTIFICATION\*LAND\_CAT= Interaction between certification as dummy and tea cultivated land category (if more than 0.5 ha=1, 0 = otherwise)

CREDIT= Access to credit from village level Cooperative (if Yes=1, 0= otherwise) [Positive correlation]

## RESULTS AND DISCUSSION

### **Socio-demographic characteristics of the respondents**

The average age of the respondents was 47 years which was slightly higher among certified respondents than non-certified. The year of schooling of certified respondents was significantly higher (8.54 schooling years) than non-certified tea growers (7.72 schooling years). The average household size was 5.11 members which was slightly higher among certified (5.13) than non-certified (5.09). About 69% household members were found

adult and economically active (age group 15-59 years) which was slightly higher among certified household (69.81%) as compared to non-certified (68.16%). Altogether 17% household members were dependent (age group less than 15 to more than 59 years). The socio-demographic features of the survey respondents are presented in Table 1.

**Table 1 Socio-demographic characteristic of tea growers by their category**

Variables	Total (n= 441)	Certified (n = 213)	Non-certified (n=228)	Mean differences (t-test)
Age of the respondents	47.1	47.44	46.62	0.812
Gender (Male=1)	0.74	0.74	0.74	0.005
Year of schooling (Education)	8.1	8.54	7.72	0.822*
Household Size	5.11	5.13	5.09	0.039
Family Type (Joint=1)	0.09	0.1	0.07	0.033
Economically Active household members (%)	68.95	69.81	68.16	1.64
Dependency Ratio	0.17	0.16	0.17	-0.107

Note: \* Significant at 10% level

### Inputs and services

Inputs availability for orthodox tea production among certified and non-certified surveyed households is presented in Table 2. Among the respondents, 20.6% had regular availability of bio-pesticide which was significantly higher in certified (40.4%) than non-certified (2.2%). Only 17.9% non-certified growers expressed the availability of chemical pesticides in their village which was strictly prohibited their application to certified tea crops and the value was significant at 1% level. In case of availability of vermi- compost, 7% respondent had regular access which was also higher for certified (14.1%) than non-certified growers (0.4%) and significant at 1%. Furthermore, availability of farm yard manure (FYM) was same for certified and non-certified orthodox tea producers.

**Table 2 Availability of inputs by farmers' category**

Variables	Total	Certified	Non- certified	Chi-square Value
<b>1. Availability of Bio-pesticides</b>				
Regular	91 (20.6)	86 (40.4)	5 (2.20)	106.27***
Irregular	5 (1.10)	5 (1.10)	0 (0.00)	
No access	245 (78.2)	122 (57.3)	223 (97.8)	
<b>2. Availability of Chemical Pesticides</b>				
Regular	79 (17.9)	0 (0.0)	79 (17.9)	98.368***
Irregular	6 (1.4)	0 (0.0)	6 (2.6)	
No access	356 (80.7)	213 (100.0)	143 (62.7)	
<b>3. Availability of Vermi-compost</b>				
Regular	31 (7.0)	30 (14.1)	1 (0.4)	38.852***
Irregular	6 (2.8)	6 (2.8)	0 (0.0)	
No access	404 (91.6)	177 (83.1)	227 (99.6)	
<b>4. Availability of FYM/Manures</b>				
Regular	424 (96.1)	205 (96.2)	219 (96.1)	2.841
Irregular	7 (1.6)	5 (2.3)	2 (0.9)	
No access	10 (2.3)	3 (1.4)	7 (3.1)	

Note: Figures in parentheses indicate percentage. \*\*\* Significant at 1% level.

### **Economic characteristics of tea growers**

The respondent households' economic characteristics are presented in Table 3. Among the respondent households, the average cultivated land was 28.12 *ropani*, it was higher in certified tea growers (33.87 *ropani*) than non-certified tea growers (22.75 *ropani*) and it was statistically significant at 1% level. The average tea cultivated area of the household was 11.94 *ropani*. The non-certified tea growers had larger farms (12.14 *ropani*) compared to certified tea growers (11.72 *ropani*); but statistically not significantly different. The share of tea cultivated land to total cultivated land was nearly 50% among the tea growers which was higher with non-certified tea growers (59.18%) than certified tea growers (39.90%) and it was significant at 1% level. The average green tea leaf production was 249.35 kg per *ropani*, it was lower in certified tea growers (107.59/*ropani*) than non-certified tea growers (381.79/*ropani*) and they were statistically significant at 1% level. The practices behind the higher yield of green tea leaves by non-certified tea growers were heavy application of chemical fertilizer (urea)

whereas certified tea growers had applied limited amount of organic manures and vermi-compost. The annual green tea leaves production was 3391.02 kg/household among the respondent households. It was higher in non-certified tea growers (5454.10 kg/household) than certified tea growers (1182.66 kg/household) and it was statistically significant at 1% level. The green tea leaf yield of certified tea growers was lower than non-certified tea growers and it was not encouraging to certified tea growers.

The average price of green tea leaves of orthodox tea was NRs 47.89/kg, it was higher in certified tea growers (NRs. 53.26/kg) than non-certified (NRs. 42.86/kg) and statistically it was significant at 1% level. The average household's income from orthodox tea was NRs. 129738 which was higher in non-certified tea producers (NRs. 190809) than certified ones (NRs. 64366) which was statistically significant at 1% level.

**Table 3 Economic characteristics of tea growers by farmers' category**

Variables	Total (n=441)	Certified (n=213)	Non-certified (n=228)	Mean Difference	T- Value
Total cultivated land (Ropani) <sup>3</sup>	28.12 (25.47)	33.87 (32.63)	22.75 (14.27)	11.11	4.687***
Tea cultivated land (Ropani)	11.94 (11.68)	11.72 (11.24)	12.14 (12.10)	-0.42	-0.378
Share of tea land in total cultivated land (%)	49.89 (43.80)	39.90 (25.15)	59.18 (54.24)	-19.27	-4.723***
Tea yield (kg/Ropani)	249.35 (194.86)	107.59 (62.39)	381.79 (183.00)	-274.2	-20.760***
Annual HH level tea production (in kg)	3391.02 (8067.17)	1182.66 (1436.14)	5454.10 (10740.93)	-4271.43	-5.755***
Average orthodox tea price (NRs./kg)	47.89 (8.59)	53.26 (4.65)	42.86 (8.38)	10.39	15.944***
Annual income from tea sub sector (NRS.)	129738 (146817.90)	64366.69 (77577.6)	190809.40 (168537.7)	-126442.7	-10.003***

Note: \*\*\* Significant at 1% level. Figures in parentheses indicate Std. Dev.,

### Econometric results: using income function model

Table 4 illustrates the descriptive statistic of variables used in the econometric model to gauge the impact of certification on annual orthodox tea income at household level.

<sup>3</sup> 20 Ropani = 1 hectare



**Table 4 Descriptions of the variables used in the econometric model**

Variables	Description of the variables	Obs.	Mean	Std. Dev.
CERTIFICATION	Organic certification of the orthodox tea (1=Certified, 0=Non-certified)	441	0.48	0.50
CREDIT	Access to credit from village level cooperative (1=Yes, 0=No)	441	0.48	0.50
INCOME	Annual income from orthodox tea (in NRs.)	441	129728.2	146828.7
logINCOME	Annual income from orthodox tea (NRs. In natural log)-dependent variable	441	11.18	1.15
LSU	Livestock standard unit	441	2.15	1.50
LAND_CAT	Tea land category (1= more than 0.5 hectare, 0= otherwise)	441	0.39	0.48
LAND_TEA	Tea cultivated land (Ropani)	411	11.94	11.68
YIELD	Tea yield (in kg/ropani)	441	249.29	194.93
logYIELD	Tea yield (kg/ropani in natural log)	441	5.19	0.83
CERTIFICATION*LAND_CAT	Interaction between certification and land category	441	0.18	0.38

Impact of certification including other control variables on annual household income from tea orthodox tea is presented in Table 4. The model is found well fitted having determination of 78% in dependent and independent variables ( $R^2= 0.78$ ). F-test is highly significant at 1% level whereas, variance influence factor (VIF) is 2.06 which expressed no multicollinearity in explanatory variables. Residual versus fitted plot (Appendix A and B) showed that residuals (error term) were randomly distributed with tea income which reflected no heteroscedasticity in model. Among the variables used to find

out the impact of certification of household orthodox tea annual income, land category as dummy (LAND\_CAT), total tea cultivated land (LAND\_TEA), livestock standard unit (LSU), tea yield (logYIELD) had statistically and positively significant, while certification dummy (CERTIFICATION), interaction between certification and land category (CERTIFICATION\*LAND\_CAT) and credit (CREDIT) had positive but statistically non-significant effect on income from orthodox tea. All variables used in the model had positively influence on orthodox tea income.

$$\begin{aligned} & \text{Real impact of CERTIFICATION on logINCOME} \\ & = 0.102 + 0.103 (\text{mean of LAND\_CAT}) \\ & = 0.102 + 0.103 (0.48) \\ & = 0.151 \end{aligned}$$

$$\begin{aligned} & \text{Real impact of LAND\_CAT on logINCOME} \\ & = 0.661 + 0.103 (\text{mean of CERTIFICATION}) \\ & = 0.661 + 0.103 (0.50) \\ & = 0.712 \end{aligned}$$

CERTIFICATION variable has positive but non-significance effect on tea sub-sector income. If farmer had done organic certification of tea, tea income had been increased by about 15% as compared to non-certified conventional tea. Real impact of certification on tea income was accurately assessed using interaction effect of certification and land category. If farmer had more than 0.5 ha land for tea production, annual income from tea had been increased by 71%. Tea land category had positively significant effect on tea income at 1% level. If farmer had more than 0.5 ha tea cultivation land, the annual tea income had been increased by 66% as compared to farmer having less than 0.5 ha tea cultivated land. Livestock holding (LSU) had positive impact on tea income by 3.9% at 5% level of significance. If yield increased by 1%, the annual house income

from orthodox tea increased by 1% which was found statistically significant at 1% level (Table 5).

**Table 5 Econometric results of orthodox tea certification**

Variable	Coef.	Std. Err.	T	P> t
CERTIFICATION	0.102	0.093	1.09	0.276
LAND_CAT	0.661***	0.083	7.91	0.000
LAND_TEA	0.034***	0.002	12.21	0.000
LSU	0.039**	0.017	2.29	0.023
<i>LogYIELD</i>	<i>1.000***</i>	<i>0.049</i>	<i>20.31</i>	<i>0.000</i>
CERTIFICATION*LAND_CAT	0.103	0.107	0.96	0.337
CREDIT	0.068	0.057	1.20	0.232
Constant	4.120***	0.290	17.62	0.000
Statistical Summary:				
No. of obs.	441			
F (7, 433)	217.65***			
R-squared	0.78			
Adj R-squared	0.77			
Mean VIF	2.06			

Note: \*\*\*Significant at 1% level; \*\*Significant at 5% level.

## CONCLUSION

Among the socio-demographic variables studied, the year of schooling of certified respondents was significantly higher (8.54 schooling years) than non-certified tea growers (7.72 schooling years). CERTIFICATION variable has positive but non-significance effect on orthodox tea income. Tea land category had positively significant effect on tea income at 1% level. If farmer had done organic certification of tea, tea income had been increased by about 15% as compared to non-certified. If farmer had more than 0.5 ha land for tea production, annual income from tea had been increased by 66%. Livestock holding (LSU) had positive impact on tea income by 3.9% at 5% level of significance. The certification was seemed a catalyst to export in international markets with quality standard but, farmers could not receive appropriate price. Findings showed that the certification of orthodox tea has in total a low impact on tea

producers' livelihoods mainly due to (1) low productivity, (2) minimum price premium, and (3) unavailability of organic fertilizers and bio-pesticides in study area.

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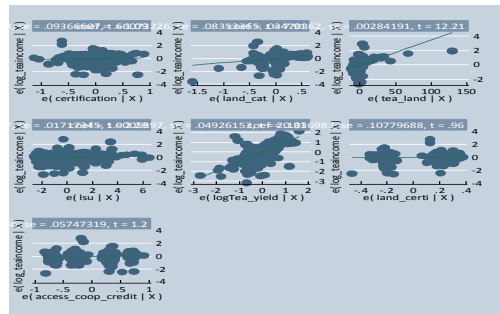
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**Appendix A: Linearity of log tea income with other variables (avplots)**



**Appendix B: Residual versus fitted plot (rvfplot): randomly distributed**

