



Impact of UTZ certification on cocoa producers in Ghana, 2011 to 2014

Appendices

Yuca Waarts, Verina Ingram, Vincent Linderhof, Linda Puister-Jansen, Fedes van Rijn, Richmond Aryeetey

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Yuca Waarts, Verina Ingram, Vincent Linderhof, Linda Puister-Jansen, Fedes van Rijn, Richmond Aryeetey, 2015. Impact of UTZ certification on cocoa producers in Ghana, 2011 to 2014, LEI Wageningen UR, Den Haag, 2015.

This study was carried out by LEI Wageningen UR and was commissioned and financed by UTZ Certified and Solidaridad

LEI Wageningen UR
Wageningen, December 2015

REPORT
LEI 2015-066
ISBN 978-90-8615-715-0

Waarts, Yuca, Verina Ingram, Vincent Linderhof, Linda Puister-Jansen, Fedes van Rijn, Richmond Aryeetey, 2015. *Impact of UTZ certification on cocoa producers in Ghana, 2011 to 2014; Appendices*. Wageningen, LEI Wageningen UR (University & Research centre), LEI Report 2015-066. 44 pp.

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Author: LEI, part of DLO Foundation, 2015

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LEI 2015-066 | Project code 2282600055

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Appendix 1 Extended methodology

Sample size calculations

In the baseline study, the sampling procedure was explained and results were reported.¹ The initial sample size was calculated based on 'a rule-of-thumb' of 30.² This rule of thumb is considered appropriate for cross-sectional surveys to explore the data, e.g. on heterogeneous effects related to site-specific characteristics. We increased the sample size to take attrition into account. At baseline we had no information on knowledge and implementation levels of Good Agricultural Practices and their variability, nor the expected effect-sizes. Also, limited information was available on productivity and income levels and their variability.

Using information from the baseline study, we could calculate the statistical power of the design of the longitudinal panel study to detect effects on knowledge level, implementation levels, and productivity levels. The baseline showed a high variability (standard deviation) in the values of indicators, especially in productivity and income data. These power calculations showed that the design was strong enough to measure an 8% increase in knowledge level, a 10% increase in implementation of good agricultural practices, and a 27% increase in yields. We did not base the sample size calculations on expected increases in incomes, as changes in wage levels and market price fluctuations influence the accuracy of net-effect calculations, for instance, because in Ghana the COCOBOD sets the price. Productivity is considered as the indicator at the limit of the span of direct influence, within which credible net-effect estimates can be made. We discussed the implications of this real-world variability for impact evaluation in Ton et al. (2013), using the results of a similar baseline survey in Ivory Coast. Cocoa income was also not used for sample size calculations as by doing so the required sample would have become very large and the study would not have been possible because of resource constraints.

The sampling procedure was conducted to find comparison group farmers who are similar to programme participants

Sampling was done in a way that comparison farmers had fairly similar characteristics as programme participants in cocoa producing areas. These comparison group farmers needed to be outside the direct influence of the programme training activities and live far enough from the programme's implementation area to become affected through the programme's possible spill-over effects. We were supported in the selection of these farmers by Solidaridad and the organisations implementing the projects. As no lists of all cocoa farmers in Ghana were available, we used two options to find comparison group farmers who would be similar to the programme participants:

1. We obtained lists from licensed buying companies from which we randomly sampled the farmers to be interviewed. As all farmers in Ghana sell their cocoa to an LBC, the farmers on such an LBC list would be representative for the area the LBC operates in.
2. When such a list was not available, we went to a community that fulfilled the characteristics for finding comparison group farmers, and found a farmer by entering the village who would be interviewed and who would lead us to another farmer to be interviewed (snowball sampling).

The sampling procedure led to similar respondents in the dataset

Table A1.1 on the next page gives an overview of the characteristics of certified and uncertified households in the baseline situation. These characteristics were taken into account to compare certified and uncertified farmers with each other because they constitute the main observable

¹ See Waarts, Y.R., L. Ge, G. Ton and J. van der Mheen (2013). A touch of cocoa; Baseline study of six UTZ-Solidaridad cocoa projects in Ghana. LEI report 2013-048. LEI Wageningen UR, the Hague, the Netherlands

² Creevey, L. and M. Ndiaye, 2008. Common problems in impact assessment research. Impact Assessment Primer Series #7, USAID, Washington DC, USA. In Ton, G., S. Vellema, M. de Ruyter de Wildt (2011). Development impacts of value chain interventions: how to collect credible evidence and draw valid conclusions in impact evaluations? Journal on Chain and Network Science 2011; 11(1): 69-84

characteristics of cocoa farmers which are not expected to be directly influenced by the programme. Households that were supported through the programme had a lower share of hired labour and slightly more farms. Certified respondents were also more often female at baseline. However, across the board it can be said that households were fairly similar at baseline; no statistical differences are found in 11 out of 14 characteristics. This confirmed that the baseline survey was able to create fairly comparable groups with certified and uncertified farmers. All quasi-experimental designs in which the treatment is not randomly allocated, like in an RCT, have a risk of selection bias: the treatment and comparison group will inevitably differ on some observable and unobservable characteristics. Therefore, we used several matching models to check the robustness of the results of the difference-in-difference design.³ These differences are controlled for statistically by using propensity score matching, regression analysis and a combination of both.

Table A1.1 *Characteristics of the respondents at baseline situation (2011)*

Characteristic	Uncertified	Certified	Significantly different
Share of female adults	30%	30%	
Share hired labour in total labour (in days)	9.3%	3.6%	***
Gender of respondent (Male is 0, Female = 1)	0.13	0.20	*
Age in years	50	49	
Education: number of years household head	7.3	6.7	
Whether respondent is Purchasing Clerk (No = 0, Yes = 1)	0.08	0.10	
Traveling time from home to farm in minutes	36	35	
Number of farms (0 = 1 farm, 1 = 2 or more farms)	0.59	0.71	**
Share of land owned by respondent	59%	51%	
Whether respondent is household head	94%	93%	
Whether respondent hires labour (No = 0, Yes = 1)	0.80	0.81	
Number of people part of the household	6	6	
Year of first establishment of the farm (proxy for age of cocoa trees)	1996	1994	
Farm size of all cocoa farms combined in acre	9.34	11.31	
Farm size of all cocoa farms combined in hectare	3.78	4.58	
Significant levels indicated as follows: *** ($\alpha = 0.01$). ** ($\alpha = 0.05$) * ($\alpha = 0.10$)			

Propensity Score Matching

The PSM model was determined using a two-step process. First, we examined correlations between the variables listed in table A1.1. While there is some correlation between the variables, none of the correlations is too high (>0.7 and statistically significant). Thus no variables had to be removed from the regression because of collinearity.

Second, we estimated the PSM model using a logit model where 0 means the comparison/uncertified group and 1 means the UTZ certified group. To decide which characteristics to include we used a stepwise procedure that included variables when they were significant in explaining the treatment at 15%. This is to ensure all relevant variables were included. The variables that were selected as predictors are:

1. Share of hired labour on total labour
2. Respondent is female
3. Number of cocoa farms, 0 = 1, 1 = 2 or more
4. Share of land under ownership
5. Year of first establishment of the farm.

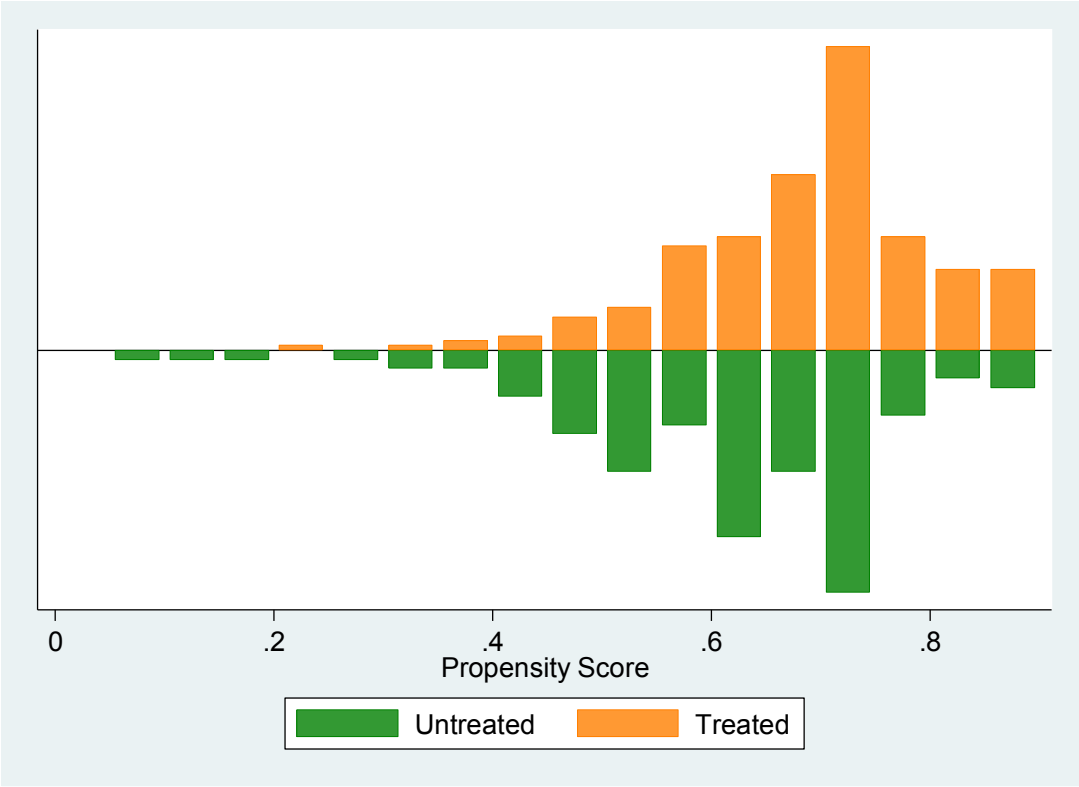
Common Support

On a scale of 0 to 1, the region of common support varies from .23 to .90. Only three uncertified households fall outside this common support. This shows that the certified and uncertified groups seem highly comparable on these observable characteristics. See also Figure A1.2 below. As an

³ See: van Rijn, F., K. Burger, and E. den Belder. 2012. Impact assessment in the sustainable livelihood framework. *Development in Practice* 22 (7): 1019-1035.

additional check, the differences in pscores presented in Appendix 5 were computed using three different matching algorithms: Stratification, Kernel and Nearest Neighbour matching.

Figure A1.2 Common Support between certified (treatment) and uncertified (untreated) farmers



Appendix 2 The questionnaire

Mid-term impact evaluation questionnaire cocoa Ghana 2015

UTZ – Solidaridad cocoa programme Ghana

See for the baseline questionnaire: Waarts et al, 2013.

A: Household identification

A Date of interview (dd-mm-yyyy):..... Start time: End time:.....

B Name of enumerator.....

1.a Region ***For the enumerator to answer***

- 0. Ashanti Region
- 1. Western Region
- 2. Eastern Region

1.b Community / Village ***For the enumerator to answer***

.....

1.c Project ***For the enumerator to answer***

.....

2.a Name of the respondent ***Name of the respondent. This should be the person on your list, if he/she is not available, it should be another person actively involved in cocoa production. This can be the owner/operator if he/she is actively involved in the farm. Check this with the project officer.***

.....(pre-filled).....

2.b Name of the respondent if not the same person as under 2.a

2.c If there is a name under 2.b, why is the respondent different from 2.a?

- 0. The original respondent is no longer alive, or no longer farming
- 1. The original respondent is available, but not really actively involved
- 2. The new respondent is a different member of the same household
- 3. Other, Specify _____

3 Position in the household

- 0. Household head
- 1. Spouse
- 2. Other adult (e.g. grandparents, brother, etc)
- 3. Child

4 Did you sell cocoa the last 12 months?

- 0. No
- 1. Yes

If the answer to question 4 is NO, then stop the interview and go to another farmer on your list.

5a How many people are part of your household in different age groups, including you?

Age group	Number of people
0 – 9 years old	
10 – 14 years old	
15-17 years old	
18-25 years old	
26 years and older	
Total number of people	

‘We would like to gather more information on your household members, their activities and their lives. Can you give us more information for each household member?’ (A household is defined as a group of people (often family members) depending on the same household head (use the term for this in Twi).

5b Information on the respondent and his/her spouse (when applicable)

First name	Position in the household	Age	Gender	Activity	Active in cocoa farming	Status in cocoa farming	Education no. of completed education years
	1 = Household head 2 = Spouse 3 = Child 4 = Other adult	Enter number of years If age is unknown; write 0	0 = Male 1 = Female	1 = Working (including work on cocoa farm) 2 = Helping in household 3 = Retired 4 = In school 5 = Other Multiple options are possible	0 = No 1 = Yes	0 = Not applicable 1 = Landowner 2 = Family land 3 = Abunu 4 = Abusa 5 = Abunan 6 = Other Multiple options are possible	Enter number I did not start school = 0
1a	1b	1c	1d	1e	1f	1g	1h
2a	2b	2c	2d	2e	2f		2h

Guide for question on nr. of years of education: please write down the total number of completed years in education. Ask the farmers themselves for the total number of years, or calculate based on: *Primary school = 6 years, Middle school = 4 years, JHS/JSS = 3 years, SSS= 3 years, Post-secondary= 3-4 years, Vocational=3 years.*

We now would like to ask you some questions about the cocoa you produce and sell

B: Information on cocoa production

1 To how many LBCs did you sell cocoa in the last year via the Purchasing Clerk?

.....

2 Please list the LBC(s) in order of preference:

(Instructions for enumerators: If only supplying to one LBC, then mention its name under 0)

- 0. Most preferred LBC (name)
- 1. Second preferred LBC (name)
- 2. Third preferred LBC (name)
- 3. Fourth preferred LBC (name)
- 4. Fifth preferred LBC (name)

2a Why did you choose the most preferred LBC?

- 1. There is only 1 LBC in the community
- 2. They pay a good price
- 3. I know them
- 4. I trust them
- 5. They come and pick up my cocoa regularly
- 6. Other

3a Have Purchasing Clerks deducted kilograms from your cocoa because he said your cocoa was of bad quality?

0. No -> **Move to question 4**

- 1. Yes, in totalkg was deducted last year for supplying low quality cocoa
- 2. Not Applicable

4 How many cocoa farms* are you responsible for ?

- a. as owner-operator
- b. as sharecropper
- c. as caretaker

.....

**Means number of different farms/plots/plantations*

We want to get to know your farm and different plots better. Therefore we will ask you questions about what you do on the farm and on your plots where you grow cocoa. We want to ask information about the last year on each farm you work on? Please start with your MAIN farm.

(Start with the main cocoa farm = the most productive farm he/she is responsible for and for which he/she can answer questions about production and cost, then continue with the smaller farms).

Cocoa farm	Relationship to the farm (can be different for different farms)	Travelling time from home to farm (walking or by bike)	Travelling time from home to farm (by motorized vehicle))	Has the farm been mapped?	Size of the farm	How old are the trees? (year of first establishment of the farm)	Last year's yield for the whole farm*	Is the cocoa farm UTZ certified?	Is the cocoa farm also Rainforest Alliance certified	Is the cocoa farm also Fairtrade (FLO) certified
	0 = Landowner 1 = Abunu 2 = Abusa 3 = Abunan 4=Caretaker	In hours and minutes (e.g. 2, 35 = 2 hours and 35 minutes)	In hours and minutes (e.g. 2, 35 = 2 hours and 35 minutes)	0=no 1=yes	In acres		In bags: 1, 2, ...,20 $\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{4}$	0 = Not certified 1 = Running for UTZ certification 2 = UTZ Certified 3 = I Don't know	0 = No 1 = Yes 2 = I don't know	0 = No 1 = Yes 2 = I don't know
Main 1	1a	1b	1c		1d	1e	1f	1h	1j	1i
2	2a	2b	2c		2d	2e	2f	2h	2j	2i
3	3a	3b	3c		3d	3e	3f	3h	3j	3i

*** Ask to have a look at the farmers' cocoa pass book: in that book it is indicated what they have produced (yield), and what they have sold.**

How much revenue did you get from cocoa last year?

- 8a Apart from your cocoa farms, do you have other land(s) that is not being cultivated?
0. No -> **Move to question 9a**
 1. Yes, 1 unused farm
 2. Yes, two or more unused farms
- 8b Why is the land unused?
0. I do not have time
 1. Remote location (too long travelling time)
 2. No money to cultivate the land (investment)
 3. Family land which is not agreed upon (**ownership undefined**)
 4. Other, please clarify
- 9a Do you have other sources of income besides cocoa?
0. No → **Please go to question 10**
 1. Yes
- 9b Please rank **your own** different sources of income according to importance

Source of income	Tick when appropriate	Income earned last year Amount in Cedi
Other crop farming activities	☐	2a
Livestock	☐	3a
Trade – Retail	☐	4a
Remittances	☐	5a
.....	☐	6a
.....	☐	7a
.....	☐	8a
.....	☐	9a
.....	☐	10a

** A household is defined as a group of people (often family members) living under the same roof and pooling resources (labour and income).*

Part C: Costs of cocoa production

We want to gain insights in how cocoa is produced on your MAIN farm. So if you have more than one farm, we only would like to know more about your MAIN farm. (The main farm = the biggest cocoa farm the respondent is responsible for and for which he/she can answer questions about production and cost)

Can you indicate who assists you and what inputs you need per activity?

- 1 How many days per year do you **personally** spend on the following activities on the MAIN cocoa farm you work on?

Activity	How many times did <u>you</u> do this activity last cocoa season?	Time spent on each activity last cocoa season, <u>by yourself, per time</u>
	Number	In days
Land preparation*	1a	1b
Weeding	2a	2b
Pruning	3a	3a
Mistletoe removal	4a	4a
Fertiliser application	5a	5a
Pest control (Capsis)	6a	6a
Disease control (Black pod)	7a	7a
Harvesting		8a
Pod breaking		9a
Fermenting		10a
Drying		11a
Transport to Purchasing Clerk		12a

* Land preparation is new cocoa farm establishment and planting new trees

- 2 On a typical day when you worked on your cocoa farm last year, how many hours did you spend on average (traveling, working, and breaks included)?

..... Hours

- 3 How many hours is a typical working day in your community?

..... Hours

- 4a Did you spend money on hired labour last year?

0 Yes

1 No → **please go to question 5**

- 4b If yes, how much in total?

1)Cedi

2) I don't know

4c If yes, how much per average working day for hired labour? *(If possible, ask the farmer if he can include also other expenses than only payments)*

.....Cedi (98= I don't know)

5.a Do you employ workers on a permanent basis?

0 Yes

1 No → please go to question 6

5.b If yes, how many? _____

5.c If yes, how much does your employee earn per year? _____ (GH cedis)

6 Can you indicate who helped you on your MAIN farm in **the last year** and how much they help you per activity on all the cocoa plots farm you are responsible for?

(Instruction for enumerator: 0 = No help from this category, 99 when farmers do not know; discuss with the farmer and calculate the number of times the activity was carried out and the number of days for each time. If the respondent is a sharecropper, he should be included in this table. Also take care to include children's help in gathering pods during harvest.

	Sharecropper, hired labour and communal labour		Adult household members		Minor household members (aged 15, 16 or 17)		Minor household members (aged 14 or less)	
Activity	No of people involved	Total no of days spent	No of people involved	Total no of days spent	No of people involved	Total no of days spent	No of people involved	Total no of days spent
Land preparation*	1a	1b	1e	1f	1g	1h	1g	1h
Weeding	2a	2b	2e	2f	2g	2h	2g	2h
Pruning	3a	3b	3e	3f	3g	3h	3g	3h
Mistletoe removal								
Fertiliser application	4a	4b	4e	4f	4g	4h	4g	4h
Pest Control (Capsis)	5a	5b	5e	5f	5g	5h	5g	5h
Disease control (Black pod)	6a	6b	6e	6f	6g	6h	6g	6h
Harvesting	7a	7b	7e	7f	7g	7h	7g	7h
Pod breaking	8a	8b	8e	8f	8g	8h	8g	8h
Fermenting	9a	9b	9e	9f	9g	9h	9g	9h
Drying	10a	10b	10e	10f	10g	10h	10g	10h
Transport to Purchasing Clerk	11a	11b	11e	11f	11g	11h	11g	11h

* Land preparation is new cocoa farm establishment and planting new trees

We would also like to know what types of inputs and equipment you used last year on the MAIN farm and what it cost

8a Did the CODAPEC or COCOBOD spraying gangs spray your main cocoa farm last year?

0 No → please go to question 8c

1 Yes

8b If yes, how often? times

8c Did you have spraying gangs from projects, cooperatives or the community spray your main cocoa farm last year?

0 No → please go to question 9

1 Yes

8d If yes, how often? times

9 What types/brands of inputs did you use last year, how many of them, and what did they cost?

(Instruction for enumerator: If not used, leave blank. Do see whether the farmers' pass book contains the information. Note: it is not the quantity bought, but the quantity used that counts)

	Used in the last 12 months	Number of items used last year	Price per item last year
	Type names	Number	Price per unit (In Cedi)
Type of planting material (seedlings / pods)	1a Hybrid/Modern	1b	1c
	2a Old type (Tetteh Quarshie)	2b	2c
	3a	3b	3c
Type of Insecticide (Litres)	4a	4b	4c
	5a	5b	5c
	6a	6b	6c
Type of Herbicide / Weedicide (Litres)	7a	7b	7c
	8a	8b	8c
	9a	9b	9c
Type of Fungicide (Sachet)	10a	10b	10c
	11a	11b	11c
	12a	12b	12c

Type of fertilizer (Bags/Litres) Also organic fertilizer (if organic fertilizer is mentioned, ask for the type)	13a	13b	13c
	14a	14b	14c
	15a	15b	15b

(Question 10 is deleted)

11 What kind of equipment, including protective equipment did you or your sharecropper / caretaker / hired labourer use for your MAIN cocoa farm last year? And against what cost per item?

(Instruction for enumerator: Let them start, if they cannot come up with more equipment then ask for the remainders of the list.)

General equipment	Do you and your labourers use this?	How much did you spend on this item last year?
	0 = No → skip to next tool 1 = Yes, I used it 2 = my labourers used it 3 = I and my labourers used this	In Cedi
Cutlass	1a	1c
Harvesting hook	2a	2c
Axe	3a	3c
Hoe	4a	4c
Drying mat (ONLY ASKED IN 2012)	5a	5c
Mist blower	6a	6c
Pruner (for mistletoe)	7a	7c
Knapsack sprayer	8a	8c
Storage for chemicals	9a	
Other	10a	10c

(Instruction for enumerator: Let them start, if they cannot come up with more equipment then ask for the remainders of the list.)

Protective equipment	Do you have this?	Do you or your labourer use this?	Did you have to buy these items last 12 months?	Cost per item	Did you use this type of equipment before you bought it as well?
	0 = No 1 = Yes	0 = No 1 = Yes, I used it 2 = my labourers used it 3 = I and my labourers used this	Enter numbers Leave blank when they did not buy it	In Cedi	0 = No 1 = Yes, I obtained it for free 2 = Yes, my previous equipment became old or was broken 3 = Yes, I borrowed the equipment 4 = Other, please specify
Nosemask	11a	11b	11c	11d	11e
Boots	12a	12b	12c	12d	12e
Hat	13a	13b	13c	13d	13e
Overall	14a	14b	14c	14d	14e
Goggles	15a	15b	15c	15d	15e
Raincoat	16a	16b	16c	16d	16e
Other	17a	17b	17c	17d	17e

12 If you **bought** equipment or protective equipment last year, why did you buy it?

(Instruction to the enumerator: multiple answers are possible but do not read aloud to respondent)

0. I was taught in training that I can benefit from it
1. I need it for required practises for UTZ Certification
2. I have seen my neighbour / colleague farmer using it
3. I wanted to buy it for a long time but just recently got the required funds.
4. Other

13 How did you use your income (both from your cocoa farm and from other sources) from last year?

(Instruction to the enumerator: multiple answers are possible but do not read aloud to respondent).

0. Buying inputs / equipment for cocoa production for Cedi
1. Buying inputs / equipment for other crops for Cedi
2. Hiring labour for cocoa production Cedi
3. Hiring labour for other crops Cedi
4. School and other education fees Cedi
5. Mobile phones and phone credits Cedi
6. Funerals Cedi
7. Other..... Cedi

**Please prompt farmer to respond to different categories*

14 Have you taken credit (*defined as a loan of cash– does not include in-kind gifts*) in the last 2 years?

- 0. No → **Please go to section D**
- 1. Yes

15 For what purpose did you use the credit?

(Instruction to the enumerator: multiple answers are possible but do not read aloud to respondent)

- 0. Buying inputs / equipment for cocoa production for Cedi
- 1. Buying inputs / equipment for other crops for Cedi
- 2. Hire labour for cocoa production Cedi
- 3. Hire labour for other crops Cedi
- 4. School and other education fees Cedi
- 5. Mobile phones and phone credits Cedi
- 6. Funerals Cedi
- 7. Other..... Cedi

16 Is it easier for you to access credits NOW compared to 2 years ago?

(Instruction to the enumerator: multiple answers are possible but do not read aloud to respondent)

- 0. No, nothing changed
- 1. No, it is more difficult now to access credits than 2 years ago
- 1. Yes, it improved because I became member of a producer group
- 2. Yes, it improved because our cocoa production has gone up
- 3. Yes, it improved, because my passbook shows my production and costs
- 4. Yes, it improved because the project's staff assists us in gaining access to credits
- 5. Yes, it improved because I am part of a cocoa certification programme
- 6. Yes, because of other reason:
- 7. I don't know

In the next questions, I will ask you about what you do on the farm

Part D: Implementation of sustainable cocoa practices on MAIN farm

1. Answering options should not be read out to the households, options are for enumerators' convenience only!
2. Select one answer option per question by circling the corresponding letter, apart from questions which state multiple answers can be given
3. Do not give any additional information about the 'right' answers as we will be questioning knowledge later on.

Production practices: questions are all related to cocoa production

1 In case you obtained planting material in the last 2 years, where did you get it from?

(multiple options are possible)

- a) I did not use planting material in the past
- b) From my own farm
- c) From friends/neighbours/other farmers/producer group members
- d) From seed garden (SPU)
- e) From the producer group
- f) From LBC
- g) I don't know
- h)

2 Which type / types of cocoa do you have on your farm?

(multiple options are possible)

- a) Amazonia
- b) Amelonado (tetteh quarshie)
- c) Hybrids
- d) Other
- e) I don't know

3 How far apart are your cocoa trees planted from each other on your farm?

- a) 3 meters x 3 meters apart (10 feet by 10 feet)
- b) 2.5 metres apart (2.5 x 2.5)
- c) Less than 2.5 metres apart
- d) More than 3 meters apart
- e) Random
- f) I don't know

4 How do you remove weed on your farm?

- a) I do not weed
- b) I remove weeds by hand
- c) I remove weeds by using hand-tools
- d) I remove weeds by using herbicide / chemicals
- e) Other

5 How often do you prune your cocoa trees?

(Multiple options are possible)

- a) I do not prune my cocoa trees
- b) I prune all my cocoa trees once a year
- c) I prune all my cocoa trees less than once a year
- d) I prune some trees each year
- e) I prune my cocoa trees during/after harvest

-
- f) I prune my cocoa trees several times per year
g) I don't know
- 6 When do you apply fertilizer (chemical or organic)?
a) I do not apply fertilizer to my cocoa → **Please go to question 8**
b) I apply fertilizer just before the rains
c) I apply fertiliser during rainy season
d) I apply fertiliser during dry periods
e) I apply fertilizer at other times
f) I apply fertilizer all year round
- 7 How often do you apply fertilizer (chemical or organic fertilizer)?
a) Less than once a year
b) Once a year
c) Twice a year
d) Three times a year
e) More than 3 times a year
- 8 Do you keep records on input use and production?
a) 0=No, go to question 9
1=Yes, go to b)
b) I keep records on production / sales
c) I keep records on inputs
d) I keep records on production / sales and inputs
- 9 What do you do with diseased pods?
(Multiple options are possible)
a) I do not have diseased pods
b) I do not know when my pods are diseased
c) I leave them on the tree
d) I leave them on the tree and spray them
e) I take the diseased pods from the tree and leave in the field
f) I take the diseased pods from the tree and burn in the field
g) I take diseased pods from the tree and burn them in a hole
h) I take diseased pods from the tree and bury them
i) I take diseased pods from the tree and spray and bury them
j) Other
- 10 What colour are the cocoa pods when you harvest them?
(Multiple options are possible)
a) I harvest the pods when they are yellowish green or greenish yellow
b) I harvest the pods when they are yellow
c) I harvest the pods when they are green
d) Other
- 11 How do you ferment the cocoa beans?
(Multiple options are possible)
a) I heap the beans on the ground and cover with banana/plantain leaves
b) I use a basket for covering the cocoa
c) I use a fermentation box for covering the cocoa
d) I heap the beans on the ground and cover with perforated plastic sheets
e) I heap the beans on the ground and cover with unperforated plastic sheets
f) Other

-
- 12 How long do you ferment the cocoa beans?
- a) 6-7 days
 - b) Shorter than 6-7 days
 - c) Longer than 6-7 days
 - d) I cannot tell
- 13 How often do you turn the cocoa beans during fermentation?
- a) Every 24 hours
 - b) More than every 24 hours
 - c) Less than every 24 hours.
- 14 How do you dry your cocoa beans?
- a) Directly on the floor
 - b) On a drying mat on the floor
 - c) On a raised platform
 - d) Other

Environment

- 15a How many shade trees do you have on your cocoa farm (per acre)?
- a) I do not know
 - b) 7 per acre
 - c) More than 7 per acre
 - d) Less than 7 per acre
- 16 If your farm borders a river or water body, do you have a buffer zone (native vegetation) that grows between the river/water body and your farm?
- a) No, My farm does not border a river/water body → **Please go to 18**
 - b) My farm borders a river/water body, but I have no native vegetation between the farm and the river/water body → **Please go to 17**
 - c) Yes, I have a strip with native vegetation of 3 meters wide (because it is a small stream) → **Please go to 18**
 - d) Yes I have a strip with native vegetation of 5 meters wide → **Please go to 18**
 - e) Yes, I have a strip with native vegetation of more than 5 meters wide → **Please go to 18**
 - f) Other → **Please go to 17**
- 17 If your farm borders a river or water body, what distance do you leave out without applying agrochemicals and chemical fertilizer, compost and organic matter?
- a) I do not keep any distance from the water stream /water body when spraying
 - b) I keep any distance of 5 metres from the river / water body when spraying (because it is a small stream of up to 3 metres wide)
 - c) I keep any distance of 10 metres from the water stream / water body when spraying next to a water body of more than 3 metres wide
 - d) I keep any distance of 15 metres from a spring when spraying
 - e) Other
- 18 What do you do with leftover chemicals after spraying?
- a) I spray remains over untreated land
 - b) I throw the remains in a river/stream
 - c) Other

19 How do you manage solid waste (including chemical containers)?

(Enumerators: multiple options are possible)

- a) No waste management in place
- b) One pit for all waste
- c) One pit for organic waste and one pit for other waste
- d) More than two pits in place: non-organic waste is further separated, for instance for plastic or glass
- e) After washing a chemical container, I bring it to a collection point.
- f) I bury chemical containers
- g) I burn chemical containers
- h) Other

20 What do you do with prunings from the field?

- d) I do not prune
- e) I leave the prunings in the cocoa field
- f) I use as mulch elsewhere on farm
- g) I use it as fuel
- h) Other

Social issues

21 When chemicals are sprayed, which personal protective equipment (PPE) does your family or you use?

- a) Not applicable, I do not spray
- b) All PPE (Mask, gloves, boots, overall, goggles)
- c) Some PPE
- d) Improvised PPE
- e) No PPE

21b When chemicals are sprayed, which personal protective equipment (PPE) do your workers use?

- a) Not applicable
- b) All PPE (Mask, gloves, boots, overall, goggles)
- c) Some PPE
- d) Improvised PPE
- e) No PPE

22 Where do you store your chemicals?

(Multiple options are possible)

- a) I do not use chemicals
- b) I store them in the house
- c) I store them in the house in a closed room / box / sack
- d) I store them outside the house

I store them outside the house in a closed room / box / sack

Part E: Labour conditions

We would like to ask you some questions about labour issues on your farm and in your community

1a Do you hire labour for some activities on your cocoa farm?

(Instruction for enumerator: please fill out yourself, you probably know by now)

- 0. No -> **Please go to question 6**
- 1. Yes

1b What kind of hired labour do you employ on your farm? (ONLY ASKED IN 2015)

(multiple options possible)

- 0. permanent employees --> **go to question 1c**
- 1. workers employed for a season --> **go to question 2**
- 2. casual labour on payment per day --> **go to question 2**
- 3. casual labour paid per outcome --> **go to question 2**

1c Do your employees pay a fee to the SSNIT (social security, pension)? (ONLY ASKED IN 2015)

- 0. No
- 1. Yes
- 2. I don't know

1d Do your employees pay a fee to the NHIS (health insurance)? (ONLY ASKED IN 2015)

- 0. No
- 1. Yes
- 2. I don't know

2. If you hire labour, do you and the person you hire agree upon the reward for this labour before the start of the activities?

- 0. No
- 1. Yes

3. If you hire labour, do you agree upon the time the hired labourers will spend on the farm?

- 0. No
- 1. Yes

4. If you hire labour for one day, how many hours per day do they spend on your farm on average?

..... hours

5. If hired labourers have worked longer than the agreed time, do they receive an extra reward?

- 0. No → Move to Question 7
- 1. Yes

6 Are you yourself sometimes hired to work on somebody else's farm?

- 0. No → Move to Question 8
- 1. Yes

7 When you are hired as a labourer, do you know if there is any procedure to complain when the farmer does not respect his agreement(s) with you?

- 0. No -> **Move to question 9**
- 1. Yes

-
- 8 Have you or other labourers ever used this procedure?
0. No
 1. Yes
- 9 Do you work as a sharecropper or caretaker on another or someone else's farm?
0. No --> **go to question 11b**
 1. Yes
10. When you are a sharecropper or caretaker, do you know if there is any procedure to complain when the farmer does not respect his agreement(s) with you?
0. No -> -> **Please go to question 11b**
 1. Yes
11. Have you or other sharecroppers/caretakers ever used this procedure?
0. No
 1. Yes
- 11b. What do you do know about rules (laws) about pay (minimum wage), hours of work and other rights of wage labourers? (*multiple options possible*) (ONLY ASKED IN 2015)
0. Nothing
 1. Yes, rules about minimum wage
 2. Yes, rules about hours of work
 3. Yes, rules about other rights of wage labourers

Next, we are curious about accidents that happen on your MAIN cocoa farm

12. Did anyone suffer an accident during the work on your main cocoa farm or on the way to the cocoa farm in the last year? (**Accidents involved injured with fractures or requiring stitches or to do with spraying / using chemicals**).

0. No → **Go to Part F**
1. Yes

13. If yes, how many accidents occurred last year?

Person	Number of accidents last year
Hired labourer	A1
Adult household members	A2
Minor household members (aged 15, 16 or 17),	A3
Minor household members (aged 14 or less)	A4
Communal labourers	a5

14. If someone was injured by whom was the injury usually treated?

(multiple options possible)

- 0. By a minor household member
- 1. By one of the household's adults
- 2. By household member who participated in a (basic) medical training or knew how to use a first aid kit
- 3. Community member who participated in a (basic) medical training or knew how to use a first aid kit
- 4. Health worker
- 5. I do not know
- 6. Other

Now we will talk about your participation in certification project or programme, focusing on training. (Training is defined as educational events; for instance, one on one training, group training, workshop, demonstration, farmer field school, etc.)

Part F: Cocoa programme

1a Have you received training to become UTZ Certified?

0 No → **please go to question 2a**

1 Yes

2 Yes, but not anymore

3 Don't know → **please go to question 2a**

1b If you participated in UTZ training how did you appreciate the training?

☐

Unsatisfied

☐

Neutral

☐

Satisfied

1c If you participated in training to become UTZ Certified, would you recommend the training to your colleague or neighbour farmers?

0 No

1 Yes

2 I don't know

1d Have you perceived any benefits from the training?

0 No

1 Yes, → If so, please specify.....

1e Are you a Lead Farmer, training other farmers, in the UTZ programme?

0. No

1. Yes

2a Is your producer group UTZ Certified?

0 No → **please continue with question 5**

1 Yes

2 Not anymore

3 Don't know → **please continue with question 5**

2b Since when is your producer group UTZ certified? (Month and year, or at least the year)

Month and year:.....

2c Have you perceived any benefits from the UTZ certification?

0 No

1 Yes, → (If so, please specify).....

3a Did you receive a price premium for the UTZ cocoa you produced in the last year?

0 No → **please go to question 5**

1 Yes

2 Not anymore → **please go to question 5**

3 Not yet

4 I don't know → **please go to question 5**

3b If yes, or not yet, how much per bag?

0.....Cedi per bag (98= don't know)

-
- 3c Was a premium provided in a different form, e.g. in kind or as a community service?
- 0 no
- 1 Yes, (please specify)

4 If you received a premium for UTZ certified cocoa, What particularly did you spend premium on?

(Instruction to the enumerator: multiple answers are possible but do not read aloud to respondent).

- 0. No, just added to general income
- 1. Invested in the farm
- 2. Invested in the home
- 3. Used for children's education
- 4. Used for medical expenses
- 5. Used for special events, e.g. funerals
- 6. Other, please clarify

Apart from information on *UTZ training*, we are interested in other certifications and trainings you participated in last year

5 Have you or any member of your household participated in training / workshops last year?
(Explanation for enumerators: trainings are defined as educational events; for instance, one on one training, group training, workshop, demonstration, training during COCOBOD visit.)

- 0 No
- 1 Yes ->**Move to question 9**

6 If **no**, what was the reason?

- 0 No training offered → Move to Question 10
- 1 Offered, but was not informed in time to be able to participate
- 2 Offered, but could not get to training, no transportation or resources
- 3 Offered, but did not have the time to participate in training
- 4 Offered, but other reasons for not attending (e.g. not interested in topic,...)
- 5 Other,->**Move to question 10**

9 If you followed training last year, on what topics did you participate in training? And for how many hours?

(Explanation for enumerator: training can be one-on-one training, group training, workshop, demonstration, visit by COCOBOD)

Topics	Did you attend training on this topic?	Who gave the training?	Number of training events last year	Nr of hours per training event
	0 = No 1 = Yes 2 = I don't know	1 = LBC 3 = Rainforest Alliance 4 = Fair Trade 5 = Lead Farmer 6 = COCOBOD 7 = NGO 8 = Input supplier 9 = Local individual/neighbour 10 = Other 11 = I do not know	Number (when they say they have training every 2 weeks, calculate number yourself)	Nr of hours
Cocoa production (for instance new types of cocoa, farm cleaning / sanitation and farm maintenance)	a1	a2	a3	a4
Health and safety (for instance HIV/AIDS, child labour, safe agrochemical use, housekeeping)	b1	b2	b3	b4
Management skills (for instance record keeping, economic decision making)/ farmer business school	c1	c2	c3	c4
Chemical application (appropriate amount and type of chemicals to be used for farm activities)	d1	d2	d3	d4
Environmental protection (not slashing close to rivers, uncontrolled burning, water pollution, control of soil erosion)	f1	f2	f3	f4
Farmer business school	H1	H2	H3	H4
Others/ combination of topics	e1	e2	e3	e4

We now would like to ask you something about producer groups and your status in the community

10 Do you have any special position in the community?

- 0. No
- 1. Yes, Chief farmer
- 2. Yes, Village leader
- 3. Yes, Women leader
- 4. Yes, Spiritual leader
- 5. Yes, Trainer
- 6. Yes, Other

11 What is your migration status?

- 0. Indigenous
- 1. Temporary resident
- 2. 1st generation migrant
- 3. 2nd or more generation migrant

12a Are you a member of a producer group or producer organisation?

- 0 No -> **Please go to Part G**
- 1 Yes

12b Are you elected or appointed as an executive for a producer group?

- 0. No
- 1. Yes

12c Do you know the name of the chairman of your producer group?

- 0 No
- 1 Yes →,if yes,(please specify)_____

13/14 Apart from information provided in the trainings, does your producer group or ICS staff provide you with information or services that make cocoa production easier for you?

- 0 No → **Please go to question 16c**
- 1 Yes
- 2 I don't know

15 If **yes**, can you name the services the producer group provides you and if you are satisfied with it / them?

Instructions for enumerators: please read the options to the farmers and write downs answers. Please note: the columns with the smileys apply only to services provided by the producer group.

Services	☺ Satisfied	☹ Neutral	☹ unsatisfied	Service is not offered (not applicable)	16a Do you obtain these services from other places /organizations? 0 = no 1 = yes 2 = I do not know	16b Do you pay for this service? 0 = no 1 = yes 2 = I do not know
Access to training						
Market information on inputs						
Market information on sales (e.g. also of other crops)						
Feedback information from Internal Controls (ICS)						
Feedback information from the external controls (audit)						
Information on COCOBOD services and COCOBOD spraying gangs and how to access them						
Access to fertilizer						
Access to seedlings/pods						
Access to pesticides						
Access to credit						
Insurance systems for agriculture						
Assistance in my relationship with the LBC (representation)						
Assistance in relation with COCOBOD (representation)						

16c Have you also experienced other benefits of being a member of a producer group?

Multiple answers are allowed

☐	1. Better social contacts with my colleague farmers		
☐	2. Some communal problems are now discussed during producer group meetings		
☐	3. I am proud to be a member of the producer group		
☐	4. Knowledge exchange between members		
☐	5. Other		

16d Have you experienced also disadvantages of being a member of a producer group?

Multiple answers are allowed

☐	1. It costs money / fees	☐	3. Record keeping
☐	2. It costs a lot of time	☐	4. Other

17 Do you agree or disagree with the following statements on the stability of the group?

Statement:	Agree	Neutral	Disagree	I don't know
1. I am confident that the producer group will still be operating in 5 years	☐	☐	☐	☐
2. I feel represented by the executives	☐	☐	☐	☐
3. I feel like I have some influence on the appointment / election of the executives	☐	☐	☐	☐
4. If an executive does not perform well, he will be replaced	☐	☐	☐	☐

18 How does the group ensure that members comply with UTZ regulations?

0 I don't know → please go to part G

1 I.....

19 If yes, what are the consequences of failing an internal control?

Multiple answers are allowed

☐	1. You have to start all over again with the trainings	☐	2. You are excluded out of the producer group and cannot follow trainings anymore
☐	3. Social status is damaged	☐	4. ICS staff and lead farmers help you to correct your failures
☐	5. You lose membership rights (e.g. voting right) of the producer group	☐	6. You cannot get certified
☐	7. Corrective actions	☐	8. Other.....

Part G: Knowledge of sustainable cocoa production

1. Answering options should **not** be read out to the households, options are for enumerators' convenience only!

2. In this part it is encouraged that the enumerators stimulate **the farmers to give more options** (time to think), but never mention the options!

3. Select the given option by circling the corresponding letter, more answer options can be selected

All questions below: (Multiple options are possible)

1 Can you mention benefits of using planting materials from seed gardens (SPU)? (ONLY ASKED IN 2012)

- a) Higher productivity
- b) Higher chance for seedlings to become mature trees
- c) Early bearing
- d) More harvesting periods in a year
- e) More tolerance to pest and diseases
- f) Other
- g) I do not know

2 Can you mention benefits of planting cocoa trees 3 meters apart from each other? (ONLY ASKED IN 2012)

- a) Higher productivity
- b) Ease of farm operations
- c) Right shade regime (light management)
- d) Right tree architecture
- e) I don't know
- f) Other

4 Can you mention some recommended methods to handle weeds in cocoa production? (ONLY ASKED IN 2012)

- a) Removing weeds by burning
- b) Removing weeds by using hand-tools
- c) Removing weeds by hand

-
- d) Removing weeds by using herbicide / chemicals
e) Other
f) I do not know
- 5 Can you mention benefits of pruning your cocoa trees? (ONLY ASKED IN 2012)
a) To maintain a manageable cocoa tree – to make plucking easier
b) To rejuvenate the tree / increase production
c) To remove diseased, dead and knotted branches
d) Other
e) I do not know
- 6 Can you mention some benefits of leaving prunings in the field? (ONLY ASKED IN 2012)
a) To suppress weeds
b) To prevent soil erosion
c) To improve soil structure
d) Releases nutrients into the top soil at decomposition
e) Reduces loss of water by evaporation (mulch)
f) Other
g) I do not know
- 7 Can you mention benefits applying soil conservation measures? (ONLY ASKED IN 2012)
a) Preserve soil fertility
b) Prevent loss of soil
c) Get high production
d) Prevent siltation in water bodies
e) Other
f) I do not know
- 8 Can you mention benefits of applying fertilizer? (ONLY ASKED IN 2012)
a) Get higher cocoa yields
b) Get higher cocoa quality
c) Maintain the cocoa tree for a long time
d) Increase nutrients to soil/improve soil fertility.
e) Other
f) I do not know
- 9 Can you mention benefits of record keeping?
a) I have evidence of performance of the farm
b) I can make decisions based on information in passbook
c) I know how much chemicals I have used
d) I know how much money I have spent
e) I can show a potential money lender
f) Other
g) I do not know
- 10 Can you mention any benefits of plucking the pods quickly when they are ripe? (ONLY ASKED IN 2012)
a) Less disease / less infected pods
b) Results in heavier cocoa beans / higher quality of cocoa beans
c) You induce more fruiting / higher productivity
d) Other
e) I do not know

-
- 11 Can you mention benefits of removing diseased pods from the field and burying them after spraying? (ONLY ASKED IN 2012)
- a) Lower chance for the disease to spread
 - b) Induce flowering
 - c) Other
 - d) I do not know
- 12 A buffer zone is a strip of indigenous vegetation between rivers or other water bodies and cultivated field. Can you mention benefits of a buffer zone? (ONLY ASKED IN 2012)
- a) A buffer zone helps protect and conserve wetlands
 - b) A buffer zone helps prevent soil erosion
 - c) A buffer zone enriches biodiversity
 - d) A buffer zone ensures pollution cannot reach the water
 - e) Other
 - f) I do not know
- 13 Can you mention the potential dangers of applying agrochemicals and fertilizer near the natural water bodies like rivers, streams, pools, ponds etc. ?
- a) Kill the aquatic life (water plants and animals)
 - b) Kill the plants growing near the water body
 - c) Poison the people drinking water downstream
 - d) Other
 - e) I do not know
- 14 Can you mention benefits of personal protective equipment (PPE)?
- a) Protects your skin from being touched by chemicals
 - b) Protects you from inhaling chemicals
 - c) Protects your feet from chemicals
 - d) Prevents illness
 - e) Other
 - f) I do not know
- 15 Can you mention methods that you use to improve the yield of cocoa in your farm?
- a) Application of the right fertilizer at the right time.
 - b) Regular plucking rounds
 - c) Control of pests/diseases
 - d) Maintaining the tree in good shape by pruning.
 - e) Timely harvesting
 - f) Training of pluckers
 - g) Other
 - h) I do not know
- 16 Can you mention the factors that affect cocoa quality?
- (Enumerators: try to get as many answers as possible, but without saying aloud the options)**
- a) Using the right variety / planting material
 - b) Control of pests
 - c) Control diseases
 - d) Timely harvesting
 - e) Proper fermentation (6/7 days)
 - f) Proper fermentation (material for covering)
 - g) Proper fermentation (turn every 3 days)
 - h) Drying on a raised platform
 - i) Moisture / water content of the beans (around 6% - 7%)

- j) Other
- k) I do not know.

- 17 Can you mention activities that are **not appropriate** for children to implement?
- a) Carrying heavy loads (any weight more than 30% of their body weight)
 - b) Carrying loads on distances of more than 3 kilometres
 - c) Mistletoe control
 - d) Pesticide application
 - e) Fertilizer application
 - f) Land preparation
 - g) Using inappropriate tools for their age
 - h) Work on the farm during school hours
- 18 Are you a purchasing clerk for a 'Licensed Buying Company'?
- 0. No -> ***you have reached the end of the questionnaire, please see final instructions at the end of this page***
 - 1. Yes
- 19 Are you licensed to trade UTZ-certified cocoa?
- 0. No
 - 1. Yes
- 20 What do you prefer to trade: certified cocoa or regular cocoa?
- 0. No preference -> ***you have reached the end of the questionnaire!***
 - 1. UTZ certified cocoa
 - 2. Rainforest Alliance certified cocoa
 - 3. Fairtrade certified cocoa
 - 4. Regular cocoa
- 21 Why do you prefer UTZ / Rainforest Alliance / Fairtrade certified cocoa?
(Multiple options are possible, do not read the options; just tick the option when respondents)
- 0. Less re-drying is required
 - 1. More bags to buy from farmers
 - 2. More professional attitude of the farmer
 - 3. Other, Please Specify_____

That was the last question in this questionnaire. Thank you very much for your time and effort to help us understand more about cocoa production. Is there anything else you would like to tell us or ask us?

Do you have any comments?

.....

.....

.....

Enumerator: please read through questionnaire to make sure no questions were left unanswered before leaving your farmer! Thank you!

Appendix 3 Descriptive statistics

Indicator	Group	2011					2014					Difference Mean
		Mean	Sd	Min	Max	N	Mean	Sd	Min	Max	N	
Average knowledge score	Uncertified	0.39	0.09	0.18	0.57	80	0.50	0.12	0.23	0.80	80	0.11
	Certified	0.41	0.11	0.17	0.70	168	0.53	0.11	0.29	0.87	168	0.12
Average implementation score	Uncertified	0.32	0.08	0.16	0.55	116	0.41	0.14	0.00	0.73	116	0.09
	Certified	0.37	0.12	0.06	0.69	228	0.47	0.15	0.00	0.85	228	0.09
Average score for implementation production practices	Uncertified	0.39	0.11	0.22	0.67	116	0.49	0.17	0.00	0.86	116	0.10
	Certified	0.45	0.15	0.08	0.86	228	0.56	0.18	0.00	0.94	228	0.11
Average score for implementation environmental practices	Uncertified	0.13	0.15	0.00	0.55	116	0.22	0.17	0.00	0.70	116	0.10
	Certified	0.17	0.16	0.00	0.67	228	0.24	0.20	0.00	0.80	228	0.07
Average score for implementation social practices	Uncertified	0.25	0.20	0.00	0.69	116	0.39	0.22	0.00	0.69	116	0.14
	Certified	0.33	0.24	0.00	1.00	228	0.44	0.23	0.00	0.69	228	0.12
Productivity per hectare	Uncertified	262.49	216.94	0.00	1035.15	98	321.23	257.77	15.81	1159.75	98	58.75
	Certified	282.45	255.84	0.00	1338.17	203	311.17	242.93	0.00	1419.73	203	28.72
Profit per hectare	Uncertified	822.33	753.02	-80.72	3743.64	91	1441.18	1409.21	-1071.94	5683.42	91	618.86
	Certified	956.45	990.66	-529.63	5828.39	198	1273.58	1325.91	-1743.57	7235.24	198	317.12
Profit per kg	Uncertified	2.63	0.64	-0.13	3.13	93	3.10	1.54	-2.90	4.61	93	0.47
	Certified	2.65	0.87	-5.02	3.13	202	3.29	1.56	-6.02	4.61	202	0.64
Profit per day spent by household labour	Uncertified	44.27	93.36	-2.97	845.11	90	24.17	34.71	-28.10	247.40	90	-20.10
	Certified	56.25	93.95	-7.94	673.50	187	34.68	62.54	-7.77	666.25	187	-21.57
Production efficiency	Uncertified	0.09	0.19	0.00	1.33	72	0.03	0.03	0.00	0.16	72	-0.06
	Certified	0.07	0.14	0.00	1.54	156	0.04	0.08	0.00	0.60	156	-0.04
Labour efficiency	Uncertified	0.20	0.19	0.00	1.03	95	0.08	0.10	0.00	0.74	95	-0.12
	Certified	0.30	0.52	0.01	5.00	202	0.10	0.20	0.00	2.73	202	-0.19
Net income from cocoa (based on average farm size)	Uncertified	3289	3012	-323	14975	91	5765	5637	-4288	22734	91	2475
	Certified	3826	3963	-2119	23314	198	5094	5304	-6974	28941	198	1269
Net income from cocoa per household member	Uncertified	697	821	-23.06	4547	91	1214	1498	-715	9833	91	517
	Certified	756	1051	-530	11377	197	1175	1902	-1395	20702	197	420
Total production costs per hectare	Uncertified	163.82	315.64	0.00	2057.56	98	542.83	777.22	0.00	5732.84	98	379.00
	Certified	127.26	168.30	0.00	955.47	205	385.66	501.93	0.00	3928.97	205	258.40

Indicator	Group	2011					2014					Difference	
		Mean	Sd	Min	Max	N	Mean	Sd	Min	Max	N	Mean	
Total production costs per kg	Uncertified	0.49	0.64	0.00	3.25	93	1.51	1.54	0.00	7.51	93	1.01	
	Certified	0.53	1.13	0.00	10.63	203	1.32	1.56	0.00	10.63	203	0.79	
Total household income from all sources	Uncertified	3610	3601	0.00	16884	116	6245	6515	-4288	30801	116	2635	
	Certified	4456	4851	-1519	38516	228	5775	6825	-4504	43795	228	1319	
Total household income from all sources per household member	Uncertified	752	908	0.00	5091	111	1431	2117	-715	17376	111	679	
	Certified	895	1221	-380	11977	217	1389	2069	-1228	20702	217	494	
Agreement on award	Uncertified	0.99	0.11	0.00	1.00	82	0.98	0.16	0.00	1.00	82	-0.01	
	Certified	0.99	0.08	0.00	1.00	160	0.98	0.14	0.00	1.00	160	-0.01	
Agreement on time spent	Uncertified	0.90	0.31	0.00	1.00	77	0.69	0.47	0.00	1.00	77	-0.21	
	Certified	0.85	0.36	0.00	1.00	155	0.83	0.38	0.00	1.00	155	-0.03	
Extra reward	Uncertified	0.69	0.46	0.00	1.00	72	0.54	0.50	0.00	1.00	72	-0.15	
	Certified	0.59	0.49	0.00	1.00	143	0.62	0.49	0.00	1.00	143	0.03	
Knowledge complaints procedure (farmers)	Uncertified	0.67	0.52	0.00	1.00	6	0.33	0.52	0.00	1.00	6	-0.33	
	Certified	0.35	0.48	0.00	1.00	37	0.46	0.51	0.00	1.00	37	0.11	
Use complaints procedure (farmers)	Uncertified	0.30	0.48	0.00	1.00	10	0.40	0.52	0.00	1.00	10	0.10	
	Certified	0.13	0.34	0.00	1.00	54	0.22	0.42	0.00	1.00	54	0.09	
Knowledge complaints procedure (sharecroppers)	Uncertified	0.69	0.48	0.00	1.00	13	0.62	0.51	0.00	1.00	13	-0.08	
	Certified	0.85	0.36	0.00	1.00	41	0.78	0.42	0.00	1.00	41	-0.07	
Use complaints procedure (sharecroppers)	Uncertified	0.43	0.53	0.00	1.00	7	0.14	0.38	0.00	1.00	7	-0.29	
	Certified	0.26	0.44	0.00	1.00	31	0.52	0.51	0.00	1.00	31	0.26	
Accidents	Uncertified	0.22	0.42	0.00	1.00	107	0.18	0.38	0.00	1.00	107	-0.05	
	Certified	0.21	0.41	0.00	1.00	213	0.07	0.26	0.00	1.00	213	-0.14	
Days spent by minors under age of 18 on hazardous activities on the main farm	Uncertified	0.66	1.87	0.00	8.00	44	1.36	4.63	0.00	25.00	44	0.70	
	Certified	0.00	0.00	0.00	0.00	17	0.12	0.49	0.00	2.00	17	0.12	
Days spent by children under age 14 on hazardous activities on the main farm	Uncertified	n.a.	n.a.	n.a.	n.a.	n.a.	0.66	2.88	0.00	21.00	106	n.a.	
	Certified	n.a.	n.a.	n.a.	n.a.	n.a.	0.17	1.03	0.00	10.00	205	n.a.	
Total income from other sources of income than cocoa	Uncertified	759	1870	0.00	15400	116	1118	2964	0.00	20000	116	359	
	Certified	871	2819	0.00	36200	228	1051	3655	0.00	35160	228	179	
Days spent by minors under age of 18 on all activities on the main farm except mistletoe removal	Uncertified	1.88	12.18	0	128	116	3.00	13.07	0	128	116	1.13	
	Certified	1.00	4.48	0	48	228	1.56	6.83	0	65	228	0.55	
Days spent by children under age 14 on all activities on the farm except mistletoe removal	Uncertified	n.a.	n.a.	n.a.	n.a.	n.a.	1.12	6.63	0	64	116	n.a.	
	Certified	n.a.	n.a.	n.a.	n.a.	n.a.	0.36	2.10	0	19	228	n.a.	

Appendix 4 Outputs statistical analyses

Indicator	Descriptives: difference over time						Difference-in-difference							Other models	
	UTZ certified			Uncertified			Average treatment effect (dif-in-dif)	sd	ttest	PSM i)			Regression	Project 3 and 4 (clean baseline)	Project 2, 3, 4 and 6
	Mean Difference 2015-2011	Standard error	ttest	Mean Difference 2015-2011	Standard error	ttest				str	nn	kern			
Productivity per hectare	29	14	-	59	16	***	-30	21	-	-	-	-	-47	53	-25
Profit per hectare	317	66	***	618	103	**	-301	122	*	-	-	*	-355**	32	-336
Profit per kg	0.64	0.08	***	0.47	0.12	***	0.17	0.14	-	-	-	-	0.13	0.59*	0.04
Total production costs per hectare	258	25	***	379	54	***	-121	60	-	-	-	-	-104	-73	-66
Total production costs per kg	0.79	0.09	***	1.01	0.12	***	-0.22	0.15	-	-	-	-	-0.15	-0.59*	-0.04
Production efficiency	-0.04	0.01	***	-0.06	0.02	**	0.03	0.02	-	-	-	-	0.03	0.03	0.04
Labour efficiency	-0.19	0.03	***	-0.12	0.01	***	-0.08	0.03	-	**	-	*	-0.09	-0.13	-0.10
Net income from cocoa (based on average farm size)	1269	264	***	2475	412	***	-1207	489	**	-	-	-	-1419** a)	128	-1344
Net income from cocoa per household member	420	97	***	517	122	-	-97	156	-	-	-	-	-231	204	-176
Profit per day spent by household labour	-21.57	5.44	***	-20.10	6.90	***	-1.48	8.79	-	-	-	-	-10.87	-14.61	-15.12
Total household income from all sources	1319	333	***	2635	429	*	-1316	543	*	-	-	-	-1256	1140	-1201
Total household income from all sources per member	494	102	***	679	153	-	-185	184	-	-	-	-	-278	327	-332
Agreement on award	-0.01		-	-0.01		-	0.00		-	-	-	-	0.01	0.05	0.01
Agreement on time spent	-0.03		-	-0.21		-	0.18		**	***	-	***	0.21*** b)	0.13	0.17*
Extra reward	0.03		-	-0.15		-	0.18		*	-	-	-	0.17 c)	0.06	0.15
Knowledge complaints procedure (farmer)	0.11		-	-0.33		***	0.44		-	-	-	-	0.58**	0.88	0.67**
Use complaints procedure (farmer)	0.09		-	0.10		***	-0.01		-	-	-	-	0.04	0.73	0.03
Knowledge complaints procedure (sharecropper)	-0.07		-	-0.08		***	0.00		-	-	*	-	0.12	2.74	0.10
Use complaints procedure (sharecropper)	0.26		**	-0.29		***	0.54		**	**	**	**	0.81** d)	0.00	0.88***

a) Accounting for clustered observations has the following effect: the regression result no longer indicates a significant difference.

b) Accounting for clustered observations has the following effect: the significance reduces from 1% to 5%

c) Accounting for clustered observations has the following effect: the regression result becomes significant at 10%

d) Accounting for clustered observations has the following effect: the significance increases from 5% to 1%

Indicator	Descriptives: difference over time				Difference-in-difference					Other models		
	UTZ certified		Uncertified		Average treatment effect (dif-in-dif)	ttest	PSM i)			Regression	Project 3 and 4 (clean baseline)	Project 2, 3, 4 and 6
	Mean Difference 2015-2011	ttest	Mean Difference 2015-2011	ttest			str	nn	kern			
Accidents	-0.14	***	-0.05	***	-0.09	-	-	-	-	-0.043	-0.035	-0.058
Average knowledge score	0.12	***	0.11	***	0.01	-	-	-	-	0.003	-0.002	-0.002
Average implementation score	0.11	***	0.10	***	0.01	-	-	-	-	-0.004	0.045	0.031
Average score for implementation production practices	0.07	***	0.10	***	-0.03	-	-	-	-	0.009	0.061*	0.047*
Average score for implementation environmental practices	0.12	***	0.14	***	-0.02	-	-	-	-	-0.039	-0.000	-0.016
Average score for implementation social practices	0.09	***	0.09	***	0.00	-	-	-	-	-0.023	0.063	0.044
Days spent by minors under age of 18 on hazardous activities on the main farm	0.71	-	0.97	-	-0.25	-	-	**	-	-0.321	-0.001	-0.228
Days spent by children under age 14 on hazardous activities on the main farm	na	na	na	na	na	**	**	**	*	-0.236**	0	0
Days spent by minors under age of 18 on all activities on the main farm except mistletoe removal	0.55	-	1.13	-		-	-	-		0	0	0
Days spent by children under age 14 on all activities on the farm except mistletoe removal	na	na	na	na	na	*	-	-	-	-0.434*	-0.382	-0.344
Total income from other sources of income than cocoa	179.37	-	359.42	-	-180.05	-	-	-	-	0	0	0
Quality: number of people who experienced deductions	0.11	***	0.08	**	0.03	-	-	-	-	0.027	0.020	0.045
Quality: number of kilos deducted	1.77	-	0.56	**	1.21	-	-	-	-	1.212	0.130	-0.098
Schooling 6-12 years	0.03	-	0.02	-	0.01	-	-	-	-	.010	0.022	0.014
Schooling 12-18 years	-0.02	-	0.01	-	-0.03	-	-	-	-	-.030	0.046	-0.012

Significant levels indicated as follows: *** ($\alpha = 0.01$), ** ($\alpha = 0.05$), * ($\alpha = 0.1$), -: no statistical difference

i) PSM algorithm: str: Stratification, kern: Kernal and nn: Nearest Neighbour

ii) We conclude with caution for these indicators because of small sample size

na = not applicable

[illegible]

Indicator	Other models										
	Sub-treatment			P1	P2	P3	P4	P5	P6	ALL-baseline	ALL-endline
	Lead farmer	Training participants	Total number of trainings participated in								
Days spent by children under age 14 on hazardous activities on the main farm	0.00	-0.21*	0.00	0.00	-0.66*	0.00	0.00	0.00	0.00	n.a.	n.a.
Days spent by minors under age of 18 on all activities on the main farm except mistletoe removal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Days spent by children under age 14 on all activities on the farm except mistletoe removal	0.28	-.51*	0.01	-0.99	-.70*	-0.97	-0.14	-0.11	0.29	na	na
Total income from other sources of income than cocoa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Quality: number of people who experienced deductions	0.09	-0.11	0.00	0.11*	0.03	-0.03	0.06	0.02	-0.04	0.02	0.05
Quality: number of kilos deducted	2.30	-0.49	-0.09	0.66	-0.47	-0.61	0.48*	7.16	-0.93	0.22	1.43
Schooling 6-12 years	0.04	-0.01	0.00	0.04*	-0.09	0.10	-0.01	-0.01	-0.01	-0.02	-0.01
Schooling 12-18 years	-0.02	0.00	0.00	-0.04	-0.18	0.12	-0.13	-0.01	-0.10	0.00	-0.03

Significant levels indicated as follows: *** ($\alpha = 0.01$), ** ($\alpha = 0.05$), * ($\alpha = 0.10$), -: no statistical difference

i) PSM: str: Stratification, kern: Kernel and nn: Nearest Neighbour

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REPORT
LEI 2015-066

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REPORT
LEI 2015-066
ISBN 978-90-8615-715-0

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