A touch of cocoa

Baseline study of six UTZ-Solidaridad cocoa projects in Ghana

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Preface

The cocoa sector faces a number of challenges in smallholder cocoa production, such as low cocoa productivity, low incomes for smallholder farmers, issues with regard to labour conditions and environmental challenges such as deforestation. UTZ Certified and Solidaridad have initiated a cocoa programme in Ghana and Ivory Coast aiming to improve sustainability in the cocoa supply chain. This programme supports cocoa farmers to implement better farming and management practices according to the UTZ Certified code of conduct. Stakeholders in the cocoa supply chain are actively engaged in the implementation of the programme. UTZ and Solidaridad expect that by means of increasing the sustainability of cocoa production and trade, cocoa production will become a more economically viable option for current and future smallholder cocoa farmers, enhancing their standard of living.

This study presents the baseline situation of farmers connected to six cocoa projects included in the UTZ-Solidaridad cocoa programme in Ghana. The research was commissioned by Solidaridad and UTZ Certified to create an independent benchmark for future impact evaluations. We hope that the findings of this study will also be useful to strengthen the programmes currently being implemented, as well as to inform the current debate on sustainable cocoa production.

We are greatly indebted to the information from and assistance of the farmers and the hard work done by the enumerators to collect the data. Without this, we would not have been able to do this study. We also wish to thank the Solidaridad and UTZ Certified team members involved in this study for providing us with information on their training and certification approach in Ghana and feedback to the questionnaire and report.

L.C. van Staalduinen MSc
Managing Director LEI Wageningen UR

Abbreviations

CIP	Cocoa Improvement Programme
COCOBOD	Ghana Cocoa Board
CRIG	Cocoa Research Institute of Ghana
FBO	Farmer Based Organisation
GAPs	Good Agricultural Practices
GHS	Ghana Cedi
IDH	The sustainable trade initiative
ICS	Internal Control System
Kg	Kilogram
LBC	Licensed Buying Company
NPK	Nitrogen, Phosphorus, Potassium
Obs	Obeservations
PPE	Personal Protective Equipment
UTZ	UTZ Certified

Executive summary

S.1 Aim of this study

The UTZ Certified and Solidaridad cocoa programme aims to improve sustainability in cocoa supply chains through implementing UTZ Certification and training activities. LEI Wageningen UR has been commissioned by Solidaridad and UTZ Certified to conduct a baseline assessment of six cocoa projects within the UTZ and Solidaridad cocoa programme implemented in Ghana, which can be used for a future impact assessment. This report presents the situation in 2012 of the project farmers. For some of the project groups, this report presents the baseline situation. Other project groups were in the programme for longer at the time of the baseline survey.

For assessing the impact of their cocoa programme UTZ Certified and Solidaridad formulated three research questions:

1. How do UTZ and Solidaridad influence cocoa farmers and producer groups in terms of knowledge and practices? And what are the results of those changes (in relation to the programme's goals) on the intended outcomes on people, planet, and profit for cocoa farmers in Ghana?
2. Who does the programme reach? To what extent is the treated group representative of the Ghanaian cocoa farmer (high/low income, sharecropper, migrants, women, youth, small/large farms) and does this involve implementing actors beyond the farm owners (spouses, workers, tenants, etc.)?
3. What is the added value of going through the certification process/being certified for the farmers? This research question must determine the certification programme's added value beyond training; how do training and certification influence each other?

In addition to an answer to these research questions, UTZ Certified and Solidaridad would like to obtain insights into lessons learnt from the baseline assessment for the further implementation of the cocoa programme as well as for conducting a future impact assessment of the programme. The baseline situation of the farmers connected to the six projects, and experience from conducting the baseline assessment form the basis for these lessons learnt.

S.2 How do UTZ and Solidaridad influence cocoa farmers and producer groups in terms of knowledge and practices? And what are the results of those changes (in relation to the programme's goals) on the intended outcomes on people, planet, and profit for cocoa farmers in Ghana?

As this report presents the results of a baseline study, it cannot provide an answer to this research question. It has been possible though, to analyse potential cocoa programme results based on the quantitative data, by assessing whether the length of participation in a project has an influence on knowledge levels, the implementation of good agricultural practices, productivity, farm efficiency and net income.

A first glimpse of potential cocoa programme results

The cocoa programme may have improved farmers' knowledge levels and their implementation of good agricultural practices as farmers who have participated in the programme for some time have better results for those indicators than farmers who just started their participation. We have not found a relationship between farmers' participation in the programme and their cocoa productivity, farm efficiency and income from cocoa. In a future assessment, it can be assessed whether such changes can be attributed to the cocoa programme, by comparing the evolution over time of both the project groups and their control groups.

Looking in-depth into the relationship between project participation and knowledge levels, we found that, when other things remain equal, the longer a farmer participated in a project, the higher his/her knowledge level is. This could be a result of the cocoa programme but could also be a result of selection bias when farmers in the groups that first started within the programme had a higher knowledge level at the start of the programme than farmers in groups that started at a later date. But we also found that other factors influence the knowledge levels: the higher the education level, the more trainings participated in and the higher a respondents' productivity, the higher the respondent's knowledge level is. Also, men have a significantly higher knowledge level than women. A possible explanation for this is that men generally have a higher education level than women. Furthermore, the effect of training on knowledge levels may differ across regions as part of the variation in the knowledge levels was due to regional variations.

With regard to the implementation of good agricultural practices, we found that farmers who have participated longer in their projects, i.e., group 1 and 2 farmers from the first phase of their project, implement good agricultural practices in a significantly better way than the farmers in their control groups while

the other project groups do not. But we do not know whether that's because of participation in the programme or because the farmers in those groups already implemented their practices in a better way at the start of their project (selection bias). We also found that, again, other factors also have an influence: farmers who participated in more non-cocoa programme trainings implement practices in a better way than farmers who participated in fewer trainings. And lead farmers implement practices in a significantly better way than other project farmers, which is an interesting finding as their knowledge level was not significantly higher than those of the other project farmers. Furthermore, men implement practices in a significantly better way than women. A possible explanation for the latter is that men generally have a higher education level than women.

S.3 Who does the programme reach? To what extent is the treated group representative of the Ghanaian cocoa farmer (high/low income, sharecropper, migrants, women, youth, small/large farms) and does this involve implementing actors beyond the farm owners (spouses, workers, tenants, etc.)?

The cocoa programme in Ghana has mainly reached male farmers, who are household head, between 40 and 60 years old with on average an education level between primary and secondary school and 5 family members. Half of the target group is a first generation migrant, while one quarter is indigenous or a second generation migrant. Sixty per cent of the farmers are owner of their main farm, the remaining 40% is a sharecropper. Most of the programme farmers have a cocoa farm size of less than the average of 7 acres, on which they generally produce fewer than 2 bags of cocoa per acre. They earned an average net income from cocoa of GHS2,174 in 2011. In addition, most of the farmers rely only on cocoa production for earning an income. We have not interviewed workers or other actors involved in cocoa production, so we do not know whether or not they have participated in the programme.

Based on feedback from the validation workshop and information from an MIT/Harvard baseline study on 3,000 farmers in Ghana (Hainmueller, Hiscox and Tampe, 2011), we conclude that the farms in our sample are representative of the Ghanaian cocoa sector with regard to the treatment group characteristics described above.

Comparing our baseline study and the MIT/Harvard 2011 baseline study
The average age of the farmers in our sample is 49.5 years, while the average age in the MIT/Harvard study sample is 51 years. Of our and MIT/Harvard's samples, respectively 79% and 81% consist of men, and the average household consists of 5 and 6 persons, respectively. Most farmers did not finalise any education after secondary school, but about a quarter or a third of the sampled farmers did not go to school at all in our and the MIT/Harvard study, respectively. With regard to farm size, the MIT/Harvard study reports slightly lower farm sizes (5 acres compared to our 7.14 acres). We cannot compare the cocoa productivity of our sample with MIT/Harvard's sample as they report on median yield and we report on average yield. Cocoa is the most important crop for over 70% and 80% of farmers in the MIT/Harvard and LEI samples, respectively, and farmers in both samples earn only a relatively low amount with other activities than with cocoa production. We cannot compare the income figures between the studies, as the MIT/Harvard study measures in median incomes and LEI in mean net income, and it is not clear whether the income figures they present represent gross or net income.

The biggest difference found between the LEI and MIT/Harvard study, is that in Ghana, usually a low percentage of farmers are a member of a producer group or association (about 10%), while in our sample the percentage of the farmers who are member of a producer group is very high. This was to be expected because we have interviewed mostly farmers who are to become UTZ certified or are UTZ certified already, and thus need to be a member of a producer group.

S.4 What is the added value of going through the certification process/being certified for the farmers? How do training and certification influence each other?

This research question can only be properly answered when farmers have been part of a certification programme for some time. As most of the farmers in this study have not been in the programme for long, we did not ask them an extensive amount of questions on this subject. However, we did ask them about their satisfaction with the training programme, whether they attribute benefits to the project activities and whether they are satisfied with services related to certification delivered by the producer groups or Licenced Buying Companies (LBCs) to get a first insight into an answer to this question. We cannot provide insights yet into how training and certification influence each other.

The added value of going through the certification process or of being certified for the farmers is that farmers are satisfied with the trainings they participated in, that they have better social contacts with other farmers, that the cocoa programme leads to knowledge exchange between the group members and that communal problems are discussed during group meetings.

The added value of the certification process can be strengthened as there is room for improvement with regard to the service delivery by the producer group/LBC and Internal Control System staff, specifically with regard to information or services related to cocoa production activities and feedback from the Internal Control system and external controls (audits).

S.5 Baseline situation of the farmers from the six cocoa projects

As a basis for lessons learnt for the future implementation of the cocoa projects, the baseline situation of the cocoa farmers is presented in this section.

Overview of the baseline situation of the sampled farmers

To conclude on the baseline situation of the cocoa programme farmers, please find the key baseline situation figures in Table S1 on the next page, the information of which is elaborated below per indicator category. In this report, we present the project groups in an anonymised way: information on the real names of the groups and their locations is known by the organisations that commissioned this study.

Table S.1	Baseline situation of the sampled cocoa farmers (March 2012)				
Indicator	**Unit of measure-ment**	**Mean**	**Mini-mum**	**Maxi-mum**	**Difference between project groups and control group?**
Knowledge level	Score, scale 0-1	0.38	0.32	0.42	3 of the 6 project groups: higher score than control group
Implementation of good agricultural practices	Score, scale 0-1	0.64	0.59	0.71	2 out of 6 projects: higher score than control group
Main cocoa farm size	Acre	7.14	0.5	60	No
Labour costs	GHS per acre	71	0.8	500	No
Fertiliser costs	GHS per acre	45.5	0.9	558	No
Planting material costs	GHS per acre	20.5	0.1	171.4	No
Insecticide costs	GHS per acre	33.4	2.3	294	No
Herbicide costs	GHS per acre	12.3	1.1	102.9	No
Fungicide costs	GHS per acre	37.1	0.1	720	No
Productivity	Bags per acre	2.06	0.02	12.33	1 out of 6 project groups: higher productivity than control group
Cocoa production efficiency	Input/output ratio		0.3	0.5	No
Net cocoa income	GHS per year	2174	50	15,600	No
Net cocoa income	USD per day	3.78			No
Gross household income	GHS per year	3,313			2 out of 6 project groups: higher gross household income
Cocoa quality	% of farmers with deductions	7%			No

Length of participation in the project of different groups

Farmers in the sample were in different phases of the certification process. Table S2 below presents an overview of the participation history of different groups by March 2012. As confirmed by project staff, the situation in the sample with regard to their length of participation reflects the situation in the entire population.

Because the projects are in different phases in the programme, they cannot be compared with each other. In a future impact assessment the improvements over time between the projects and their control groups can be compared.

Table S.2 Length of participation in the project (status: March 2012)

Project group	Length of participation in the project a)			Total nr of farmers
	0	1	2	
	Number of farmers			
Group 1	0	17	25	42
Group 2	0	29	12	41
Group 3	44	0	0	44
Group 4	41	0	0	41
Group 5	0	43	0	43
Group 6	0	47	0	47
Control Group Ashanti (for Group 1+ 3)	43	0	0	43
Control Group Eastern (for Group 2 + 6)	43	0	0	43
Control Group Western (for Group 4 + 5)	41	0	0	41
Total number of farmers	212	136	37	385

a) 0 = less than half a year, not certified (starting phase); 1 = longer than half year, less than a year; (phase 2, not certified yet, about to be certified, just certified); 2 = longer than one year (most probably certified)

Knowledge levels on good agricultural practices

The current levels of knowledge on good agricultural practices, including issues addressed in the UTZ code of conduct, are quite low for both project group members and control group members, with an overall knowledge score below 0.43 (on a scale of 0 to 1). Lead farmers' knowledge levels do not differ significantly from other project farmers. This indicates that there is a lot of room for improving the knowledge of farmers on good agricultural practices and the UTZ code of conduct. One explanation for the low knowledge levels in general is that most farmers in the sample have not had training at all, or not for long.

Project groups 1, 2 and 3 farmers have a significantly higher average knowledge levels than the farmers from the comparison groups in their region. This is not the case for farmers from groups 4, 5, and 6, although the group 5 farmers do have a higher knowledge level than the control group farmers but not significantly so. It is interesting to note that the group 3 farmers have higher knowledge levels than their comparison group as they had just started their participation in the cocoa programme at the time of the survey.

Implementation of good agricultural practices

Implementation of good agricultural practices was assessed with scores on production, environmental and social indicators. The overall scores of the project groups on production related indicators are slightly higher than those of the control groups (but not significantly so), ranging between 0.59 and 0.71 out of a maximum of 1. This means that, as the overall knowledge score is below 0.42, project farmers score much better with regard to how they implement practices, than with what they know about those practices.

Project farmers implement production practices in a better way than environmental practices; scores for environmental practices range between 0.36 and 0.47 (on a scale of 0 to 1). From a social indicator perspective, project farmers score average on the use of Personal Protective Equipment (PPE) and the storage of agro-chemicals. Information on inputs bought and applied confirms that the availability and use of PPE can indeed be improved. Also, some children perform certain tasks while they should not be doing so, although this has been observed on a very limited scale. This means that there is still room for improvement for project farmers with regard to the implementation of environmental and social practices.

Correlation between knowledge levels and the implementation of practices

Analysing factors influencing the overall implementation of practices, we found that respondents with a higher knowledge level implement practices in a significantly better way than respondents with a lower knowledge level. This finding is important, as it indicates that increasing knowledge levels can indeed lead to improved practices implemented in the field, as the impact logic indicates. However, when looking into details for the individual questions asked, we find that sometimes knowledge levels are low but that their corresponding levels of implementation are very high. This means that the impact logic applies for the overall indicators for knowledge and the implementation of practices, but that it does not apply for all particular practices under investigation.

Production characteristics

To assess production related aspects of the farmers in our sample, we assessed input use (labour, fertilisers, crop protection products) and the size and productivity of the main cocoa farm of the respondents. We furthermore present economic farm efficiency results, followed by information on cocoa quality in the 2011 season, using deductions of cocoa by purchasing clerks as a proxy indicator.

Most farmers hired labour in 2011, spending between GHS0 and GHS100 per acre. There is no significant difference between the project groups and their control group with regard to hired labour costs, even though labour use and costs show a high variability between the project groups and their control groups. We did find that the region in which a farmer is situated has an influence on labour costs: significantly fewer Eastern Region farmers hire labour than farmers from the other two regions.

Many farmers bought personal protective equipment in 2011, and they spent money on chemical fertilisers, planting material, crop protection products and other equipment. The survey results showed that fertiliser costs per acre did not differ significantly between project groups and comparison groups and across regions. However, costs of fungicide, insecticide and planting material did show strong regional variations, both in quantities used and in prices paid for the products, which means regional differences should be taken into account when performing an impact assessment in the future: in Ashanti and Eastern region, namely, farmers who have participated longer in the programme had significantly lower costs of fungicide, insecticide and planting material per acre than farmers who participate shorter in the programme or control group farmers. A reason for this could be that some regions have more shade trees and a higher humidity and hence a higher incidence of pests and diseases than others.

Based on the data, and input from the validation workshop, we can also conclude that some farmers use forbidden crop protection products (as indicated by Solidaridad West Africa staff), and that they sometimes mix fertilisers and crop protection products.

Production figures also show strong variations. Farm sizes range between 0.5 and 60 acre, and productivity between 0.02 and 12.33 bags per acre. The majority of the surveyed farmers are in the 'low cocoa production class' with an average yield of fewer than 2 bags per acre. This indicates that there is a large yield gap. Except in Western Region, where group 4 farmers have a significantly higher yield per acre than their control group farmers, there are no significant differences in productivity between project groups and their control groups. Also, the length of participation in a project does not influence the cocoa productivity per acre. But the survey results do indicate that both the average acreage

of the farmers and the yield per acre differ significantly among the regions. Respondents in Ashanti have on average the highest acreage of their main farms, while the productivity (yield/acre) was the highest in the Western Region. Eastern Region has on average the smallest farm and lowest yield per acre.

There is not much difference in farm efficiency between the groups and we do not find that the length of participation in the UTZ-Solidaridad cocoa programme influences farm efficiency. However, farm efficiency is significantly better for Western Region farmers than for farmers situated in Eastern Region and Ashanti.

With regard to the potential to increase cocoa production over time, we asked farmers whether they have an unused farm or not: a quarter of the farmers have an unused farm because they have insufficient money or insufficient time to cultivate it. Thus it seems that generally speaking there is room for increasing cocoa production, when farmers could find funds and time to cultivate their unused farms.

Looking at cocoa quality, we found that 93% of the farmers delivered cocoa of acceptable quality to the purchasing clerks, as no kilos were deducted from the cocoa they supplied them with in 2011. Seven per cent of the farmers, of whom most are from a comparison group or from projects that have just started, have seen kilos of their cocoa deducted by the purchasing clerks in 2011, usually because the moisture content of the beans was too high. The deducted amounts were between 1 and 36 kilograms.

Income

For more than 80% of the farmers, cocoa production is the most important source of income, although 70% of the farmers also have other sources of income. The average net income per year from cocoa was GHS2,174 (USD3.78 per day) in 2011, which is well above the USD2-a-day poverty line (World Bank, 2012). No significant differences between groups or regions could be found with regard to net income earned from cocoa production.

We estimate that the average farmer has a gross income of GHS3,313 per year as total household income. There is a great variability in estimated total household income between the project groups and the regions in which they are situated. Households in project groups 3, 4 and 5 seem to earn much more annually than farmers in other project or comparison groups. And farmers from the Eastern Region seem to earn much less on average than farmers from the Ashanti and the Western Region, which could be explained by their lower cocoa yields.

71 farmers borrowed money in 2011, with loans ranging between GHS50 and GHS3,000. They use the loans for school fees, inputs and/or equipment for cocoa production, for hiring labour for cocoa production and for other unknown purposes, in order of importance. Compared to control group farmers, fewer project farmers have loans: 60% of borrowers are control group farmers, 30% of the borrowers are farmers in projects that had just started, and 10% of the borrowers are farmers who participated in the project for more than a year. More surveyed producers indicate better access to finance than producers who indicate worse access to finance, compared to two years ago (57% vs. 30%).

S.6 Lessons learnt from the baseline study for further implementation of the cocoa projects

Based on the baseline situation of the UTZ-Solidaridad cocoa project farmers and feedback from the validation workshop, the following recommendations are made for the cocoa projects to effectively improve knowledge levels, the implementation of sustainable practices, and more informed decision-making. Recommendations stem from the data analyses when not otherwise specified.

- Look carefully at the knowledge scores for the individual questions per project group, and focus future trainings on topics where farmers score low. This is especially recommended for the indicators, for which the farmers score especially low (average: <0.35 out of 1).
- Take similar steps to improve the implementation of good agricultural practices as the scores are not satisfactorily yet. This can be done in a similar exercise in which detailed information on the individual questions per project group is used for guiding focussed, project specific training sessions. Furthermore, add training on the production of other crops than cocoa in the programme, as well as other livelihood options.
- Analyse what the reasons are that male farmers score better with regard to knowledge and the implementation of practices than female farmers, and adjust the training programme accordingly.
- Focus the training on two areas: i) improving the application of fertilisers, especially with regard to the timing of application, and ii) following recommendations on forbidden crop protection products and the length of time not to enter a field or sprayed strip around their homesteads after the application of herbicides. This recommendation stems from both the validation workshop as well as the data analyses.

- Enhance the communication between farmers and Internal Control System staff and producer group management. This recommendation stems from both the validation workshop and the data analyses (farmer satisfaction with producer group and the Internal Control System).
- Workshop participants recommended to enable farmers to interact more frequently with lead farmers and/or project staff. In addition, it was recommended by workshop participants to assist farmers to fill out passbooks, because many farmers are illiterate and thus have difficulties in record keeping, so the passbooks can be better used for monitoring (inputs and outputs). Before implementing this, it would be worthwhile to investigate whether such records will be actually used by farmers themselves or the project staff for relevant decision making, otherwise the effort to assist farmers in record keeping may not render any benefits for either party.

S.7 Lessons learnt from the baseline study for conducting a future impact assessment

As some of the projects had already started some time before this baseline study was conducted, and new farmers have joined those projects over time, the 'true baseline situation' of such projects are extremely difficult to establish. This has posed some difficulties in the analyses, also because due to random sampling, information from only a limited number of early project farmers was analysed. We have overcome this problem partly by assessing the influence of the length of participation in a project with statistical techniques, the results of which will be added to the analyses in the future impact assessment.

As we already found that non-programme related factors influence the outcomes, it would be valuable to access information from various interventions in the project areas from other sources than from farmer interviews (e.g. from the project staff, traders, farmer passbooks etc.). This will assist to better attribute the changes to the UTZ-Solidaridad cocoa programme.

Several time-related factors posed difficulties for the baseline survey in finding the sampled farmers and obtaining the right information. Also, since the questionnaire covers many issues that require good record keeping (physically or mentally) and an understanding of the questions to be able to answer questions correctly, the data are subject to recollection error and interpretation bias.

Our recommendations for the impact assessment research are:

- The status of training and certification of the respondents should be verified with the project staff before the interviews start as farmers have difficulties in remembering the details.
- To warn project groups and farmers well in advance so they are present on their farm/in the community on the day of the survey. This is possible as the same farmers will be interviewed in the impact assessment as in the baselines survey. This is especially the case when owners where interviewed who may not always be on a farm.
- The length of the survey should be decreased because farmers appeared to be fatigued at the end of the survey. This is something to be avoided in surveys to keep the respondents motivated to cooperate (in the future) and to ensure that the farmer still has energy to answer the last questions properly.
- Enumerators should be enabled to do a good job by preparing them for the interviews, e.g. by going through the questionnaire in a detailed way and give them enough time to test the questionnaires.
- It is recommended for the enumerators and the data entry person to double check whether all answers were answered and correctly documented.

S.8 Research methodology

For this baseline study, LEI established conditions for the set of indicators that will be used to assess the impact of the six projects in the future. The indicators include knowledge levels, implementation of good agricultural practices, productivity, gross and net income, farm efficiency, as well as various livelihood aspects. Information on these indicators was collected in the baseline study through household surveys in three regions in Ghana on randomly selected farmers in the six project groups (N=258) and in three comparison groups (N=127). The results were discussed with stakeholders in a validation workshop, where also qualitative views on the programme were collected by LEI, before the report was finalised.

Basic statistics of the indicator variables such as the mean and standard deviation were computed for the six project groups and their comparison group, which is situated in the same region as the project group. All groups were then compared to see whether and where significant differences are observed. Effects of possible explanatory factors were assessed using regression analyses. Such comparisons and regression analyses were conducted to understand potential sources of selection bias and contextual factors that may influence the impact of the programme.

In this report, we present the project groups in an anonymised way: information on the real names of the groups and their locations is known by the organisations that commissioned this study.

1 Introduction

1.1 Cocoa production in Ghana

Cocoa beans are used for the fabrication of chocolate products and are generally produced by five to six million smallholder farmers. About 70% of all cocoa is produced in four countries in West Africa, among which Ghana and Ivory coast. The world output is 3.5 million MT, but could be much higher as productivity is very low (Frimpong Manu, 2012).

There are various reasons for low productivity: extension services are often inadequate, leading to low knowledge and adoption levels of good agricultural practices, and the right production inputs are either not available or not available at the right time. Furthermore, cocoa trees are old and of poor variety, farmers have a relatively low education level and are often illiterate, and farmers are ageing.

1.2 The UTZ-Solidaridad cocoa programme

UTZ Certified and network organisation Solidaridad collaborate in a programme that aims to improve sustainability in cocoa supply chains by supporting cocoa farmers to implement better farming and management practices according to the UTZ Certified code of conduct. UTZ Certified (UTZ) is one of the largest sustainability programmes for coffee, cocoa and tea in the world. Both organisations hope that by increasing the sustainability of cocoa production and trade, cocoa production becomes an economically viable option for farmers, enhancing the standard of living of smallholder cocoa farmers.

In 2007, Solidaridad and UTZ set up a joint cocoa programme with the aim to develop sustainable cocoa supply chains. Mid-2008, a partnership with IDH the sustainable trade initiative was established allowing the programme to upscale to a wide range of private partners and producers under the name of the 'Cocoa Improvement Programme' (CIP).

The CIP aimed at:
1. Improved producer practices
2. Improved transparency in the cocoa supply chain
3. Improved market access
4. Increased capacity of national/producer organisations

The CIP was carried out between 2008 and 2012, together with a wide range of private sector parties, civil society and NGOs and led by Solidaridad. The UTZ-Solidaridad projects that are subject to this evaluation have been carried out under the umbrella of the CIP.

1.2.1 UTZ-Solidaridad projects in Ghana

To achieve the cocoa programme goals, Solidaridad implements a variety of projects that aim to guide cocoa farmers towards UTZ certification. A large part of the activities of Solidaridad is training their partners so that they can train lead farmers to train other farmers.

Solidaridad uses two types of models for Ghanaian cocoa farmers to become guided and trained. The first type is the 'LBC model'. In the LBC model, Solidaridad collaborates with a Licensed Buying Company (LBC[1]) in order to get farmers UTZ certified. In this case, the LBC holds the certificate and manages the Internal Control System (ICS). The LBC may also organise or link, guide, and train the cocoa farmers. Solidaridad trains the employees of the LBCs and assists the LBC in all these activities.

The second model is the Producer Group model. In this model, Solidaridad collaborates with a local NGO to get farmers' organisations UTZ certified. The producer group itself will hold the certificate but in practice, an implementing partner (NGO) manages the ICS and the UTZ certificate. It is anticipated that an exit strategy is developed to ensure that the producer group becomes independent after its capacity has been built. Just like in the LBC model, the NGO organises, guides, and trains the farmers. Solidaridad supports and assists its NGO partners in these activities.

Regardless of the type of model (LBC or Producer Group model), the process towards certification is comparable for all participating farmers (See Section 1.3 on the logical framework of the projects). There are two main differences for the farmers between the two models. First, the certificate own-

1 An LBC, Licenced Buying Company, is licensed to buy cocoa locally and sell to COCOBOD. COCOBOD, the Ghana Cocoa Board is the only exporter to engage in external cocoa sales in Ghana.

ership differs: in the LBC model, the LBC holds the certificate and the trained farmers must deliver their cocoa to this LBC if they want to sell their cocoa as UTZ certified cocoa. In the Producer Group model, the farmer group is the owner of the certificate and the group can decide to which LBC they sell their cocoa. Hence in the Producer Group model, the farmers are more independent. Second, in the Producer Group model, activities start on a small scale and build up over time, and the training activities are very much development driven, after which certified beans would be bought by an interested LBC. The Producer Group model also allows a platform for other interventions such as Farmer Business School and Group Nurseries etcetera to be introduced. The LBC model is more commercially focused with high interest on large scale implementation in order to get large volumes of certified cocoa for sale in a short time span, leading to the LBC model to target a lot more farmers from the onset than the Producer Group model.

Beyond farmer level, there are probably more differences between the two models. Such differences need to be taken into account in future assessments on the effectiveness of the two models.

At the time of this study (June 2012), various projects were implemented, which target to reach around 25,000 farmers in Ghana in total. Table 1.1 provides information on the status of the six projects of which the baseline situation is presented in this report. Note that in this report, one overall project is presented as two project groups (groups 3 and 4), as it is implemented in two regions. These two regions are assessed separately. Thus, six projects are assessed in this study of which two are implemented by one implementing party.

Table 1.1	Information on Ghana cocoa projects to be evaluated (June 2012)				
Name project	**Location (region)**	**Nr. of farmers targeted a)**	**Nr. of certified farmers**	**Start date b)**	**Model c)**
Group 1	Ashanti	1,040	1,010	Dec 2010	PG
Group 6	Eastern	1,000	807	March 2011	LBC
Group 5	Western	540	500	Feb 2012	PG
Group 3 and 4	Ashanti + Western	6,000	0	Jan 2012	LBC
Group 2	Eastern	7,194	5,953	Jan 2011	LBC

a) This is the total number of farmers connected to the project in June 2012. Some of the farmers started the programme earlier than others; b) This is the start date of the project. Some farmers may have started their training programme within the project on a later date; c) PG = Producer Group, LBC = Licenced Buying Company

1.2.2 Reasons to choose the six projects to be evaluated

The reasons to choose the projects described above to be evaluated are:

- Project group 1 is currently the most important 'Producer Group model' project in the Solidaridad-UTZ cocoa programme in Ghana. Therefore it was chosen to be evaluated even though it has already been running for 1.5 years by June 2012.
- Project group 2 is implemented as an LBC model. This project is a textbook example of an LBC project. It is the first LBC model project, Solidaridad West Africa signed on after their pilot with group 6. Group 2 operates in 3 Ghanaian Regions: Eastern Region, Central Region, and Ashanti. As such, 130 communities are involved. Of the 7,194 registered farmers, 5,953 are already certified. In this study, the groups' project activities in the Eastern Region are taken into account.
- LBC project groups 3 and 4 started in January 2012, just before the mid-term survey was carried out, which is an ideal situation for collecting baseline data. The location of group 3 in Ashanti creates opportunities for comparison with the, longer-running, project group 1.
- Group 5 is implemented as a Producer Group model project, and has over 540 participating farmers. It is the only group 5 project in the Western Region, which is partly a reason why it was chosen because it can be compared with group 4 in the same region.
- Project group 6 was by November 2012 the only LBC model in the cocoa programme portfolio that had a significant number of participating farmers. Other LBCs have projects running that guide farmers towards UTZ certifica-

tion, but Solidaridad is not or only indirectly involved in those projects. Hence, this is a very interesting project to incorporate in the assessment.

1.3 The logical framework

An impact logic is a useful tool to grasp the rationale behind a programme and determine what the intended outcomes are. As such, the impact logic visualises the causal relation between the programme's activities and its intended outcomes in one diagram. Discussions with Solidaridad and UTZ Certified were organised to design an impact logic for the cocoa programme, and thus the six projects of which the baseline situation is presented in this study.

The diagram starts with the actions of the programme and leads to expected changes in the farmer's situation. This impact logic is presented in figure 1 on the next page. While looking at the impact logic it is important to realise that this logic only applies to the farmer level. The entire UTZ-Solidaridad programme is broader than the one depicted in the impact logic (e.g. working with other actors in the supply chain). But those other elements are not part of the impact assessment and thus not represented here. The impact of an intervention is also determined by external factors. Since the external factors are not explicitly a part of the rationale behind the logic, they are not displayed in the impact logic.

Figure 1: Theory of Change of UTZ - Solidaridad cocoa programme (to assess farm-level impacts

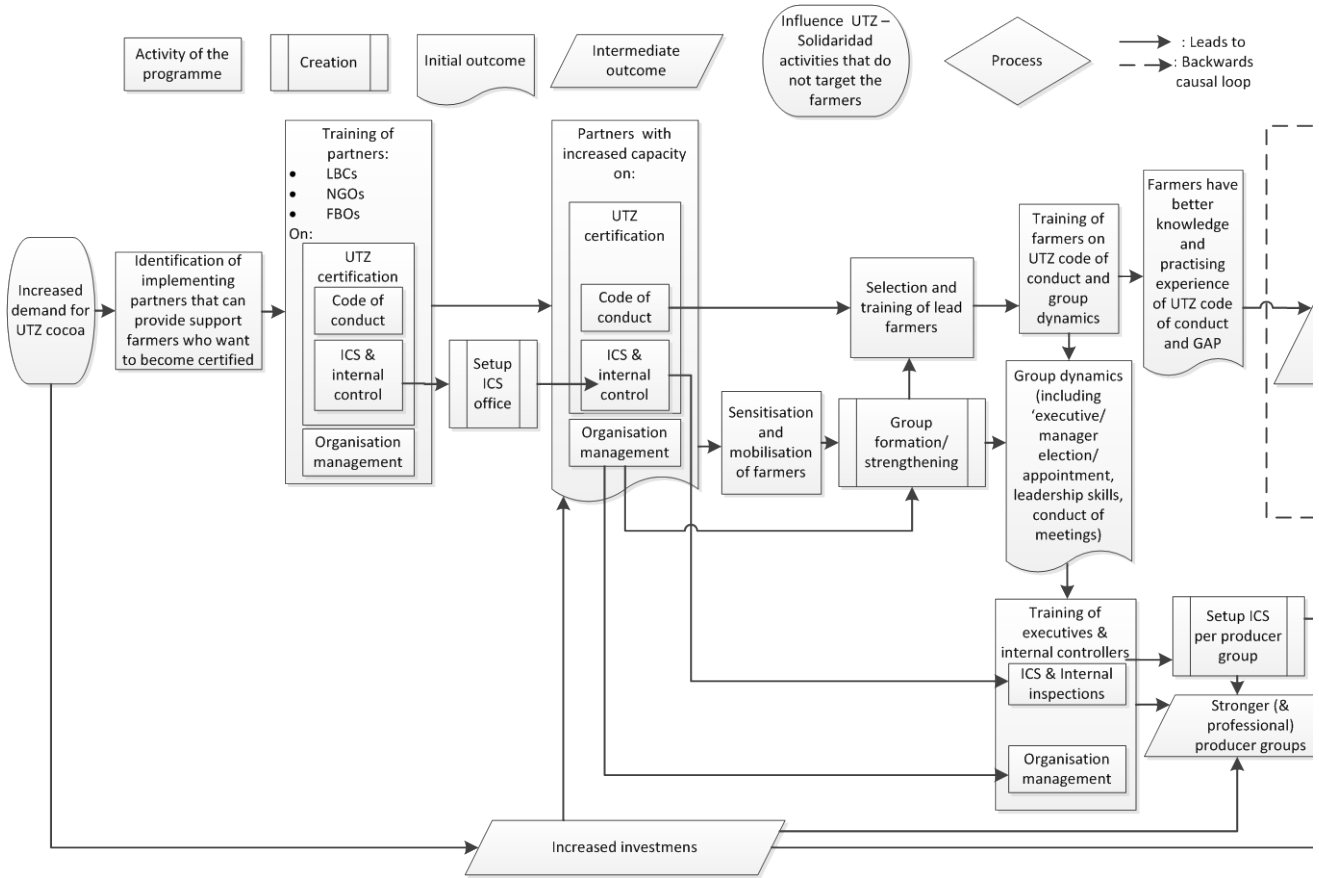
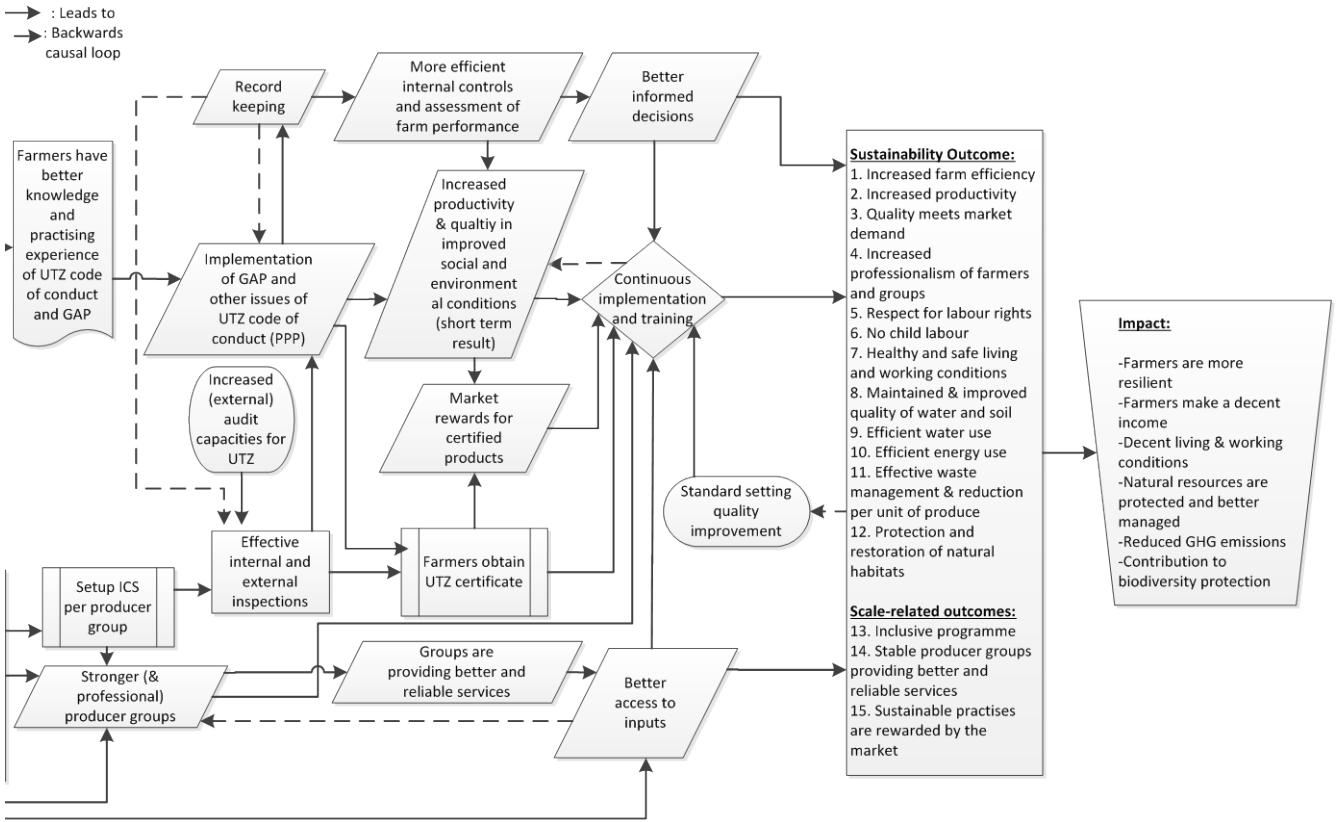


Figure 1 (continued) : Theory of Change of UTZ - Solidaridad cocoa programme (to assess farm-level impacts



1.4 Explaining the logical framework

This section covers the assumptions underlying the impact logic of the cocoa programme. This impact logic is created and elaborated by Solidaridad and UTZ, and documented by LEI. In a future impact assessment research it can be fully tested whether the assumptions made in the impact logic are indeed correct. When possible, provisional findings are presented on the assumptions underlying the impact logic in this baseline report,

1.4.1 Background of the cocoa programme

UTZ and Solidaridad want to create a world where sustainable cocoa farming is the norm. In order to do so, UTZ and Solidaridad stimulate both demand for and supply of sustainable produced cocoa. Successful commercial activities result in an increased demand for UTZ certified cocoa. This increased demand must stimulate sustainable cocoa farming in line with the UTZ standard. Constant audit quality control ensures effective auditing and implementation of the standard. Solidaridad and UTZ link demand and supply and assist farmer groups and local partners with implementation of the programme.

As a consequence of market pressures (increased demand), more partners are interested in training and assisting farmers who are willing to produce UTZ certified cocoa. The selected partners are then trained and assisted by Solidaridad West Africa in working with the farmers. NGOs and LBCs can be identified as partners and some of Solidaridad West Africa projects can become Farmer Based Organisations (FBOs). Also, then, these FBOs receive further assistance from Solidaridad West Africa. The increased demand for sustainable cocoa is also expected to increase investments in the certified producer groups.

1.4.2 Training of partners, lead farmers and farmers, setup and management of ICS

Solidaridad West Africa trains its partners on several topics. First, they need to become familiar with the requirements of obtaining the UTZ certificate. Solidaridad West Africa partners get trained on the entire UTZ Code of Conduct. This includes Good Agricultural Practices (GAPs), social and environmental issues. The GAPs must result in cocoa production that is economically sustainable and occurs with more respect for people and the environment. All aspects of sustainable production (economic success, respect for the environment, respect for people) are interrelated and important for the long-term productivity and

economic viability of the farm. Training on social topics must ensure that cocoa is produced with respect for all persons involved.

In order for producer organisations to obtain a certificate, also an ICS has to be set up. After receiving training on the ICS, Solidaridad West Africa partners must be able to set up an ICS office themselves. This ICS office often becomes the (regional/district) heart of a project. ICS records can lead to the decision by the group to organise an external inspection and a well-functioning ICS must be able to show to external inspectors that all group members comply with UTZ Certification requirements. Without the ICS, only individual certification would be possible. Since, in Ghana, cocoa is mostly produced by smallholder farmers, individual certification is not realistic.

The certificate holder (LBC or producer group) manages the ICS and must ensure compliance with UTZ's requirements.[1] Grouping farmers in producer organisations is a task of Solidaridad West Africa partners. This requires training on organisation building and management. Finally, when farmers are organised in groups, internal inspections to check compliance with the UTZ CoC are organised prior to external inspections. The ICS training teaches Solidaridad West Africa partners how to organise internal inspections. Once all partners are trained, they must have the required capacities on all aspects of the programme to implement a project.

Through sensitisation campaigns, the partners try to mobilise the farmers so that they register themselves for the project. The registered farmers will be organised in a producer organisation. Out of the pool of registered farmers, a number of lead farmers is selected. Lead farmers are partly responsible for the transfer of knowledge on GAPs and group dynamics to the 'regular' farmers and form the link between regular farmers and the implementing partners. In all of the visited projects, Solidaridad West Africa's partners still visit and train the farmers themselves as well. Lead farmers can be either selected by the partners or can be appointed by the farmers.

Through the cascade of knowledge on GAPs and group dynamics (Solidaridad West Africa trains Solidaridad West Africa's partners, who train lead farmers, who in their turn train other farmers), the knowledge finally reaches the farmers. Thanks to training, the farmers also gain hands-on experience in implementing GAPs. The assistance and training in group dynamics must eventually lead to selection of executives (either through elections or appointment) within producer organisations. Through the training in organisation management, Soli-

[1] At present, producer groups are not strong enough to manage the ICS, and the NGOs do it on their behalf.

daridad West Africa's partners are able to support the elected executives in their roles. They need leadership skills in order conduct group meetings and control and steer group dynamics.

The ICS management also has to decide which farmers will become the internal inspectors. Internal inspectors can be regular farmers, executives, or lead farmers. The main criteria are that there is no conflict of interest. Lead farmers cannot inspect farms of farmers they trained for example, or their own farm. Hence, the group's structure (with executives, lead farmers, and internal inspectors) is designed around the administrative structure of the ICS and the accompanying process of forming a producer organisation. When Solidaridad West Africa's partners acquired knowledge on organisation management, ICS, and the ICS's internal inspections they can help the producer groups in becoming stronger and more professional.

The ICS is designed to make internal and external controls possible and more efficient. Without the ICS, no group certification would be possible. Then, every single producer would have to be audited separately by an external auditor. Internal controls become easier when farmers have been taught how to keep records. Keeping records also may help farmers in better assessing their own performance and taking more information-based decisions. This will contribute to the implementation of acquired knowledge. When internal controls are organised efficiently, farmers have the incentive to continuously implement acquired knowledge.

Internal controls and record keeping also allow the farmers to assess their own productivity. This must enable the farmers to better decide on the inputs used, and organise their production more efficiently. Together with the implementation of the GAPs and other UTZ requirements this results in more sustainable cocoa production in improved environmental and social conditions. Because the farmers apply GAPs, not only the production improves, because due to better post-harvest practices also cocoa quality improves.

At this stage, the producer groups have been formed and the LBCs and NGOs have helped them to set up an ICS, which is an UTZ requirement. If farmers comply with the requirements for UTZ certification and pass the internal inspection, they are included in the external audit of the group. Once the group passes the external audit, they acquire an UTZ certificate. This certificate allows them to sell their cocoa as UTZ certified and to be rewarded by the cocoa market for implementing sustainable practices. The reward can be the access to a premium on top of the farm gate price which in Ghana is determined by the COCOBOD (Ghana Cocoa Board).

In order to maximise the programme's impact, it is crucial that farmers continuously implement the GAPs and all acquired knowledge.

A number of factors are expected to ensure that cocoa farmers adhere to the programme continuously. First, farmers who witness increased productivity and quality levels and other benefits like cleaner environment and less health risk for their family will be convinced of the usefulness of the programme, implementing GAPs, and adhering to social and environmental requirements. Second, farmers are obligated to comply with all requirements as long as they want to maintain their UTZ certificate. This certificate is also needed to access the market rewards (when applicable) as it is a proof of implementation of professional and sustainable production practices. Third, it is assumed that stronger and more professional producer groups will also be able to deliver better and more reliable services to their member-farmers. This could simplify access to inputs (agrochemicals, credit, equipment, labour). Such better access to inputs will make it easier for the farmers to implement all GAPs and UTZ requirements.

Since continuous implementation implies that farmers implement GAPs, this will enforce sustainability of cocoa production in better social and environmental conditions. These are the shorter term results of the programme. When farmers adhere to the GAPs and all other UTZ requirements, they are expected to become more professional, which is expected to lead to a greater profitability. Keeping records, which is expected to facilitate information-based decision-making, is also expected to contribute to a more professional farmer attitude. Especially long-term risk assessments based on record keeping are expected to lead to better farm resilience.

1.4.3 Expected outcomes and impacts

At the right-hand side of the figure depicting the impact logic (Figure 1 on page 28 and 29), the intended outcomes of the UTZ-Solidaridad programme are presented, that are expected to be reached when all UTZ requirements are met, and all programme aspects are finalised. The programme is expected to result in sustainability outcomes and scale-related outcomes.

The following sustainability outcomes are expected by UTZ Certified and Solidaridad:

1. Increased farm efficiency (reduced costs per unit of produce)
2. Increased productivity
3. Quality meets market demand
4. Increased professionalism (profitability and long-term risk assessment of farmers and farmer groups)

5. Respect for labour rights
6. No child labour (ILO convention 182 and 138)
7. Healthy and safe living and working conditions
8. Maintained & improved quality of water and soil
9. Efficient water use (farm level)
10. Efficient energy use (farm level)
11. Effective waste management and waste reduction per unit of produce (farm level)
12. Protection and restoration of natural habitats

The following sector/supply chain related outcomes are expected:

1. The programme is inclusive (all cocoa farmers are attracted and allowed; women, youth, migrants, smallholders, sharecroppers)
2. Stable producer groups providing better and reliable services to their members
3. Sustainable practices are recognised and rewarded by the market (market access[1], premium, investments). Recognition by market price is not possible in Ghana as the farm gate price is determined by COCOBOD.

In the end, the combination of these outcomes is expected to determine the programme's impact at production level. UTZ and Solidaridad expect the following long-term programme impacts:

1. Farmers are more resilient
2. Farmers make a decent income
3. Farmers, farm workers and their families have a decent standard of living
4. Farmers, farm workers and their families enjoy better health
5. Natural resources are safeguarded for future generations
6. Reduced GHG emissions per unit of produce
7. Contribution to biodiversity protection
8. Children do not perform hazardous tasks and are enabled to go to school.

The expected outcomes and impacts mentioned above have been used in developing the indicators to assess the baseline situation of the smallholder cocoa farmers participating in the cocoa programme. For more information on indicator selection, see Section 2.4.

[1] Market access is not an issue for Ghanaian cocoa farmers, they can always sell their cocoa easily for a guaranteed price

1.5 Aim of this study

LEI Wageningen UR has been asked by Solidaridad and UTZ to establish the baseline situation of smallholder cocoa farmers from six projects in their cocoa programme in Ghana. As some projects have started a few years ago, they also would like to obtain first insights into the results of the projects where this can be established. In the future, an impact assessment can be conducted using the baseline study results to test the assumptions underlying the impact logic This baseline assessment study focuses on farm level impacts. Other stages of the value chain are not within the scope of the study.

LEI has taken up this task, working intensively together with Dr. Aryeetey from the University of Ghana (Legon) for data collection purposes and with Dr. Francis Baah from the Cocoa Research Institute of Ghana (CRIG) for input on cocoa production practices and trends in Ghana.

The aim of this report is to present the baseline situation of a representative sample of farmers of the six projects mentioned in Table 1.1 on page 26 (counting one large project which is implemented in two regions as two separate projects), in order to be able to conduct an impact assessment of these projects in the future.

The entire impact assessment will generate conclusions that can be used in the learning process of UTZ, Solidaridad, and Solidaridad West Africa. In order to assess the impact of the projects in a few years' time, evaluation questions have been formulated, as presented below. These evaluation questions are used as research questions in this report, and as such guide this report's presentation of the baseline situation of the six projects from the UTZ-Solidaridad cocoa programme in Ghana.

1.5.1 Evaluation questions

For assessing the impact of their cocoa programme UTZ Certified and Solidaridad formulated three evaluation questions:

1. How do UTZ and Solidaridad influence cocoa farmers and producer groups in terms of knowledge and practices? And what are the results of those changes (in relation to the programme's goals) on the intended outcomes on people, planet, and profit for cocoa farmers in Ghana?
2. Who does the programme reach? To what extent is the treated group representative of the Ghanaian cocoa farmer (high/low income, sharecropper, migrants, women, youth, small/large farms) and does this involve implementing actors beyond the farm owners (spouses, workers, tenants, etc.)?

3. What is the added value of going through the certification process/being certified for the farmers? This research question must determine the certification programme's added value beyond training; how do training and certification influence each other?

In addition to an answer to these research questions, they would like to obtain insights into lessons learnt from the baseline assessment that can be used for the further implementation of the cocoa programme as well as for conducting a future impact assessment of the programme. The baseline situation of the farmers connected to the six projects, and experience from conducting the baseline assessment form the basis for these lessons learnt.

1.6 Outline of this report

Chapter 2 offers a description of the methodology of the baseline study, and an outlook towards the methodology of the future impact assessment.

The results chapters consist of a chapter in which it is explained how UTZ and Solidaridad influence cocoa farmers and producer groups (Chapter 3) and a chapter on what type of farmers participate in the UTZ-Solidaridad cocoa programme (Chapter 4). Chapter 5 explains research results on the added value of going through the certification process or of being certified. The final results chapter, Chapter 6, presents information on the baseline situation of the programme farmers, following as much as possible the impact logic elements from Figure 1.

In Chapter 7 we draw conclusions, and give recommendations on the lessons learnt from the baseline assessment for the further implementation of the cocoa programme and for conducting a future impact assessment of the programme.

2 Methodology

2.1 Introduction

This chapter describes the methodology used in the baseline study and gives an outlook to the future impact assessment. The general approach to the impact assessment is first introduced, followed by a detailed description of the sampling strategy and results as well as data collection and analysis.

2.2 General approach

The impact assessment will adhere to the *Difference in Difference* approach. This approach combines two types of comparisons. The first comparison focuses on the change in the longitudinal data to establish the effect of the intervention through the difference between the 'before' and 'after' intervention situations.

A second comparison accounts for external factors that influence the performance of participating farmers. For this second comparison, the change in the indicators assessed between a treatment and a comparison group are compared. Farmers in the treatment group are participating in one of the projects. Farmers in the comparison group are not participating in a project but are operating in comparable agro-economic circumstances. Since external factors may determine the change in the indicators for farmers who produce under the same circumstances but were not involved in training for UTZ certification, this comparison accounts for the external factors' influence.

Ideally, baseline data are collected before farmers actively participate in the programme. This baseline study, however, reflects a situation in which activities have already started for some of the projects and participating farmers found themselves in different phases of training and certification: while for some farmers the training had just started a few months ago, others had been in a project for more than 2 years. Some farmers are not UTZ certified yet, whereas others are. The differences in the training received made it necessary to consider not only whether a farmer participates in a project, but also how long he/she has been trained by the project at the moment we carried out our baseline survey. After this baseline study, it is foreseen that data will be collected for midterm (after 2 years) and final assessments (after 4 years). The impact of the projects

will then be established as the changes observed in the selected indicators over the time period of the project, and the changes observed in the selected indicators between the treatment and comparison groups.

2.3 Sampling

2.3.1 Sampling procedure for project farmers

For all the projects, except the for project groups 3 and 4, the following stratified sampling procedure was followed:

1. Per project, a list with all communities and the total number of project farmers in each community was obtained. As in some communities there are many more project farmers than in others, we could not randomly select the communities per project. This would result in farmers in communities with a low number of project farmers having higher chances to be sampled than farmers in communities with a high number of project farmers. Therefore, we divided the communities evenly into three community types: type 1: communities with a low number of project farmers; type 2: communities with a medium number of project farmers; type 3: communities with a high number of project farmers.
2. Then, 5 communities were randomly selected from the total list of project communities per project, where type 1 communities counted once, type 2 communities counted twice and type 3 communities counted thrice. The random selection was done using the random number generator of Microsoft Excel 2010.
3. 42 farmers were to be interviewed per project, and per control group, totalling 378 farmers (252 project and 126 control group farmers).
4. On average 8 farmers in each community (42/5) were randomly selected for an interview, using the Excel 2010 random number generator. However, as some communities have more project farmers than others, the number of farmers to be interviewed per community was based on the following equation: the number of farmers in the community, divided by the total number of farmers in all 5 communities, times 42 (rounded off following normal procedures). This resulted in 5-12 respondents per community. The sampling strategy results in a representative sample of the projects.

For project groups 3 and 4, the procedure was different. As the projects just started up when we were preparing the baseline study, they were still recruiting

farmers. Thus, they did not yet have information on the total number of project farmers in each community. As time did not allow for a delay, we randomly selected 5 communities for each of the two project regions (Ashanti and Western Region) from the total list of communities. Then, the implementing partner submitted information on the total number of project farmers per community (up to that point in time), and we could identify how many project farmers were to be interviewed in each community. We finally randomly selected the farmers in each selected community, using the same procedure as described above in step 3 and 4. However, it is possible that finally more farmers will take part in the project than was the case at the time of sampling, and thus the outcome might have been different had the final status been known.

2.3.2 Sampling procedure for control group farmers

A control group was to be established for each project region (Ashanti, Eastern Region and Western Region) to enable comparisons between the project groups in each region with a control group in the same region.

Sampling control group farmers proved to be difficult as there was no list readily available with all cocoa farmers in each of the study regions. Thus, we devised a strategy in which the project staff in each region would select control group communities based on the following criteria:[1]

1. Most villagers are involved in cocoa production
2. No training/certification has taken place for UTZ in the community
3. No training/certification has taken place for other certifications in the community (Rainforest Alliance, Fair Trade/FLO)
4. The community is at least 10 kilometres from a project community.

To select the farmers in the control communities as randomly as possible, two strategies were available, and were both implemented. In the first strategy the enumerators would go to the community, and try to gather a group of farmers through a Licenced Buying Company operating in the community (LBCs have a list with all farmers supplying them). From this group, farmers were randomly selected to take part in the interview. The second strategy consisted of snowball sampling: the enumerators would arrive in a selected community and find a cocoa farmer to be interviewed. This respondent would indicate another person

[1] This sampling strategy was a practical approach to difficulties in obtaining information on potential control group communities. Appendix A1.3 gives more information on the sampling strategy which we initially intended to follow.

to be interviewed (etcetera). When the respondent does not know a person, or the indicated person is not present, the enumerator would randomly find a new farmer to be interviewed.

2.3.3 Sampling results

In Table 2.1, the sampling results are presented. We present the groups in anonymised way; information on the real names of the groups and their locations is known by the organisations that commissioned this study. For more information on the implementation model, see Section 1.2.1.

Table 2.1 Characteristics of the sampled groups

	Characteristics	
Group	**Model**	**Region**
Group 1	Producer Group	Ashanti
Group 2	Licenced Buying Company a)	Eastern Region
Group 3	Licenced Buying Company a)	Ashanti
Group 4	Licenced Buying Company a)	Western Region
Group 5	Producer Group	Western Region
Group 6	Licenced Buying Company a)	Eastern Region
Control Group 1	-	Ashanti
Control Group 2	-	Eastern
Control Group 2	-	Western

a) Licenced Buying Company.

2.3.4 Distribution of survey households over projects and regions

During data collection, the enumerators encountered the challenge of actually finding the sampled farmers and interviewing them. In some communities, selected farmers were replaced by others by the project staff because the selected farmers were not available. In some communities of project groups 3 and 4, no farmer on the list could be found, and thus a new list of farmers in those communities was made by project staff. Then as much as possible a random selection was made of the listed farmers by the enumerators, and interviews were held. Finally, the enumerators managed to interview a sufficient number of farmers for the project and control groups with sufficient randomness to have a representative sample.

The distribution of interviewed respondents in the projects and regions is presented in Table 2.2 and the total number of communities per project/control group in Table 2.3. As can be seen, 385 interviews were held, of which 127 with control group farmers and 258 with project farmers. Appendix 3.12 shows all communities in which farmers were interviewed as well as the number of farmers interviewed in those communities.

Table 2.2	**Distribution of survey households in different regions and projects**			
	Region			
Project group	**Ashanti**	**Eastern**	**Western**	**Total**
Group 1	42			42
Group 2		41		41
Group 3	44			44
Group 4			41	41
Group 5			43	43
Group 6		47		47
Control Group	43	43	41	127
Total	129	131	125	385

Table 2.3	**Number of different communities in each region and project**			
Project group	**Region**			**Total**
	Ashanti	**Eastern**	**Western**	
Group 1	5			5
Group 2		5		5
Group 3	4			4
Group 4			5	5
Group 5			5	5
Group 6		5		5
Control Group	4	8	4	16
Total	13	18	14	45

2.4 Indicator selection

To measure the impact of the projects, a number of indicators have been selected. The projects intend to affect the farmers' livelihood in different ways (see Sections 1.3 and 1.4 on the impact logic). As the projects aim to have economic, social, and environmental impacts, it was necessary to select indicators covering all these aspects of farmers' livelihood.

To ensure that all essential parts and outcomes of the programme can be assessed in both the baseline assessment as well as a future impact assessment, the selection of indicators followed a structured process. The process started with the research questions. Based on these questions, and the impact logic, indicators were defined. For addressing the second learning question on who the programme reaches and to what extent the treated group is representative of Ghanaian smallholder cocoa farmers, we have established the demographic characteristics of the farmers in the projects. Such characteristics are used to reflect whether the sampled farmers are representative of 'the average Ghanaian smallholder cocoa farmer' based on information from the literature.

The indicators selected for the baseline study can be found in Appendix 1. Not all identified indicators for a future impact assessment are applied in the baseline survey, as some of the indicators can only be assessed after the projects have been running for some time.

2.5 Data collection for the baseline survey

The data gathered for the baseline study was collected by enumerators guided by Dr. Aryeetey from the University of Ghana (Legon). They visited 385 individual farmers in three regions with a questionnaire in March and April 2012. The questionnaire first gathers data on the general characteristics of farmers and their farms. Secondly, information related to potential impacts of the projects was gathered to enable future impact assessments.

To prepare the enumerators for data gathering, a two-day training was organised. This training focused on introducing the survey team (seven enumerators and two supervisors), to the cocoa farming system in Ghana. Enumerators learned about the local names and terminologies used by cocoa farmers, the activities that cocoa farmers typically go through to produce cocoa, and the equipment and tools used in cocoa production. The survey team was also introduced to the UTZ-Solidaridad cocoa programme implemented in Ghana. Most of the training time was however used to discuss and refine the questionnaire. Dur-

ing the questionnaire discussion, enumerators were trained to interpret the questions/items into the local language (Akan) in which the interview was to be conducted. This process of local language translation, together with role plays carried out by the enumerators, was instrumental in the extensive modification of the questionnaire after the workshop.

Following the workshop, the revised questionnaire was pre-tested in Aboabo Camp, a cocoa growing community in the Central Region of Ghana. All seven enumerators and one supervisor participated in the pre-test. Afterwards, the group discussed the interviews, and commented upon the process of interview, farmer selection, question structure, as well as questions arrangement. LEI finalised the questionnaire based on the comments of the survey team. The questionnaire can be found in Appendix 2, indicators used for creating the questionnaire can be found in Appendix 1.

For a future impact assessment, it is envisioned that data on the trainings given by the cocoa projects and the ICS will be collected, in consultation with Solidaridad West Africa (and if necessary Solidaridad West Africa's partners) in addition to the questionnaires to fully establish the impacts of the programme.

2.6 Data analysis and validation

The survey data were first entered into Excel and then exported to the statistical program STATA[1] for analysis. For the indicators, descriptive statistics such as the mean, median and standard deviation are presented. When relevant, the table of descriptive statistics also show maximum and minimum values.

The six project groups were compared with the control groups in their region on key indicators such as knowledge on sustainable production, production, and income through cross-tabulation, pairwise t-test, and regression analysis.

To account for both fixed and random effects that cause the variation in indicators such as the knowledge and implementation score, multilevel mixed-effects linear regression was used in which variables such as age, gender, and years of education are used to estimate the fixed effect model. Also, the indicator for region was used as a group variable to address random effects associated with the regions.

In addition to primary data analyses, a quick scan of literature was conducted to assess whether the research results in this study reflect the general situa-

[1] StataCorp, 2007. Stata Statistical Software: Release 10. College Station, TX: StataCorp LP.

tion of Ghanaian cocoa farmers. Information on this literature review can be found in chapters 3 and 4.

After the first data was analysed, a draft report was written, and its main results presented to various stakeholders in a validation workshop in Ghana: Solidaridad West Africa, Solidaridad, LBC and NGOs implementing the projects, project farmers, CRIG, COCOBOD and the University of Ghana (Legon). Based on the discussions in the validation workshop, as well as feedback obtained from Solidaridad West Africa, UTZ Certified and Solidaridad, the analyses were adapted and explanations given as to why results are the way they are. Then the report was finalised.

3 How do UTZ and Solidaridad influence cocoa farmers and producer groups?

3.1 Introduction

In this chapter we present information related to the research question: How do UTZ and Solidaridad influence cocoa farmers, producer groups in terms of knowledge and practices? And what are the results of those changes on the intended outcomes on people, planet, and profit for cocoa farmers in Ghana?

As this report presents the results of a baseline study, it cannot provide an answer to this research question. It has been possible, though, to analyse potential cocoa programme results based on the quantitative data, by assessing whether the length of participation in a project has an influence on knowledge levels, the implementation of good agricultural practices, productivity, farm efficiency and net income.

3.2 A first glimpse of potential cocoa programme results

As some of the projects started several years ago, we assessed whether the length of participation in a project has had an influence on knowledge levels, the implementation of sustainable practices, productivity and net income.

We found that, all other things remaining equal, the longer a farmer participated in a project, the higher his/her knowledge level is, which could be a confirmation of the assumptions in the impact logic but could also be a result of selection bias when farmers in the first groups had a higher knowledge level at the start of the programme than farmers in later groups. But we also found that other factors influence the knowledge levels: the higher the education level, the more trainings participated in and the higher a respondents' productivity, the higher the respondent's knowledge level is. Also, men have a significantly higher knowledge level than women. A possible explanation for this is that women generally have a lower education level than men. Furthermore, the effect of training on knowledge levels may differ across regions as part of the variation in the knowledge levels was due to regional variations.

With regard to the implementation of good agricultural practices, we found that farmers who have participated longer in their projects, i.e., farmers from

the first phase of project groups 1 and 2, implement good agricultural practices in a significantly better way than the farmers in their control groups while the other project groups do not. But we do not know whether that's because of participation in the programme or because the farmers in those groups already implemented their practices in a better way at the start of their project (selection bias). And we also found that, again, other factors also have an influence: farmers who participated in more trainings other than the cocoa programme trainings implement practices in a better way than farmers who participated in fewer trainings. We also found that lead farmers implement practices in a significantly better way than other project farmers, which is an interesting finding as their knowledge level was not significantly higher than those of the other project farmers. Furthermore, men implement practices in a significantly better way than women. A possible explanation for this is that women generally have a lower education level than men.

Farmers who participated in the programme for longer did not have a higher cocoa productivity or a higher income than farmers who just started their participation in the programme.

In a future assessment, it can be assessed whether the changes in the knowledge levels, the implementation of sustainable practices, productivity and net income, amongst others, can be attributed to the cocoa programme, by comparing the evolution over time of both the project groups and their control groups.

4 Who does the programme reach?

4.1 Introduction

In this chapter, the characteristics of the farmers in the project and control groups are presented in the baseline situation, and whether the project farmers are representative for the Ghanaian cocoa farmer. This chapter will mostly provide a narrative, while detailed information can be found in Appendix 3. In the text it is often made explicit where in Appendix 3 the detailed information can be found. Tables or figures are placed in the text whenever this is relevant.

4.2 Demographic characteristics of the respondents

The majority of the respondents (79%) were male and household head. Female respondents accounted for about 20% of the survey sample, of which 50% were household head. On average, a household was made up of 6 people. More than 50% of the households have fewer than 6 members. The households in the Western Region are slightly smaller than households in the other two regions.

To be able to conduct regression analyses taking into account age as an explanatory factor for knowledge (development), we investigate the average age of the respondent. The average age of the respondents was 49.5 years, with the oldest respondent being 96 years old and the youngest 16 years old. About half of the respondents were between 40 and 60 years old. No significant differences in age were observed among different groups.

Education level is also an important factor to take into account in impact assessment analyses. The respondents' level of education, measured as the number of completed education years, varied greatly in our sample: it ranged between farmers who have never been to school to farmers having finished 18 years of education. About 18% of the respondents enjoyed more than 10 years of education, while about a quarter of the respondents have never been to school. No significant differences were observed among project groups in the same region. However, there were significant differences across the regions. As shown in Figure A3.3 in Appendix 3, the Ashanti Regions has the highest percentage of respondents who did not start school, while the Eastern Region has the lowest.

Migration status was also assessed during the study. In the regions, the percentage of indigenous, first generation migrants and second or more generation migrants was similar (on average about 23%, 55% and 23%, respectively). In the Western Region, however, we found relatively more indigenous farmers than in the other regions, and fewer second or more generation migrants (33% and 10%, respectively).

We also assessed whether we have lead farmers in our sample. In total, 36 of the respondents are lead farmers (13%), of whom three are female. These lead farmers are concentrated in four out of the six projects: 11 in group 1, 12 in group 2, 5 in group 5 and 8 in group 6. There are no lead farmers in the sample of group 3 and 4 projects, as those project groups had just started at the time of the survey. Thus, especially in group 1 and 2, lead farmers are relatively overrepresented.

The last general characteristic we would like to present here is how many farmers we have interviewed are also purchasing clerks[1] because being a purchasing clerk may affect productivity or farm management negatively (because they do not have time to manage their farms), or positively (because they may be richer). In total, 34[2] farmers (about 10%) interviewed are purchasing clerks. We think this percentage is higher than the average.[3] We interviewed between 2 and 7 purchasing clerks per group. Eight purchasing clerks are licensed to sell UTZ certified cocoa. About half of the purchasing clerks (19 of the 34) indicated their preference for selling certain types of cocoa: 21% has no preference, 53% prefers to sell UTZ certified cocoa and 25% prefers regular cocoa. Reasons for their preference to sell UTZ certified cocoa were 'more bags to buy from farmers' (5 answers) and 'less re-drying is required' (3 answers). For more information, see Appendix A3.13. In the future impact assessment we will analyse whether this has changed over time and whether such changes can be attributed to project impacts (productivity or quality increase).

[1] Purchasing clerks are agents of a specific company; they buying cocoa beans with a commission for each bag of good quality cocoa sold to a LBC.

[2] The question 'Are you a purchasing clerk?' was answered with 'yes' by 34 farmers . However, the next question, which should only have be answered by purchasing clerks, was inexplicably answered by 53 farmers. We present the information here, based on the 34 farmers who said that they were a purchasing clerk in the first question.

[3] In Laven (2010) about 6% of the farmers may have a moderation position including being purchasing clerks.

4.3 Ownership of and responsibility for cocoa farms

Sharecropping is widely used in Ghana. To obtain more insight into the land tenure system, the respondents were asked about their ownership of the land. As shown in Table A3.4, about 58% of the respondents were landowner of their main farm, while about 37% of the respondents were sharecroppers (*Abunu, Abusa* or *Abunan*). The survey results showed that the main sharecropping form among the respondents was *Abunu* (77% of all sharecroppers), followed by *Abusa* (about 20%). *Abunan* was only mentioned by 4 respondents.

The differences between these three sharecropping systems are as follows: the *Abunu* is a farming system in which a piece of land is given to a sharecropper and crops are shared equally between the sharecropper and landowner (Ghana Districts, 2012). The *Abusa*, on the other hand, is a farming system in which a sharecropper can use the land and the crops are shared as follows: the sharecropper receives two-thirds of the crops for his farm management work while the landowner takes the remaining one-third. In the *Abunan* system, the sharecropper takes a quarter of the crops and the landowner takes the remaining three quarters. Between these three systems, there are also different duties for landowners, e.g. for paying input costs.

In addition to asking farmers about land ownership, we also asked to whom they sold their cocoa in 2011. Most farmers (about 79%) sold cocoa to one LBC only in the last year. About 18% indicated that they supplied to two LBCs and about 2% of the farmers said to have sold their cocoa to three LBCs. Only two farmers sold their cocoa to four LBCs. One issue that needs to be taken into account in analysing supply to LBCs is that farmers may have a debt outstanding at one LBC which needs to be repaid before the farmer can sell all his cocoa to another LBC. This may result in a farmer selling to multiple LBCs or farmers selling all their cocoa to a less-preferred LBC until they have repaid their debts and can start selling to their preferred LBC. The list of LBCs can be found in Appendix 3, Table A3.5.

4.4 Representativeness of the sample

To analyse whether the farmers we sampled represent cocoa farmers in Ghana, we presented the draft research results to stakeholders in a validation workshop, and conducted a literature review.

According to the workshop participants, almost all of the information provided to them from the draft report reflects the situation in the field, both with re-

gard to the means and the minimum and maximum figures. On the following points, the information we presented was said to be different:

- The number of farmers being a member of a producer group is extremely high compared to the national average of 18%, but that would be expected as we mostly have farmers in our sample that are (to become) UTZ certified, and producer group establishment is one of the steps in the certification process.
- The percentage of farmers having experienced deductions last year was seen as too low; workshop participants said that over 10% of the farmers experience deductions normally.
- The mean input costs were confirmed, but the maximum input costs were found to be high.
- There was a discussion on the scores for knowledge and the implementation of practices, as project staff and farmers found the scores low. LEI and Solidaridad West Africa had a look at the scores for the individual questions again, and adjusted some based on agronomic advice to the farmers, but scores remain low.

In conducting the literature review, we found only one study up to present which is recent, and has similar detailed data as we have collected. This study is the MIT/Harvard baseline survey by Hainmueller, Hiscox and Tampe (2011). They interviewed about 3,000 farmers in 335 communities throughout Ghana, including in the three regions in which we have interviewed farmers. Based on validation workshop discussions and the MIT/Harvard baseline study, we conclude that the farmers in our sample are representative of the 'average' Ghanaian cocoa farmer. The average age of the farmers in our sample is 49.5 years, while the average age in the MIT/Harvard study sample is 51 years. Out of our and the MIT/Harvard samples, respectively 79% and 81% consist of men, and the average household consists of 5 and 6 persons, respectively. Most farmers did not finalise any education after secondary school, but about a quarter or a third of the sampled farmers did not go to school at all in our and the MIT/Harvard study, respectively. With regard to farm size, the MIT/Harvard study reports slightly lower farm sizes (5 acres compared to our 7.14 acres). We cannot compare the cocoa productivity of our sample with MITs sample as they report on median yield and we report on average yield. Cocoa is the most important crop for over 70% and 80% of farmers in the MIT/Harvard and LEI samples, respectively, and farmers in both samples earn only a relatively low amount with other activities than with cocoa production. We cannot compare the income figures between the studies, as the MIT/Harvard study measures in me-

dian incomes and LEI in mean net income, and it is not clear whether the income figures they present are gross or net income.

The biggest difference between the LEI and MIT/Harvard study, is that in Ghana, usually a low percentage of farmers are a member of a producer group or association (about 10%), while in our sample the percentage of the farmers who are member of a producer group is high. This was to be expected because we have interviewed mostly farmers who are to become UTZ certified or are UTZ certified already, and thus need to be a member of a producer group.

Based on these two types of sources, we conclude that the farms in our sample are representative of the Ghanaian cocoa sector, apart from the fact that relatively more of them are organised in producer groups than normally.

5 What is the added value of going through the certification process or being certified for the farmers?

5.1 Introduction

In this chapter we present information related to the research question: What is the added value of going through the certification process / being certified for the farmers? How do training and certification influence each other?

This research question can only be properly answered when farmers have been part of a certification programme for some time. As most of the farmers in this study have not been in the programme for long, we did not ask them an extensive amount of questions on this subject. However, we did ask them about their satisfaction with the training programme, whether they attribute benefits to the project activities and whether they are satisfied with services related to certification delivered by the producer groups or Licenced Buying Companies (LBCs) to get a first insight into an answer to this question. We cannot provide insights yet into how training and certification influence each other.

5.2 First evaluation by farmers of the project trainings, producer group and ICS

Those farmers who mentioned to participate in trainings to obtain UTZ certification, were also asked to evaluate the trainings. Almost all project farmers who answered this question (166), except members of group 3 and 4, were satisfied with the trainings (see Table A3.6 for more information). About 97% (165 farmers) of those who participated in the training would recommend the training to their colleague or neighbour farmers, while 3 farmers said that they would not. Even though group 3 and 4 farmers hardly received any training, 25 of the in total 85 farmers answered the question about their satisfaction with regard to trainings. Of them, 21 were unsatisfied. This is probably because both projects had just started when the survey was carried out.

Another evaluation question asked whether the producer group or ICS staff provides the farmers with information or services that make cocoa production easier. About 38% of the respondents replied positively to this question.

We also asked some more in-depth questions about the satisfaction of the farmers with the services of the producer group. See Appendix A3.14 - A3.18 for more details. When presenting the information in the validation workshop, there was quite some discussion on what, for instance, commercial activities would entail, and whether farmers have a similar definition of the concepts evaluated as the researchers. This should be carefully explored during the impact assessment study.

A maximum of 128 farmers answered the different questions. Of those farmers, 70% and 62% were satisfied with market information on inputs and sales, respectively. Farmers were, however, quite unsatisfied with access to inputs (especially credit, fertiliser and pesticides), as well as commercial activities, with percentages of unsatisfied farmers ranging between 47 and 82%. Twenty-seven per cent of farmers were unsatisfied with the feedback information from the ICS, and 33% of the farmers were unsatisfied with feedback from the external controls.

Farmers were also asked about the benefits and disadvantages of being a member of a producer group. A maximum of 210 farmers answered this question. Most benefits that are mentioned are better social contacts with other farmers, knowledge exchange between members and communal problems discussed during group meetings. Extremely few farmers mentioned disadvantages of being a member of a producer group. In interviews with project staff and farmers from group 1, they mentioned that especially the upfront investment costs are difficult for farmers to manage. Farmers need to make sure that they continue with the practices (weeding, pruning, removing mistletoe) for some time, before they see the benefits, and try to spread the costs. They conclude that farmers need to be supported to cover the investment for the first year, and that 'certification is for relatively rich farmers as poor farmers cannot participate'. This information does not confirm our study results in that the sampled farmers are representative. In the future impact assessment we will try to find out if the impact differs between 'rich' and 'poor' farmers.

6 Baseline situation of cocoa programme farmers

6.1 Introduction

In this chapter, we will follow the impact logic to explain what the baseline situation is of the farmers in our sample. As some of the projects had already started some time before this baseline study was conducted, and new farmers have joined those projects over time, the 'true baseline situation' of such projects is impossible to establish. This has posed some difficulties in the analyses, also because due to random sampling, information from only a limited number of early project farmers was analysed. We have overcome this problem partly by assessing the influence of the length of participation in a project with statistical techniques. Also, because of the different phases of the projects, the projects cannot be compared with each other. In the future impact assessment we will compare improvements over time between the projects and their control groups. And we will need to collect data from other sources than farmer interviews on trainings, other interventions and certification (e.g from the project staff, traders, farmer passbooks etcetera) to be able to draw strong conclusions on the impact of training and certification.

This chapter describes the status of the farmers in the programme. After that, we will address the knowledge levels of all farmers, followed by how they implement certain practices on their farm. One of the analyses presented there is a comparison between project groups and control groups, and lead farmers and other farmers. Then, we will present the results for all kinds of (outcome) indicators regarding cocoa production (productivity, yield, inputs, income, etcetera).

6.2 Training activities to obtain a certificate and certified status

6.2.1 Introduction

As obtaining UTZ certification is one of the objectives of the cocoa projects, we also assessed whether farmers are certified or not, as well as how long they have been part of the project. In addition, we have asked farmers whether they

are certified by Rainforest Alliance or FairTrade (FLO), to be able to attribute the potential impacts found in the impact assessment to the certification status (which certificate(s)) and how long farmers have been certified.

6.2.2 Participation in the cocoa projects

Since regional differences in agro-climatic and social-economic conditions could lead to differences in productivity and livelihood among different project groups, it is important to assess regional effects when assessing the project impacts. The sample in this study covers farmers in different regions and different phases of the projects, which allows for a first assessment of possible short-term training effects on the knowledge and practice of sustainable cocoa production as well as regional effects. Table 6.1 shows the distribution of farmers in different phases of the project.

Table 6.1 Length of participation in the project (March 2012)

Project group	Length of participation in the project a)			Total nr of farmers
	0	1	2	
	Number of farmers			
Group 1	0	17	25	42
Group 2	0	29	12	41
Group 3	44	0	0	44
Group 4	41	0	0	41
Group 5	0	43	0	43
Group 6	0	47	0	47
Control Group Ashanti (for Group 1+ 3)	43	0	0	43
Control Group Eastern (for Group 2 + 6)	43	0	0	43
Control Group Western (for Group 4 + 5)	41	0	0	41
Total number of farmers	212	136	37	385

a) 0 = less than half a year, not certified; (staring phase); 1 = longer than half year, less than a year; (phase 2, not certified yet, about to be certified, just certified); 2 = longer than one year, most probably certified)

As can be seen, none of the farmers connected to project groups 3 and 4 had started training when the survey was carried out. Some of them also mentioned that they were not going to be trained to become UTZ certified. Farmers from group 5 and 6 had been in the project for some time. Some surveyed farmers in group 1 and 2 have been trained longer (or participated in the same

trainings but in less time than others) and are certified, while others have started their participation in a later stage and are not yet certified.

Another issue that we wanted to find out was whether there would be producer group executives in the sample, because they may have acquired more knowledge than other farmers as they are so close to project implementation. Of the 378 respondents who gave us an answer 208 (55%) said to be a member of a producer group or producer organisation. Fifty-five of them said to be elected or appointed as an executive for a producer group. We thought that this is quite a high number of executives and wondered whether it is representative. The participants of the validation workshop indicated, however, that there are many executives of and unofficial functions at a producer group, and thus that this figure is representative.

6.2.3 UTZ certification status

As to the certified status of farmers, farmers had some difficulty in responding whether they/their producer group had obtained the UTZ certificate, and also since when they/their producer group was certified.

We have worked with the following information, based on information from project staff and comments from workshop participants:

- Group 1 farmers are almost all certified, but not all at the same time
- Group 2 farmers who said they were certified in 2012 were actually not certified yet. Not all group 2 farmers are certified as there are different groups running for certification in different phases.
- Group 3 and 4 farmers were not certified yet
- Group 5 farmers just became certified before the survey was carried out, but this was not known to the farmers at the time of the survey.
- Certified farmers in group 6 obtained the UTZ certificate in 2011 (and not in 2012 as mentioned by some farmers). Not all farmers are certified as there are different groups running for certification in different phases.

Table 6.2 contains information on the certification status of the farmers in the sample, which is based on the responses of the farmers and information from the validation workshop (June 2012).

Table 6.2 Certified status survey farmers (March 2012)			
Project group	**Number of farmers who are UTZ certified**		**Total number of farmers**
	No	**Yes**	
Group 1	0	42	42
Group 2	29	12	41
Group 3	44	0	44
Group 4	41	0	41
Group 5	43	0	43
Group 6	6	41	47
Control Group Ashanti (for Group 1+ 3)	43	0	43
Control Group Eastern (for Group 2 + 6)	43	0	43
Control Group Western (for Group 4 + 5)	41	0	41
Total	290	95	385

Information on price premiums received due to UTZ certification was given by 103 of the farmers (please note that more people answered this question, as there was confusion on the status of certification by some farmers; we only present the findings of the farmers who said their producer group is UTZ certified). Twenty-six farmers said that they had received a premium, and 23 said that they did not receive price premiums yet. Fifty-three said that they did not receive any premium, and 1 did not know. A reason for certified farmers not to have received a price premium yet could be that they have not been able to sell their cocoa as certified because they first had to repay loans to their former LBC. Only after they have repaid their loans, they can change the LBC and sell cocoa to an LBC that trades in certified cocoa.

Another reason given by validation workshop participants is that its premiums go through the producer group or LBC and (part of it) may only be distributed after all the certification costs are known at producer group level. According to the UTZ Code of Conduct for cocoa, the certificate holder should pay producers in a manner convenient to them and prices and premiums should be clearly communicated and transparent to the producers. In addition, the certificate holder should report to the producers about spending of the UTZ Certi-

fied premium in a transparent way. The premium should clearly benefit all certified producers, in cash and/or in kind.[1]

According to the project staff, the following premiums are paid to farmers:

- Group 1: GHS6-10 per bag
- Group 2: no premium yet
- Group 3 and 4: no premium yet
- Group 5: GHS25 per bag
- Group 6: GHS10 per bag.

The premium mentioned by the farmers however ranged from GHS1-250 per bag with an average of GHS10 (about EUR4). GHS250 per bag cannot be right with the COCOBOD fixed price per bag of GHS200 so it probably refers to the total amount of GHS received as premium (number of bags times the premium per bag), or to Old Cedis according to the participants of the validation workshop. We have also understood that for group 1, the cash premium for the first year has recently been distributed to the farmers who participated in the first year and not to others (about GHS250). Even though all the other members may benefit from part of that premium because group 1 has reinvested it into their ICS activities, some farmers may not be aware and able to share this information. Now, the membership of group 1 has more than quadrupled to over 1,000 members and therefore, most of them are likely to say they have not received premium because they were not part of the project in the first year.

To be a member of a producer group, farmers pay a fee. Group 6 farmers pay GHS2 a month, while group 1 and group 5 members pay GHS1 a month. They use this fee to open up accounts to pay for organisational costs. The account is also used for the premium. Membership fees for group 2, 3 and 4 members are not applicable (yet).

6.2.4 Training for and certified status of other sustainability certificates

None of the farmers in the sample who gave us information about possible training for other sustainability certificates, had received any training to become Rainforest Alliance or Fair Trade certified, nor had their producer group obtained certificates for these sustainability schemes. The issue with our data is that only 50% of the farmers gave us information about training and certification related to other certificates, so in reality it may be that farmers have been trained for Rainforest Alliance or Fair Trade or that their producer group obtained a certifi-

[1] UTZ Code of Conduct for cocoa (2009). No 141 and 142.

cate for one of them. We do not know why so few farmers gave us this information. UTZ Certified indicated that such information is usually known on producer group and ICS level. If this is indeed true, then it would be very difficult to establish the impact of certification programmes using farm level surveys, except when detailed information can be obtained from the producer group or other organisations on interventions that have been implemented.

According to representatives from group 6 at the validation workshop, their farmers are certified organic. We understood earlier however, that the organically certified farmers are different (and are kept separate) from the farmers who are (becoming) UTZ certified. Thus, group 6 farmers who are UTZ certified are not certified organic and thus the organic certification cannot have a direct influence on UTZ certified farmers.

6.2.5 Participation in other training activities than for certification

Next to asking farmers about training and certification in their project, we also assessed whether farmers or their household members also participated in other trainings in the previous year. This question was answered by 367 farmers. Forty per cent of the farmers who answered this question also participated in other trainings than the project trainings. Such trainings had a range of topics; most farmers who indicated to have participated in other trainings had trainings on cocoa production, health and safety, chemical application or a combination of topics. See Appendix A3.8 for more information on the topics addressed at the trainings and A3.7 for information on how many farmers per project/control group participated in such trainings.

When farmers did not participate in any other training activities, their reasons were in 71% of the cases that no training was offered. Another important reason was that training was offered, but that the farmer did not have time to take part or was not available (on site).

From Table A3.9 to Table A 3.11, more information can be found on the trainings, other than from the cocoa project, farmers participated in. Farmers participated on average in 3 trainings in the last year (ranging between 1 and 10 events). The average number of hours per training event is 2 (ranging between 1 and 3 hours per event). Most trainings are organised by COCOBOD, followed by LBCs and NGOs. Some farmers mentioned UTZ as a trainer, misinterpreting the question as the question asked farmer about 'other training than for UTZ certification'. Apparently farmers did mention the training by the cocoa project as part of 'other trainings'. This indicates that such questions need to be carefully phrased in the future impact assessment so farmers understand exactly what

is being asked. Even better would be to collect data from implementers on trainings and other activities, to get to know exactly what kind of technical assistance and other attention the farmer has received, to be able to attribute possible impacts to the correct intervention.

6.3 Knowledge of good agricultural practices

The respondents were asked 17 knowledge questions on sustainable production. The questions covered topics on good agricultural practices (GAPs) related to the UTZ Code of Conduct and other GAPs. The farmers scored points on each question by the amount of pre-defined correct answers. These predefined correct answers were established by Solidaridad West Africa cocoa programme staff. See Appendix A4.1 for the scores for all answer options. Sometimes, the questions were multiple response type and gave different (sets of) motivations for the particular sustainability practice. The answers on each question were recalculated so that the maximum score on each question was 1. The higher the score, the more knowledge the farmer has. It is important to note here that we asked farmers all kinds of questions and that some of the issues asked after only come up in year two, three or four of the trainings.

Table 6.3 below shows the overall knowledge scores for the different questions for the project and control groups, and Appendix A4.2 shows the average scores for the individual questions. The actual questions asked can be found in Appendix 2, the questionnaire.

As can be seen from Table 6.3, the overall knowledge scores are quite low, with *all* overall scores amounting to or below 0.42 (or 42 points out of 100). This indicates that there is a lot of room for improving the knowledge of farmers on good agricultural practices and the UTZ Code of Conduct. The reason why the overall score is so low is that most farmers in the sample have not had training at all, or not for long.

Table 6.3	Average knowledge scores in different groups		
	Region		
Project group	Ashanti	Eastern	Western
Group 1	0.37 a)		
Group 2		0.41 a)	
Group 3	0.37 a)		
Group 4			0.36
Group 5			0.42
Group 6		0.32	
Control Group	0.33	0.32	0.39
Total	0.36	0.35	0.39
a) Significant difference with the control group (95% confidence interval).			

As for the overall scores for the individual questions, only two questions score higher than 0.50:

1. Can you mention benefits of removing diseased pods from the field and burying them after spraying (Average score: 0.50)
2. Can you mention the potential dangers of applying agrochemicals and fertiliser near the natural water bodies like rivers, streams, pools, ponds etcetera? (Average score: 0.57).

On the following indicators, the farmers score especially low (<0.35):

1. The benefits of leaving prunings in the field
2. The benefits of applying soil conservation measures
3. The benefits of record keeping
4. The benefits of a buffer zone
5. Factors affecting cocoa quality
6. Activities that are not appropriate for children to implement.

It has to be mentioned, however, that project farmers often score slightly better on these knowledge questions than control group farmers, but not significantly so.

It is worth noting that many farmers, especially farmers in group 3, 4 and 6, answered 'I don't know' or provided no answer to some individual knowledge questions. This has resulted in low knowledge scores for the questions mentioned above. Group 1, 2 and 5 have relatively fewer respondents who answered 'I don't know' than the other groups. See Appendix A4.3 for more

information. This might suggest knowledge gaps in training that deserve attention in programme activities.

The quality of data can significantly influence the reliability of an impact assessment and therefore deserves great attention. To assess data quality, we had a look at missing values for key indicators in the impact logic in this baseline study. A missing value occurs when you would expect a farmer to give you certain information, but he does not. We came to the following conclusion:

- Information on output (yields) is quite complete, but there are a large number of missing values for inputs used.
- There are no apparent differences between the projects with regard to the percentage of missing values.
- Respondents whose producer group is UTZ certified seem to be able to provide more information than not-certified respondents, but not with regard to chemical fertilisers and crop protection products. The reason for this may be that they apply fewer agro-chemicals than non-certified farmers, and that thus they give less information about it.

In the impact assessment research we will do a similar analysis to see if farmers have progressed with regard to recollecting information and answering questions.

6.3.1 Comparison of knowledge scores across groups and regions, and between lead farmers and other project farmers

In addition to looking at the individual questions, we made comparisons of the overall knowledge scores between the project groups and the comparison group in their region.

As can be seen from Table 6.3 presented earlier, farmers from group 1, 2 and 3 have a significantly higher overall knowledge score than the farmers from the comparison groups in their region (with a 95% confidence interval). This is not the case for members of group 4, 5 and 6, although group 5 farmers did score higher than the control group farmers but not significantly so. The differences may be explained by the fact that group 1 and 2 projects have been running for longer than the other projects which may have led to a higher knowledge level than their comparison groups. It is surprising, however, that the group 3 farmers score higher than their comparison group, as they have just started with their programme. In a future impact assessment it can be assessed

if and how the knowledge and other indicators of the different groups has changed over time and in comparison with the control group.

We also assessed whether the lead farmers score significantly higher than the other project farmers with regard to the overall knowledge scores. This was not the case: lead farmers do not score significantly higher than other project farmers with regard to knowledge scores.

6.3.2 Possible explanatory factors to the levels of knowledge

In addition to looking at the differences between the groups, we also looked at possible explanatory factors for the knowledge scores. The factors we took into account are: age, gender, education, being a lead farmer or not, participation in other training, being UTZ certified or not and yield per acre on the main farm.

From a pairwise correlation test, it can be concluded that there is a significant positive correlation between the fact that a farmer is male and the level of knowledge. This may be the result of longer education, although the knowledge questions we asked are related to topics not treated in school; men have on average more education than women (7.58 versus 4.16 years);

Furthermore, there is a significant positive correlation between the years of education (although not strong), other trainings than for UTZ certification participated in the last year, and yield per acre on the main farm. The other indicators, UTZ certification and being a lead farmer or not, do not show significant correlations with knowledge scores. Age has a slightly negative effect, but not significantly so (the older, the lower the knowledge score).

We also assessed whether the time spent in a project is correlated to knowledge levels. The regression shows that a respondent who has been participating in the project for a longer time, would have higher knowledge score, when other things remain equal (ceteris paribus). This confirms the impact logic which indicates that the projects are expected to lead to knowledge increase. What needs to be taken into account is that part of the variation in the knowledge score was due to regional variations, which means the effect of training may differ across regions. See Appendix A4.4 and Appendix 5 for more details.

6.4 Implementation of good agricultural practices

After analysing the knowledge of the farmers in the previous section, this section presents 22 indicators for the implementation of acquired knowledge. We use production, environmental and social indicators that were developed to

measure the practice. The score for the indicators was calculated using the answers given by the farmers to 22 practice-related questions. For each indicator, a score between 0 and 1 was assigned to each possible answer to the relevant question according to its compliance with the UTZ Code of Conduct and GAPs. The questions and the corresponding scores to the possible answers are listed in Appendix 2 (Part D of the questionnaire) and Appendix A4.5, respectively.

The questions related to GAPs are grouped into three categories that represent sustainability practices most related to intended impacts on production ('profit'), on the environment ('planet'), and on social well-being ('people'). Group scores are the mean of the scores from individual questions. Appendix A4.6 gives the scores for the individual questions, and the overall scores for each category, both per project group. The higher the score the more farmers implemented the GAPs.

In the end of this section, a comparison is made between project groups and control groups and lead farmers and other farmers.

6.4.1 Production indicators

With regard to production related indicators, the overall scores of the project groups are slightly higher than those of the control groups, ranging between 0.59 and 0.71 (the scores for the control groups range between 0.59 and 0.66). This means that there is still room for improvement, but that project farmers do already relatively well. This is an interesting find as the overall knowledge scores are so low. An explanation given by the workshop participants was that often farmers know how to do something, but not necessarily why they should do it the way they do.

The questions that score specifically low, greatly decreasing the overall production indicator scores for the project groups are:

1. How far apart are your cocoa trees planted from each other on your farm? Overall score: 0.34. A reason for this low score is that farmers have old plantations and thus you can only see a change over a longer time period; farmers do not uproot their existing trees easily and replant them, because they would forego income before the new trees produce pods. So even when the farmers know what to do, it might be that their farm was established a long time ago and thus the planting density is not up to standards. it
2. When do you apply fertiliser (chemical or organic), overall score: 0.24. A reason for this low score is indicated to be by workshop participants that fertilisers only becomes available in the wrong season, and are then applied by the farmers.

3. Do you keep records on input use and production? Overall score: 0.18. This score surprised us as half of the farmers in the sample have been in a project for more than a year and have passbooks. It was mentioned at the validation workshop that many farmers were illiterate, and thus would need help in record keeping.
4. What do you do with diseased pods? Overall score: 0.21

Obviously, the majority of the project farmers in the sample are relatively new to the project, so such results are not surprising. But as Table 6.4 on page 66 shows, project groups that have been active for more than one year when the survey was conducted score better than the other groups for some of these indicators.

6.4.2 Environmental indicators

Project farmers scored lower for environmental indicators than for production related indicators, with scores ranging between 0.36 and 0.47. Environmental scores for the comparison groups range between 0.35 and 0.42. With regard to the environmental practices much can thus still be improved by both comparison group farmers and project farmers.

Practices that were specifically not implemented well (low scores) were:

1. How many shade trees do you have on your farm per acre? Overall score: 0.19.
2. What do you do with leftover chemicals? The overall score: 0.27, although project farmers usually score better than control group farmers. According to participants at the validation workshop, there usually are no leftover chemicals, and as that was not one of the answer options, maybe this score does not represent the reality.

6.4.3 Social indicators

Social practices investigated here are related to the use of Personal Protective Equipment (PPE) when applying crop protection products and chemical fertilisers, the storage of both types of products, child labour and labour conditions. As the information on these issues cannot be summarised as easily as we did for production and environmental indicators, this section is much longer.

Table 6.4	Average scores for the implementation of sustainable practices per indicator category per project group									
Indicator categories	**Project group**									**Total**
	Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Group 6**	**Control Group for Group 1+3**	**Control Group for Group 2+6**	**Control Group for Group 4+5**	
Production indicators	0.71	0.71	0.61	0.59	0.65	0.64	0.59	0.66	0.6	0.64
Environmental indicators	0.43	0.43	0.36	0.36	0.47	0.39	0.35	0.4	0.42	0.4
Social indicators	0.79	0.71	0.55	0.51	0.66	0.8	0.61	0.69	0.55	0.65
What PPE does your family or worker use when spraying chemicals?	0.8	0.5	0.43	0.48	0.51	0.57	0.51	0.35	0.44	0.51
Where do you store your chemicals?	0.77	0.8	0.66	0.54	0.8	0.86	0.61	0.76	0.67	0.71

Farmers score average for both questions on the use of PPE and the storage of 'chemicals' although there is still room for improvement. The overall score for project farmers ranges between 0.51 and 0.8, with project groups that have been running for some time scoring higher than the ones that just started (see Table 6.4 above). An explanation given to us in the validation workshop for the low scores for storage of agro-chemicals is that most farmers are in the first year of training, and have difficulties in organising a storage room. Also, it was said that farmers do not buy all PPEs easily, because of the costs involved.

Appendix A4.7 shows the availability of PPE items for all farmers. This figure indicates that not many farmers have PPE items available on their farm. Almost

60% of the farmers have boots, but fewer than 30% of the farmers have a hat, nose mask, overall, and/or goggles. This confirms the fact that all groups, except group 1, score lower than 0.57 on the question on the use of PPE.

We also had a look at the use of child labour (by children <18) on the main farm. The information was collected by asking about labour used on the farm for a variety of activities. Table A4.8 in Appendix 4 provides an overview of whether and if so, how many children do certain activities, in different groups. Children mostly assist their parents in harvesting and pod breaking, but also in weeding, fertiliser application and transporting cocoa to purchasing clerks. Control groups and groups 3 and 4 used children more often for these 5 tasks than the other groups.

According to the UTZ Code, children are allowed to do certain tasks on the family farm, as long as it is not dangerous to do so (working with sharp items, e.g. during pod breaking, working with dangerous chemicals (crop protection products, chemical fertilisers) carrying heavy loads, and only for a maximum of 14 hours per week, and if the work does not interfere with their schooling. As can be seen from the child labour table, fertiliser application could be a task not suitable for children (3 children performed this task in all project groups except in groups 3 and 4), just as pest control although we do not have detailed information enough to assess whether this involved application of toxic agrochemicals[1] (1 child assisted in pest control in all project groups except in groups 3 and 4). For harvesting, more children are used but we do not know whether their activities would be dangerous (climbing high in the trees, using sharp items). This also counts for pod-breaking activities. Four children in all project groups except groups 3 and 4, have been carrying cocoa bags of 64 kilograms to the purchasing clerk, which is not permitted on the basis of the UTZ Code of Conduct. All in all, we conclude that still some children perform certain tasks while they should not be doing so, although on a very limited scale.

We also have collected information on labour conditions:

- When the hired labourers have worked longer than the agreed time, about 62% of the respondents said that they would receive an extra reward (an addition to the agreed fee), which means that in about 37% of the cases, the hired labourer did not receive an extra award.
- About 12% of the respondents who provided an answer (39 respondents) also worked on somebody else's farm. Of these respondents, about 76% knew that there is a procedure to complain when the hiring farmer does not

[1] This depends on whether these fertilisers are hazardous and if pest control was done with chemicals or not (e.g. removing diseased pods).

respect their agreements and about 40% of them indicated that they or other labourers did use the procedure.
- About 33% of the respondents (129) are sharecroppers or caretakers, of which more than 80% are aware of the procedure to complain when the agreement is not respected and about 30% have used the procedure.
- Of the 376 respondents who answered the question regarding accidents, about 20% (76) said that someone suffered an occupational accident on their main cocoa farm or on the way to the cocoa farm in the last year. The number of accidents ranged from one to five times, with the most occurred to adults, hired labourer and family labour. In seven cases, the accidents concerned minor household members and five cases concerned communal labourers. In most of the cases (more than 72%), the injured person was treated by health worker. In 9 cases, the injured person was treated by one of the household's adults. One respondent answered the helping person to be the community member who participated in a (basic) medical training or knew how to use a first aid kit.

It appears that there is room for improvement with regard to remuneration for overwork for hired labourers as 37% did not get any. Furthermore, a high percentage of the farmers are aware of the existence of complaints procedures. Occupational accidents have been reported by 20% of the farmers. We do not know whether this is a high, low or average percentage.

6.4.4 Comparison of the overall scores between project and control groups and lead farmers and other project farmers

We made two types comparisons: first, we looked whether lead farmers have better scores for the implementation of practices than other farmers. We found that, even though the lead farmers do not score significantly higher than the non-lead farmers with regard to knowledge scores, their scores for the implementation of practices were significantly higher than the for other project-farmers.

Second, we compared the overall scores for the implementation of practices between the project groups and the control groups in their region. See Table 6.5. We found that:
- In the Ashanti Region, farmers from the group 1 have a significantly higher score than the control group farmers. There is no significant difference between group 3 farmers and the control group. This result is as expected as

project group 1 started some time ago while the project group 3 started just before the baseline survey was conducted.

- In the Eastern Region, group 2 farmers score significantly higher than the control group (as expected as they have been in a project for longer), but there is no significant difference between group 6 farmers and the control group.
- In the Western Region, there is significant difference between group 5 farmers and the control group, but no significant difference between group 4 farmers and the control group in the same region.

Table 6.5	**Comparison between project group and control group per region a)**		
	Region		
Project group	**Ashanti**	**Eastern**	**Western**
Group 1	0.127***		
Group 3	0.02		
Group 2		0.049*	
Group 6		-0.006	
Group 4			-0.028
Group 5			0.054**

a) Shown as difference between the project group and the corresponding control group in the same region.

6.4.5 Reflecting on the correlation between knowledge scores and the scores for the implementation of practices

As the impact logic indicates that gaining knowledge leads to the adoption of practices, we conducted a correlation test to analyse whether there is a positive correlation between overall knowledge scores and overall scores for the implementation of practices. Its result is that there is a significant positive correlation between the overall knowledge score and the overall score for the implementation of practices. This means that, on average, farmers with a higher knowledge score will also have a higher score for the implementation of practices. This finding is important, as it indicates that there indeed can be a connection between knowledge levels and the practices implemented in the field, as the impact logic indicates.

In addition to looking at the overall scores, we also compared the scores for knowledge and implementation questions which relate to each other. This could not be done for all the questions. The results are as follows:

- With regard to the distance in planting the cocoa trees, the knowledge score of what the benefit is of planting them 3 metres apart is similar (0.35 and 0.34) to the implementation score for actually having planted trees with such distance from each other.
- For weeding, farmers score much higher with regard to actual weeding practices on the farm, than on knowledge about which recommended methods exist (0.93 versus 0.43). An explanation given at the validation workshop was that farmers often do the right thing, without knowing exactly why, especially with practices which are implemented often on the farm such as weeding.
- The same counts for what farmers do with prunings: farmers score 0.94 for how they treat prunings (most answer that they leave them in the field), but only 0.26 for knowledge on the benefits of leaving prunings in the field.
- When looking at the use of PPE, farmers score on average 0.51 for the implementation of PPE by themselves and their family members, while they score a bit lower (0.43) on the benefits of using PPE. Again, the implementation of the practice is better, albeit slightly, than the knowledge why it is important.

These results indicate that even though there is an overall significant positive correlation between knowledge and the implementation of practices, for some individual questions a mismatch has been found as implementation scores were much higher than knowledge scores.

We also conducted regression analyses to assess whether there are factors that correlate with the levels of the scores of the implementation of practices. We found that the duration of the project, the knowledge score, being a lead farmer or a male and participation in other trainings significantly correlate in a positive manner with the scores for the implementation of practices (see Appendix 7).

6.5 Input use, production and income

In this section, we will focus on 'intermediate outcome' oriented indicators, such as inputs used, cocoa production indicators and income, and the input/output ratio, following the impact logic from chapter 1. We have asked the farmers about these indicators for the 'last year' which we interpret as 2011, and only for their main farm. During the impact assessment in 2014, for which the survey will be conducted in the same month as the baseline survey, we will ask the

question in a similar way to ensure that we will receive information on a similar period from the farmers.

6.5.1 Labour use and costs

Most farmers (78%) hired labour in the last year (2011). This percentage and all the other information below include work done by sharecroppers. The variability of labour input is very high between the groups, as well as the activities, as can be seen from Tables A4.11 in the Appendix. For the different groups the range is as follows: between 4.1 and 708 days per acre per year with averages between 75 and 133 days per acre per year.[1] The percentage of farmers hiring labour is significantly lower in the Eastern Region than in the other regions. Within the same region, there is no significant difference between the project groups and the control group.

When hiring labour, almost all of the respondents (about 99.4%) who answered the question (307 respondents) said to agree upon the time the hired labourers will spend on the farm. The hours per day spent by the hired labourer were reported to vary between 0.5 to 9 hours, with an average of 4.8 hours (which is close to a normal working day of 5 hours). The hours spent by the hired labourer were significantly lower in the Eastern Region than those in the Western (difference 0.3 hour). No other differences were observed across the groups.

There are large variations in the money spent on hired labour: the minimum spent was GHS8, the maximum GHS3,000. The average amount spent was GHS366. These costs were established by using the time spent on a variety of activities, and multiplying it by GHS4 (EUR1.67), the average daily wage (CRIG, 2007, reconfirmed by CRIG during the enumerator training). If farmers answered the question correctly, by stating the hired labour costs for their main farm only, this amounts to an average of GHS71 per acre, with a minimum of 0.79 and a maximum of 500. Money spent per acre on hired labour is not normally distributed, but skewed to the right: most farmers spent between 0 and GHS100 per acre. The outliers were not removed from the analyses, as participants of the validation workshop gave us the information that the high figures were exceptional, but possible. There are no significant differences in labour costs between the different groups.

[1] The labour input given by the farmers for all activities could be an underestimation of the true labour input: to retain a higher number of observations, missing labour input for certain activities was considered zero when calculating the sum of labour input in all different activities unless labour inputs for all observations were missing.

6.5.2 Use and costs of inputs other than labour

We asked farmers how many inputs they used on the farm last year: planting material, crop protection products, (chemical) fertilisers, and PPE. And also how much these cost. Tables A4.12 and A4.13 in the Appendix give more details on the inputs bought and used last year. Based on that information we calculated the total input costs.

As mentioned before, not all have PPE available. Tables A4.12c provides an overview of the ownership and use of PPE items. It is worth noting that about 5-7% of the farmers do not have the PPE item themselves, but do use it. On the other hand, some farmers do not use a PPE item while they do have one.

Of the respondents who bought PPE last year, 38 said that they were taught in training that they can benefit from it, 16 said that it was a required practice for UTZ certification, 27 said that they have seen their neighbours or colleague farmer using it. It is notable that 34 respondents said that they wanted to buy it for a long time but just recently got the required funds. Many more respondents (172), however, bought it for other reasons that were not specified. In the impact assessment study we will assess again whether the farmers have PPE available more generally, and whether they also use them in the field, and what the reasons are for them to use them.

With regard to general equipment bought and used last year, most farmers who answered the question (95%) bought a cutlass, followed by 46% of the farmers buying a drying mat and 42% buying a harvesting hook. Seventeen per cent of the farmers who answered the question bought a knapsack sprayer and 3% a storage for chemicals. The costs per items range between GHS1 (for a harvesting hook or drying mat) and about GHS100 (for a drying mat), although we had to recalculate the costs of items that were indicated to be extremely high, as we expected farmers to have used the Old Cedi's (e.g. GHS900 for a drying mat).

Furthermore, we asked farmers about the fertilisers, planting materials and crop protection products used. Table 6.6 gives an overview of the costs per acre for these inputs and Appendix A4.13 presents an overview of all these inputs used per project group. The costs for these inputs were used in net income calculations next to labour costs. We did not deduct costs for PPE or general equipment from the gross income, as farmers may use these items for several years, and thus these costs cannot be attributed to the farm outputs of one specific year.

Table 6.6	Average cost per acre of the main inputs in GHS for all farmers				
Input	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
Fertiliser	145.0	45.5	61.7	0.9	558.0
Planting material	55.0	20.5	31.9	0.1	171.4
Insecticide	180.0	33.4	43.1	2.3	294.0
Herbicide	100.0	12.3	15.2	1.1	102.9
Fungicide	55.0	37.1	103.6	0.1	720.0

Regarding the information on inputs used, in the dataset many inputs were in the wrong category. For example, a type of fertiliser was reported as planting material or a pesticide was reported as herbicide. It could be that that farmers were unaware of the exact nature of the chemical or that the answers were incorrectly noted by the enumerators. We expect that the enumerators have noted down the answers given by the farmers correctly, although we will ensure that in the enumerator training for the impact assessment study we will treat this topic with extra vigilance. We thus suspect that the farmers do not know exactly which material is part of which category. This was confirmed by interviews with representatives from groups 1, 5 and 6 and project staff.

The survey results showed that fertiliser costs per acre did not differ significantly across regions. In all regions, there are variations in the price and use of fertiliser, but no significant differences were observed both in average price and average use of fertiliser. However, costs of fungicide, insecticide and planting material showed strong regional variations both in quantities and in prices. Workshop participants explained that some regions have more shade, higher humidity and hence higher incidence of pests and diseases. This counts for the Eastern Region. Another reason for difference in input use is that the intensity of production differs between the regions.

We think that the total costs for inputs other than labour are understated: farmers do not always implement crop protection measures themselves. About 78% of the 381 respondents said that the COCOBOD spraying gangs sprayed their main cocoa farm last year, of which 47% said they had a visit once, 35.5% said to have had a visit twice and 15% said to have had a visit three times, and about 2% more than 3 times. The costs for this have not been taken into consideration, even though farmers could have sprayed themselves instead of using COCOBODs services and then would have had higher input costs.

Two other issues with regard to input use need to be mentioned here:

1. A small number of farmers applied forbidden products such as Gramazone and DDT (details per project can be found in Table A4.13c in Appendix 4). Most of the project farmers did not, but some did.
2. We understood that even though farmers are said by workshop participants to mix the right amount of crop protection product with water, farmers can actually mix both fertilisers and crop protection products.

6.5.3 Cocoa production indicators

As mentioned before, 58% of the respondents were owners of their main farm. The other 42% were sharecroppers on their main farm. The survey results showed that the main sharecropping form among the respondents was Abunu (77% of all sharecroppers), followed by Abusa (about 20%). Abunan was only used by 4 respondents on their main farm, which came as a surprise to CRIG as they only know of the use of Abunan sharecropping in the Volta Region. See Section 3.3 for more information about these sharecropping systems. The key production indicators of the main farm of the respondents are shown in Table 6.7.

Table 6.7 Key production indicators on the main farm of all the respondents

Variable	Obs	Mean	Std. Dev.	Min	Max
Size of the main farm (acre)	360	7.14	7.62	0.5	60
Yield of the whole farm (bags)	350	10.55	12.60	0.25	78
Yield per acre (bag/acre)	350	2.06 a)	1.93	0.02	12.33

a) The yield in bag per acre is calculated as a mean of the individual yields, not the ratio of average production to average farm size. This leads to a different figure.

There are usually large differences in cocoa production due to size of plots, level of input use and management in Ghana; a research from the Cocoa Research Institute of Ghana (CRIG) and COCOBOD described the typology of cocoa farmers in Ghana in three classes (Baah, 2009):

- 'The high class: improved seeds from designated seed gardens are used to raise seedlings for planting, regular spacing at 3mx 3m, regular weed management, shade management, pest (about 4 times a year) and disease control (5-6 times a year) is practices, frequent pruning, fertiliser application once a year, frequent harvesting, average yield: 1,400 kg (or 22 bags) per hectare (or 9 bags per acre). The proportion to total production that falls within this category is 5%.

- The medium class: planting in line at regular spacing with improved seeds from designated seed gardens, proper weed management, regular pruning and mistletoe removal, periodic shade management, Pest and disease control about twice a year, frequent harvesting. Average Yield is 650 kg (or 10 bags) per hectare or 4 bags per acre. The proportion of total production that falls within this category is 45%
- The low class: Planting at stake with unspecified source of seeds, at irregular spacing, high density, infrequent weeding, little or no pruning, infrequent removal of mistletoe, infrequent disease and pest control, infrequent harvesting. Shade management is not normally practiced. Average Yield is 350 kg (or 5.5 bags) per hectare or 2 bags per acre. The proportion of total production that falls within this category is 50%'.

The typology shows a high yield gap. This is confirmed by results of our study where the average farmer harvests 2 bags per acre although there are farmers with a productivity of up to 12 bags per acre (which seems like an outlier but is possible according to CRIG). As shown in Appendix, Figure A4.16, the majority of the surveyed farmers (about 70%) are in the low class with an average yield lower than 2 bags per acre. The average of the whole sample is higher than 2 bags per acre, because some farmers have a very high average (this is similar for all groups). It is interesting to note here that representatives from group 1 and 6 and project staff expressed in an interview that their productivity had gone up greatly since the programme started. We cannot check this information as we do not know their actual baseline situation but will be able to analyse improvements for all groups in the future impact assessment. We will need to take into account then that the impact for the groups that are longer in the programme may be understated because we do not have information on their baseline situation.

The survey results indicated that the average acreage of the farmers and yield per acre differ significantly among the regions (Figure 6.1 and 6.2). Respondents in Ashanti have on average the highest acreage of the main farms, while the productivity (yield/acre) was the highest for farmers situated in the Western Region. The Eastern Region has on average the smallest farm and lowest yield per acre. See for more information Appendix A4.17. Within each region, we compared the project groups in different project phases and the control group to see whether they differ from each other. Except in the Western Region, where the group 4 members have a significantly higher yield than the control group farmers, there are no significant differences between project groups and the control groups. As shown in Table 6.8, the average yield of pro-

ject farmers in phase 2 is higher than the project farmers who just started (phase 0) or have been in project for only one year. The differences are however not significant.

Table 6.8.	Comparison of average productivity between project group in different phase and control group per region a)		
	Region		
Project phase	**Ashanti**	**Eastern**	**Western**
Project phase 0	-0.175		1.077 b)
Project phase 1	-0.240	-0.164	-0.120
Project phase 2	0.696	0.326	

a) Shown as difference between the project group and the corresponding control group in the same region;
b) Significant at 0.05 level.

A possible result of increasing incomes and efficiency could be that the agreements between sharecroppers and landowners may change. We thus asked the sharecroppers whether their type of sharecropping would change, when they would produce higher yields or earn a higher income, for instance by changing from being a Abunu to being an Abusa (thus from receiving half of the yield to receiving two thirds). This could happen if a sharecropper delivers much more kilos/bags to the landowner than previously because the productivity has gone up while input costs stay the same, and the owner decides to change the system. The reason we asked this question was that we understood from discussions in the field that this may happen. The problem with the answers we got was that the respondents did not understand the questions; they indicated an change in kilos instead of a change in their share of the cocoa crop. We will have to see how to obtain such information in the future assessment.

About 7% of the farmers have seen kilos of his cocoa deducted by the purchasing clerks last year, usually because of the moisture content of the cocoa beans. The deducted amounts of were between one to 36 kilograms. The percentage of farmers experiencing deductions was seen as low by the participants of the validation workshop, but they confirm that an average deduction would be between 2 and 5 kilograms per bag. As the amount of deducted kilo's is a proxy for quality (related to post-harvest handling mostly, which is part of the programme), we will analyse in the future impact assessment if a change in deductions can be seen.

It is interesting to note that about 23% of the farmers also have an unused farm. Five per cent of these farmers have two or more unused farms. The most

important reason for not using land, is 'no money' and 'no time to cultivate it' (49% and 17%, respectively). Thus it seems that there is room for intensifying production in general, apart from when the reason that land is left unused because of a rotation strategy (left fallow).

6.5.4 Farm efficiency

To assess farm efficiency (one of the expected sustainability outcomes in the impact logic), we have calculated the economic input output ratios for the main cocoa farm, based on the calculated input costs of the main cocoa farm and income from cocoa sales from that farm (based on the yield of the main farm and the price set by COCOBOD). Appendix A4.15 gives information on the input-output ratios between the different groups and regions. Since many costs were not mentioned by the farmers, the overview is expected to be an overestimation of the profitability and should be interpreted with caution.

The mean input-output ratios range between 0.3 and 0.5 and there is not much difference between the groups. However, the rate for all groups in the Western Region is significantly lower than those for the Ashanti and the Eastern Region (($p<0.05$) and $P\leq0.10$). The difference between the ratios of the groups in the Ashanti and the Eastern Region is not statistically significant.

We also assessed whether the length of participation in a project has had an impact on the input-output ratios. Although on average, farmers who are longer in the programme have lower input-out ratio (i.e., higher profitability) than farmers in the comparison groups or the projects that just started, the difference is not significant.

6.5.5 Income from cocoa production

We use information from the main farm for net income calculations. In most of the cases, the main cocoa farm is both the largest in acre and has the highest yield. In 52 cases, however, this is not the case. Following feedback from the validation workshop, farms with the highest yield were considered as the main farm as they bring in the most. Of the farms that were said to be the main farm but not having the largest acreage, about 50% of the respondents were not the owner. Perhaps farmers consider their own land first as a main farm, then consider the farms for which they are sharecroppers.

The gross income from cocoa production was estimated using total cocoa production from all three farms reported upon, times the 2011 producer price of GHS200 per bag set by COCOBOD. Note that the price was raised to

GHS205 per bag after 14 October 2011 (Reuters, 2011), but as this was done so late in the year, and with such a small difference, we used the price of GHS200 per bag for income calculations.

Farmers earned a gross income from cocoa of between GHS 50 and GHS15,600 in 2011, with an average of GHS2,258. Net income ranged from GHS50 to GHS12,300, with an average of GHS2,174, as can be seen from Appendix A4.10. The outliers were not removed from the database, as participants of the validation workshop mentioned that such figures could occur. No statistical differences between groups or regions could be found. Also, farmers who are in the project for longer did not have significantly higher incomes than farmers who just started the programme. This is an interesting find as group 1 and 6 project staff and farmers indicated that their groups had increased yields and decreased costs greatly. This may mean that their farmers had on average lower yields and/or higher costs at the start of the programme.

6.5.6 Income from other sources than cocoa production and total household income

In addition to earning income from cocoa, farmers also grow other crops, hold livestock, or have other sources of income. Seventy per cent of the respondents said to have other sources of income besides cocoa, but for more than 80% of the farmers cocoa production is the most important source of income. Cocoa farming seems to be a relatively attractive means of earning an income, with a mean net income of GHS2,174 per year, just as trade/retail (gross: GHS2,491 per year, for 40 farmers). This amounts to around EUR900 net income from cocoa and EUR1,040 gross income from trade/retail per year, respectively, and thus to a net income of USD2.47 from cocoa per day, which is well above the USD2-a-day poverty line). See Table A4.18 in the Appendix. But as we do not know the costs related to both activities, even though for cocoa production we have information on the costs for the main farm, we cannot make a statement which source of income provides the highest benefits. In total, we estimate that the average farmer earns GHS3,313 per year from all income sources combined.

When asked to estimate the total annual income of the household, about 45% (176) of the respondents indicated that they did not know and about 55% of respondents provided estimates. A summary of the total household income per year as estimated by the respondents in different regions and different projects is shown in the Appendix, A4.19. Farmers from the Eastern Region seem to earn much less on average than farmers from the Ashanti and the Western Region. There is also a great variability in estimated household income between

the project groups. Households in groups 3, 4 and 5 as well as in the Western Region control group seem to earn much more annually farmers in other projects/groups.

6.5.7 Credit

Of the 385 respondents, 71 answered the question whether they borrowed money in the last 2 years to buy equipment, other inputs or expenses for the household, of which fewer than 50% also indicated how they used the credit. The farmers who answered the question borrowed between GHS50 and GHS3,000. The summary statistics of the answers are shown in the Table in Appendix A4.14.

Most farmers who borrowed money the last 2 years, used it for schooling fees, followed by inputs/equipment for cocoa production and to hire labour for cocoa production. Thirty farmers of the 71 mentioned that they used it for other purposes than the ones mentioned in the list with the question, but we do not know for what.

6.6 Overview of the baseline study results for key indicators

To conclude on the baseline situation of the cocoa programme farmers, please find the key baseline situation figures in Table 6.9 on the next page.

Table 6.9	Baseline situation of the sampled cocoa farmers (March 2012)				
Indicator	**Unit of measurement**	**Mean**	**Minimum**	**Maximum**	**Difference between project groups and control group?**
Knowledge level	Score, scale 0-1		0.32	0.42	3 of the 6 project groups: higher score
Implementation of good agricultural practices	Score, scale 0-1	0.64	0.59	0.71	2 out of 6 projects: higher score
Main cocoa farm size	Acre	7.14	0.5	60	No
Labour costs	GHS per acre	71	0.8	500	No
Fertiliser costs	GHS per acre	45.5	0.9	558	No
Planting material costs	GHS per acre	20.5	0.1	171.4	No
Insecticide costs	GHS per acre	33.4	2.3	294	No
Herbicide costs	GHS per acre	12.3	1.1	102.9	No
Fungicide costs	GHS per acre	37.1	0.1	720	No
Productivity	Bags per acre	2.06	0.02	12.33	1 out of 6 project groups: higher productivity
Cocoa production efficiency	Input/output ratio		0.3	0.5	No
Net cocoa income	GHS per year	2,174	50	15,600	No
Net cocoa income	USD per day	3.78			No
Gross household income	GHS per year	3,313			2 out of 6 project groups: higher gross household income
Cocoa quality	% of farmers with deductions	7%			No

7 Conclusions and recommendations

7.1 How do UTZ and Solidaridad influence cocoa farmers and producer groups? And what are the results of those changes on the intended outcomes for cocoa farmers in Ghana?

As this report presents the results of a baseline study, it cannot provide an answer to this research question. It has been possible, though, to analyse potential cocoa programme results based on the quantitative data, by assessing whether the length of participation in a project has an influence on knowledge levels, the implementation of good agricultural practices, productivity, farm efficiency and net income.

A first glimpse of potential cocoa programme results

The cocoa programme may have improved farmers' knowledge levels and their implementation of good agricultural practices as farmers who have participated in the programme for some time have better results for those indicators than farmers who just started their participation. We have not found a relationship between farmers' participation in the programme and their cocoa productivity, farm efficiency and income from cocoa. In a future assessment, it can be assessed whether such changes can be attributed to the cocoa programme, by comparing the evolution over time of both the project groups and their control groups.

Looking in-depth into the relationship between project participation and knowledge levels, we found that, when other things remain equal, the longer a farmer participated in a project, the higher his/her knowledge level is. This could be a result of the cocoa programme but could also be a result of selection bias when farmers in the groups that first started within the programme had a higher knowledge level at the start of the programme than farmers in groups that started at a later date. But we also found that other factors influence the knowledge levels: the higher the education level, the more trainings participated in and the higher a respondents' productivity, the higher the respondent's knowledge level is. Also, men have a significantly higher knowledge level than women. A possible explanation for this is that men generally have a higher education level than women. Furthermore, the effect of training on knowledge levels may differ across regions as part of the variation in the knowledge levels was due to regional variations.

With regard to the implementation of good agricultural practices, we found that farmers who have participated longer in their projects, i.e., group 1 and 2 farmers from the first phase of their project, implement good agricultural practices in a significantly better way than the farmers in their control groups while the other project groups do not. But we do not know whether that's because of participation in the programme or because the farmers in those groups already implemented their practices in a better way at the start of their project (selection bias). We also found that, again, other factors also have an influence: farmers who participated in more non-cocoa programme trainings implement practices in a better way than farmers who participated in fewer trainings. And lead farmers implement practices in a significantly better way than other project farmers, which is an interesting finding as their knowledge level was not significantly higher than those of the other project farmers. Furthermore, men implement practices in a significantly better way than women. A possible explanation for the latter is that men generally have a higher education level than women.

7.2 Who does the programme reach, and to what extent are programme participants representative of the Ghanaian cocoa sector?

The cocoa programme in Ghana has mainly reached male farmers, who are household head, between 40 and 60 years old with on average an education level between primary and secondary school and 5 family members. Half of the target group is a first generation migrant, while one quarter is indigenous or a second generation migrant. Sixty per cent of the farmers are owners of their main farm, the remaining 40% is a sharecropper. Most of the programme farmers have a cocoa farm size of less than the average of 7 acres, on which they generally produce fewer than 2 bags of cocoa per acre. They earned an average net income from cocoa of GHS2,174 in 2011. In addition, most of the farmers rely only on cocoa production for earning an income. We have not interviewed workers or other actors involved in cocoa production, so we do not know whether or not they have participated in the programme.

Based on feedback from the validation workshop and information from an MIT/Harvard baseline study on 3,000 farmers in Ghana (Hainmueller, Hiscox and Tampe, 2011), we conclude that the farms in our sample are representative of the Ghanaian cocoa sector with regard to the treatment group characteristics described above.

Detailed feedback from workshop participants on the representativeness
According to the workshop participants, almost all of the information provided to them from the draft report reflects the situation in the field, both with regard to the means and the minimum and maximum figures. On the following points, the information we presented was said to be different:

- The number of farmers being a member of a producer group is extremely high compared to the national average of 18%, but that would be expected as we mostly have farmers in our sample that are (to become) UTZ certified, and producer group establishment is one of the steps in the certification process
- The percentage of farmers having experienced deductions last year in this study was seen as too low; workshop participants said that over 10% of the farmers experience deductions normally.
- The mean input costs were confirmed, but the maxima of input costs were found to be high.
- There was a discussion on the scores for knowledge and the implementation of practices, as project staff and farmers found the scores low. LEI and Solidaridad West Africa had a look at the scores for the individual questions again, and adjusted some because they were not calculated correctly at first, but scores remain low.

Comparison between our baseline study and the MIT /Harvard baseline study
The average age of the farmers in our sample is 49.5 years old, while the average age in the MIT/Harvard study sample is 51 years old. Out of our and MIT/Harvard's samples, respectively 79% and 81% consist of men, and the average household consists of 5 and 6 persons, respectively. Most farmers did not finalise any education after secondary school, but about a quarter or a third of the sampled farmers did not go to school at all in our and the MIT/Harvard study, respectively. With regard to farm size, the MIT/Harvard study reports slightly lower farm sizes (5 acres compared to our 7.14 acres). We cannot compare the cocoa productivity of our sample with MIT/Harvard's sample as they report on median yield and we report on average yield. Cocoa is the most important crop for over 70% and 80% of farmers in the MIT/Harvard and LEI samples, respectively, and farmers in both samples earn only a relatively low amount with other activities than with cocoa production. We cannot compare the income figures between the studies, as the MIT/Harvard study measures in median incomes and LEI in mean net income, and it is not clear whether the income figures they present represent gross or net income.

The biggest difference found between the LEI and MIT/Harvard study, is that in Ghana, usually a low percentage of farmers are a member of a producer group or association (about 10%), while in our sample the percentage of the farmers who are member of a producer group is very high. This was to be expected because we have interviewed mostly farmers who are to become UTZ certified or are UTZ certified already, and thus need to be a member of a producer group.

7.3 What is the added value of going through the certification process/being certified for the farmers? How do training and certification influence each other?

This research question can only be properly answered when farmers have been part of a certification programme for some time. As most of the farmers in this study have not been in the programme for long, we did not ask them an extensive amount of questions on this subject. However, we did ask them about their satisfaction with the training programme, whether they attribute benefits to the project activities and whether they are satisfied with services related to certification delivered by the producer groups or Licenced Buying Companies (LBCs) to get a first insight into an answer to this question. We cannot provide insights yet into how training and certification influence each other.

The added value of going through the certification process or of being certified for the farmers is that farmers have participated in trainings they are satisfied with, that they have better social contacts with other farmers, that the cocoa programme leads to knowledge exchange between the group members and that communal problems are discussed during group meetings. The added value of the certification process can be strengthened as there is room for improvement with regard to the service delivery by the producer group/LBC and Internal Control System staff, specifically with regard to information or services related to cocoa production activities and feedback from the Internal Control system and external controls (audits).

7.4 Baseline situation of the cocoa programme farmers

Farmers in the sample were in different phases of the certification process. As some of the projects had already started some time before this baseline study was conducted, and new farmers have joined those projects over time,

the 'true baseline situation' of such projects are impossible to establish. This has posed some difficulties in the analyses, also because due to random sampling, information from only a limited number of early project farmers was analysed. We have overcome this problem partly by assessing the influence of the length of participation in a project with statistical techniques. Also, because of the different phases of the projects, the projects cannot be compared with each other. In the future impact assessment we will compare improvements over time between the projects and their control groups. As the project groups and the comparison groups in their region are generally comparable, it is possible to use the same groups in a future assessment, although it may be that not all farmers will be taken up in the final analyses when they are individual 'outliers' with regard to some of their characteristics.

7.4.1 Knowledge on sustainable cocoa production

With regard to knowledge levels, it can be concluded that the overall knowledge scores are quite low for project group members and control group members, with all overall scores amounting to below 0.42 out of 1 (or 42 points out of 100). This indicates that there is a lot of room for improving the knowledge of farmers on good agricultural practices and the UTZ Code of Conduct. The reason why the overall score is so low is that most farmers in the sample have not had training at all, or not for long.

Also, we found out that many people answered the knowledge questions with 'I don't know'. These answers are taken into account in the knowledge scores, but signify that many farmers do not have knowledge on the practices we queried them about.

We also compared the project groups with their control groups. Members from groups 1, 2 and 3 have a significantly higher overall knowledge level than the farmers from the comparison groups in their region. This is not the case for group 4, 5 and 6 members, although group 5 farmers have a higher knowledge level than the control group farmers but not significantly so.

In addition to comparing project groups, we also assessed whether the lead farmers score significantly higher than the other project farmers with regard to the overall knowledge scores. This was not the case.

As for factors influencing knowledge levels, we conclude that the following factors have a significant positive correlation with knowledge: being male, years of education, other trainings than the cocoa project participated in, and yield per acre on the main farm. A regression shows that a respondent who has participated in the project for a longer time, would have a higher knowledge score,

when other things remain equal (ceteris paribus). Furthermore, part of the variation in the knowledge score was due to regional variations, which means the effect of training may differ across regions. UTZ certification and being a lead farmer or not, do not show significant correlations with knowledge scores.

7.4.2 Implementation of sustainable cocoa practices

With regard to production related indicators, the overall scores of the project groups are slightly higher than those of the control groups, ranging between 0.59 and 0.71. This means that there is still room for improvement, but that project farmers score much better with regard to what they do, than with what they know. An explanation given was that farmers may do the right thing, but may not necessarily know all reasons why his/her actions are beneficial.

The questions that score specifically low, greatly decreasing the overall production indicator scores are: the distance between trees, the season in which farmers apply fertiliser, record keeping and actions undertaken with diseased pods.

Farmers scored lower for environmental indicators than for production related indicators, with the overall score for all groups being 0.40, and overall scores of the project groups ranging between 0.36 and 0.47. With regard to the environmental practices much can thus still be improved by the project farmers. Indicators scoring very low are: the number of shade trees per acre (which is expected as most of the farms with fewer shade trees were established prior to the project), and what farmers do with leftover chemicals, although project farmers usually score better on what they do with leftover chemical containers than their control group.

From a social indicator perspective, farmers score average on the use of PPE and the storage of agro-chemicals although there is still room for improvement. The overall score for project farmers ranges between 0.51 and 0.8, with project groups that have been running for some time scoring higher than the ones that just started. Information on inputs bought and used confirms that the availability and use of PPE can be improved.

We also looked at child labour and labour conditions. With regard to child labour we conclude that still some children perform certain tasks while they should not be doing so, although on a very limited scale. An example is that some children carried bags with cocoa to a purchasing clerk. As for labour conditions, almost 40% of the hired labourers do not get extra payments when they work longer/more than agreed upon at first. Farmers are generally aware about the exist-

ence of complaint procedures and 30-40% of them actually used such procedures. Twenty per cent of the respondents mentioned occupational accidents on the farm or on the way to the farm, with between 1 and 5 accidents mentioned for the year 2011. Most people needing help were assisted by health workers.

Comparing the farmers, and groups with each other, we came to the following conclusions: even though the lead farmers do not score significantly higher than the non-lead farmers with regard to knowledge scores, their scores for the implementation of practices were significantly higher than for other project-farmers. Furthermore, farmers from group 1 and 2 implement practices in a significantly better way than their control group farmers. The other project groups do not.

7.4.3 Correlation between knowledge and implementation of practices

Based on a correlation test, we conclude that there is a significant positive correlation between the overall knowledge score and the overall score for the implementation of practices. This means that, on average, farmers with a higher overall knowledge score will also have a higher overall score for the implementation of practices. This finding is important, as it indicates that there indeed can be a connection to knowledge levels and the practices implemented in the field, as the impact logic indicates. However, when looking into details for the individual questions, we find that there sometimes is a mismatch between knowledge and implementation levels. In the impact assessment research, this will be further explored.

We also conducted regression analyses to assess whether there are factors that correlate with the scores of the implementation of practices. We found that the duration of the project, the knowledge score, being a lead farmer or a male and participation in other trainings significantly correlate in a positive manner with the scores for the implementation of practices. The results with regard to differences between men and women suggest that on average women have a lower knowledge score than men, which is possibly due to their lower level of education compared to men.

7.4.4 Input use and production

Most farmers hired labour in 2011. The variability of labour input is very high between the groups, as well as the activities, ranging between 4.1 and 708 days per acre per year with averages between 75 and 133 days per acre per

year. The percentage of farmers hiring labour is significantly lower in the Eastern Region than in the other regions. Within the same region, there is no significant difference between the project groups and the control group. There are also large variations in the money spent on hired labour. The average amount spent was GHS366. This amounts to an average of GHS71 per acre, with a minimum of GHS0.79 and a maximum of GHS500. Money spent per acre on hired labour is not normally distributed, but skewed to the right: most farmers spend between GHS0 and GHS100 per acre.

Many farmers bought PPE and other equipment in the last year, and spent money on chemical fertilisers, planting material and crop protection products. The survey results showed that fertiliser costs per acre did not differ significantly across regions. However, costs of fungicide, insecticide and planting material showed strong regional variations. Based on the data, and input from the validation workshop, we can also conclude that some farmers use forbidden crop protection products, and that they mix fertilisers and crop protection products (even though they are said to mix the right amounts in water).

Production figures also show strong variations. The size of the farms ranges between 0.5 and 60 acres, and productivity between 0.02 and 12.33 bags per acre. The majority of the surveyed farmers (about 70%) are in the low class with an average yield lower than 2 bags per acre. This indicates that there is a large yield gap. The survey results indicated that the average acreage of the farmers and yield per acre differ significantly among the regions. Respondents in the Ashanti Region have on average the highest acreage of the main farms, while the productivity (yield/acre) was the highest for farmers situated in the Western Region. The Eastern Region has on average the smallest farm and lowest yield per acre.

About 10% of the farmers have seen kilos of his cocoa deducted by the purchasing clerks last year, for various reasons. The deducted amounts of were between one to six kilograms.

A quarter of the farmers have an unused farm. The most important reason for not using land, is having no money for doing so, and no time to cultivate it. Thus it seems that generally speaking there is room for increasing production, apart from when the land is left unused because of a rotation strategy (left fallow).

There is not much difference in farm efficiency between the groups and we do not find that the length of participation in the UTZ-Solidaridad cocoa programme influences farm efficiency. However, farm efficiency is significantly better for Western Region farmers than for farmers situated in the Eastern Region and the Ashanti Region.

7.4.5 Income from cocoa production, from other sources and credit

Farmers earned a yearly net income from cocoa of between GHS50 and GHS12,300 in 2011 (between GHS23 and GHS5,500), with an average of GHS2,174 (about EUR900). No statistical differences between groups or regions could be found.

Seventy per cent of the respondents said to have other sources of income besides cocoa, but for more than 80% of the farmers cocoa production is the most important source of income. Cocoa farming seems to be an attractive means of earning an income, with a mean net income of GHS2,174 per year, just as trade/retail (gross income of GHS2,491per year, for 40 farmers). This amounts to a net income from cocoa farming of around EUR900 and EUR2.47 per day, which is well above the USD2-a-day poverty line (World Bank, 2012). But as we do not know the costs related to both activities, even though for cocoa production we have information on the costs for the main farm, we cannot make a statement which source of income provides the highest benefits. In total, we estimate that the average farmer earns GHS3,313 per year (EUR1,380) from all income sources combined.

When asked to estimate the total annual income of the household, about 45% of the respondents indicated that they did not know and about 55% of respondents provided estimates. The figures thus need to be taken with care. Farmers from the Eastern Region seem to earn much less on average than farmers from the Ashanti and the Western Region. There is also a great variability in estimated household income between the project groups. Households in groups 3, 4 and 5 as well as households in the Western Region control group seem to earn much more annually farmers in other projects/groups.

Credit is officially not part of the impact logic but we did ask farmers about access to credit as it could become one of the services that producer groups and/or LBCs deliver to farmers. Information on amounts borrowed was given by 71 farmers. They borrowed between GHS50 and GHS3,000 in 2011, and used it for schooling fees, followed by inputs/equipment for cocoa production and to hire labour for cocoa production. Thirty farmers of the 71 mentioned that they used it for other purposes than the ones mentioned in the list with the question, but we do not know for what. Obtaining credit seems to be easier than 2 years ago: 57% of the farmers say that it is easier now to access credits compared to 2 years ago although 30% of them replied that it became more difficult.

7.5 Recommendations for the implementation of the cocoa projects

Based on the data and information in this report, as well as information from the validation workshop, we have formulated recommendations for the cocoa projects. We especially focus on four areas: building knowledge, improving the implementation of practices, input use and the functionality of the producer group and ICS.

7.5.1 Building knowledge

With regard to building knowledge, we give the recommendation to look carefully at the knowledge scores for the individual questions per project group, and focus future trainings on topics where farmers score low. This is especially recommended for the following indicators, for which the farmers score especially low (average: <0.35 out of 1, the project groups score somewhat higher):

1. The benefits of leaving prunings in the field
2. The benefits of applying soil conservation measures
3. The benefits of record keeping
4. The benefits of a buffer zone
5. Factors affecting cocoa quality
6. Activities that are not appropriate for children to implement.

As many farmers answered our knowledge questions with 'I don't know', but score much higher in the implementation of practices, we also think that farmers often do something, without knowing exactly why. This was confirmed in the validation workshop. We think it is important for farmers to know why they should implement certain practices, as this may enable them to make better decisions. Even though we know that it is part of the projects to explain why practices are valuable to be undertaken, we recommend looking into how knowledge on such matters may be improved. Also, it can be verified whether the knowledge built up by lead farmers through trainings is passed on to farmers.

7.5.2 Improving the implementation of good agricultural practices

To improve the implementation of practices, we recommend taking similar steps as for building knowledge as the scores are not satisfactorily yet: use detailed information on the individual questions per project groups for guiding focussed, project specific training sessions. Overall, especially important practices to focus on are (overall scores between brackets):

1. How far apart are your cocoa trees planted from each other on your farm? (0.34.)
2. When do you apply fertiliser (chemical or organic). (0.24.)
3. Do you keep records on input use and production? (0.18.)
4. What do you do with diseased pods? (0.21.)
5. How many shade trees do you have on your farm per acre? (0.19.)
6. What do you do with leftover chemicals? (0.27.)
7. What PPE does your family and workers use when spraying chemicals (0.51)
8. Where do you store your chemicals (0.71)
9. Child labour (even though minimal, it occurred at project farms).

It was furthermore suggested by the validation workshop participants to add other crops other than cocoa in the training as well as other livelihood options. Finally, male farmers score better with regard to knowledge levels and the implementation of practices than female farmers. A possible explanation for this is that women generally have a lower education level than men. We recommend the projects to analyse what the reasons are that women have a lower knowledge level and lower adoption rates, and adjust the project accordingly.

7.5.3 Input use

With regard to input use, we recommend the trainings to focus on two areas. First, and in connection with the practices above, we would recommend focusing on improving the application of fertilisers, especially with regard to the timing of application. But as we understood that the availability of fertilisers on the right time is a problem, it may be better for the programme/project staff to link the project groups with fertiliser suppliers first to ensure actual availability of the fertilisers. Only then it will be time to get farmers to learn about the right timing of fertiliser application.

Second, some forbidden crop protection products have been used by project farmers though minimally. Also, we understood that farmers sometimes mix multiple products, which was said to be dangerous by workshop participants, and farmers do not follow the recommendations for the length of time not to enter a field or sprayed strip around their homesteads after the application of herbicides. We thus recommend focusing on these issues (again) in the trainings.

7.5.4 The functionality of producer groups and ICS

Based on the information from the survey, as well as from workshop participants, we recommend enhancing the communication between farmers and ICS staff and producer group management. More than half of the project farmers, namely, say that the producer group or ICS does not provide them with information or services that make cocoa production easier for them. This was confirmed by more in-depth questions where about 30% of the project farmers said to be unsatisfied with feedback from the ICS or external controls. Obviously, some of the projects just started, so this may improve over time, but as also workshop participants mentioned this, we suggest trying to improve on this issue and think of ways how ICS staff, producer group executives, trainers or lead farmers can be used as channels of information.

This also counts for interaction with lead farmers and/or project staff. Farmers would like more frequent interactions with the trainers to discuss cocoa farming issues. In addition to more interaction with project/ICS staff or trainers on cocoa farming, it was recommended by workshop participants to assist farmers to fill out passbooks, so the passbooks can be better used for monitoring (inputs and outputs). Many farmers are illiterate and thus have difficulties in record keeping. This is confirmed by a very low score for record keeping. Thus we fully agree with the recommendation to assist farmers to keep records, as long as there actually will be done something with the data, by the farmers themselves, or by project staff. Otherwise the effort to assist them in record keeping may not render any benefits for either party.

7.6 Recommendations for the impact assessment research

All impact assessment researches experience difficulties, as situations in the field are never as expected. Several time-related factors posed difficulties for the survey in finding the sampled farmers and obtaining the right information:

1. The tight time schedule in setting up the survey, which did not allow all project groups to be well informed before the survey;
2. The very recent start of some projects, which made it difficult to identify some project farmers in the field;
3. The long time needed to ask all the questions in the questionnaire as the questionnaire was quite large, which may have resulted in farmers answering in a sub-optimal way to questions in the last part of the questionnaire since they became fatigued at the end of the survey.

Another issue for this study was that the questionnaire covers many issues that require good record keeping and an understanding of the questions to be able to answer questions correctly. This means the data are subject to recollection error and interpretation bias. Besides possible recollection error and misinterpretation of the questions, the data analysis had to deal with a number of issues that may have negatively influenced the validity of the conclusions:

- There is a possible confusion between 'no response' and the answer 'I don't know' for missing observations. In the first case, the answer to the question was not properly registered (the answer options were wrong or the enumerator did not fill the questionnaire properly). In the second case, it reflects the poor status of record keeping or lack of knowledge by the respondent on certain issues. The second case is interesting for the programme as it suggests important areas to be improved by the training.
- Inconsistency in the dataset can shed doubts on the trustworthiness of the answers given. For example, some questions were supposed to be skipped after the respondent gave a certain answer to the previous question, but in the dataset the respondent did answer the question.
- It seems that farmers may be confused with regard to the status of receiving training for UTZ certification, being UTZ certified, or in the process to become UTZ certified. With a lot of effort and assistance of the project groups and Solidaridad West Africa, we hope we have been able to assign the farmers in the right categories.

In the next impact assessment research we can mend part of the problems we had during this research. Our recommendations for the impact assessment research are:

- The status of training and certification of the respondents should be verified with the project staff before the interview starts.
- To warn project groups and farmers well in advance so they are present on their farm/in the community on the day of the survey. This is possible as the same farmers will be interviewed in the impact assessment as in the baselines survey. This is especially the case when owners where interviewed who may not always be on a farm.
- The length of the survey should be decreased because farmers appeared to be fatigued at the end of the survey. This is something to be avoided in surveys to keep the respondents motivated to cooperate (in the future) and to ensure that the farmer still has energy to answer the last questions properly.

- Enumerators should be enabled to do a good job by preparing them for the interviews, e.g. by going through the questionnaire in a detailed way and give them enough time to test the questionnaires
- It is recommended for the enumerators and the data entry person to double check whether all answers were answered and correctly documented.

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Appendix 1 Indicators

Indicators identified to be used in the impact assessment

A1.1 Indicators on demographic and general information

Table A1.1 Demographic and general information	
Name of indicator	
Age	Trainings
Gender	Ownership of farm
Migrant	Farm size
UTZ Certification	Sharecropping
Other certificates	Share of cocoa in revenue
Position in household	Other sources of income
Number of children	Production

A1.2 Potential indicators used for outcomes of the impact logic

Table A1.2 Potential indicators for outcomes of the impact logic	
Outcome	**Indicators**
1. Increased farm efficiency	1.1 Input/output ratio (agronomic/economic)
2. Increased productivity	2.1 Yield per tree/acre
3. Quality meets market demand	3.1 Rejection rate 3.2 Rate that requires re-drying 3.3 Post-harvest practices (proxy)
4. Increased professionalism of farmer groups	4.1 Record keeping 4.2 Use of records and other input provided by group/ICS for decision making 4.3 Knowledge: Is market information used for decision making? (e.g. price of other crops)
5. Respect for labour rights	5.1 Knowledge: Are you aware of your right to join an association? 5.2 Implementation: Do you know anybody who joined an association? 5.3 Forced labour, discrimination & contracts

6. No child labour	6.1 Activities of children (labour) 6.2 Knowledge: What activities on a cocoa farm can be executed by children? 6.3 Knowledge: do they know whether children assist hired labourers?
7. Healthy and safe living and working conditions	7.1 Number of injuries during cocoa farming (hired labour, family labour, communal labour): cuts that need stiches and fractures 7.2 Sickness that can be explained by contamination 7.3 Injured or serious sick in household 7.4 Treatment of Injured/sick persons
8. Maintained and improved quality of water & soil	8.1 Knowledge on erosion 8.2 Implementation of anti-erosion measures 8.3 Implementation: soil cover 8.4 Inputs: agrochemicals, quality and type is proxy for water and soil pollution/quality.
9. Efficient water use	-
10. Efficient energy use	-
11. Effective waste management and reduction per unit of produce	11.1 Implementation: How are leftovers of agrochemicals handled 11.2 Occurrence of surpluses? 11.3 Treatment of empty containers 11.4 Are different waste types handled separately?
12. Protection and restoration of natural habitats	-
13. Inclusive programme	13.1 Demographic information of questioned farmers vs. 'general' cocoa farmers in Ghana. 13.2 Percentage of lead farmers, internal inspectors, executives, gender in the sample

14. Stable producer groups providing better and reliable services	14.1 Participation in group, number of years 14.2 Who is the leader of the producer organisation 14.3 Is leadership of the group rotating 14.4 The number of participating members? 14.5 Membership is growing? 14.6 'Likert scale' on usefulness of the group 14.7 'Likert scale' on benefits of the group 14.8 'Likert scale' on what can still improve 14.9 Do you receive feedback on internal inspections, from ICS, from external inspections 14.10 Can you use the information for decision making? 14.11 Does group facilitate access to inputs? 14.12 Does the group facilitate sales 14.13 Sustainability of the group: 'Do you think it will keep on existing after certification?' Compared to non-UTZ:
15. Sustainable practices are rewarded by the market	15.1 Better price/premium 15.2 Long-term buying commitments 15.3 More potential buyers 15.4 Less time needed before a buyer shows up? 15.5 Less time invested in finding a buyer? 15.6 Do you receive additional inputs, or external support.

A1.3 Intended sampling strategy

Farmers in the control communities should be similar to farmers in communities enrolled in the cocoa projects with regard to the following aspects:

1. Most villagers are involved in cocoa production
2. No training/certification has taken place for UTZ in the community
3. No training/certification has taken place for other certifications in the community (Rainforest Alliance, Fair Trade/FLO).
4. No (intensive) agronomic training by COCOBOD in the community when no such training has taken place in the project communities.

5. Agro-ecological conditions (soil, terrain and climate)
6. Age
7. Education
8. % of males and females active in cocoa farming
9. % of migrants in community
10. Number of household members
11. Land acreage per farmer
12. Distance to the Purchasing Clerk (time for traveling)
13. Infrastructure.

Furthermore, the communities that are indicated by the project staff should be minimally 10 kilometres away from the project communities.

Based on the information, we hoped to be able to receive a list with potential control group communities, and make a random selection. However, in practice, the selection of control communities with these criteria proved to be too difficult and thus a more practical approach was taken which is described in the text.

Appendix 2 The questionnaire

The baseline study questionnaire

UTZ - Solidaridad cocoa programme Ghana

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*

0. Group 1
1. Group 2
2. Group 3
3. Group 4
4. Group 5
5. Group 6
6. Control Group

2 Name of the respondent *This should be a person actively involved in cocoa production*

……

3 Position in the household
   0. Household head
   1. Spouse
   2. Other adult (e.g. grandparents, relative of spouse)
   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?

……

'We would like to gather more information on your household members activities and lives. Can you give us more information for each household member?'

5b Composition of the household

First name	**Position in the household**	**Age**	**Gender**	**Activity**	**Active in co-coa 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
3a	3b	3c	3d	3e	3f		3h
4a	4b	4c	4d	4e	4f		4h
5a	5b	5c	5d	5e	5f		5h

6a	6b	6c	6d	6e	6f		6h
7a	7b	7c	7d	7e	7f		7h
8a	8b	8c	8d	8e	8f		8h
9a	9b	9c	9d	9e	9f		9h
10a	10b	10c	10d	10e	10f		10h

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 mostly 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 to 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) ……

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 total …… kg was deducted last year for supplying low quality cocoa

3b What was the reason/what were the reasons for getting a 'discount'?
(Enumerators: multiple answers are possible)

0. The water content/moisture content of the beans was too high (too wet)
1. There was foreign matter (waste/soil/stones) in the bag

2. Other, please specify ……

4 For how many cocoa farms are you responsible (as owner-operator/sharecropper/caretaker)?

.....

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.

6 Can you provide information on every farm you individually work on? Please start with your MAIN farm.

Start with the biggest farm they work on, than continue with the smaller farms.

Cocoa farm	**Ownership of the farm (can be different for different farms)**	**Travelling time from home to farm (on foot)**	**Travelling time from home to farm (vehicle)**	**Size of the farm (acreage)**	**Year of first establishment of the farm**	**Last year's yield for the whole farm a)**	**Is the cocoa farm UTZ certified? Or will become 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 = Other*	*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)*	*In acres*		*In bags:* *1, 2, …,..20* *¼* *½* *¾*	*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*
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
a) 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.									

7a If you are a landowner using sharecroppers: did your share of the yield change between now and 2 years ago?

0 Not applicable
1 No
2 Yes, please explain the difference: now ..... 2 years ago .....

7b If you are a sharecropper did your share of the yield change between now and 2 years ago?

0 Not applicable
1 No
2 Yes, please explain: now ..... 2 years ago .....

8a Apart from your 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)**
Cocoa farming	○	1a
Other crop farming activities	○	2a
Livestock	○	3a
Trade - Retail	○	4a
Remittances	○	5a
……..……	○	6a
……..……	○	7a
……..……	○	8a
……..……	○	9a

10 Can you estimate the total households annual income in Cedi?

0 …… Cedi
1 I do not know

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.

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? And has this changed compared to 2 years ago?

Activity	**How many times did *you* do this activity last year?**	**Time spent on each activity last year, *by yourself***	**How many times did *you* do this activity *2 years ago?***	**Time spent on each activity *2 years ago, by yourself***
	Number	**In days**	**Number**	**In days**
Land preparation a)	1a	1b	1c	1d
Weeding	2a	2b	2c	2d
Pruning	3a	3b	3c	3d
Fertiliser application	4a	4b	4c	4d
Pest control (Capsis)	5a	5b	5c	5d
Disease control (Black pod)	6a	6b	6c	6d
Harvesting	7a	7b	7c	7d
Pod breaking	8a	8b	8c	8d
Fermenting	9a	9b	9c	9d
Drying	10a	10b	10c	10d
Transport to Purchasing Clerk	11a	11b	11c	11d

a) Land preparation is new cocoa farm establishment and planting new trees.

2 If you spend a typical day on cocoa activities, on average how many hours are you away on the farm last year (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?

.....Cedi

5a Did you spend money on hired labour two years ago?
0 Yes
1 No → *Please go to question 6*

5b If yes, how much in total?

.....Cedi

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)

Activity	**Share-cropper**		**Hired labour**		**Adult household members**		**Minor household members (-18)**		**Other**	
	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**	**No of people involved**	**Total no of days spent**
Land preparation a)	1a	1b	1c	1d	1e	1f	1g	1h	1i	1j
Weeding	2a	2b	2c	2d	2e	2f	2g	2h	2i	2j
Pruning	3a	3b	3c	3d	3e	3f	3g	3h	3i	3j
Fertiliser application	4a	4b	4c	4d	4e	4f	4g	4h	4i	4j
Pest Control (Capsis)	5a	5b	5c	5d	5e	5f	5g	5h	5i	5j
Disease control (Black pod)	6a	6b	6c	6d	6e	6f	6g	6h	6i	6j
Harvesting	7a	7b	7c	7d	7e	7f	7g	7h	7i	7j
Pod breaking	8a	8b	8c	8d	8e	8f	8g	8h	8i	8j
Fermenting	9a	9b	9c	9d	9e	9f	9g	9h	9i	9j
Drying	10a	10b	10c	10d	10e	10f	10g	10h	10i	10j
Transport to Purchasing Clerk	11a	11b	11c	11d	11e	11f	11g	11h	11i	11j

a) Land preparation is new cocoa farm establishment and planting new trees.

7 Can you indicate who helped you on your MAIN farm in *2 years ago* and how much they help you per activity on all the cocoa plots farm you are responsible for?

(Instruction for enumerator: 0 = No assistance by a person from this category, 99 when farmers do not know)

Activity	**Hired labour**		**Sharecropper**		**Adult household members**		**Minor household members (-18)**		**Other**	
	No of people involved	**Total no of days spent**	**No of people involved**	**No of days per activity**	**No of people involved**	**No of days per activity**	**No of people involved**	**No of days per activity**	**No of people involved**	**No of days per activity**
Land preparation*	1a	1b	1c	1d	1e	1f	1g	1h	1i	1j
Weeding	2a	2b	2c	2d	2e	2f	2g	2h	2i	2j
Pruning	3a	3b	3c	3d	3e	3f	3g	3h	3i	3j
Fertiliser application	4a	4b	4c	4d	4e	4f	4g	4h	4i	4j
Pest Control (Capsis)	5a	5b	5c	5d	5e	5f	5g	5h	5i	5j
Disease control (Black pod)	6a	6b	6c	6d	6e	6f	6g	6h	6i	6j
Harvesting	7a	7b	7c	7d	7e	7f	7g	7h	7i	7j
Pod breaking	8a	8b	8c	8d	8e	8f	8g	8h	8i	8j
Fermenting	9a	9b	9c	9d	9e	9f	9g	9h	9i	9j
Drying	10a	10b	10c	10d	10e	10f	10g	10h	10i	10j
Transport to Purchasing Clerk	11a	11b	11c	11d	11e	11f	11g	11h	11i	11j

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

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

2 Yes

3 No → *Please go to question 9*

8b 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)

	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	1b	1c
	2a	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 fertiliser *(Bags/Litres)* *Also organic fertiliser*	13a	13b	13c
	14a	14b	14c
	15a	15b	15b

10 What types/brands of inputs did you use *2 years ago*, how many of them, and what did they cost?
(Instruction for enumerator: If not used, leave blank)

	Used 2 years ago	**Number of items used 2 years ago**	**Price per item 2 years ago**
	Type names	**Number**	**Price per unit (In Cedi)**
Type of planting material *(seedlings/pods)*	1a	1b	1c
	2a	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 fertiliser *(Bags/Litres) (Also organic fertiliser)*	13a	13b	13c
	14a	14b	14c
	15a	15b	15b

11 What kind of equipment, including protective equipment did you or your sharecropper/caretaker/hired labourer use for cocoa farming 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 many items did you buy last year?**	**Cost per item**	**Did you use this type of equipment before you bought it as well?**
	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*
Cutlass	1a	1b	1c	1d
Harvesting hook	2a	2b	2c	2d
Axe	3a	3b	3c	3d
Hoe	4a	4b	4c	4d
Drying mat	5a	5b	5c	5d
Mist blower	6a	6b	6c	6d
Pruner (for mistletoe)	7a	7b	7c	7d
Knapsack sprayer	*8a*	*8b*	*8c*	*8d*
Storage for chemicals	*9a*	*9b*	*9c*	*9d*
Other	*10a*	*10b*	*10c*	*10d*

Protective equipment	**Do you have this?**	**Do you 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*	*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	1b	10a	10b	10c	10d
Boots	2b	11a	11b	11c	11d
Hat	3b	12a	12b	12c	12d
Overall	4b	13a	13b	13c	13d
Goggles	5b	14a	14b	14c	14d
Raincoat	6b	15a	15b	15c	15d
Other	7b	16a	16b	16c	16d

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 practices 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 the income from your cocoa farm 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. Hire labour for cocoa production …….. Cedi

3. Hire labour for other crops ……. Cedi
4. Education fees ……. Cedi
5. Mobile phones ……. Cedi
6. Funerals ……. Cedi
7. Other, please clarify ……for ……Cedi

14 Have you taken credit in the last 2 years to buy equipment, other inputs, or expenses for your household last year?

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. Education fees ……. Cedi
5. Mobile phones ……. Cedi
6. Funerals ……. Cedi
7. Other, please clarify ……for ……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 When you obtained planting material in the last 2 years, where did you get it from?
   a) I did not buy planting material in the past → *Please go to question 3*
   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) I don't know

2 Which type/types of cocoa have you on your farm?
   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) I don't know

4 How do you 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 don't know

6 When do you apply fertiliser (chemical or organic)?

a) I do not apply fertiliser to my cocoa → *Please go to question 8*
b) I apply fertiliser just before the rains
c) I apply fertiliser during rainy season
d) I apply fertiliser during dry periods
e) I apply fertiliser at other times
f) I apply fertiliser all year round

7 How often do you apply fertiliser (chemical or organic fertiliser)?

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) I do not keep records
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 When do you harvest the cocoa pods?

(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?

a) I heap the beans on the ground and cover with banana 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 un-perforated 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 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
   c) Yes, I have a strip with native vegetation of 3 meters wide (because it is a small stream)
   d) Yes I have a strip with native vegetation of 5 meters wide
   e) Yes, I have a strip with native vegetation of more than 5 meters wide
   f) Other

17 If your farm borders a river or water body, what distance do you leave out without applying agrochemicals and chemical fertiliser, 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?

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?

a) I do not prune
b) I leave the prunings in the cocoa field
c) I use as mulch elsewhere on farm
d) I use it as fuel
e) Other

Social issues

21 When chemicals are sprayed, which personal protective equipment (PPE) does your family or your workers use?
   a) Not applicable, I do not spray
   b) All PPE (Mask, gloves, boots, overall, goggles)
   c) Some PPE
   d) 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
   e) I store them outside the house in a closed room/box/sack
   f) Other

Part E: Labour conditions

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

1 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

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
1. Yes

6 Are you yourself sometimes hired to work on somebody else's farm?
0. No → *Move to question 9*
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 a farm?
0. No → *Please go to question 12*
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 12*
1. Yes

11 Have you or other sharecroppers/caretakers ever used the procedure?
0. No
1. Yes

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

12 Did anyone suffer an occupational accident on your main cocoa farm or on the way to the cocoa farm in the last year? **(Accidents involved injured with fractures or requiring stiches 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**
Adults	a1
Hired labourer	a2
Family labour	a3
Minor household members (-18),	a4
Communal labourers	a5

14 If someone was injured by whom was the injury usually treated?
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 have talked about labour issues we are interested whether you have been part of a project or programme

Part F: Cocoa programme

1a Are you being trained to become UTZ certified?
0 No → **Please go to question 1d**
1 Yes
2 Not anymore
3 I do not know

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

○	○	○
Unsatisfied	Neutral	Satisfied

1c If you participated in UTZ training, would you recommend the training to your colleague or neighbour farmers?
0 No
1 Yes
2 I don't know

1d 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 5a*
1 Yes
2 Not anymore
3 I do not know

2b Since when is your producer group UTZ certified?

.....

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

0 No → *Please go to question 5a*
1 Yes
2 Not anymore → *Please go to question 5a*
3 Not yet
4 I do not know → *Please go to question 5a*

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

0 .....Cedi per bag
1 I do not know

4 If you received a premium for UTZ certified cocoa, what did you do with the premium?
(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. Education fees ..... Cedi
5. Mobile phones ..... Cedi
6. Funerals ..... Cedi
7. Other, please clarify .....for .....Cedi

5a Is your producer group Fairtrade Certified?

0 No → *Please continue with question 6a*
1 Yes
2 Not anymore
3 I do not know

5b Since when is your producer group Fairtrade certified? (FLO)

.....

6a Is your producer group Rainforest Alliance Certified?

0 No → *Please continue with question 7*
1 Yes
2 Not anymore
3 I do not know

6b Since when is your producer group Rainforest Alliance certified?

.....

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

7 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*

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

0 No training offered
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,
.....

9 If **you followed training last year,** on what topics did you follow 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* *2 = UTZ* *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)	c1	c2	c3	c4

Chemical application (appropriate amount and type of chemicals to be used for farm activities)	d1	d2	d3	d4
Others/ combination of topics	e1	e2	e3	e4
Environmental protection *(not slashing close to rivers, uncontrolled burning, water pollution, control of soil erosion)*	f1	f2	f3	f4
Sustainability certification (UTZ, Rainforest Alliance, Fairtrade, Organic)	g1	g2	g3	g4

We now would like to as 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. 1st generation migrant
2. 2nd or more generation migrant

12a Are you a member of a producer group or producer organisation?
0 No → ***Please go to question 18***
1 Yes

12b Are you elected or appointed as an executive for a producer group?
0. No
1. Yes

13a Do you know how many executives your producer group has?
0 No
1 Yes, …….people
2 I do not know

13b Do you know the name of the chairperson?
0 No
1 Yes, …….(name)
2 I do not know

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 15*
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

Services of the producer group	☺ **Satisfied**	😐 **Neutral**	☹ **Unsatisfied**	**Not applicable**
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 fertiliser				
Access to seedlings/pods				
Access to pesticides				
Access to credits				
Insurance systems are set up				
Assistance in my relationship with the LBC (representation)				
Assistance in relation with COCOBOD (representation)				
Commercial activities				

16a Have you experienced also other benefits of being a member of a producer group?
Multiple answers are allowed

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

16b 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 Do you know what internal controls are?
0 No → *Please go to part G*
1 Yes

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 any-more
○	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)?
   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?
   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?
   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?
   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?
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?
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 fertiliser?
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?

a) Less disease/fewer 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?
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?
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 fertiliser 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 fertiliser 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) Fertiliser application
f) Land preparation
g) Using inappropriate tools for their age

h) Work on the farm during school hours

Finally, If you are a purchasing clerk, we would like to know more about your activities

18 Are you a purchasing clerk for a 'Licenced 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 licenced 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. Regular cocoa

21 Why do you prefer this type of cocoa?

(Multiple options are possible, do not read the options; just tick the option when respondents)

UTZ		**Regular cocoa**	
Less re-drying is required	○	Less administration is required	○
More bags to buy from farmers	○	No bags must be kept separate	○
More professional attitude of the farmer	○	Less control	○
Other, ……..……..	○	Other, ……..	○

That was the last question in this questionnaire. Thank you very much for your time and effort to help us understand more about tea 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 Farmers characteristics

Detailed information on farmers' characteristics

The tables in the text and Appendices show the number of non-missing observations (obs.) for the relevant question in the questionnaire and percentages are expressed to the total number of non-missing observations instead of to the size of the sample population.

Table A3.1 Gender and position in the household of the respondent

Gender	Position of the respondent in the household			Total
	Household head	Spouse	Other adult	
Male	303	2	5	310
Female	38	30	7	75
Total	341	32	12	385

Table A3.2 The distribution of respondents in different age groups

Age of the respondent	Frequency	Percentage
age ≤ 20 years	2	0.5%
20 ≤ age < 40 years old	102	27.1%
40 ≤ age < 60 years old	201	53.5%
60 ≤ age < 80 years old	67	17.8%
age > 80 years old	4	1.1%
Total	376	100%

Table A3.3	The years of completed education in different groups	
Number of completed education years (education)	**Freq.**	**Percentage**
did not start school	96	25.5%
education ≤ 5 years	41	10.9%
5 years ≤ education < 10 years	167	44.4%
10 years ≤ education < 15 years	58	15.4%
education > 15 years	14	3.7%
Total	376	100%

Figure A3.1 Number of completed education years among the respondents

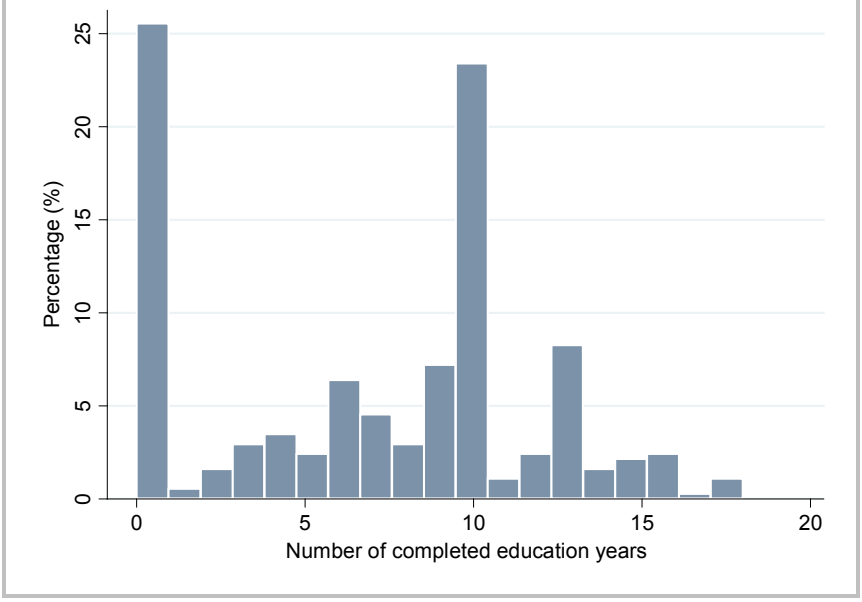

Figure A3.2 **Percentage of respondents who did not start school in different regions**

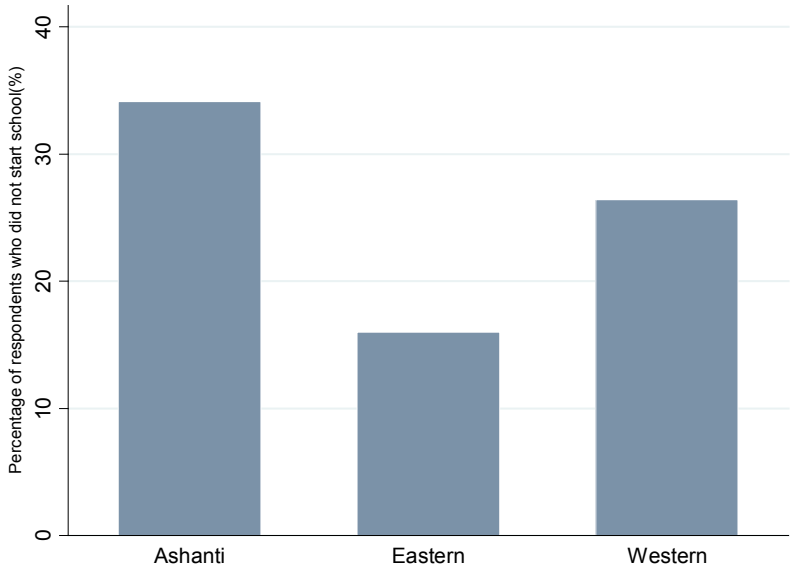

Figure A3.3 Histogram of the size of households among the respondents

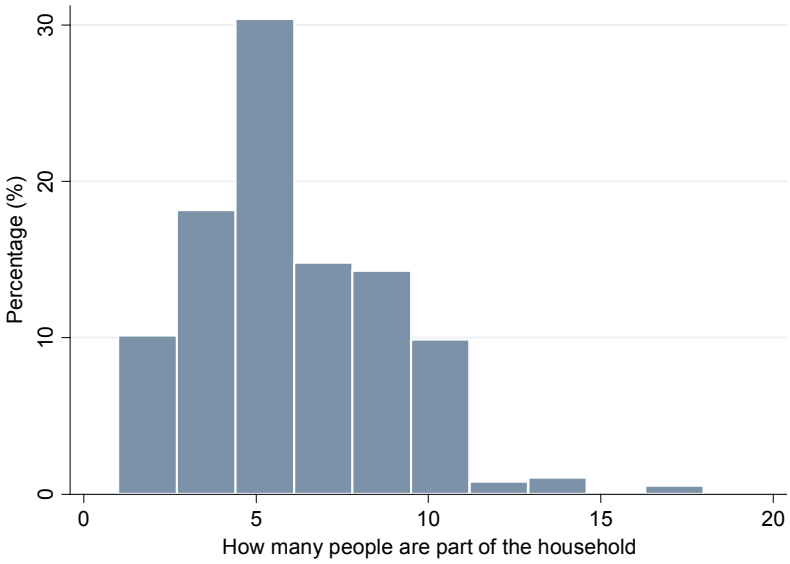

Table A3.4 The respondent's ownership of the main cocoa farm

Respondent's ownership of the farm	Freq.	Percent
Landowner	220	58.3
Abunu	112	29.7
Abusa	29	7.7
Abunan	4	1.1
Other	12	3.2
Total	377	100

Table A3.5	Preferred LBCs among the surveyed households				
Most preferred LBC	**Fre-quency**	**Percentage (%)**	**Second most preferred LBC**	**Fre-quency**	**Percentage (%)**
Akuafo Adamfo	118	33.2%	CMB/PBC	23	32.9%
CMB/PBC	86	24.2%	Akuafo Adamfo	16	22.9%
Armajaro LTD	64	18.0%	Armajaro LTD	11	15.7%
OLAM	25	7.0%	Kuapa Kokoo	9	12.9%
Yayra Glover	22	6.2%	Adwumapa	4	5.7%
Kuapa Kokoo	21	5.9%	OLAM	2	2.9%
Adwumapa	12	3.4%	Cashco	1	1.4%
Fedco	2	0.6%	Firstco	1	1.4%
Trans Royal	2	0.6%	Sika Ba	1	1.4%
Abrabopa	1	0.3%	Trans Royal	1	1.4%
Cadbury	1	0.3%	Yayra Glover	1	1.4%
Royal Commo.	1	0.3%			
UTZ	1	0.3%			
Total	356	100.0%		70	100%

Table A3.6	Evaluation of the trainings to become UTZ certified			
Project group	**Evaluation of training**			**Total**
	Unsatisfied	**Neutral**	**Satisfied**	
Group 1	1	1	40	42
Group 2	0	1	39	40
Group 3	13	0	0	13
Group 4	8	0	4	12
Group 5	0	2	40	42
Group 6	2	2	43	47
Control Group Eastern (for group 2+6)	2	0	2	4
Total	26	6	166	198

Table A3.7	Participation in other training than the cocoa project		
Project group	**Participation in other training**		**Total**
	No	**Yes**	
Group 1	18	24	42
Group 2	11	28	29
Group 3	32	11	43
Group 4	35	6	41
Group 5	23	20	43
Group 6	26	16	42
Control Group Ashanti (for Group 1+3)	27	16	43
Control Group Eastern (for Group 2+6)	22	12	34
Control Group Western (for Group 4+5)	27	13	40
Total	221	146	367

Table A3.8	Percentage of farmers participating in other trainings	
Topics in training	**Number of responses a)**	**Percentage of total responses**
Cocoa production *(for instance new types of cocoa, farm cleaning/sanitation and farm maintenance)*	78	82.1%
Health and safety *(for instance HIV/AIDS, child labour, safe agrochemical use, housekeeping)*	72	56.9%
Management skills (for instance record keeping, economic decision making)	47	27.7%
Chemical application (appropriate amount and type of chemicals to be used for farm activities)	65	69.2%
Others/ combination of topics	85	63.5%
Environmental protection (not slashing close to rivers, uncontrolled burning, water pollution, water pollution, control of soil erosion)	54	42.6%
Sustainability certification (UTZ, Rainforest Alliance, Fairtrade, Organic)	43	16.3%
a) Respondents who said to have participated in the training.		

Table A3.9	Number of training events last year (*observation with >10 training events were changed to unknown because they are unrealistic according to the participants of the validation workshop)				
Topics in training	**Obs.**	**Mean**	**Sd.**	**Min**	**Max**
Cocoa production *(for instance new types of cocoa, farm cleaning/sanitation and farm maintenance)*	58	2.9	1.4	1	7
Health and safety *(for instance HIV/AIDS, child labour, safe agrochemical use, housekeeping)*	34	2.1	1.3	1	7
Management skills (for instance record keeping, economic decision making)	10	3.3	1.9	1	7
Chemical application (appropriate amount and type of chemicals to be used for farm activities)	39	3.1	1.5	1	7
Others/combination of topics	39	3.9	2.5	1	10
Environmental protection (not slashing close to rivers, uncontrolled burning, water pollution, water pollution, control of soil erosion)	20	2.9	1.7	1	7
Sustainability certification (UTZ, Rainforest Alliance, Fairtrade, Organic)	7	4.1	1.6	2	7

Table A3.10	Number of hours per training events (*observations with >3 hours were changed to unknown because they are unrealistic according to the participants of the validation workshop)				
Topics in training	**Obs.**	**Mean**	**Sd.**	**Min**	**Max**
Cocoa production *(for instance new types of cocoa, farm cleaning/sanitation and farm maintenance)*	55	2.2	0.8	1	3
Health and safety *(for instance HIV/AIDS, child labour, safe agrochemical use, housekeeping)*	33	1.8	0.7	1	3
Management skills (for instance record keeping, economic decision making)	9	2.0	0.7	1	3
Chemical application (appropriate amount and type of chemicals to be used for farm activities)	40	2.3	0.8	1	3
Others/ combination of topics	39	2.3	0.6	1	3
Environmental protection (not slashing close to rivers, uncontrolled burning, water pollution, water pollution, control of soil erosion)	20	1.9	0.9	0.15	3
Sustainability certification (UTZ, Rainforest Alliance, Fairtrade, Organic)	4	3.0	0.0	3	3

Table A3.11	Main providers of the training (the frequency of being mentioned, and total participants of the trainings)			
Topics in training	**COCOBOD**	**LBC**	**NGO**	**Total**
Cocoa production *(for instance new types of cocoa, farm cleaning/sanitation and farm maintenance)*	23	14	10	65
Health and safety *(for instance HIV/AIDS, child labour, safe agrochemical use, housekeeping)*	1	5	5	41
Management skills (for instance record keeping, economic decision making)	3	5	2	13
Chemical application (appropriate amount and type of chemicals to be used for farm activities)	17	7	9	46
Others/ combination of topics	20	11	1	55
Environmental protection (not slashing close to rivers, uncontrolled burning, water pollution, water pollution, control of soil erosion)	2	5	3	24
Sustainability certification (UTZ, Rainforest Alliance, Fairtrade, Organic)	2	1	2	8

Table A3.12	Number of households per community and region			
Community/Village	**Region**			**Total**
	Ashanti	**Western**	**Eastern**	
Aboabo	11			11
Adiembra No.5	1			1
Adukrom			5	5
Aduku			7	7
Agyakamanso		12		12
Akanteng			8	8
Akorabo			17	17
Amanase			5	5
Ampoma	14			14
Anyinamso 2	9			9
Apiatu			1	1
Aponaponso	11			11
Asantekrom		5		5
Asanteman		1		1
Asempanaye		4		4
Asempaneye_Ashanti	6			6
Asempaneye_Western		12		12
Awisam 1			5	5
Bopa		11		11
Bosomoiso		7		7
Bronikrom	1			1
Buagyaa	8			8
Chiran		1		1
Esasso			2	2
Esienkyem	9			9
Fordjourkrom		1		1
Katapei	8			8
Kunkunso	14			14
Nambro		4		4
Ntabea			8	8
Ntakam		15		15
Nyamebekyere	12			12
Oboatumpang			9	9
Okorase-Suhum			8	8

Onyinameanu			5	5
Onyinamienu			4	4
Pataboaso	7			7
Potroase			11	11
Progya		13		13
Punikrom		4		4
Santramor			15	15
Simitare			2	2
Supresu			8	8
Tanoso		8		8
Wodekum			11	11
Total	129	125	131	385

Table A3.13 Reasons of preference of purchasing clerks for UTZ certified and regular cocoa

UTZ		**Regular cocoa**	
Less re-drying is required	3	Less administration is required	
More bags to buy from farmers	5	No bags must be kept separate	
More professional attitude of the farmer	1	Less control	1
Other	2	Other (could not get UTZ certified anywhere)	2

Table A3.14	Satisfaction with the services of the producer group			
Services of the producer group	**Obs.**	**Satisfied**	**Neutral**	**Unsatisfied**
Access to training	128	91.4%	0.9%	7.7%
Market information on inputs	127	70.1%	14.9%	15.0%
Market information on sales (e.g. also of other crops)	128	61.7%	14.9%	23.4%
Feedback information from Internal Controls (ICS)	124	46.8%	26.7%	26.5%
Feedback information from the external controls (audit)	123	43.1%	23.5%	33.4%
Information on COCOBOD services and COCOBOD spraying gangs and how to access them	122	59.0%	20.3%	20.6%
Access to fertiliser	119	38.7%	9.5%	51.9%
Access to seedlings/pods	120	48.3%	13.9%	37.8%
Access to pesticides	118	44.9%	7.9%	47.2%
Access to credits	117	14.5%	3.5%	82.0%
Insurance systems are set up	117	13.7%	7.1%	79.2%
Assistance in my relationship with the LBC (representation)	126	73.8%	11.3%	14.9%
Assistance in relation with COCOBOD (representation)	125	49.6%	25.9%	24.5%
Commercial activities	122	39.3%	13.2%	47.5%

Table A3.15	Satisfaction with the services of the producer group	
Advantages	**Obs**	**Percentage**
1. Better social contacts with my colleague farmers	210	28.6%
2. Some communal problems are now discussed during producer group meetings	218	24.3%
3. I am proud to be a member of the producer group	206	12.6%
4. Knowledge exchange between members	207	28.5%
5. Other	17	
Disadvantages		
1. It costs money/fees	177	0.50%
2. It costs a lot of time	177	1.70%
3. Record keeping	176	0%
4. Other	33	

Table A3.16	Other benefits of being a member of a producer group
Other benefits of being a member of a producer group	**Freq.**
Being able to harvest more	1
Credit	1
Equipment and input premium	1
It is entertaining	1
Knowledge on cocoa production	1
Learn so much, it has helped	1
More experience	1
New to the group	1
Premium	1
Provision of PPES	1
Respect for fellow famers	1
Communal labour	2
Knowledge on cocoa production	1
Knowledge on good cultural practices	1
Teaches maintenance of farm	1
With inputs, but little	1
Total	17

Table A3.17	Other disadvantages of being a member of a producer group
Other disadvantages of being a member of a producer group	**Freq.**
Disparities in distribution of free inputs	1
Time keeping	1
Challenges of meeting the ICS	1
Financial obligations	1
Not vibrant, hence to be dissolved	1
Non-commitment	2
Total	7

Appendix 4 Baseline data

Detailed information on the baseline situation of farmers

The tables in the text and Appendices show the number of non-missing observations (obs.) for the relevant question in the questionnaire and percentages are expressed to the total number of non-missing observations instead of to the size of the sample population.

Table A4.1 **Scores for the knowledge questions in Part G of the Questionnaire (empty cells have a score of zero)**

Part G	Answer options											Max.
Question	a	b	c	d	e	f	g	h	i	j	k	Score a)
1	1	.9	1	.9	1							4.8
2	1	1	.9	1								3.9
4		1	1	.5								2.5
5	.9	1	.9									2.8
6	.9	.9	1	1	1							4.8
7	1	1	1	.9								3.9
8	.9	.9	.9	1								3.7
9	1	1	.9	.9	.8							4.6
1	1	1	.9									2.9
11	1	.8										1.8
12	1	.9	1	1								3.9
13	1	.5	1									2.5
14	1	1	1	.9								3.9
15	1	.8	1	1	.9	.8						5.5
16	1	1	1	1	1	1	1	1	1			9
17	1	1	1	1	1	1	1	1				8

a) The maximum score for each question was used as the denominator to scale the score for each question to between 0 and 1.

Table A4.2	Knowledge scores per question per group									
Knowledge Question (Part G in the questionnaire)	Project group									Total
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Control Group Ashanti For group 1+3	Control Group Eastern For group 2+6	Control Group Western For group 4+5	
G1	0.33	0.36	0.30	0.27	0.38	0.28	0.28	0.28	0.29	0.31
G2	0.35	0.44	0.34	0.29	0.40	0.34	0.34	0.34	0.35	0.35
G4	0.43	0.47	0.52	0.50	0.49	0.39	0.48	0.46	0.57	0.48
G5	0.41	0.47	0.44	0.43	0.50	0.39	0.41	0.36	0.44	0.43
G6	0.21	0.29	0.23	0.21	0.27	0.27	0.19	0.20	0.26	0.24
G7	0.26	0.31	0.24	0.24	0.30	0.27	0.21	0.22	0.29	0.26
G8	0.34	0.42	0.36	0.38	0.42	0.32	0.33	0.30	0.39	0.36
G9	0.24	0.25	0.25	0.25	0.29	0.21	0.22	0.17	0.24	0.24
G10	0.44	0.39	0.43	0.48	0.47	0.39	0.39	0.38	0.49	0.43
G11	0.58	0.51	0.46	0.54	0.58	0.42	0.45	0.43	0.54	0.50
G12	0.27	0.31	0.24	0.20	0.28	0.21	0.19	0.19	0.19	0.23
G13	0.63	0.64	0.59	0.50	0.65	0.45	0.47	0.54	0.67	0.57
G14	0.45	0.48	0.42	0.43	0.45	0.40	0.39	0.42	0.45	0.43
G15	0.38	0.43	0.45	0.44	0.48	0.32	0.37	0.30	0.45	0.40
G16	0.29	0.39	0.28	0.28	0.33	0.24	0.29	0.29	0.30	0.30
G17	0.31	0.39	0.33	0.31	0.38	0.27	0.29	0.27	0.30	0.32
Overall average 'knowledge'	0.37	0.41	0.37	0.36	0.42	0.32	0.33	0.32	0.39	0.36

Table A4.3	Number of respondents answered 'I don't know' per knowledge question and project group									
G1		1	6	9		6	8	3	6	39
G2	1	1	1	7	1	3	2	2	3	21
G4			2		1	2				5
G5			1	1		1	1	2		6
G6	2	1	1	9	1	2	6	5	5	32
G7	2	2	4	8	2	4	8	5	2	37
G8	1	1	1		2			2		7
G9	4	4	6	7	2	12	8	9	7	59
G1	1		3	1	1	1	3	3	2	15
G11	2	2	9	6	2	8	8	9	5	51
G12	6	4	4	1	4	1	1	1	12	7
G13		1	2	8	1	3	5	2	1	23
G14				1		2	3			6
G15	1			1						2
G16			1	2		1			1	5
G17	2									2
Note: missing values are considered to be 'I do not know'.										

Table A4.4	Possible explanatory factors: pairwise correlation						
	Knowledge	**Gender**	**Education**	**Lead farmer**	**Other training**	**UTZ certification**	**Yield per acre**
Knowledge	1.0000						
Gender	-0.1081 a)	1.0000					
Education	0.2093 a)	-0.2620 a)	1.0000				
Lead farmer	0.0022	-0.1241 a)	0.2245 a)	1.0000			
Other training	0.2533 a)	-0.0338 a)	0.0362	0.1646 a)	1.0000		
UTZ certification	-0.0146	-0.0343	0.0573	0.2099 a)	0.1424 a)	1.0000	
Yield per acre	0.1435 a)	-0.0291	0.0797	-0.0300	-0.0209	-0.0726	1.0000
a) Significant positive correlation.							

Table A4.5	Scores for the implementation questions in Part D of the Questionnaire (empty cells have a score of zero)										
Question	**Answer options**										**Max. score**
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	
1	n.a. a)		.5	1	1						1
2			1								1
3	1										1
4			1								1
5		.9			1						1
6	n.a.	1									1
7		1									1
8		.8		1							1
9							.5	.9	1		1
1	.9	1									1
11	.9		1								1
13	1	1									1
14		.5	1								1
15		1	1								1
16	n.a.		.9	1	1						1
17		1	1	1							1
18	1										1
19			.6	.9	1	.5					1
2		1	1								1
21	n.a.	1	.5								1
22	n.a.		.9	.8	1						1

a) Not applicable: when the option is selected, the question is not included in the calculation of the average score for the respondent.
Note: question D12 was left out as the answers may be dependent of the weather conditions.

Table A4.6	Scores for the implementation of sustainable practices per question and per project group									
Questions	**Project group**									**Total**
	Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Group 6**	**Control Group Ashanti (for Group 1 and 3)**	**Control Group Eastern (for Group 2 and 6)**	**Control Group Western (for Group 4 and 5)**	
Production	**0.71**	**0.71**	**0.61**	**0.59**	**0.65**	**0.64**	**0.59**	**0.66**	**0.60**	**0.64**
Source of the planting material	0.88	0.75	0.85	0.58	0.57	0.47	0.56	0.86	0.61	0.68
Type of cocoa on farm	0.95	0.76	1.00	0.64	0.68	0.41	0.81	0.93	0.85	0.78
Distance between trees	0.56	0.46	0.30	0.22	0.21	0.38	0.33	0.42	0.20	0.34
How do you weed on farm	0.90	0.98	0.98	0.83	0.95	1.00	0.88	0.95	0.90	0.93
How often do you prune	0.65	0.80	0.76	0.82	0.89	0.74	0.74	0.70	0.70	0.75
When do you apply fertiliser	0.13	0.50	0.11	0.16	0.22	0.67	0.14	0.50	0.29	0.24
How often do you apply fertiliser	0.67	0.74	0.54	0.65	0.75	0.56	0.41	0.83	0.44	0.61
Do you keep records on input use and production	0.38	0.24	0.11	0.08	0.20	0.15	0.11	0.19	0.13	0.18
What do you do with diseased pods	0.46	0.44	0.10	0.11	0.34	0.12	0.11	0.13	0.09	0.21
When do you harvest the	0.92	0.92	0.94	0.96	0.97	0.95	0.87	0.91	0.99	0.94

cocoa pods										
How do you ferment the cocoa beans	0.90	0.90	0.88	0.86	0.90	0.90	0.88	0.88	0.85	0.88
How often do you turn the cocoa beans during fermentation	0.97	1.00	0.96	1.00	0.96	0.92	1.00	0.97	1.00	0.97
how do you dry your cocoa beans	0.90	0.88	0.99	1.00	1.00	0.95	0.93	0.86	1.00	0.95
Environment	**0.43**	**0.43**	**0.36**	**0.36**	**0.47**	**0.39**	**0.35**	**0.40**	**0.42**	**0.40**
How many shade trees do you have on your cocoa farm (per acre)	0.12	0.29	0.10	0.03	0.19	0.41	0.10	0.29	0.11	0.19
Do you have native vegetation that grows between the river and your farm	0.54	0.46	0.32	0.47	0.56	0.62	0.41	0.62	0.38	0.49
Do you keep a strip without applying agrochemicals and chemical fertiliser	0.67	0.44	0.56	0.67	0.73	0.38	0.50	0.56	0.54	0.56
What do you do with leftover chemicals	0.25	0.26	0.26	0.29	0.32	0.16	0.20	0.21	0.50	0.27
How do you manage solid waste (including chemical containers)	0.27	0.20	0.03	0.02	0.24	0.09	0.03	0.08	0.05	0.11

What do you do with prunings from the field	0.95	0.94	0.93	0.98	1.00	0.88	0.95	0.87	0.95	0.94
Social issues	**0.79**	**0.71**	**0.55**	**0.51**	**0.66**	**0.80**	**0.61**	**0.69**	**0.55**	**0.65**
What PPE does your family or worker use when spraying chemicals	0.80	0.50	0.43	0.48	0.51	0.57	0.51	0.35	0.44	0.51
Where do you store your chemicals	0.77	0.80	0.66	0.54	0.80	0.86	0.61	0.76	0.67	0.71

Table A4.7 Ownership of PPE per project group

PPE	Project group									Total
	Group 1	Group 3	Control Group Ashanti (for groups 1+3)	Group 2	Group 6	Control Group Eastern (for groups 2 +6)	Group 4	Group 5	Control Group Western (for groups 4 +5)	
Nosemask	62%	20%	21%	22%	15%	5%	22%	23%	29%	24%
Boots	74%	59%	60%	71%	43%	44%	68%	47%	61%	58%
Hat	48%	23%	16%	34%	21%	19%	24%	35%	22%	27%
Overall	62%	20%	9%	12%	15%	7%	15%	30%	17%	21%
Goggles	57%	5%	12%	10%	15%	5%	2%	19%	20%	16%
Raincoat	24%	5%	7%	5%	9%	2%	2%	7%	7%	8%
Other	21%	2%	9%	10%	9%	2%	5%	16%	7%	9%

Figure A4.1	The percentage of respondents who said to have the protective equipment

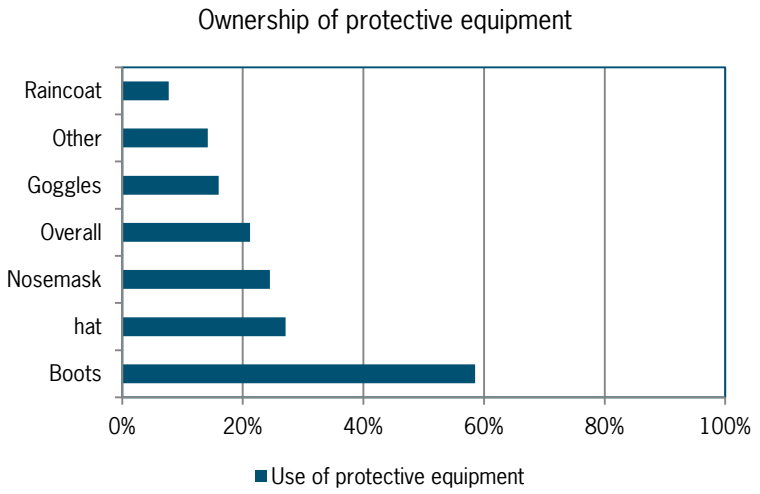

Table A4.8	Tasks implemented by children (Frequency and percentage per project group)									
Activity	**Project groups**									**Total**
	Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Group 6**	**Control Group Ashanti (1+3)**	**Control Group Eastern (2+6)**	**Control Group Western (4+6)**	
Land preparation	1 (2%)	1 (2%)	1 (2%)	0 (0%)	0 (0%)	0 (0%)	1 (2%)	0 (0%)	0 (0%)	4 (1%)
Weeding	1 (2%)	0 (0%)	1 (2%)	2 (5%)	1 (2%)	1 (2%)	4 (9%)	0 (0%)	2 (5%)	12 (3%)
Pruning	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (2%)	1 (0%)
Fertiliser application	0 (0%)	1 (2%)	1 (2%)	4 (10%)	1 (2%)	1 (2%)	1 (2%)	0 (0%)	3 (7%)	12 (3%)
Pest control (Capsis)	0 (0%)	0 (0%)	1 (2%)	1 (2%)	0 (0%)	1 (2%)	1 (2%)	0 (0%)	2 (5%)	6 (2%)
Disease control (Black pod)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (2%)	0 (0%)	0 (0%)	1 (0%)
Harvesting	3 (7%)	2 (5%)	9 (20%)	4 (10%)	2 (5%)	3 (6%)	8 (19%)	3 (7%)	8 (20%)	42 (11%)
Pod breaking	3 (7%)	2 (5%)	8 (18%)	3 (7%)	5 (12%)	1 (2%)	7 (16%)	2 (5%)	7 (17%)	38 (10%)
Fermenting	2 (5%)	0 (0%)	1 (2%)	1 (2%)	0 (0%)	0 (0%)	2 (5%)	1 (2%)	0 (0%)	7 (2%)
Drying	1 (2%)	1 (2%)	1 (2%)	2 (5%)	0 (0%)	0 (0%)	1 (2%)	0 (0%)	0 (0%)	6 (2%)
Transport to purchasing clerk	1 (2%)	1 (2%)	1 (2%)	2 (5%)	1 (2%)	1 (2%)	3 (7%)	1 (2%)	1 (2%)	12 (3%)

Table A4.10	Income from cocoa production in 2011				
Income from cocoa farming	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Calculated based on production					
Main farm	373	2,258	2,543	50	15,600
Second farm	207	1,312	1,558	50	12,000
Third farm	87	1,127	1,485	60	12,000
Total net income (max. 3 farms)	373	3,249	3,869	50	36,000
Estimated total net income from cocoa	272	2,174	2,269	50	12,300

Table A4.11a	Average labour input per activity per acre on the main farm in 2011 (days/acre)					
Activity	**Own**	**Hired labour**	**Share-crop-per**	**Family labour**	**Other labour**	**Total labour per activity**
Land preparation	1.5	1.9	0.0	0.4	0.1	1.4
Weeding	6.7	9.7	1.2	12.6	2.7	14.1
Pruning	2.8	3.0	0.2	0.7	0.5	3.4
Fertiliser application	0.5	1.0	0.2	0.4	0.1	0.9
Pest control (Capsis)	0.8	1.1	0.1	0.3	0.5	1.3
Disease control (Black pod)	0.8	0.6	0.1	0.1	0.1	0.7
Harvesting	3.4	4.1	1.1	5.1	2.2	7.5
Pod breaking	1.7	2.1	0.5	2.3	7.9	7.9
Fermenting	3.8	1.6	1.0	2.1	2.3	5.2
Drying	6.4	2.2	2.9	3.3	3.7	9.1
Transport to purchasing clerk	4.1	1.1	0.3	1.4	1.4	4.2
Total labour for all activities	**26.7**	**18.2**	**42.7**	**20.5**	**14.9**	**97.3**

Note: the numbers were rounded to one decimal point, a value of 0.0 means that the average number of days was less than 0.1.

Table A4.11b	Total labour input on the main farm (days/acre) in different projects			
Project	**Mean**	**Std. Dev.**	**Min**	**Max**
Group 1	86	82.2	4.1	400
Group 3	113.6	113.1	20.2	545.7
Control Group Ashanti (for groups 1+3)	86.9	71.2	7.5	358
Group 2	81	72.7	11.2	424
Group 6	103.7	79.5	11.1	313.8
Control Group Eastern (for groups 2+6)	113.6	123.8	6.4	662
Group 4	132.8	164.9	11.1	708.5
Group 5	74.5	51.4	7	231
Control Group Western (for groups 4+5)	81	53.8	6.7	214.2
Total	97.3	97.5	4.1	708.5

Table A4.12a	Numer of general equipment bought last year					
Equipment	**Obs.**	**Percentage**	**Mean**	**Std. Dev.**	**Min**	**Max**
Cutlass	364	94.5%	3.2	3.6	1	50
Harvesting hook	162	42.1%	2.0	1.2	1	8
Axe	13	3.4%	1.5	0.8	1	3
Hoe	46	11.9%	1.8	1.1	1	5
Drying mat	175	45.5%	2.2	1.4	1	10
Mist blower	24	6.2%	1.2	0.5	1	3
Pruner (for mistletoe)	12	3.1%	1.8	1.1	1	4
Knapsack sprayer	66	17.1%	1.1	0.4	1	3
Storage for chemicals	11	2.9%	1.0	0.0	1	1
Other	44	11.4%	5.5	6.9	1	45

Table A4.12b	Cost per item of the general equipment bought last year (in GHS)					
Equipment	**Obs.**	**Percentage**	**Mean**	**Std. Dev.**	**Min**	**Max**
Cutlass	362	94.0%	7.9	7.5	3	76.5
Harvesting hook	158	41.0%	9.3	40.1	0.7	500
Axe	12	3.1%	7.3	3.2	2	13
Hoe	46	11.9%	6.4	4.0	2	20
Drying mat	173	44.9%	91.0	125.2	1	900
Mist blower	24	6.2%	464.6	280.9	3	850
Pruner (for mistletoe)	11	2.9%	34.0	65.9	5	230
Knapsack sprayer	66	17.1%	33.6	17.3	12	90
Storage for chemicals	9	2.3%	108.0	142.8	3	400
Other	42	10.9%	11.2	30.2	0.5	200

Table A4.12c	Ownership and use of PPE items									
	Group 1	Group 3	Control Group Ashanti (gr 1+3)	Group 2	Group 6	Control Group Eastern (gr 2+6)	Group 4	Group 5	Control Group Western (gr 4+5)	Total
	Whether owns PPE									
Nosemask	62%	20%	21%	22%	15%	5%	22%	23%	29%	24%
Boots	74%	59%	60%	71%	43%	44%	68%	47%	61%	58%
Hat	48%	23%	16%	34%	21%	19%	24%	35%	22%	27%
Overall	62%	20%	9%	12%	15%	7%	15%	30%	17%	21%
Goggles	57%	5%	12%	10%	15%	5%	2%	19%	20%	16%
Raincoat	24%	5%	7%	5%	9%	2%	2%	7%	7%	8%
Other	21%	2%	9%	10%	9%	2%	5%	16%	7%	9%
	Whether uses PPE									
Nosemask	69%	30%	33%	32%	16%	16%	32%	36%	29%	33%
Boots	79%	64%	63%	78%	45%	47%	68%	45%	61%	61%
Hat	56%	30%	24%	42%	26%	18%	32%	40%	20%	32%
Overall	64%	30%	15%	21%	17%	11%	20%	33%	20%	26%
Goggles	60%	16%	13%	13%	12%	3%	15%	24%	20%	20%
Raincoat	31%	16%	13%	6%	10%	3%	7%	12%	10%	12%
Other	37%	13%	15%	21%	22%	5%	15%	27%	13%	19%

Figure A4.42c **The percentage of respondents who said they or their labourers used the equipment**

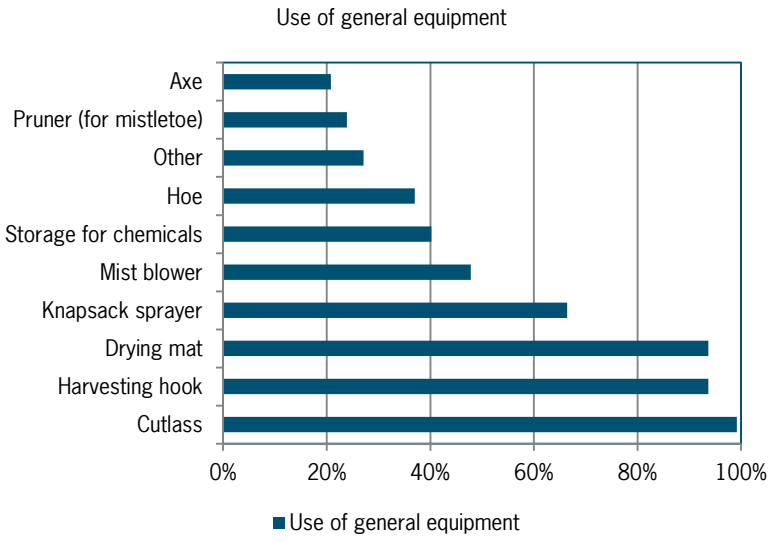

Table A4.13a	Use of planting material per project group									
Input use	**Project group**									**Total**
	Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Group 6**	**Control Group Ashanti (1+3)**	**Control Group Eastern (2+6)**	**Control Group Western (4+5)**	
	No.	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**
Planting material 1										
Amazonia		1		4	4	6	3		2	20
Amelonado						3				3
Don't know	1									1
Hybrid	11	8	17	10	14	4	12	10	12	98
Own nursed seedlings		2								2
Total	12	11	17	14	18	13	15	10	14	124
Planting material 2										
Amazonia						1				1
Hybrid	1			1						2
Total	1			1		1				3

Table A4.13b	Use of insecticide per project group									
Insecticide	**Project group**									**Total**
	Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Group 6**	**Control Group Ashanti (1+3)**	**Control Group Eastern (2+6)**	**Control Group Western (4+5)**	
	No.	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**
Insectide 1										
Actara	1		5							6
Akate Master	14	10	17	10	16	1	12	6	17	103
Confidor	17	6	14	24	17	5	15	2	14	114
DDT							1			1
Don't know		2	1				2	1		6
Provided by the government		2				1				3
Semithox		1					1			2
Total	32	21	37	34	33	7	31	9	31	235
Insecticide 2										
Actara	2			2	1					5
Akate Master	7	2	7	15	8		9	2	6	56
Bossmate 2.5EC				1						1
Confidor	11	4	13	8	10	1	10	3	16	76
Don't know			1					1		2
Total	20	6	21	26	19	1	19	6	22	140
Insecticide 3										
Actara	3		3							6
Confidor	1		1							2
Don't know							1			1
Glyphosate							1			1
Petrol									1	1
Total	4		4				2		1	11

Table A4.13c	Use of herbicide per project group									
Herbicide	**Project group**									**Total**
	Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Group 6**	**Control Group Ashanti (1+3)**	**Control Group Eastern (2+6)**	**Control Group Western (4+5)**	
	No.	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**
Herbicide 1										
Adwumawura	1	1	9	6	7		3	1	9	37
Atrazine			1							1
Cellucit								1		1
Condemn	1		1	7	4		2	2	4	21
Don't know		1		1	1		2		1	6
Gallarn-2								1		1
Glyphosate				1	1			1		3
Gov't provided		1								1
Gramazone		1	3	1		1	2	1	2	11
Gramoquat				3	2				1	6
Kalash			1							1
Odiniho									1	1
Ogyatanan									2	2
Round-up	1		8		1		1	1	2	14
Sanfocid			1							1
Sarosate				1						1
Weed out		1								1
Weed-up								1		1
Weedmaster		1								1
Total	3	6	24	20	16	1	10	9	22	111
Herbicide 2										
Adwumawura					1					1
Ammonium powder			1							1

Ammwnyia									1	1
Atala					1					1
Condemn			2						1	3
Destroyer								1		1
Don't know				1						1
Glysophate								1		1
Gracel			1							1
Gramazone			1						1	2
Gramoquant				1						1
Gramoquate				1						1
Kalash				1			1			2
Petro					1					1
Shipreko				1						1
Sunphosit		1								1
Total		1	5	5	3		1	2	3	2
Herbicide 3										
24 D						1				1
Don't know		1		1						2
Powder			1							1
Total		1	1	1		1				4

Table A4.13d	Use of fungicide per project group									
Fungicide	**Project group**									**Total**
	Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Group 6**	**Control Group Ashanti (1+3)**	**Control Group Eastern (2+6)**	**Control Group Western (4+5)**	
	No.	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**
Fungicide 1										
Akate Master				2			1			3
CODAPEC						1				1
Don't know	1	2	1	1	5		1	2	2	15
Funguran	3			1	3		2		1	1
Govt. provided	2									2
Kocide	1		1				1			3
NORDOX Copper fungicide								1		1
Nordox				2	2			2	2	8
Provided by the government		1				1				2
Redomil	3	2	1	4	4		1	2	3	2
Total	1	5	3	1	14	2	6	7	8	65
Fungicide 2										
Akate Master				1						1
Champion								1		1
Don't know	1									1
Funguran				1						1
Hybrid	1									1
Koude					1					1
Nordox			1	1						2
Redomil	1				1				2	4
Total	3		1	3	2			1	2	12
Fungicide 3										
Redomil				1						1
Total				1						1

Table A4.13e	Use of fertiliser per project group									
Fertiliser	**Project group**									**Total**
	Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Group 6**	**Control Group Ashanti (1+3)**	**Control Group Eastern (2+6)**	**Control Group Western (4+5)**	
	No.	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**	**No.**
Fertiliser 1										
Ammonia									1	1
Asaasewura	3	2	6	9	11	1	2	3	1	47
Cocofed	8	2	8	6	7	1	2	2	3	39
Diegro			1							1
Don't know	1	1	1			1		2		6
Manure					1					1
NPK								1	1	2
Poultry dropplings	2				1					3
Provided by the government		1				1				2
Sidalco	5	3	17	12	5	2	8	2	11	65
Sulphate ammonia							2			2
Total	19	9	33	27	25	6	14	10	26	169
Fertiliser 2										
Asaasewura		1	3		2				2	8
Cocofed				1						1
Don't know	1		1							2
Hybrid									1	1
NPK				1						1
Poultry dropplings	1				1					2
Sidalco			1		1	1	1		4	8
Super grow			1							1
cocofeed			1		1					2
Total	2	1	7	2	5	1	1		7	26

Fertiliser 3										
Asaasewura				1						1
Don't know			1	1						2
Sidalco					2					2
Total			1	2	2					5

Table A4.13f Costs of input per acre in different regions

	Region			
Costs on inputs	**Ashanti**	**Eastern**	**Western**	**Total**
Costs of fertiliser per acre	42.8	42.5	40.8	41.8
Costs of fungicide per acre	33.4	65.7	19.3	30.7
Costs of herbicide per acre	14.0	9.4	10.8	11.7
Costs of insecticide per acre	34.4	25.9	52.2	41.7
Costs of planting material per acre	24.6	38.8	15.3	25.5
Total	129	125	131	385

Table A4.14 Use of the credit per item (in GHS)

Variable	Obs.	Mean	Std. Dev.	Min	Max
Buying inputs/equipment for cocoa production	15	324.7	315.2	50	1.300
Buying inputs/equipment for other crops	2	75.0	35.4	50	100
Hire labour for cocoa production	13	277.5	266.1	30	1.000
Hire labour for other crops	1	200.0	.	200	200
Education fees	24	603.3	533.7	30	2.000
Mobile phones	1	80.0	.	80	80
Funerals	3	616.7	775.1	50	1.500
Others	30	754.3	804.9	20	3.000

Table A4.15a	Input/Out ratio among different project groups				
Project	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
Group 1	28	0.3	0.2	0.1	0.8
Group 3	28	0.3	0.3	0.1	1.4
Control Group Ashanti (for group 1+3)	24	0.5	0.8	0.1	3.7
Group 2	24	0.3	0.4	0.1	2.3
Group 6	19	0.5	0.6	0.1	2.9
Control Group Eastern (for group 2+6)	24	0.4	0.4	0.1	1.4
Group 4	26	0.3	0.2	0.1	0.8
Group 5	31	0.3	0.3	0.1	1.4
Control Group Western (for group 4+5)	26	0.3	0.2	0.1	0.9
Total	230	0.3	0.4	0.1	3.7

Figure A4.15b **Comparison of the average input-output ratio across regions (Lower ratio = higher profitability)**

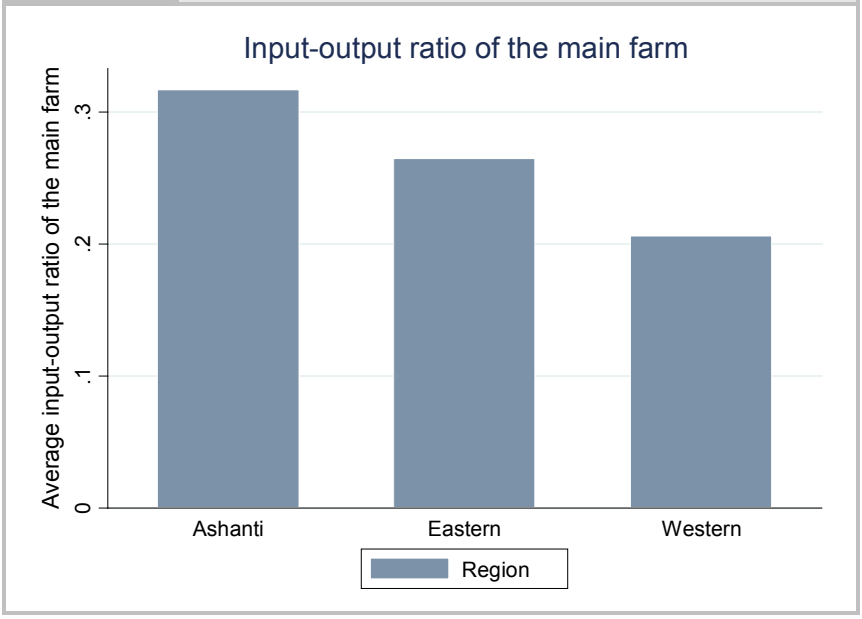

Figure A4.15c **Comparison of the average input-output ratio between UTZ certified and not certified respondents in the project groups (Lower ratio = higher profitability)**

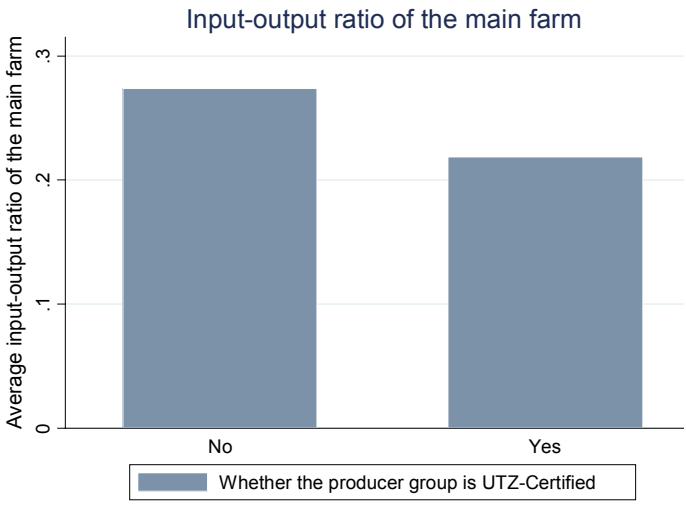

Figure A4.16 **Distribution of yield per acre on the main farm among the respondents**

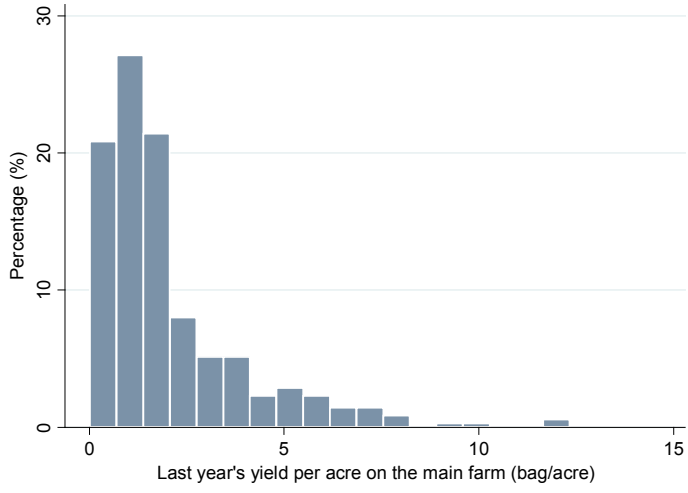

Figure A4.17a **Average acreage of the main farm of the respondent in different regions**

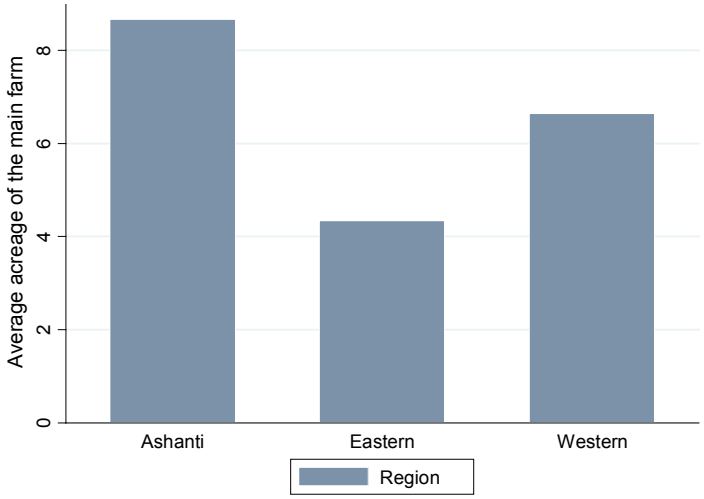

Figure A4.17b **Average yield per acre on the main farm of the respondent in different regions**

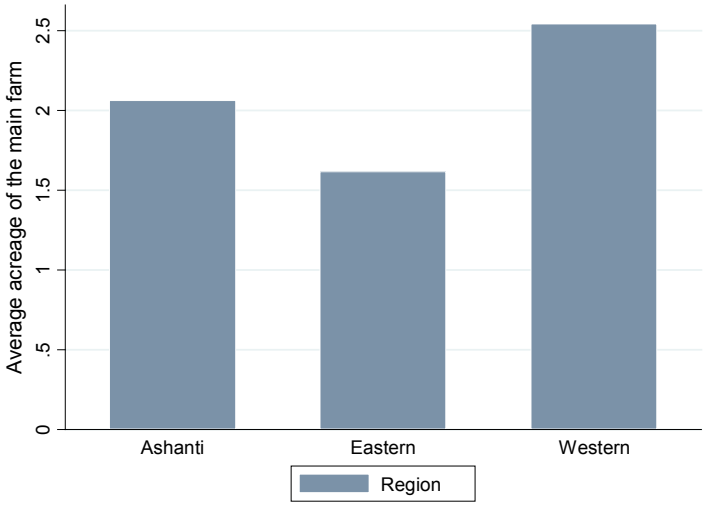

Table A4.18	Income earned last year from different sources				
Income source	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
Cocoa farming	272	2,174.7	2,269.3	50	12,300
Other crop farming	158	637.8	811.6	20	7000
Livestock	30	706.5	862.6	50	4,000
Trade-Retail	40	2,490.9	5,946.1	96	36,000
Remittance	13	1,784.6	2,059.9	100	7,200
Other	38	1,827.8	2,684.9	60	12,000
Total	274	3,312.8	3,925.0	100	36,979

Table A7.19a	Total households annual income (in GHS) estimated by the respondents per region				
Region	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
Ashanti	63	3,390	3,152	100	15,000
Eastern	81	1,883	1,436	410	8,000
Western	65	5,138	5,123	400	25,125
Total	209	3,349	3,697	100	25,125

Table A7.19b	Total households annual income (in GHS) estimated by the respondents per project				
Project group	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
Group 1	21	2,681	2,274	100	7,400
Group 3	26	1,753	1,236	500	5,500
Control Group Ashanti (for group 1+3)	19	4,887	4,191	355	15,000
Group 2	23	6,289	5,433	1,000	20,000
Group 6	25	4,403	4,796	400	25,125
Control Group Eastern (for group 2+6)	32	2,065	1,224	500	4,700
Group 4	23	2,800	2,482	251	8,000
Group 5	23	1,778	1,889	410	8,000
Control Group Western (for group 4+5)	17	4,660	5,186	600	21,800
Total	209	3,349	3,697	100	25,125

Appendix 5 Regression results

Regression analysis on knowledge and practice

1) Two-level mixed effect linear regression on knowledge scores and the possible explanatory factors

The regression shows that a respondent who has been participating in the project for a longer time, would have higher knowledge score, when other things remain equal (ceteris paribus). The LR test suggests a multi-level regression rather than a simple linear regression with a regional dummy as an independent variable. Furthermore, part of the variation in the knowledge score was due to regional variations, which means the effect of training may differ across regions.

Variables:

a1a_region:	region (three regions)
_Ia3_sex_1:	whether the respondent is female
_If7_1:	whether the participant has had other trainings
b0_projectage:	length of participation in the project.
-cons:	constant

```
Mixed-effects ML regression                     Number of obs      =       367
Group variable: a1a_region                      Number of groups   =         3

                                                Obs per group: min =       115
                                                               avg =     122.3
                                                               max =       128

                                                Wald chi2(3)       =     50.60
Log likelihood =  388.39785                     Prob > chi2        =    0.0000
```

score_know~e	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_Ia3_sex_1	-.0368755	.0110639	-3.33	0.001	-.0585603	-.0151907
_If7_1	.0430033	.0092246	4.66	0.000	.0249235	.0610831
b0_projec~ge	.0223862	.0069794	3.21	0.001	.0087069	.0360656
_cons	.3452588	.0139152	24.81	0.000	.3179855	.372532

Random-effects Parameters		Estimate	Std. Err.	[95% Conf.	Interval]
a1a_region: Identity	sd(_cons)	.021177	.009867	.0084969	.0527797
	sd(Residual)	.0832269	.0030849	.077395	.0894983

LR test vs. linear regression: chibar2(01) = 14.47 Prob >= chibar2 = 0.0001

2) Linear regression on implementation scores and the possible explanatory factors

Quite as expected, knowledge score is a good predictor of practice. Being a lead farmer has positive effect on implementing sustainable practices.

Table A7.1 Regression on practice score on explanatory factors

Independent variables	Coefficient
Gender (male=0, female =1)	-0.0371**
	(0.015)
Participation in other training	0.0271**
	(0.014)
UTZ-certified	-0.00858
	(0.019)
Length of project	0.0510***
	(0.014)
Knowledge score	0.283***
	(0.072)
Lead farmer	0.0399**
	(0.019)
Constant	0.432***
	(0.028)
Observations	267
R-squared	0.25

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 6 Missing values on key indicators

Missing values on key indicators

Table A6.1	Percentage (%) of missing values on key indicators per project group								
Indicator	**Ashanti**			**Eastern Region**			**Western Region**		
	Group 1	**Group 3**	**Control**	**Group 2**	**Group 6**	**Control**	**Group 4**	**Group 5**	**Control**
Size of the farm	2.4	0	13.6	9.8	2.3	4.3	14	7	4.9
Yield last year	2.4	2.4	4.5	7.3	0	2.1	9.3	2.3	7.3
Own labour: land preparation	47.6	39	65.9	29.3	25.6	48.9	58.1	48.8	46.3
Own labour on weeding	23.8	17.1	13.6	4.9	4.7	14.9	18.6	14	12.2
Own labour on pruning	19	19.5	31.8	17.1	11.6	10.6	20.9	23.3	24.4
Own labour on fertiliser application	40.5	43.9	36.4	7.3	16.3	57.4	46.5	51.2	34.1
Own labour on pest control	28.6	41.5	31.8	9.8	14	59.6	37.2	51.2	24.4
Own labour on disease control	45.2	46.3	77.3	26.8	23.3	57.4	55.8	44.2	43.9
Own labour on harvesting	14.3	9.8	13.6	0	9.3	2.1	7	7	9.8
Own labour on pod breaking	9.5	7.3	9.1	2.4	4.7	4.3	9.3	7	9.8
Own labour on fermenting	14.3	2.4	15.9	2.4	9.3	0	11.6	7	12.2
Own labour on drying	7.1	2.4	9.1	0	7	2.1	4.7	4.7	12.2
Own labour on transport	21.4	22	31.8	17.1	20.9	14.9	20.9	25.6	29.3
Money spent on hired labour	23.8	24.4	34.1	19.5	34.9	23.4	41.9	34.9	31.7
Planting material	71.4	73.2	61.4	65.9	58.1	72.3	65.1	76.7	65.9
Insecticide	23.8	48.8	15.9	17.1	23.3	85.1	27.9	79.1	24.4
Herbicide	92.9	85.4	45.5	51.2	62.8	97.9	76.7	79.1	46.3
Fungicide	76.2	87.8	93.2	75.6	67.4	95.7	86	83.7	80.5
Fertiliser	54.8	78	25	34.1	41.9	87.2	67.4	76.7	36.6

Table A6.2	Percentage (%) of missing values on key indicators in UTZ certified and not certified group	
Indicator	**Not certified**	**UTZ-certified**
Size of the farm	7.6	3.2
Yield last year	4.8	2.1
Own labour on land preparation	45.5	46.3
Own labour on weeding	13.1	15.8
Own labour on pruning	22.1	12.6
Own labour on fertiliser application	34.5	46.3
Own labour on pest control	31	41.1
Own labour on disease control	46.6	48.4
Own labour on harvesting	8.3	7.4
Own labour on pod breaking	7.9	4.2
Own labour on fermenting	9	6.3
Own labour on drying	5.9	4.2
Own labour on transport	24.5	16.8
Money spent on hired labour	31.7	24.2
Planting material	66.2	72.6
Insecticide	35.5	49.5
Herbicide	63.8	93.7
Fungicide	83.1	83.2
Fertiliser	51.7	69.5

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