Uncovering smallholder heterogeneity

An analysis of diverging livelihood trajectories and outcomes of engagement in tree-crop value chains in Ghana

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Chapter 2
Research methodology
2.1 Introduction
This chapter details the methodology used in conducting the various parts of the study. After a reflection on my positionality (see 2.2), it presents the approach to the study and the research design (see 2.3), justifies the selection of study areas (see 2.4), specifies units of observation and analysis (see 2.5), and outlines the data collection and sampling methods (see 2.6) and data analysis techniques (see 2.7). The latter includes the operationalization of the food sovereignty concept and how the various components were measured (see 2.7.5). Finally, the chapter includes a reflection on the research ethics (see 2.8) and the quality and limitations of the study (see 2.9).

2.2 Positionality
I grew up in the smallholder cocoa sector. My grandmother had and still has two cocoa farms in two different regions in Ghana, one of them quite recently developed through the land sharing abunu shareholder system. She acquired the other farm from her late husband. As a child, I went to the farm with her on Saturdays and school holidays, working on our food-crop farms. During vacations, we worked on her cocoa farms because the cocoa farms were outside our home region, and vacations provided ample time to stay and do substantial work. My siblings and I were actively engaged in cocoa tree planting and weeding, and the farm income financed my education up to the undergraduate degree. This experience prompted my study of agriculture as a first degree in a society where most people do not value education in agriculture. This also informed my passion for smallholders and drew me to the Inclusive Value-Chain Collaboration project (see 2.3.1). I remember sending the project leader an email asking if I could apply, although my subject areas were not listed in the job posting, and after I received the nod, I made sure that my experience with smallholder cocoa farming in Ghana stood out in both the motivation for applying and during the interviews. I got the position; however, I realized the potential influence of my identity on my research only in the field. I faced daily struggles to position myself as a researcher, having so much experience with a cocoa farmer’s day-to-day life and work. This came especially to the fore in the profiling of smallholders, which was greatly influenced by what my grandma called ‘false farmers’. She referred to the winners of the national farmers’ day award, often large-scale producers with off-farm jobs, using highly mechanized and paid farm workers. There was also the focus and scope of the broader Inclusive Value Chain Collaboration project to which I had to conform. Being aware of these positions enabled me to adopt a reflexive and flexible approach to fieldwork. My ambiguous position as a smallholder and a researcher prompted deeper reflections on my research topic, research questions, research design, methods, data collection, data processing, analysis and drawing conclusions.

[39]
My experience helped overcome the initial resistance that smallholders expressed after declaring that I was not working for the government but as a researcher and that the project had no immediate benefits except for a possible uptake of the research recommendations by the government that could help improve their farming. The smallholders perceived student research as 'non-valuable', and they expressed that they often gave information without receiving anything back in terms of the results and impact of the information given on changing their lives. When I introduced myself, my assistants and my mission to smallholders, I often drew on my experience and my grandmother’s, hoping to identify with them and vice versa. While several farmers refused to participate, it ultimately worked and perhaps shaped the subsequent high trust and the relationship between the farmers and me. Many saw me as their daughter or granddaughter, inviting me to funerals and meetings and discussing their children’s achievements and other family affairs. They sought my advice on family and personal issues that overwhelmed me. I received special treatment because they saw me as intelligent and having had scholarships to study outside Ghana. On one occasion, I had to check on a child at the school where my father tutors to ease the parent’s anxiety about being far from her, while on another occasion, I had to help someone apply for the university with which I was affiliated in Ghana. While this made them open to discussing every subject I brought up, they could not help but bring up their farming and family challenges even when we discussed other issues. Often steering them back to the topic at hand affected their momentum, and I soon realized that I had to listen to the stories they wanted to share and not only to those that had my interest. I realized this was very helpful in detailing their life histories as it made them comfortable to share even circumstances they considered ‘shameful’. This brought more depth to my study, but I also realized that I took most of their statements at face value without exploring them further. In many aspects, having two research assistants during every field visit to translate the same interviews into English gave me different meanings to what smallholders said and allowed me to identify how my own experience may have shaped my translation as opposed to the translation of others. This also ensured that my data was authentic, reflecting the Twi words of my farmers as closely as possible. My experience proved valuable in the data collection process, as I could detect when they were exaggerating or understating answers, especially concerning their incomes and challenges, as is often the case when they feel that the research might lead to financial assistance.

The originality of the data was further enhanced by the inclusion of validation sessions at the end of every field visit when I presented the results to farmers before leaving the field. The themes of the annual learning platforms (see 2.3.3) organized each year also aligned with the researched theme and allowed another presentation of the results to farmers and other stakeholders. For farmers and myself, these triangulation
and validation exercises were valuable, allowing me to ask emerging questions after the validation exercise and to get answers to the same questions in a different context.

Regarding other stakeholders in the cocoa and oil palm value chains, I had to make special efforts to connect. These included oil palm companies, the Ghana Cocoa Board (COCOBOD) and its divisions, the Ministry of Agriculture, Departments of Agriculture, District Assemblies and licensed buying companies. These organizations have special procedures for researchers, guidelines for staff on what information can be shared, and special requirements on how the research results can be used. However, after the initial resistance, subsequent interactions and their involvement in the research were unexpectedly smooth, with some even making presentations on innovations at the learning platforms. This was facilitated by the innovative nature of the project’s learning platforms, which they saw as a key platform to connect with the farmers.

As the research and our learning platforms spanned over five years, active engagement of the same group of farmers and stakeholders was required, and my bond with them proved valuable. Project members were often perplexed by how I got large numbers of farmers and other stakeholders to attend every gathering, while other researchers often struggled to reach them for such gatherings.

Despite my efforts to be flexible and reflexive, I noted that I was often more accountable to the smallholders than other stakeholders, often identifying more with them and their interests. Although complete objectivity is a vain wish in research that dwells on human lived experience (Bourke 2014), I tried to remain as objective as possible.

2.3 Research design and approach
The farmer-centred approach adopted in this study (see 1.2.5) requires an understanding and explanation of farmers’ realities based on recognizing differences in their characteristics and lived experiences and the constantly changing context of opportunities and constraints of making a livelihood (Bagchi et al. 1998; Bolwig et al. 2010; Hospes & Clancy 2011). The study used a mixed-method design in a comparative multiple case study. A mixed-method design allows using quantitative and qualitative research methods (Bryman 2012) recommended in livelihood and food and nutrition security research to comprehensively understand underlying issues (Bagchi et al. 1998; Murray 2000; Bilinsky & Swindale 2010). This was necessary as neither quantitative nor qualitative methods were sufficient by themselves to capture the details, changes and complexities of smallholder profiles, value chain engagements, livelihood trajectories and household food sovereignty. Combining qualitative and quantitative research methods ensured accurate data capture, using one method to triangulate and complement findings from the other, allowing for expanding different parts of the study (Onwuegbuzie & Collins 2007; Creswell & Clark 2011; Creswell 2013).
Chapter 2

Data was collected in three fieldwork stages to prevent research fatigue among the respondents. The study began with a survey among smallholder cocoa and oil palm farmers in 2015 that formed the source of quantitative farmer data throughout the study. Four focus groups with smallholders in 2015 helped identify possible profiles among them. Smallholders who passed away or left the study communities during the 4-year fieldwork period were not replaced. This was to ensure that the qualitative data used to refine and explain certain observations in the survey data referred to the same respondents. The survey data was later used to cluster smallholders into profiles (see 2.7.3). These profiles represent the cases that are compared throughout the study. The comparative case-study design ensured an in-depth analysis of contrasting profiles (see Chapter 4) and enabled better understanding and explanations of differences and similarities and better reflections on the research findings. While single case studies emphasize understanding the findings in their specific contexts rather than generalizing results (Bryman 2012), the comparative approach allowed this study to delve deeper and get a broader perspective than a single case study. The generalizability of the findings was improved through a multi-strategy and multi-methods design (Yin 2009) involving multiple contexts, value chain engagements, policies, and institutions.

2.3.1 Embedding within the inclusive value chain collaboration project

This study took shape within the Inclusive Value Chain Collaboration (Inclusive VCC) project17 financed by WOTRO Science for Global Development of the Netherlands Organization for Scientific Research (I) (project no. W08.250.2013.122). A consortium of partners in the Netherlands, Ghana and South Africa carried out the 5-year project from November 2014 to October 2019. The project aimed to contribute insights that help make value chain collaborations more inclusive of smallholder tree-crop farmers while contributing to sustainable landscapes and food sovereignty. The Inclusive VCC project focused on smallholder cocoa and oil palm farmers in Ghana and macadamia and avocado farmers in South Africa to achieve this. The project adopted a farmer-centred approach that aims to provide an alternative, bottom-up approach to achieving inclusiveness, centred on smallholders’ knowledge, experiences, innovation capacity and aspirations. This approach strongly builds on the concepts of inclusiveness, value chain engagement, smallholder profiles, livelihood trajectories and food sovereignty (see Chapter 1), measured empirically with qualitative and quantitative data. The study is thus both deductive and inductive, using the existing literature as a starting point to offer an alternative approach to addressing the issue of smallholders’ inclusiveness in value chains. This explains its mixed quantitative and qualitative approach (Bryman 2012).

17 See https://inclusivevcc.wordpress.com/home/
2.3.2 Concurrent and sequential mixed method research design
The quantitative and qualitative methods used in this study were meant to verify and complement findings and expand separate parts of the study and hence were used both concurrently and sequentially. The first stage involved concurrent semi-systematic analysis of literature (see 2.6.2), key informant interviews (see 2.6.3), a survey (see 2.6.4) and focus group discussions (see 2.6.5) in 2015. The survey data formed the source of the data-driven cluster analysis that teased out four profiles, while the focus group discussions resulted in seven self-identified farmer profiles (see Chapter 4). This stage was concurrent as both methods were used simultaneously without building on each other (Onwuegbuzie & Collins 2007). The next two stages of the study utilized mainly qualitative data collection methods: focus group discussions, timelines, life histories, seasonal calendars, and validation sessions (see 2.6.5-2.6.9). These methods were used to develop and expand various parts of the study and to complement and verify results.

2.3.3 Learning platforms
The study’s farmer-centred approach required an active engagement with smallholders and other stakeholders. To achieve this, the project developed a multi-stakeholder platform called the learning platform. The learning platform brought together smallholders involved in the research, researchers, policymakers, agricultural officers, cocoa and oil palm companies and practitioners in a safe space to co-create, learn and exchange relevant knowledge and practices essential for improving farming. The knowledge included both scientific and local knowledge and involved a knowledge brokering role of the researchers between smallholders and other stakeholders.

Each platform was preceded with fieldwork to identify bottom-up farmer innovations. The meeting themes usually revolved around one of the research questions of this study. The learning platforms offered a space to present results to smallholders and other stakeholders, validate the findings, delve deeper into the results, and encourage and negotiate learning between smallholders and other stakeholders within and beyond the cocoa and oil palm value chains. This helped refine research questions and assumptions and reduce biases resulting from my position as a smallholder. It also created a great bond between the smallholders and me. The project organized four learning platforms, the first at the national level in 2015 and two at the district level in the following four years. The learning platforms in Tepa brought together smallholders from the Tepa and Dunkwa communities in the Ashanti and Central Regions, respectively, and those in Kade mobilized smallholders in the study communities around Kade in the Eastern Region (see 2.4).

The national level platform held in Accra included only five smallholders from the study area due to the long distance between the study communities and Accra and
the language barrier. At least 60 smallholders from the study area participated each year in the local-level learning platforms. Smallholders from the Dunkwa area elected five smallholders each year to represent their communities in the 2017 and 2018 learning platform meetings. All listed smallholders in the Tepa and Kade communities were called by phone prior to the platform meetings at least twice and asked to confirm their participation. Though we targeted 30 smallholders per platform meeting, smallholders’ participation often exceeded this number.

2.4 Study areas
This section presents the study areas and the rationale for selecting them.

2.4.1 Selection of the study sites
Cocoa and oil palm are grown in six out of ten regions18 of Ghana (MoFA 2011a; Asante-Poku & Angelucci 2013). Based on an initial scoping study carried out in these six regions, the Eastern Region of Ghana was selected for the study as the largest producer of oil palm and a substantial cocoa producer. Kwaebibirem Municipal District is the centre of oil palm production. The district hosts the only institute for oil palm, the Oil Palm Research Institute (OPRI), which is part of the Ghanaian Council for Scientific and Industrial Research (CSIR). The district also hosts several oil palm companies ranging from large-scale plantations to small-scale artisanal palm oil processing Kramers.19 Three groups20 of oil palm farmers are found in the district; independent smallholders, outgrowers and smallholders (Ofosu-Budu & Sarpong 2013). The baseline survey and discussions during a multi-stakeholder learning platform organized in 2015 (Inclusive VCC project 2015) revealed that smallholders might be engaged in multiple tree crops and face different opportunities and constraints. This necessitated the inclusion of other regions where smallholder production of tree crops might differ to capture the full extent of the heterogeneity among smallholder tree-crop farmers. The Ahafo-Ano North District in the Ashanti Region was added in December 2015. Smallholders in this district produce mainly cocoa. This study site is also included in another sub-project linked to

19 Kramers are named after the Belgian engineer who first installed the processing unit (Osei-Amponsah et al. 2012).
20 Both smallholder farmers and outgrowers are attached to medium to large-scale oil palm companies under contract arrangements with support to farmers and the company as the sole buyer. The two schemes differ in terms of who provides the farmland and who is responsible for the management of the farm. Independent smallholders are not attached to any company, own their lands, manage their farms and sell to any buyer (OFosu-Budu & Sarpong 2013).
the Lindt Cocoa Foundation and the Armajaro Ghana Ltd (AGL). The Central Region’s Upper Denkyira East Municipal District was included in 2016 to enable the study of the effects of an outgrower scheme implemented by the government to expand tree-crop production (MoFA 2006). The region is ranked as the third largest region for oil palm cultivation and hosts many oil palm companies, such as the Twifo Oil Palm Plantations (TOPP), involved in the policy implementation (MoFA 2011a). See Figure 2.1 for the location of the study sites.

**Figure 2.1 Location of the study sites**

Communities in the Kwaebibirem District were selected with the help of the Department of Agriculture based on an extension map of oil palm communities. The District was divided into the north, centre and south to have good coverage of the area, and two communities were purposefully selected from each divide based on accessibility and availability of public transport. This resulted in the selection of six communities: Asuom, Pramkese, Adankrono, Kwae, Damang and Kwamang (see Figure 2.2). In the Ahafo-North

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Chapter 2

District, community selection was based on the cocoa district map of Armajaro Ghana Limited. The district was divided into three strata and two communities purposefully selected from each based on the same criteria, making six communities: Tanokrom, Camp, Manfo, Achina, Nkyensedanho and Nfenibu (see Figure 2.3).

Figure 2.2 Communities selected in Kwaebibrem Municipal

![Figure 2.2 Communities selected in Kwaebibrem Municipal]

Source: Prepared for the author by Kwabena Asubonteng, University for Development Studies, Tamale, Ghana.

Figure 2.3 Communities selected in the Ahafo Ano North and South and Tano North Districts

![Figure 2.3 Communities selected in the Ahafo Ano North and South and Tano North Districts]

Source: Prepared for the author by Kwabena Asubonteng, University for Development Studies, Tamale, Ghana
Communities were purposively selected in the Upper Denkyira East Municipal from the list of communities involved in the TOPP project. These include Buabin, Mmredani, Rubbermu, Mbaim, Kontokrom and Kramokrom (see Figure 2.4). Table 2.1 presents an overview of the study locations.

**Figure 2.4** Communities selected in the Upper Denkyira East District

![Map of the Upper Denkyira East District showing selected communities](image)

**Table 2.1** Overview of study areas

<table>
<thead>
<tr>
<th>Study regions</th>
<th>Study districts</th>
<th>Study communities</th>
<th>Number of male farmers interviewed</th>
<th>Number of female farmers interviewed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Region</td>
<td>Kwaebibirem Municipal</td>
<td>Asoum, Pramkese, Kwamang, Damang, Adankrono, Kwae</td>
<td>43</td>
<td>8</td>
<td>51</td>
</tr>
<tr>
<td>Ashanti Region</td>
<td>Ahafo-Ano North District</td>
<td>Manfo, Camp, Achina, Mfenibu, Nkyensedanho, Tanokrom</td>
<td>36</td>
<td>24</td>
<td>60</td>
</tr>
<tr>
<td>Central Region</td>
<td>Upper Denkyira East Municipal</td>
<td>Buabin, Mmredani, Mbaim, Rubbermu, Kontokrom, Kramokrom</td>
<td>40</td>
<td>17</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>(3)</td>
<td>(18)</td>
<td>119</td>
<td>49</td>
<td>168</td>
</tr>
</tbody>
</table>

*Source: The author.*
Initially, I considered the Western Region of Ghana for this research as it is the largest producer of cocoa, producing a substantial amount of oil palm (Smith & Sarpong 2018). However, after a scoping study, I decided to drop this option for logistical and cost constraints because the cocoa and oil palm districts are quite apart and because of research fatigue among the smallholder tree-crop farmers, as almost every study on cocoa includes this region.

2.4.2 Characteristics of study sites
Three study sites were selected in this comparative study (Yin 2009). The Kwaebibirem Municipal Assembly (hereafter referred to as the Kade area) is located in the southwestern corner of the Eastern Region of Ghana, with Kade as the municipal capital. Agriculture employs 70.8% of the economically active labour force (GSS 2014), with smallholders cultivating cash crops such as cocoa, oil palm and citrus and food crops such as plantain, cassava, cocoyam and maize.

The Ahafo-Ano District (hereafter referred to as the Tepa area) is located in the northwestern part of the Ashanti Region, with Tepa as the district capital. The agricultural sector absorbs over 78% of the labour force. Cocoa is the major cash crop for smallholders in the district. Smallholders also produce food crops such as plantain, cassava and cocoyam (MoFEP 2015).

The Upper Denkyira East Municipal Assembly, with Dunkwa-On-Offin as its capital, covers 10% of the total land area of the Central Region. Agriculture employs 59.7% of all households, and cocoa is the main crop, covering about 50% of arable lands in the municipality. Maize, cassava, plantain and cocoyam are the main food crops cultivated. As part of the programme for promoting perennial crops in Ghana, the Buabin Oil Palm Outgrower Project (BOPOP) was implemented in this municipality (UDEMA 2014).

2.5 Units of observation and analysis
For this study, the units of observation were smallholder cocoa and oil palm farmers and their households. Other actors in and outside the value chains were also included. At the national level, these included organizations and institutions, primarily the Ghana Cocoa Board (COCOBOD), the Ministry of Food and Agriculture (MoFA) and the Outgrower and Value Chain Fund (OVCF). At the district level, we had the annual learning platforms, the Departments of Agriculture, District Assemblies, the Cocoa Health and Extension Division and the Quality Control of COCOBOD, licensed buying companies, oil palm companies, the Oil Palm Research Institute, and the Ghana Police. At the community level, purchasing clerks, artisanal processors and community leaders were included. The tree-crop farming households were the units of analysis, forming the
basis of analysing their profiles (see Chapter 4), livelihood trajectories (see Chapter 5) and food and nutrition security (see Chapter 6).

2.6 Data collection and sampling methods
This section presents and justifies the methods used to select smallholders and other stakeholders and the number of individuals selected for the various parts of the study.

2.6.1 Introduction
Due to its mixed-method research design, the study involves different sampling methods depending on the data collection methods. The sampling methods are outlined under the different methods below.

2.6.2 Literature review
Literature provides ground for measuring and advancing concepts, plausible methods for data collection and what can be considered a new contribution to knowledge at the end of the study (Levy & Ellis 2006). The study used a systematic approach to searching the literature (Booth et al. 2016). This encompassed (i) the definition of inclusion and exclusion criteria based on the Population, Interest, Context (PICo) table, (ii) an iterative process of defining search strings corresponding with the PICo table, (iii) the application of the search strings in the Scopus and Web of Science databases and Google Scholar (the first 100 hits\(^ {22} \)), (iv) hand searching in the table of contents of three key journals and the reference lists of three index publications\(^ {23} \), (v) de-duplication of hits and subsequent screening of title and abstract, (vi) full-text screening of the remaining titles, and (vii) the final selection of articles to be included in the review. Table 2.2 presents the combinations of search strings used, Table 2.3 presents the final selection of publications reviewed per theme, and Figure 2.5 shows the PRISMA flow diagram that visualizes the search and screening process. The full review protocol can be found in Appendix 1.

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\(^{22}\) A number of between 50 and 100 records in Google Scholar is common in systematic literature reviews (Haddaway et al. 2015).

\(^{23}\) The three-journals reviewed for additional references were Agriculture and Human Values, the Wageningen Journal of Life Sciences NJAS, and World Development. The three index publications identified were Ros-Tonen et al. 2015; Ros-Tonen et al. 2019 and Laven 2010.
Table 2.2 Search string combinations used in Scopus and Web of Science, and Google Scholar

<table>
<thead>
<tr>
<th>String combination</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1+2</td>
<td>Smallholder tree-crop farmers in sub-Saharan Africa</td>
</tr>
<tr>
<td>2. 1+2+3</td>
<td>Partnerships/VCCs with smallholder tree-crop farmers in sub-Saharan Africa</td>
</tr>
<tr>
<td>3. 1+2+4</td>
<td>Smallholder tree-crop farmers' heterogeneity in sub-Saharan Africa</td>
</tr>
<tr>
<td>4. 1+2+5</td>
<td>Smallholder tree-crop farmers' livelihood trajectories in sub-Saharan Africa</td>
</tr>
<tr>
<td>5. 1+2+3+6</td>
<td>Effects of partnerships/VCCs with smallholder tree-crop farmers in sub-Saharan Africa</td>
</tr>
<tr>
<td>6. 1+2+7</td>
<td>Smallholder tree-crop farmers in sub-Saharan Africa and food and nutrition security/sovereignty</td>
</tr>
<tr>
<td>7. 1+2+3+7</td>
<td>Partnerships/VCCs with smallholder tree-crop farmers in sub-Saharan Africa and food and nutrition security/sovereignty</td>
</tr>
<tr>
<td>8. 1+2+3+8</td>
<td>Inclusivity of partnerships/VCCs with smallholder tree-crop farmers in sub-Saharan Africa</td>
</tr>
<tr>
<td>9. 5</td>
<td>Conceptual papers on livelihood trajectories/pathways</td>
</tr>
<tr>
<td>10. 2+3</td>
<td>Partnerships/VCCs with smallholder tree-crop farmers</td>
</tr>
<tr>
<td>11. 2+4</td>
<td>Smallholder tree-crop farmers' heterogeneity</td>
</tr>
<tr>
<td>12. 2+5</td>
<td>Smallholder tree-crop farmers' livelihood trajectories/pathways</td>
</tr>
<tr>
<td>13. 2+7</td>
<td>Smallholder tree-crop farmers' food and nutrition security/sovereignty</td>
</tr>
<tr>
<td>14. 2+3+5</td>
<td>Partnerships/VCCs with smallholder tree-crop farmers and livelihood trajectories/pathways</td>
</tr>
<tr>
<td>15. 2+3+8</td>
<td>The inclusivity of partnerships/VCCs with smallholder tree-crop farmers</td>
</tr>
</tbody>
</table>

Source: The author.
### Table 2.3 Literature search results

<table>
<thead>
<tr>
<th>Themes</th>
<th>String combination</th>
<th>Records from Scopus &amp; WoS (n)</th>
<th>Records from Google Scholar (n)</th>
<th>Records after duplicates removed and screened (title, abstract, keywords) (n)</th>
<th>Full-text articles assessed for eligibility (n)</th>
<th>Full-text articles included in review (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smallholder tree-crop farmers in sub-Saharan Africa (SSA), Ghana</td>
<td>1+2</td>
<td>545</td>
<td>240</td>
<td>606</td>
<td>163</td>
<td>116</td>
</tr>
<tr>
<td>Smallholder tree-crop farmers’ heterogeneity in SSA</td>
<td>3 +11</td>
<td>4,000</td>
<td>217</td>
<td>2286</td>
<td>144</td>
<td>55</td>
</tr>
<tr>
<td>Inclusivity of partnerships/VCCs with smallholder tree-crop farmers in SSA</td>
<td>2+8+10+15</td>
<td>2,664</td>
<td>354</td>
<td>1511</td>
<td>202</td>
<td>121</td>
</tr>
<tr>
<td>Smallholder tree-crop farmers’ livelihood trajectories in SSA (related to VCCs)</td>
<td>4+9+12+14</td>
<td>1,633</td>
<td>429</td>
<td>1483</td>
<td>149</td>
<td>51</td>
</tr>
<tr>
<td>Effects of partnerships/ VCCs with smallholder tree-crop farmers in SSA on food and nutrition security/sovereignty</td>
<td>5+6+7+13</td>
<td>4,765</td>
<td>434</td>
<td>2516</td>
<td>166</td>
<td>49</td>
</tr>
</tbody>
</table>

*For a specification of the search strings, see Appendix 1;
*The search was done via the search platform lib.uva.nl, where the maximum number of hits displayed per search string is 2000.
*Some articles are duplicated across themes; hence the total does not match the total included articles in Figure 2.5.

Source: The author.
**Figure 2.5 The PRISMA flow diagram**

- **Records identified through Scopus and Web of Science**
  - (n = 13,607)
- **Additional records identified through other sources (Google Scholar, websites, or expert advice)**
  - (n = 1,674)
- **Records after duplicates removed**
  - (n = 4,828)
- **Records screened (title, abstract, keywords)**
  - (n = 4,828)
- **Records excluded**
  - (n = 4,154)
- **Full-text articles assessed for eligibility**
  - (n = 674)
- **Full-text articles excluded, with reasons**
  - (n = 305)
- **Studies included in the review**
  - (n = 369)

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*a The accumulated total of all 15 search strings (see Tables 2.2 and 2.3).

*b Some records appeared in multiple search results, emerging up to six times.

*c This is the total number of references used in the first chapter and the discussions of the empirical chapters.

2.6.3 Key informant interviews
Key informant interviews using unstructured questionnaires with actors in and beyond the cocoa and oil palm value chains and profile-specific farmers formed a prominent data collection method. The key informants covered in this study are licensed cocoa-buying companies (LBCs), cocoa-purchasing clerks, and staff of the Ministry of Food and Agriculture (MoFA), the Oil Palm Research Institute (OPRI), the Ghana Cocoa Board (COCOBOD), Departments of Agriculture, Cocoa Abrabopa Farmers Association, Quality Control of COCOBOD, Cocoa Health and Extension Division (CHED) of COCOBOD, oil palm companies, Kramer operators, the Police, the Outgrower and Value Chain Fund (OVCF), and community leaders. I conducted the key informant interviews in March 2016 with 33 respondents24, covering questions on the implementation of the BOPOP, the President Special Initiative on oil palm, the cocoa mass spraying and fertilizer distribution, access to land in terms of gender, age and ethnicity, and the nature and terms and conditions of value chain collaborations. The interview guides used for the key informant interviews are in Appendix 2.

2.6.4 Survey
Quantitative data was collected using a survey (see Appendix 3). It was developed to establish the baseline for the project, including questions peculiar to this PhD study. The objective of the survey was to generate insight into the context, opportunities, constraints and livelihoods of smallholder cocoa and oil palm farmers. The data included household demographics, assets, access to land, incomes and expenditure, investments in agriculture, market and non-market production, livestock production, access to and use of farming inputs, markets, external support, access to natural resources, the experience of food insecurity and dietary diversity. This involved a standard questionnaire developed by the Inclusive Value Chain project to be used in both Ghana and South Africa. The questionnaire was tested with random farmers in Atronie, a cocoa farming community near Sunyani, to train the three research assistants involved in this study and familiarize them with the research questions, especially in translating them to the local language (Twi). This questionnaire piloting also allowed us to check the consistency and reliability of some measured scales, such as the household food insecurity access scale (HFIAS; see 2.7.5).

The survey began in the Kade area in February 2015, where most farmers engaged in multiple cash crops (cocoa, oil palm and citrus). This was followed by the Ahafo-Ano North District (the Tepa area) in December 2015, where farmers almost exclusively engaged in cocoa production. The survey in the Upper Denkyira East Municipal (the

24 See Section 1.5 about the timeframe of this study.
Dunkwa area) was conducted in January 2017. Three trained research assistants and I conducted the interviews in both Kade and Tepa areas, while two assistants helped me conduct the survey in the Dunkwa area.

I used purposive, convenience and snowballing sampling to find respondents for the survey. The districts were purposively selected, then stratified into 3 strata, and 18 communities with accessible roads and public transportation were purposefully selected (see 2.4.1). Convenience sampling was used to select smallholders for the survey, including as many farmers as possible within the target population who were accessible and willing to participate on the day and time of the survey. Sometimes, farmers were reluctant to participate in research as they complained that people come for the information but do nothing to change their lives.

Female farmers were recruited through snowballing to improve the representation of female farmers in the study. Female farmers are often reluctant to share their views or are hard to find. Most female-headed tree-crop households have farms being managed by male caretakers and either reside outside the community or work in non-farm activities, mostly trading. Therefore, I used the network of purchasing clerks and licenced buying companies to locate these female household heads. The survey was initially planned to cover 150 smallholders, 50 per district, based on cost, time and logistics. However, 18 more farmers were included as time permitted. The number of farmers totalled 168: 51, 60 and 57 from the Kwaebibirem, Ahafo-Ano North and Upper Denkyira East Municipal Districts, respectively (see Table 2.1). Forty-nine women answered the questionnaire, 33 of whom were heads of their households.

2.6.5 Focus groups
Focus groups formed a huge part of the qualitative methodology because most of the study dealt with lived experiences, actions and perceptions. Four focus groups were held in the Tepa and Kade areas in 2015, preceding the survey with about 80 farmers. Two similar focus groups involving 45 farmers were held in 2017 in the Upper Denkyira East Municipal. These aimed to explore farmers’ ideas of differences and similarities among tree-crop farmers and to create farmer profiles that are unique from each other (see Chapter 4). These first focus groups used participatory scenario development with backcasting (van Vliet & Kok 2015) (see Appendix 4). This is a people-centred approach used extensively in research and practice to create and develop a participatory and interactive learning environment in a way that captures the diversity of actors’ aspirations and outcomes (Kok & van Vliet 2011). The method helped stimulate farmers’ thinking about the key characteristics defining the different types of farmers, their needs, opportunities, constraints and future aspirations and how to achieve those (for instance, what support structures and partnerships would be needed). This implied working
backwards from broadly defined aspirational futures for each profile. Farmers worked in groups depending on the profile they identified, in which they developed scenarios for the next 10 years. The resulting descriptive stories were then shared with all farmers, combining identical profiles and identifying unique profiles. Using a similar approach, the profiles were presented at the first national learning platform in August 2015 (see 2.3.3). Participants, including farmers, researchers and actors in the cocoa and oil palm value chains, helped develop them further. Farmer selection for the focus groups was convenience sampling, inviting farmers willing to participate and included in the survey. Subsequently, eighteen focus groups were held, two in each district in 2016, 2017 and 2018, respectively.

The focus groups in 2016 focused on identifying different types of value chain collaborations in the communities, the different terms and conditions of engagement, determinants of farmers’ engagement and evaluation of policies that target farmers’ value chain engagement (see Chapter 3). This took place in May 2016 in all three districts involving 90 farmers from the survey. The focus group discussion in 2017 built on the farmer’s self-identified profiles from 2015 and aimed to define the profiles further regarding farmers’ livelihood trajectories. Farmers were then grouped per profile for the in-depth individual interviews using life histories. This exercise was held in all three districts from mid-December 2016 to early March 2017. It involved 68 farmers from the survey and 16 farmers who had not participated in the survey. See Appendix 5 for the focus group protocol and Appendix 6 for the life history interviews.

The last focus groups were held between July and early September 2018, with 95 farmers, 88 from the survey. The questions addressed the availability of food, access to food, the experience of food insecurity, strategies to cope with food insecurity, access to natural resources, and the historical timeline of land-use changes and effects on present and future food and nutrition security. The protocol can be found in Appendix 7, and the results in Chapter 6 and Appendix 8.

2.6.6 Historical timelines
During the 2018 focus group discussions, I asked farmers to detail changes in their landscape using timelines. This is a participatory activity (Cavestro 2003), and the farmers were put in two groups per district to identify different land uses in their landscape, notably the changes that have occurred over the years and the changes anticipated in the next five years with rough percentage estimates. Each community identified a baseline year, usually when cocoa or oil palm production began in their community or covered the last 20 years. Changes were mapped from the baseline year to 2023, five years from 2018. The group then discussed the effects of these changes on land for food production, food availability, access and stability and innovations in land access for food production.
The resulting timelines were further refined in the verification meeting, where the two timeline charts per district were discussed, differences were identified and discussed, and a final timeline chart was agreed on for the district. These results are presented in Chapter 6.

2.6.7 Life histories
The study used the life history method to obtain data on farmers’ livelihood trajectories (see Chapter 5). This method allows both an exploratory and explanatory study of individuals’ life within a defined period and fits our study of farmers’ agency and livelihood trajectories in its ability to identify the role of the context and institutions, opportunities and constraints, actions and responses and changes in these over time (Nelson 2010). The study used semi-structured questions that set out the scope of the interview and the period under consideration, limited to when the household first engaged in the tree-crop value chain. This approach enabled openness as respondents directly progress to events that they deem significant. This also offered an in-depth understanding of events through both qualitative and quantitative data that can be generated (Nelson 2010). The life history interviews with profile-specific farmers were held between mid-December 2016 and early March 2017, with 143 of the surveyed 168 smallholders. The interview targeted all surveyed smallholders, but some had died in the meantime, while others had travelled out of the study locations and could not be interviewed.

2.6.8 Seasonal calendars
Seasonal calendars were developed with farmers during the 2018 focus group discussions to explore and understand seasonal variations in production activities and the availability, access and stability of food produced and bought. This included discussions on the coping strategies used in times of food shortages in groups of mixed gender. Participatory seasonal calendars enable farmers to explore and understand changes and identify opportunities and constraints and their responses (Cavestro 2003; SPRING 2018) regarding production and food sovereignty related to this study. The study considered 12 months, and the calendars were drawn on flipcharts (see Chapter 6 and Appendix 8).

2.6.9 Validation meetings
Following farmers’ complaints of not receiving any information back from researchers, this study used validation meetings, one held per district at the end of each research period and six throughout the study period, to verify the results of the data collected from farmers and also to give information on their knowledge back to them. Sampling was convenient and purposeful, with farmers participating in the focus group discussions and key informant interviews. Forty-six farmers participated in the respondent validation
meeting in 2016 and fifty-two in 2017. No validation meeting was held in 2018 as the period overlapped with the learning platform, where the results were also presented and verified.

2.7 Data processing and analysis

2.7.1 Policy analysis
A qualitative content analysis was made of Ghana’s overarching agricultural policy, the Food and Agriculture Sector Development Policy (FASDEP II 2007) and the related Medium-Term Agriculture Sector Investment Plan (METASIP) (2011-2015) and Ghana Agriculture Sector Investment Programme (GASIP) (2015-2021). This was updated with a review of the more recent Planting for Food and Jobs (PFJ) (2017) and Investing for Food and Jobs (IFJ) (2018-2021). Additionally, I reviewed Ghana’s National Policy on Public-Private Partnerships (PPP) (2011) and four programmes relevant to the tree-crop sector: the cocoa mass spraying and fertilizer distribution programmes operational since 2001, the president’s special initiative on oil palm (PSI Oil Palm) of 2002, the Programme for the Promotion of Perennial Crops in Ghana launched in 2006, and the 2012 Tree Crop Policy (see Chapter 3). The review was limited to the policies’ overall aim, aims regarding smallholders, and the vision on partnerships.25

2.7.2 Survey analysis
The survey formed the quantitative data source for the study. The quantitative data was entered into Microsoft Excel to do basic calculations such as summations and to transform some variables for use in the Statistical Package for Social Sciences (SPSS) analyses. These analyses included cluster analysis, analysis of variance, correlations and regressions and were performed following the SPSS guide by Pallant (2016).

Income is a key variable that can distinguish different farmers (Tyszler et al. 2018) and is used in this study as a key dependent variable. This study used the household’s annual real income to make up for price changes between 2015 and 2017. Real income considers changes in the prices of goods and is useful considering the surveys were two years apart, and prices had changed over the period. Ghana’s consumer price index (CPI)26, provided by the International Monetary Fund (IMF), was used to convert all incomes to the level of January 2017.

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25 Although some interviews were held with COCOBOD at the national level about their programmes and involvement in VCCs, no specific data was collected with policymakers about how the policies came into being, as I considered an in-depth policy analysis beyond the scope of this research.

26 The CPI for February 2015 was 166.41, 187.12 in December 2015 and 221.83 in January 2017 http://data.imf.org/regular.aspx?key=61545849 . Incomes were adjusted to 2017 CPI.
2.7.3 Cluster analysis

The fundamental aim of this study is to determine whether different groups of smallholders face different opportunities and constraints and should be included in value chains differently. However, despite surging interest in exploring heterogeneity among farmers, there is no single defined way to do it. The fundamental questions to cluster analysis are what variables and what method to use. Scholars identified two approaches to unravelling farmer profiles: concept-driven and data-driven (Bymolt et al. 2018). Both approaches may depend on metrics of specific attributes of the farmer, the farm or the farming household, but data-driven approaches depend on data to identify natural groupings, while in concept approaches, the researcher chooses which characteristics suit their purpose (Bymolt et al. 2018). I followed the data-driven approach in this study, using the survey data in cluster analysis. Cluster analysis is a grouping method in market research (Mooi & Sarstedt 2011) and is increasingly used in farmer profiling in the tree-crop production context (Bymolt et al. 2018; Jelsma 2019; Olofson 2020). It allows for identifying natural homogenous groupings from data to maximize homogeneity within and heterogeneity between groups (Mooi & Sarstedt 2011).

The traditional clustering methods depend on one data type − continuous or categorical. The decision on the number of clusters can be arbitrary and result in a biased result (Mooi & Sarstedt 2011). In this study, I used a two-step cluster analysis procedure appropriate for continuous and categorical variables, allowing me to self-define the optimal number of clusters. Two-step cluster analysis also provides information on the quality of the cluster solution using the silhouette measure of cohesion and separation (-1.0 to 0.2 = poor quality, 0.2 to 0.5 = fair quality and 0.5-1.0 = good quality). Finally, it indicates the importance of each variable and the ratio between the largest and smallest clusters in the solution (Blaikie 2003; Mooi & Sarstedt 2011). Details about the iterative clustering process are presented in Appendix 9.

2.7.4 Qualitative data analysis

Qualitative data collection and analysis occurred simultaneously to enable continual reflections to clarify or validate a finding or redefine the entire focus when needed. Below, I outline the process per method used.

Focus group discussions

Notes at focus group discussions were taken and transcribed by two research assistants for triangulation. The transcripts were coded and analysed through ATLAS.ti.27 The

analysis in ATLAS.ti followed explicit data reduction, display and findings verification. In ATLAS.ti, data was coded using a combination of deductive coding based on the operationalized concepts and inductive coding, allowing for relevant themes to emerge for context-based meaning and understanding (Boeije 2010). Timelines constructed during the focus groups were redrawn to make them legible and presentable for this manuscript. The seasonal calendar sheets compiled for each district were transposed into a two-dimensional table (time/activity) with accompanying notes to make them legible and presentable (see Appendix 8). Qualitative data from the life histories was analysed with ATLAS.ti, using inductive and deductive coding. The code lists can be found in Appendix 10.

**Key informant interviews**

Key informant interviews were transcribed by both the researcher and later by research assistants using audio recordings, where possible, to ensure that the account was as accurate as possible to what the respondents intended, especially where interviews were conducted in the local language. The transcripts were then coded and analysed using ATLAS.ti.

**Livelihood trajectories analysis**

SPSS was used to randomly select at least 15 life histories per household profile for the livelihood trajectories analysis. This number was chosen based on feasibility and data saturation; analysing as many life histories per profile as possible until adding the data of more respondents did not add valuable information (Guest et al. 2006). Random selection using SPSS prevented bias in the analysis (Pallant 2016).

**2.7.5 Food and nutrition security and food sovereignty analysis**

This study analytically combined notions of food and nutrition security and food sovereignty through the four pillars measured in this study, namely (i) food and nutrition security, comprising availability, access, utilization, and stability, (ii) autonomy over production, marketing and consumption, (iii) respect for local knowledge and innovations, and (iv) sustainable production (see Chapters 2 and 6). These four pillars are operationalized in Table 2.4.

**Experience-based indicators of food and nutrition security and dietary diversity scores**

I measured food availability by analysing data on farmers’ production – the types and number of crops produced, the rearing of livestock and types of livestock reared,

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28 Including all life histories in the analysis was not feasible due to time constraints.
availability of non-farm food products from the landscape, and the presence of food markets within 2 kilometres of the community. Food availability also includes other sources such as food reserves, commercial imports and food aid (Bilinsky & Swindale 2010), but these were either difficult to track or non-existing in the study areas.

Smallholders’ access to food was measured both physically and economically. Economically, farmers’ real income was measured to determine their ability to purchase food (Castel et al. 2015). Physically, the study used an experience-based indicator that assumes that household food insecurity can be measured based on perceptions and behaviour during food insecurity. The household food insecurity access scale (HFIAS) uses generic questions to capture the experience of food insecurity that can be plotted on a scale continuum. The HFIAS is adaptable, fits different contexts, is easy to compute, applicable to the household level, and allows placement of households on a severity continuum – from food secure to severely food insecure (Coates 2007; Leroy et al. 2015). The original HFIAS covers 12 questions over four question domains but was simplified to four questions representative of each domain. After pre-testing the questionnaire, these were found to be consistent and reliable in measuring households’ food insecurity scores. Responses were found to be consistent and reliable with Cronbach alpha 0.856, which falls within values reported for the HFIAS (Cronbach alpha ≥ 0.85) (Leroy et al. 2015). The mean inter-item correlations of 0.6 indicate a strong relationship among measures along the scale (Pallant 2016; Husein et al. 2018). Experiential questions related to the experience of struggle to obtain food within the season included (i) anxiety over the food supply, (ii) insufficient food quality (compromised food preference), (iii) insufficient food quantity (eating a small meal) and (iv) experiencing hunger (not eating for a whole day or more). Questions were asked about the occurrence (Yes/No) and frequency over the last 30 days of the survey (1 = seldom or rare (1 or 2 times); 2 = occasionally or sometimes (3-10 times), and 3 = regularly or often (more than 10 times). The HFIAS was calculated as the mean (0-4) for each farmer profile and placed on a scale continuum: 0 = food secure; 1 = mildly food insecure (household experiencing anxiety over food supply/ compromised food preference); 2 = moderately food insecure (compromised food preference/eating smaller meals), and 3 = severe food insecure (eating smaller meals/ no food in a day) (Coates 2007).
Table 2.4 Operationalization of the food and nutrition security and food sovereignty concepts

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Dimensions</th>
<th>Variables</th>
<th>Indicators</th>
<th>Methods¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food and nutrition security</td>
<td>Food and nutrition security</td>
<td>Access to food</td>
<td>Ability to obtain the available food through own production or from the market. The latter includes economic access (enough income to spend on food?) and physical access (possible to reach markets or farming land?).</td>
<td>Survey, focus group discussion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Availability of food</td>
<td>Own food production, food reserves (own and community reserves), presence of food market</td>
<td>Survey, focus group discussions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Utilization of food</td>
<td>Distribution of food to household members for consumption; quality of food (in terms of healthy, culturally appropriate and dietary diversity) and sufficient quantity of food,</td>
<td>Survey, focus group discussions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stability of food</td>
<td>Security of food availability, access and utilization over time.</td>
<td>Survey, focus group discussions</td>
</tr>
<tr>
<td>Food sovereignty</td>
<td>Farmers’ autonomy-</td>
<td>Control over land</td>
<td>Arrangements to access land for men and women. Tenure security.</td>
<td>Survey, focus group discussions</td>
</tr>
<tr>
<td></td>
<td>Autonomy over resources</td>
<td>Control over seeds/</td>
<td>How is access to seeds/planting material arranged for men and women? (notably hybrid species). Do farmers have control over their seeds/planting material? Who decides which seeds/planting material is used?</td>
<td>Focus group discussions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>planting material</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control over inputs</td>
<td>How is access to inputs arranged for men and women? (tools/equipment, pesticides, weedicides, credit). Do farmers have control over inputs? Who decides which inputs are used?</td>
<td>Focus group discussions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control over the</td>
<td>Who decides what land is planted with what (location per crop)</td>
<td>Survey, focus group discussions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>planted area</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control over crop</td>
<td>Who decides which crops are planted?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>choice</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*(table continues on the next page)*
<table>
<thead>
<tr>
<th>Concepts</th>
<th>Dimensions</th>
<th>Variables</th>
<th>Indicators</th>
<th>Methods¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomy over marketing</td>
<td>Control over sales</td>
<td>Who decides to whom to sell?</td>
<td>Survey, focus group discussions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Who decides where to sell?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Who decides when to sell</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Who decides how to sell?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomy over consumption</td>
<td>Control over consumption</td>
<td>Who decides what to eat, when, where and how it must be eaten</td>
<td>Survey, focus group discussions</td>
<td></td>
</tr>
<tr>
<td>Sustainable farming system</td>
<td>Soil management</td>
<td>Measures to maintain soil fertility: minimum/zero tillage, mulching with crop residues, applying manure, applying chemical fertilizers, use of soil tests, fallow</td>
<td>Survey, focus group discussions</td>
<td></td>
</tr>
<tr>
<td>Pest management</td>
<td></td>
<td>Crop rotation, non-chemical pesticides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weed control</td>
<td></td>
<td>Crop rotation? Intercropping? Hand weeding? Chemical weedicides?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water management</td>
<td></td>
<td>Measures for efficient water use, irrigation, pollution prevention, and protection of watercourses</td>
<td>Focus group discussion</td>
<td></td>
</tr>
<tr>
<td>Waste management</td>
<td></td>
<td>Waste disposal at the end of a working day?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nature conservation</td>
<td></td>
<td>Deforestation? No production within 2 km of a protected area? Protection of threatened species? Safeguarding habitats?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agrodiversity</td>
<td></td>
<td>Crop diversity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: The author.
Table 2.5 The food groups

<table>
<thead>
<tr>
<th>Code</th>
<th>Food group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cereals</td>
<td>Maize, millet, sorghum and related dishes.</td>
</tr>
<tr>
<td>2</td>
<td>Roots and tubers</td>
<td>Yam, cassava, plantain, cocoyam, taro, potatoes, and related dishes.</td>
</tr>
<tr>
<td>3</td>
<td>Vegetables</td>
<td>All vegetables, local and foreign, known to farmers: cocoyam leaves, ayoyo (Corchorus leaves), cassava leaves, wawa leaves, onions, tomatoes, garden eggs, okra, pepper, cabbage, carrot, etc.</td>
</tr>
<tr>
<td>4</td>
<td>Fruits</td>
<td>All fruit types; oranges, bananas, mangoes, avocado, pawpaw, etc.</td>
</tr>
<tr>
<td>5</td>
<td>Meat</td>
<td>Chicken, turkey, duck, birds, beef, pork, mutton, lamb, wild game, etc.</td>
</tr>
<tr>
<td>6</td>
<td>Fish</td>
<td>Fresh, dried, salted shellfish or seafood.</td>
</tr>
<tr>
<td>7</td>
<td>Egg</td>
<td>Eggs from poultry or other birds.</td>
</tr>
<tr>
<td>8</td>
<td>Legumes, nuts and seeds</td>
<td>Beans, peas, peanuts, soybeans, etc.</td>
</tr>
<tr>
<td>9</td>
<td>Dairy products</td>
<td>Milk, yoghurt or other milk products</td>
</tr>
<tr>
<td>10</td>
<td>Oils and fats</td>
<td>Palm oil, olive oil and other cooking oils</td>
</tr>
<tr>
<td>11</td>
<td>Sugars</td>
<td>Sugar cubes, powder, sweeteners</td>
</tr>
<tr>
<td>12</td>
<td>Beverages</td>
<td>Tea and coffee, alcohol and non-alcoholic drinks.</td>
</tr>
</tbody>
</table>


Food utilization was measured using the household dietary diversity score (HDDS) (Leroy et al. 2015). This study employed the household dietary diversity score based on the consumption of 12 food groups which serve as a proxy for the quantity and quality of diet consumed by the household (FANTA 2007). Fifteen food groups were used in the survey, including staple foods translated to local diets in the study area (fufu, ampesi, banku, jollof rice, etc.). Observations showed that farmers remember more when asked about the local dishes eaten than when asked about individual food groups consumed. According to the pre-test observation, these local dishes may contain up to nine food groups. The 15 food groups were then aggregated into the 12 food groups in FANTA (see Table 2.5) during data entry. The consumption of a food group scored 1, and no consumption scored 0. The total number of food groups was summed for each household (0-12), and the mean per profile was calculated as the dietary diversity score. I acknowledge that dietary diversity measures for women of reproductive age (15- 49 years) differ from those of infants and young children (6-23 months old) (Leroy et al. 2015), but such nuances were beyond the scope of this study.
Chapter 2

Measuring farmers’ local knowledge
Farmers’ local knowledge was captured in a focus group discussion using seasonal calendars and historical timelines covering seasonal production activities, food availability, access and changes in these, as well as coping strategies in the experience of food insecurity (see 2.6.8 and 2.6.9).

Measuring autonomy
With the discussion of farmers’ autonomy centred on production, marketing and consumption (LVC 2018), we measured farmers’ autonomy based on household control over decisions regarding crop choice for consumption and market, choosing a buyer and spending of household income. These were captured in the survey (see Appendix 3). The data was complemented with focus group discussions on farmers’ engagement in value chain collaborations (see 2.6.5) and the effect of VCC engagement on the choice of what to produce and to whom to sell and household income.

Measuring sustainable production
The study captures some aspects of farmers’ sustainable production in focus group discussions on farming practices.

2.8 Ethical principles
This research involves people, and dealing with people requires adherence to ethical norms and principles. The ethics considered for this study included openness, transparency and honesty; objectivity; integrity and carefulness; confidentiality; and responsible publishing (Resnik 2011). The study followed these ethics in dealing with farmers, other stakeholders, and data management.

2.8.1 Openness, transparency and honesty
Before starting data collection, I sought the consent of the chief or assembly member (where the chief was absent) or both. This involved introducing myself and the research assistants, explaining the purpose of the study, who would be targeted, the duration of interviews and focus groups, and what the community could expect to receive at the end. This introduction at the chief palace involved the presentation of drinks (gin), a tradition performed when one seeks an audience with the chief.

All farmers were briefed about the project and the kind of information required of them. I also made clear that participation was voluntary. Several farmers refused to participate after being informed that it was for a PhD research and a project that had no immediate benefit to individuals. Key informants were also informed, and consent was sought before recording interviews.
Some key informants representing COCOBOD, MoFA and the Departments of Agriculture, oil palm companies, and licensed buying companies required an official introduction letter from the supervisors explaining the project objectives and the information required.

In all communications, including reporting the results, I strived for honesty and transparency about procedures, data collection, and analysis. I did not fabricate, falsify, or misrepresent data and committed no act of deception.

2.8.2 Objectivity
In collecting and analysing data, I strived to avoid bias. However, my self-identification as a smallholder cocoa farmer put me in an ambiguous position that required continuous reflexivity and flexibility (see 2.2). Notes from focus group discussions and key informant interviews were transcribed by at least two people, especially where the interview was conducted in the local language (Twi), to ensure that it reflected what respondents meant to say as accurately as possible.

2.8.3 Integrity and carefulness
I adhered to integrity and carefulness when dealing with research participants, research assistants, and peers. No false promises were made; I kept promises and acted with sincerity to the best of my ability. I carefully documented all research phases and stored the anonymized transcripts, field notes and data on the ISO-certified servers of UvA/AUAS figshare, which is protected by two-factor authentication. Access to the data can be provided on request.

2.8.4 Confidentiality
I ensured all participants’ privacy by not including their names in the thesis and using pseudonyms. Transcripts are stored in a database requiring double authentication (see 2.8.3) and separated from the information that could lead to the identification of the research participants.

2.9 Reflection on the quality of the research
I assess the quality of the research based on Bryman’s (2012) distinction between internal validity, external validity, internal reliability, and external reliability.

Internal validity refers to the match between the data collected and theoretical concepts used to analyse them and the extent to which the findings give a realistic account of reality. This was ensured, first, by the mixed-method design that allowed data triangulation from different sources. Second, the farmer-centred approach ensured that farmers’ perspectives were central to the analysis, ensuring their knowledge of their
daily reality was foregrounded. Third, the annual learning platform meetings (see 2.3.3) offered an opportunity for respondent validation. During these meetings, I presented preliminary results and could ask probing questions on issues that were unclear or interpreted incorrectly.

External validity refers to whether the research findings can be generalized across different settings. Selecting study sites across three administrative regions ensured a broad coverage of different contexts (see 2.4). These included a cocoa-dominated area (Ahafo-Ano North District or ‘Tepa’ in the Ashanti Region), an oil palm-dominated area (the Upper Denkyira East Municipal in the Central Region), and an area with a strong presence of oil palm where farmers also grow cocoa (Kwaebibirem District in the Eastern Region). Since the selection of communities was based on cocoa and oil palm districts maps, some communities meeting the selection criteria may have been missed. In terms of gender, I consider this study representative: it included 33 female-headed households forming 19.6% of respondents. This is a good representation considering the number of female-head households in a recent national study of cocoa households (Bymolt et al. 2018).

Internal reliability is concerned with inter-observer consistency (Bryman 2012). I tried to ensure this by training the research assistants before conducting the interviews and focus groups so that we were all on the same page. Transcribing the interviews by two assistants ensured that differences in interpretations were discussed and solved.

External reliability is about whether the study can be replicated. I strived to create the conditions for this by extensively documenting how data was collected, processed, and analysed and being transparent and open about the choices and problems encountered.

Despite these efforts to adhere to the ‘canons of good practice’ (Bryman 2012:377), this study faced several limitations addressed in 7.4.

2.10 Conclusion
This chapter provided an overview of the research design and methodological choices, revealing a farmer-centred multiple case study and mixed-method design. The multiple cases ensure broad coverage of different cocoa and oil palm contexts, whereas the mixed-method design warrants triangulation, enhancing the reliability and validity of the research. I highlighted my positionality and reflected on the ethical principles and quality of the research, reflecting my openness and transparency about procedures, choices, and challenges. Based on this extensive methodology, I now turn to the empirical findings of this study.

29 The cocoa district maps were obtained during the scoping study from COCOBOD in the Eastern Region, Armajaro in the Ashanti Region and the project communities from TOPP. These are different from the national administrative district maps.