Uncovering smallholder heterogeneity

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

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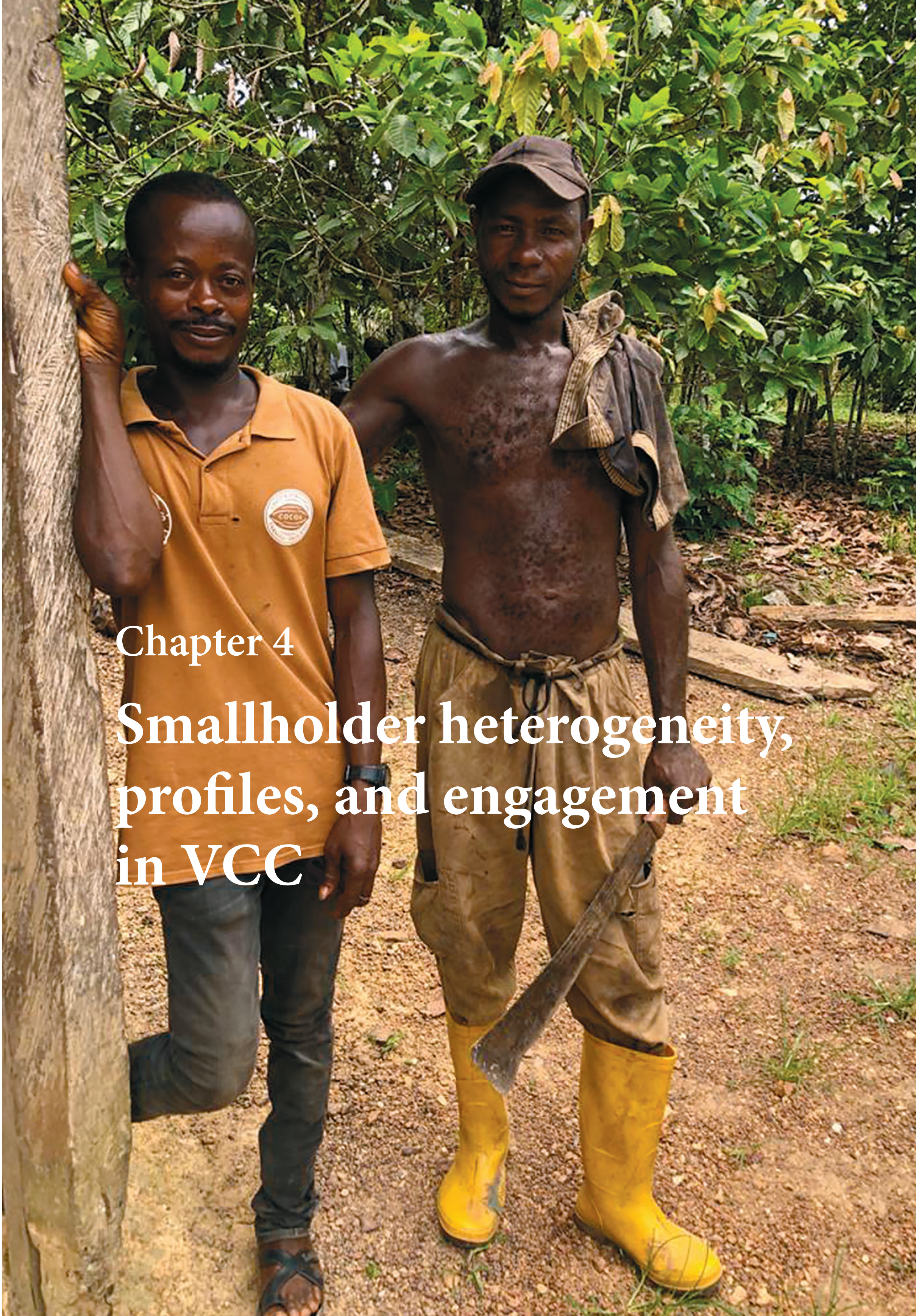
Chapter 4

Smallholder heterogeneity, profiles, and engagement in VCC



4.1 Introduction

In the previous chapter, which analysed different types of VCC, I argued that VCCs might work differently for certain smallholders (Laven 2010). Based on the idea that inclusiveness can be enhanced if VCCs are better aligned with smallholder characteristics, this chapter aims to identify different socio-economic profiles among smallholder households growing tree crops. It addresses the following research question: How do smallholder tree-crop farming households in Ghana differ, what socio-economic profiles can be identified, and how do they impact smallholders' engagement in VCCs? Data used for this chapter comes from participatory scenario workshops, a household survey, and life history interviews with smallholder cocoa and oil palm farmers (see Chapter 2). The chapter first examines smallholder household profiles from a farmers' perspective (see 4.2), followed by statistical cluster analysis (see 4.3). It then contrasts the qualitative (farmer-centred bottom-up) approach based on participatory scenario focus group discussions with the quantitative ("top-down") data-driven approach based on cluster analysis, eventually resulting in the synthesized profiles used for further analyses in the following chapters (see 4.4). Section 4.5 characterizes the household profiles and links them to farmers' engagement in VCCs. The discussion (see 4.6) looks at the implications of household profiles for VCC engagement (see 4.6.1), compares the findings with similar studies (see 4.6.2), and ends with some methodological reflections (see 4.6.3). The concluding section synthesizes the findings and answers the research question (see 4.7).

4.2 Farmer-centred definition of smallholder heterogeneity[45]

This section presents profiles of smallholder tree-crop farmers as identified by participating cocoa and oil palm farmers in Ghana's Eastern, Ashanti and Central Regions. This is based on a farmer-centred (bottom-up) approach that allows participants to identify differences and similarities among them (see Chapter 2 for the methodology followed). Farmers combined similar profiles, and those who considered themselves to belong to a particular profile further characterized them. Participants identified seven profiles among tree-crop farmers: caretakers, sharecroppers, constrained (surviving) farm owners, mixed-income farm owners, entrepreneurial farmers, part-time farmers, and absentee farmers. These distinct profiles vary on multiple dimensions, as evident in the profile descriptions in the sub-sections below and synthesized in 4.2.8.

[45] There is an ambiguity regarding whether my qualitative profiling exercise refers to individual farmers or their households (see 4.2.8 and 4.6.2). This ambiguity should be seen in the cultural context, where people see farming as a joint activity of the spouses and adult children, but consider males the household head unless the woman is widowed, divorced or single (Ataa-Asantewaa & Ros-Tonen 2015; Ataa-Asantewaa et al. 2016). In this section, I follow farmers' language and refer to farmers but will nuance this further in 4.2.8. This ambiguity was less prevalent in the survey data, which was collected at household level.

4.2.1 Caretakers (*Nhwɛsofoɔ; Apaafoɔ*)

Caretakers are managers of productive tree-crop farms that belong to absentee farm owners (see 4.2.6). Their duty is to maintain the farm. They are abundant in the cocoa sector but scant in the oil palm sector. Caretakers manage the farm under *abusa* crop-sharing arrangements, and the sharing modalities differ under cocoa and oil palm (see Box 4.1). The caretakers take one-third of the proceeds in the cocoa sector, while in the oil palm sector, the caretakers generally take two-thirds of the proceeds because, in addition to providing labour, they also invest in inputs for the farm. Caretakers are mostly males, as women are considered "too weak" to manage tree-crop farms and provide the labour needed. A woman caretaker may have adult sons to do the job or act just temporally as such until the farm owner finds a male caretaker:

> "I have nowhere to go because I was born here. I have lived on this cocoa farm all my life. I have no land or other skills except farming. The farm owner will come here later, but I am sure she will give the farm to another – male – caretaker because they don't prefer women" (Amina[46], caretaker, January 2017).

Caretakers are usually married migrants between 16-45 years old. Farm owners prefer young and married outsiders (Northerners) because such people are considered trustworthy, responsible and hardworking. Moreover, farm owners remain better in control with outsiders, who move on to find another farm when the farm owner decides to end the agreement:

> "I had to get married to show the farm owner I am responsible and have someone to share the farm work with. For instance, someone to gather the cocoa beans when it is night or raining, and I am not in the house" (Isaac, caretaker, March 2017).

Caretaking requires only an oral contract sealed with a bottle of schnapps and two witnesses, one for the farm owner and one for the caretaker, which makes the job unstable, especially when the migrant caretaker does not have the power to contest a decision:

> "I went with the chief as my witness to get the farm. We went with one bottle of schnapp to show there is a contract, but she [farm owner] took the farm just after two seasons and gave it to another caretaker" (Emmanuel, caretaker, March 2017).

[46] Pseudonyms are used where respondents are cited.

Box 4.1 Share-cropping arrangements

Under an *abusa* crop-sharing arrangement, the caretaker and farm owner divide the proceeds of the farm in three parts. In the cocoa sector, the caretaker provides only labour to a productive farm and gets one-third of the proceeds, but in the oil palm sector, the caretaker or sharecropper provides both labour and financial capital to the land or farm and receives two-thirds. Unlike the *abunu* land-sharing arrangement prevalent in the cocoa sector, in the oil-palm sector only the proceeds are divided between the landowner and caretaker or sharecropper. Farmers' livelihood trajectories (see Chapter 5) will reveal varied modalities of the *abusa/abunu* sharecropping arrangements. However, it should be noted that the *abunu/abusa* sharing arrangements have shifted over the years with many variants and variations across the many communities in Ghana (Takane 2000; Ruf 2010). Here I report only what has been observed in the study communities and will use farm-sharing when sharecropping explicitly refers to sharing a productive cocoa farm after establishment and crop-sharing when it refers to sharing the proceeds.

Most caretakers have little to no education; if they are educated, this is at the basic school level.[47] Neither do they have access to other income sources in most cases. Caretakers are considered poor, highly dependent on tree-crop incomes, and often depend on selling labour, hunting and picking wild fruits to supplement income and food needs. Some caretaker households also engage in various food-crop sharing arrangements and trading to support household incomes. As a group, caretakers are not considered farmers by the government or other value chain actors but are seen as supporters and assistants to farm owners:

> "I do not get help from anyone. I sell the yield to Armajaro[48] because my farm owner asked me to, but the purchasing clerk always reserves incentives till the farm owner comes herself" (Foster, caretaker, February 2017).

Many caretakers are able to obtain support and assistance from buyers, but this is often facilitated by the trust and loyalty relationship between the farm owner and the buyer:

[47] In Ghana, primary school encompasses six years of education and is followed by three years of Junior High School (JHS). Primary school and JHS are together referred to as basic education. After completing JHS, students can take the Basic Certificate Examination (BECE) for a certificate that gives access to Senior High School (SHS) (Adu-Gyamfi et al. 2016).

[48] Armajaro Ghana Ltd. (AGL); a licensed (cocoa) buying company.

> "I get advance payment from the purchasing clerk because he is sure I will always bring the cocoa to him. He is the one my farm owner wants, so I send it to him" (Eric, caretaker, January 2017).

Caretakers desire to become farm owners through *abunu* farm-sharing arrangements. In such cases, they establish the farm and get half of it when the cocoa trees are mature (see 4.2.2). Many of the caretakers combine caretaking with *abunu*:

> "I combined caretaking with land sharing in 2016. Getting *abunu* is very expensive; I paid GHS 1,750 (USD 402.30).[49] The land is 3 hectares, so I only get 1.5 hectares at the end" (Mark, caretaker January 2017).

Most caretakers aspire that their children get salaried jobs, but most caretakers' children do not go to school as they often live in hamlets far away from the farming community where the school is.

4.2.2 Sharecroppers (*Domeyɛnkyɛ/Yomeyɛnkyɛ*)

Sharecroppers work under *abunu* or *abusa* farm- or crop-sharing arrangements (see Box 4.1). In the study communities, *abunu* is a 50/50 farm-sharing arrangement. In the cocoa sector, it implies that the farm will be shared between the landowner and the farmer who established the cocoa farm. Hence after establishing the cocoa farm, both parties keep their share of the land. The landowner decides which tree crops to plant, but the sharecropper usually decides on the food crops:

> "I have been doing sharecropping for the last five years. I paid GHS 2,500 (USD 575.70) for these 5 hectares of land. I wanted to use the land to join the oil palm outgrowers scheme, but the landowner wanted only cocoa, so I couldn't join. When you do sharecropping in an outgrower scheme, it complicates the income sharing" (Moses, caretaker/sharecropper, January 2017).

Farmers describe sharecroppers as poor 'real' farmers because they work tirelessly during all seasons to prevent delays that motivate the landowner to give the land to another person. Like the caretakers (see 4.2.1) and for the same reasons, they are mostly married males between 18-45 years. Most female sharecroppers use family lands or get land from landowners because they have adult sons. Most sharecroppers have low to no education. Sharecroppers have no income from tree crops as they are still developing the farm. Hence

[49] Converted using the average Ghana Cedis to US dollar exchange rate of 4.35 for 2017. See https://data.worldbank.org/indicator/PA.NUS.FCRF?locations=GH

they depend on selling food crops intercropped in the early stages of farm development. In the first season, sharecroppers face a lot of hardships as food crops are not yet ripe and ready to sell or eat. They often solve this by selling labour for cash or food, collecting wild foods, and hunting meat. However, food-crop production often serves as the main income source from the second season. The household also depends on rearing livestock (notably goats and sheep) and poultry and other activities such as trading, selling labour as a caretaker, or day labourer for income generation, as they bear all the costs for farm investment:

> "I sell labour to the oil palm farmers during the dry season when I do not have much work on my *abunu* farm. .My wife buys foodstuff from here and sells at the weekly market in the city [Dunkwa]" (John, sharecropper, January 2017).

Planting and weeding are the major farm activities, and usually, the whole household is involved, sometimes even hired labour if the household hands are insufficient:

> "We need a lot of labour on the *abunu* farm, and though we have joined '*Nnoboa*[50]', my wife and children often help on the farm" (Martha, caretaker/sharecropper, January 2017).

Sharecroppers need high amounts of fertilizers and seedlings, but they often have to source these themselves as they receive little to no support from the government and rarely from other value-chain actors, except when they work under an outgrower scheme:

> "I need a lot of fertilizer because my abunu land is not forest land, but I do not have the money to buy up to the recommended amount. I got some fertilizer from the government programme, but it came late and was inadequate. I do not get help from the government and the buyers because they help only farmers with a 'Passbook[51]" (Anthony, sharecropper, March 2017).

In some cases, sharecroppers transition to other forms of farm-owner profiles, but the majority aspire to become absentee farmers and employ caretakers so that they can move back to their hometowns and help their children get salaried jobs.

[50] *Nnoboa* is a labour-sharing arrangement where farmers form groups and help each other on their farms (Takane 2000).

[51] A passbook is given to cocoa farmers to record production and sales as a means for the Ghana Cocoa Board (COCOBOD) to monitor cocoa production, productivity and trade in the country (UNDP 2012). In most of the government incentives to the sector, farmers have to present their passbook.

4.2.3 Constrained farm owners

Constrained farm owners are tree-crop farmers with productive cocoa or oil palm farms growing a single tree crop. They see themselves as constrained because they largely depend on income from a single tree crop. Most of these farmers are relatively old (45 years above) males and often long-staying migrants (over 20 years). Their farms are relatively old, too, 20 or more years, and often small, with all the land under cocoa or oil palm. They are considered poor as their farms have low productivity because they are unable to invest adequately in their farms. They have low incomes, which are primarily spent on family needs:

> "My cocoa farm is 2 hectares, and I get money, but all my children are still in school, the eldest is in university, and all the money goes to school fees. By the time I have to apply fertilizer and spray the cocoa, I have no money left. The government spraying is always small, comes late, and if you are not their party member, you don't get it" (Ama, farm owner, March 2017).

Constrained farm owners have relatively small reserve land for other production needs. Some combine various crop-sharing arrangements, but while some farm owners expand or diversify by making new tree-crop farms, livestock rearing, processing or trading, this group usually has tree crops as the only income source. This may be explained by their limited access to land and funds, limited strength due to old age, and the small size of their farms. They receive government support but are unable to supplement or provide the inputs themselves when this support is deficient. Other value-chain actors also target them through VCCs, but many of them prefer basic collaboration[52] with buyers:

> "I had two plots of cocoa, but the big one (2ha) I used it as '*awowa*'[53] (collateral) to get GHS 10,000 (USD 2,298. 90) from the purchasing clerk for my daughter who was going to the nursing training school. I will get the farm back after five years" (Akwasi, farm owner, March 2017).

> "I get money from my purchasing clerk during the offseason, but I don't usually go for it because he charges 100% interest when the main season opens" (Richard, farm owner, March 2017).

[52] Mere buying and selling relationship; see Chapter 3 for different types of VCCs.

[53] Awowa is collateral whereby the buyer takes over the management of the farm to recover the amount of money borrowed by the farmer and returns it only upon expiry of the time agreed upon or when the farmer can pay the whole amount of the loan at any moment of the agreed loan period.

When they participate in extended or advanced VCCs (see Chapter 3), many constrained farmers can be adversely included due to the low productivity of their farms:

> "I was in Cocoa Abrabopa[54], but I lost all my money at the end of every season. The cocoa did not yield the quantity they told me, and they blame me for not following their instructions" (Kwabena, farm owner, February 2017).

Most constrained farm owners aspire to replant or rehabilitate their farms but lack the resources required and are looking to the government for support. Most of them will also refuse to partake in government rehabilitation projects[55] since the farm is their only source of income, and rehabilitation means they will be unable to meet their needs until the farm matures again. They also aspire to give portions of their old farms to sharecroppers and, eventually, their children, who will inherit the farms. However, they prefer their children to live and work in the city and become absentee farmers who lease the farm to caretakers.

4.2.4 Mixed-income farm owners

Mixed-income farmers are distinguished based on the diversity of their income sources. Most mixed-income farmers are males between 18-50 years old and have had basic education. They have tree-crop farms in various stages of development, with some under sharecropping arrangements. They often have a single tree crop such as cocoa or oil palm and are engaged in various non-farm activities and jobs such as trading, purchasing clerks (buying cocoa for companies), and artisans (e.g. carpenters, masons, tailors). Where they have two or more tree crops, they differ from entrepreneurial farmers (see 4.2.5) by the smaller areas of their farms, their semi-commercial orientation, less wealth, and the inability to hire permanent farmhands:

> "I have cocoa and oil palm farms and have just planted rubber. I am also doing cocoa sharecropping. I wanted to plant oil palm to join the TOPP[56] outgrower project, but the landowner wanted only cocoa. I am a purchasing clerk in this community for the Olam company. My wife manages a small provision store" (Ali, mixed-income farmer, January 2017).

[54] Cocoa Abrabopa is a farmers' association in the cocoa sector that produces certified cocoa and pays a premium to farmers for it, http://www.cocoaabrabopa.org/cabrabopa/index.php/about-us.

[55] This is a programme through which the Ghanaian government supports the replanting of old cocoa farms by providing monetary incentives and seedlings to farmers https://www.cocobod.gh/.

[56] The Twifo Oil Palm Plantation (TOPP) is a large-scale oil-palm processing company that buys palm oil from the Buabin Oil Palm Outgrower Project (see Chapter 4).

Workshop participants consider this category as farmers who have to divide their attention between farming and other activities and depend relatively more on hired labour to maintain their farms. Mixed-income farmers see farming as the pathway to wealth and aspire to increase their farms in number and size, invest more in farming, and sustain a farming lifestyle with income from non-farm activities. They can be said to be commercially-oriented farmers combining commercial food crop farming with tree-crop farming:

> "I make a rice and maize farm every season to sell. I do not have land, but I do the rice and maize on 50/50 produce-sharing arrangements with the landowner. I also have part of my sharecropping land, which is waterlogged, and I grow rice there while I intercrop every new farm with food crops. My household has no food problems –sometimes I even leave plantain to rot on the farm because the price is not worth carrying it to the market" (Owusu, mixed-income farmer, January 2017).

Government agencies consider mixed-income farm owners as the 'ideal' smallholders who are the first to be targeted for support. They are also the target of VCCs and have the opportunity to benefit from multiple collaborations. They are able to benefit when included, as they are keen to apply the required practices, negotiate terms, supplement the support they receive, and meet expectations. They also have the capacity to opt out of a VCC:

> "I am an outgrower farmer with GOPDC[57], and I sell my oil palm only to them, but I do not take their credited inputs because I can buy what I need myself with money from my cocoa farms." (Anim, mixed-income farmer, February 2017).

> "I didn't join the TOPP outgrower because we [farmers] thought that it was a ploy to steal our land. I am now planting oil palm because there are lots of buyers, and I can choose who I want to sell to" (Samuel, mixed-income farmer, January 2017).

Most aspire to add other income-generating activities and to educate their children for salaried jobs:

[57] The Ghana Oil Palm Development Company is a large-scale oil palm processing company in the Eastern Region of Ghana, Kwae (MoFA 2011a).

> "I got 20 bags of fertilizer from Armajaro this season for my cocoa farm because I am in their cocoa verification programme. Cocoa gives you a lump sum of money upon harvest, and it is finished before you blink. Driving this taxi on Thursdays and Sundays gives a lot of money, too" (Mathew, mixed-income farmer, March 2017).

4.2.5 Entrepreneurial farm owners

Entrepreneurial farmers are of mixed ages, males with basic education in most cases. Many have made money from non-agricultural sources and are investing in farming as their primary livelihood. Many are natives and have easy access to land or the money to acquire lands. These farmers are medium- to large-scale commercial farmers with farms under different stages of development and crop-sharing arrangements. They diversify into different tree crops and are able to make significant investments, especially in fertilizers, agrochemicals and labour. They concentrate more on tree crops than on food crops:

> "I have cocoa, oil palm, animal rearing, and I am into fisheries too. I was one of the initiators of the oil palm outgrower scheme in the community" (James, entrepreneurial farmer, January 2017).

Many have permanent farm labourers who live with them as part of their households. They have expanded into value-adding activities, especially in the case of oil palm processing and soap making. Most entrepreneurial farmers live with and care for their permanent labourers. This is seen as cheaper than using caretakers and sharecroppers:

> "Now I have three permanent and many casual labourers. Both help in the farm and the Kramer. Together I have about 20 workers that I pay" (Stephen, entrepreneurial farmer, February 2017).

These households may also combine farming income with other incomes from off-farm and non-farm sources, generally have large farms and higher yields to sell, and receive much support. They are also the target of VCCs, but the benefits often do not meet their needs, so they exclude themselves:

> "I was nominated for the farmers' day award in the district in 2013, but I didn't win. I have heard about Cocoa Abrabopa and the others, but I do not need what they give; I can buy inputs myself. What I need is big loans to expand and develop my land and buy a car for transporting the harvest, but they do not give that" (Kwadwo, entrepreneurial farmer, February 2017).

Entrepreneurial farmers see farming as a business and aspire to expand with innovations and efficiency in their production. They hope that their children will settle well and accumulate more wealth:

> "Now I have had enough of the tree-crop farms; I want to expand my Kramer to medium-scale, buy highly efficient processing equipment, employ more people and ensure that my children settle well in life. I need credit support from banks and the government to acquire these things" (Stephen, entrepreneurial farmer, February 2017).

4.2.6 Absentee farm owners

Absentee farmers are farm owners who leave the management of their farms to caretakers. Caretakers are preferred as the cheapest and most convenient option to avoid high dependence on daily hired labour. Most female farmers are absentee farm owners. Male absentee farmers are often migrants who have moved back to where they came from, professionals who have inherited farms, or vulnerable people such as the elderly or sick. Other farmers considered them as those who do not have the strength or time to manage their own farms and got this label because they often reside outside the farming community, often coming only to collect the seasonal income from the share-cropping arrangement with the caretaker:

> "Since I am old now and cannot do any other activities. I have given it to my nephew as a caretaker. He takes care of all the things to be done, including inputs, so we divide the money into two equal parts" (Yaw, absentee farmer, February 2017).

They are of mixed ages, but most of them are old. Females and professionals can be younger, as the following quote illustrates:

> "I made the farm with my husband, but he died. The farm was divided seven years ago, and I gave my farm and my children's part to caretakers because I am a woman, and my children are all in salary work now" (Akosua, absentee farmer, March 2018).

Farming activities such as harvesting cocoa or oil palm, spraying and pruning are considered male jobs, prompting many women to give their farms to caretakers after establishing or inheriting them. Absentee farmers may be engaged in farming, off-farm and non-farm activities in the same community or elsewhere:

> "Now I sell cooked food, make vegetable farm and also process oil palm, but I have a caretaker too" (Rose, absentee farmer, February 2017).

The absentee farmer is responsible for financial investment in the cocoa farm, while the caretaker provides labour. Most depend entirely on government support to the cocoa sector because they share the income with caretakers, which is insufficient to buy the inputs. However, some absentee farmers invest heavily in their farms. As value-chain actors recognize only on-farm owners, most absentee farmers are engaged in basic collaborations with buyers (see Chapter 3) and often miss out on extended and advanced collaborations because these require their presence:

> "I cannot join Abrabopa; I must be there for their training. I do not have the strength, and my caretaker will not go" (Agyei, absentee farm owner, February 2017).

When engaged in extended or advanced VCCs, they cannot attend the necessary training because of their absence from the farming community. Their inability to follow the training and apply what is taught increases their risks because they do not get the anticipated yields. They aspire for their children to inherit the farm.

4.2.7 Part-time farmers

Part-time farmers are farmers who have a primary job outside farming. Most of these are civil servants or artisans who acquired their farms by inheritance or combined their job with farming by establishing their own farms. They may use sharecropping or own land for farming. They depend highly on hired labour but differ from absentee farmers by their high involvement in the farm throughout the year. They differ from entrepreneurial farmers by their focus on usually a single tree crop and the small size of their farms. They differ from mixed-income farmers by their view of farming as a secondary source of income. Farmers define them as opportunistic farmers because they rush into farming when they hear that there is a good market for any crop:

> "I am a professional teacher and reverend minister at my church. My wife also manages a family restaurant. I planted the oil palm 12 years ago under the PSI[58], but I am not in any contract with the government because it was aborted. My citrus farm is also 12 years old. I wanted to intercrop oil palm

[58] The President Special Initiative (PSI oil palm) was a government-initiated programme supposed to be a private-public-producer-partnership (4Ps) but was aborted in 2007. See 3.2.3.

> in the new farm; I was to do it this season but was not financially prepared enough, so next season" (Peter, part-time farmer, February 2017).

Some may only be managers of family farms. They include males and females and are relatively older farmers (between 18-59 years). They depend mainly on hired labour to make or maintain their farms:

> "I hire labour for every activity on the farm because I work Monday to Friday and can only visit the farm on holidays and Saturdays. Labour is costly, but I still manage to get profit at the end of the season. I do not have to buy food because I produce some" (Chris, part-time farmer, February 2017).

Many are also involved in food cropping, dry season vegetable production, and livestock and poultry rearing for income and home consumption. For most of them, livestock rearing is commercial and usually involves pig farms:

> "I also go for other people's land to make food crops such as maize to sell every year. Those doing *abunu* give lands to those who want, so I clear 1 acre, plant my food crops, and he will give me cocoa seedlings to plant for him" (Monica, part-time, March 2017).

Part-time farmers qualify for government support, but many forgo it due to the sporadic nature of their farm activity and government support and invest their own resources. Like mixed-income farmers and entrepreneurial farmers, part-time farmers are the target of many VCCs but are also the ones who can afford to opt out.

4.2.8 Triangulation of self-identified profiles with the survey data

Combining the life history interviews with the survey data allowed linking the households to the seven self-identified profiles (see Table 4.1) as respondents referred to themselves as a caretaker, sharecroppers, etcetera. Households were found in each profile, but mainly in the mixed-income and entrepreneurial profiles (about 55% of the sample).[59]

Combining survey data with life-history interviews also enabled the triangulation of some key characteristics of farmers' self-identified profiles (see Table 4.2). Caretakers (60% between 18-45 years) and sharecroppers (67% between 18-45 years) were found to be relatively younger, and absentee farmers were relatively older (62% above 60 years) than the average[60]. Table 4.2 also shows more female farmers in the absentee profile

[59] Methodological observations regarding this table are discussed in the next sub-section.
[60] Data referring to the household head.

(43%) compared to the other profiles. The caretakers, sharecroppers, and constrained farmers have lower schooling than the other profiles, with no household head with senior high (SHS) or tertiary education. All entrepreneurial farmers grow multiple tree crops, contrasting the constrained profile (all growing a single tree crop) and part-time farmers (71% growing a single tree crop). Aside from tree-crop incomes, having an additional income source is widespread across all profiles (at least 52%) except among constrained farmers, where the proportion of households having an additional income source was relatively small (11%). Hence, the survey data confirms the participants' account of the profile characteristics.

Table 4.1 Distribution of households across the seven self-identified profiles

Household profiles	Number of farmers (n)	Proportion (%)
Caretakers	5	3.0
Sharecroppers	24	14.3
Constrained farm owners	18	10.7
Mixed-income farm owners	47	27.9
Entrepreneurial farm owners	46	27.4
Absentee farm owners	21	12.5
Part-time farmers	7	4.2
Total	**168**	**100.0**

Source: Survey 2015; Life history interviews 2017.

4.2.9 Methodological reflections on farmers' self-identified profiles

As noted before, the farmer-centred classification shows some ambiguity about whether the profiles refer to the head of the household or the household as a whole. Although farmers named the profiles based primarily on the characteristics of the household head, there is a noticeable household characteristic behind defining most of the profiles. For instance, caretakers and sharecroppers must be married, and their spouses should be willing to help. Sharecroppers, in particular, often use family labour to establish the farm. Also, the life history and survey quotes suggest that land ownership and livelihood portfolio are linked to the household rather than the household head. The spouses may have their farm, and most respondents mentioning incomes aside from farm incomes also referred to incomes from activities carried out by other household members and not necessarily theirs. It is, therefore, better to speak of farming household profiles than farmer profiles.

Table 4.2 Triangulation of characteristics of self-identified profiles with survey data

Profile / Characteristic	Caretakers (n = 5)		Share-croppers (n = 24)		Constrained (n = 18)		Mixed-income (n = 47)		Entrepreneurial (n = 46)		Absentee (n = 21)		Part-time (n = 7)		Total (N = 168)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	N	%
*Age (yrs)**																
– 18-45	3	60.0	16	66.7	3	16.7	16	34.0	5	10.9	3	14.3	1	4.3	47	28.0
– 45-60	2	40.0	7	29.2	10	55.6	19	40.4	25	54.3	5	23.8	4	57.1	72	42.9
– 60+	0	0	1	4.1	5	27.7	12	25.6	16	34.7	13	61.9	2	28.6	49	29.1
*Gender**																
– Male	4	80.0	18	75.0	15	83.3	37	78.7	43	93.5	12	57.1	6	85.7	135	80.4
– Female	1	20.0	6	25.0	3	16.7	10	21.3	3	6.5	9	42.9	1	14.3	33	19.6
Marital status																
– With spouse	3	60.0	17	70.8	11	61.1	36	76.6	38	82.6	9	42.9	3	42.9	117	69.7
– Without spouse	2	40.0	7	29.2	7	38.9	11	23.4	8	17.4	12	57.1	4	57.1	51	30.4
Education[61]*																
– None	2	40.0	9	37.5	7	38.9	14	29.8	6	13.0	6	28.6	1	14.2	45	26.8
– Basic incomplete	0	0	6	25.0	5	28.8	8	17.0	5	10.9	4	19.0	0	0	28	16.7
– JHS/basic complete	3	60.0	9	37.5	6	33.3	20	42.6	28	60.9	9	42.9	3	42.9	78	46.7
– Senior High School	0	0	0	0	0	0	3	6.4	4	8.7	1	4.8	0	0	8	4.7
– Tertiary	0	0	0	0	0	0	2	4.2	3	6.5	1	4.8	3	42.9	9	5.4
Land ownership																
– Yes	0	0	0	0	18	100	46	97.9	46	100	21	100	7	100	138	82.2
– No	5	100	24	100	0	0	1	2.1	0	0	0	10	0	0	30	17.9

(table continues on the next page)

[61] Ghana's education system has seen many reforms. In 1987, primary and 4-year middle school (Form one to Form four) changed to basic education comprising 6-year primary education and 3-year junior high school (JHS). Due to this change, many farmers reported having had middle school or "Form four" education. These were recoded as JHS (basic) level of education (see Stratmon 1959; Adu-Gyamfi et al. 2016).

Characteristic / Profile	Caretakers (n = 5)		Share-croppers (n = 24)		Constrained (n = 18)		Mixed-income (n = 47)		Entrepreneurial (n = 46)		Absentee (n = 21)		Part-time (n = 7)		Total (N = 168)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	N	%
Tree crops																
– Single	5	100	21	87.5	18	100	34	72.3	0	0	12	57.1	5	71.4	95	56.5
– Multiple	0	0	3	12.5	0	0	13	27.7	46	100	9	42.9	2	28.6	73	43.5
Income source																
– Tree crop only	2	40.0	11	45.8	16	88.9	8	17.0	21	45.7	10	47.6	0	0	68	40.5
– Mixed-income	3	60.0	13	54.2	2	11.1	39	83.0	25	54.3	11	52.4	7	100	100	59.5

* These characteristics refer to the household head.

Source: Survey 2015; life history interviews 2017.

4

Four distinguishing characteristics stand out in the seven profiles identified by the participants. The first is *land ownership*, dividing the profiles into landless and land-owning farm households. Caretakers and sharecroppers have no land of their own and are engaged in sharecropping arrangements. The difference is that caretakers manage productive farms, and sharecroppers establish the farms for the landowner in exchange for a share in the established farm or its products. Four profiles refer to landowners (constrained, mixed-income, entrepreneurial, and absentee). The part-time profile comprises both farm households with and without land. In the latter case, they are usually engaged in sharecropping arrangements.

The second variable, *tree-crop diversity*, divides the households into those who grow a single tree crop (cocoa or oil palm) and those growing two or more tree crops (in addition to cocoa and oil palm, also citrus and/or rubber). This distinction aligns with the one between the constrained (who commonly grow one tree crop) and entrepreneurial (who usually have multiple tree crops). The third factor concerns the *household livelihood portfolio*, with other incomes besides tree-crop farming defining the mixed-income profile. The last factor is *farming intensity*, distinguishing between full-time farming (constrained and entrepreneurial households), part-time farming (mixed-income and part-time farming households), and absentee farm households.

In addition, the profiles vary on secondary characteristics such as gender, age, education level, food production, household size and type, farm investment, and support from the government and other value chain actors. Remarkably, gender was not a primary distinguishing factor or profile. Participants acknowledged that some profiles had gender characteristics. For instance, sharecroppers and caretakers are usually, but not exclusively, males (see 4.2.1 and 4.2.2), and absentee farmers relatively have more females compared to other profiles (see 4.2.6). However, participants did not consider gender or female-headed households as a distinctive category, as all profiles encompass both male- and female-headed households.

Whereas Table 4.1 suggested that households fall neatly into one category, the allocation to a category has sometimes been somewhat arbitrary. The classification was easy based on farm-related characteristics such as land ownership: caretakers and sharecroppers easily identified themselves as such in the survey and life history interviews; the others identified themselves as farm owners. Also, the constrained and entrepreneurial farm households could be easily identified as growing single and multiple tree crops, respectively (see 4.2.3 and 4.2.5). Survey respondents explicitly stated what types of tree-crop farms they had.

The classification based on livelihood portfolio was less straightforward. For example, households with other incomes aside from farming could be classified as mixed-income or part-time. They could be classified as caretakers or sharecroppers if they had no land. They could also be constrained single tree-crop farming households, entrepreneurial multiple tree-crop farming households, or even absentees. Similarly, farmer households were hard to classify based on farming intensity. Both mixed-income and part-time farming households are partly engaged in farming and other income activities. Households were considered mixed-income if they divided their attention more or less equally between farming and other activities. Most households with other income activities were thus classed as mixed-income, except when the primary income came from jobs such as teaching, which placed households in the part-time profile. But then again, such households often employed caretakers or permanent labourers and could also be classified as absentees. Even non-professionals with other income activities besides farming considered themselves part-time instead of mixed-income.

These observations show that the boundary between mixed-income, part-time and absentee is fuzzy. The degree of engagement in farming is not fundamentally different, especially between the mixed-income and part-time profiles, and they could therefore be seen as more or less the same. These observations imply that mixed-income or part-time is insufficiently distinctive for further analysis. Therefore, I re-categorized the 54 farmer households in the mixed-income and part-time profiles (see Table 4.1) based on the underlying farm characteristics – land ownership and diversity of tree crops. I thereby build on participants' characterization of constrained farm households as growing a single tree crop and entrepreneurial farm households as growing multiple tree crops. In this way, the mixed-income and part-time farmers were re-categorized as follows: one sharecropper (1.9%), 30 constrained (55.5%), 18 entrepreneurial (33.3%), and 5 absentee farmer households (9.3%). Hence, four self-identified profiles remain after the reclassification: landless farming households (caretakers and sharecroppers), constrained farming households (farmers having either cocoa or oil palm), entrepreneurial farming households (growing multiple tree crops and often engaging in multiple economic activities), and absentee farming households. I retained the absentee profile as a peculiar profile defined by putting farm management in the hands of a caretaker, shareholder, or family member (see Table 4.3). This reclassification creates more homogenous categories and a basis for merging the profiles with the statistical clusters analysed in Section 4.3.

A final observation relates to the fluidity of the profiles, with mobility occurring in space and time. There are trends of transition and variegations in the profiles. Although caretakers seldom transition into a more solid profile, sharecroppers can become farm owners when engaging in an *abunu* land-sharing arrangement. Farm owners could also use sharecropping arrangements to increase their farm areas and diversify their tree crops. Some farmers could have been placed in more than one farm profile. In such cases, they were placed in the most solid profile. For example, caretakers engaging in a land-sharing *(abunu)* arrangement were placed in the sharecropping profile, which is a more progressive profile, potentially leading to becoming a farm owner. These sharecroppers/caretakers were a considerable proportion of farmers in the sharecropping profile (n=10; 41.7%). Other examples are constrained, entrepreneurial and absentee farm owners, who use sharecropping arrangements (both *abunu* and *abusa*; see 4.2.1) to expand their farm areas or diversify into other tree crops. These farmers (n=13; 9.4%) were not labelled as sharecroppers but placed in one of the farm owner profiles, thereby opting for the most solid profile that applied to the household. However, these are important variations, which will be examined more extensively in Chapter 5 on farmers' livelihood trajectories.

Table 4.3 Distribution of farmer households across farming household types

Household type	Number of households (n)	Proportion (%)
Landless farming households	30	17.9
Constrained farming households	48	28.6
Entrepreneurial farming households	64	38.1
Absentee farming households	26	15.5
Total	**168**	**100.0**

Source: Survey 2015, 2017.

4.3 The statistical approach: heterogeneity using cluster analysis

This section uses cluster analysis to examine smallholder tree-crop farming household profiles generated from survey data with 168 smallholder cocoa and oil palm farming households (see 2.6.4).

4.3.1 Characteristics of the clusters

Seven independent variables in the survey were taken through an iterative clustering process in SPSS to produce the statistically best possible clusters. More explicitly than in the qualitative profiling exercise, the household was the unit of analysis in the survey data (see Chapter 2). Data on individual characteristics was collected for both the household head and the spouse, but in the analysis, the gender of the household head was used to distinguish between male- and female-headed households.

Four of the seven variables used mainly determined the four distinctive clusters. In order of importance, these variables are the gender of the household head, farming intensity (full- or part-time), tree-crop diversity, and size of cultivated tree-crop land area. The gender of the household head stood as the most important defining variable of the clusters, dividing the households into one female-headed cluster and three male-headed clusters. The female-headed Cluster 4 consists of 33 tree-crop farming households

(19.6%); the 135 remaining male-headed households (80.4%) were more or less equally spread over the three other clusters (see Table 4.4).

Table 4.4 Gender characteristics of the clusters (head of household)

Gender	All		Cluster 1		Cluster 2		Cluster 3		Cluster 4	
	N	%	n	%	n	%	n	%	n	%
Male	135	80.4	48	100	46	100	41	100	–	–
Female	33	19.6	–	–	–	–	–	–	33	100
Total	**168**	**(100)**	**48**	**(28.6)**	**46**	**(27.4)**	**41**	**(24.4)**	**33**	**(19.6)**

Source: Survey 2015, 2017.

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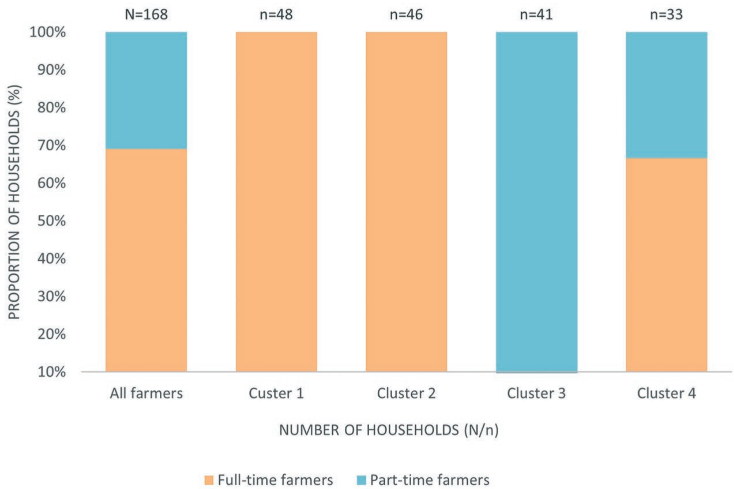
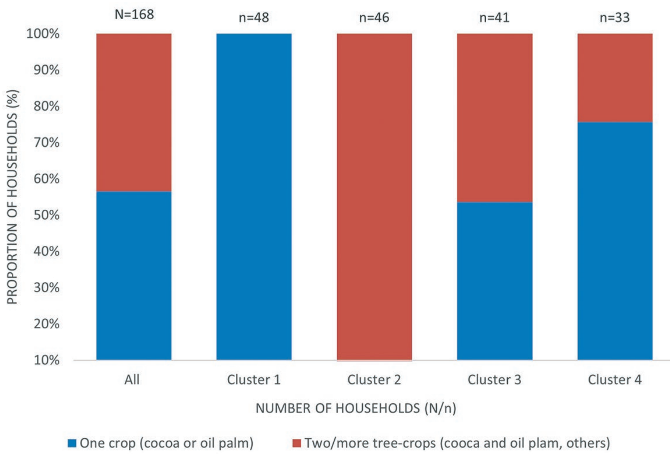
Regarding gender, it should be noted that the sample may be biased towards females. Female respondents were purposively selected to have a proportionate representation of women respondents for in-depth insight into the gendered nature of tree-crop farming and value-chain collaboration (see Chapter 2). Forty-nine female tree-crop farmers participated in the survey, but only 33 were heads of their households. This implies that the proportion of female-headed households may not be representative of the entire tree-cropping population.

Figure 4.1 Farming intensity per cluster



Source: Survey 2015, 2017.

Figure 4.2 Tree-crop diversity among clusters



Source: Survey 2015, 2017.

The second variable, farming intensity, divides the three male-headed clusters into full-time and part-time farming households. Figure 4.1 shows unambiguously that the male-headed Cluster 3 consists of part-time farming households, while the other two male-headed clusters (1 and 2) consist entirely of full-time farming households. The female-headed Cluster 4 comprises households fully and partly engaged in farming: 11 (33.3%) part-time and 22 (66.7%) full-time.

The two male-headed full-time clusters are further differentiated by a third variable – the diversity of tree crops – into a single tree-crop cluster and a multiple tree-crop cluster. The male-headed full-time Cluster 1 consists of single tree-crop farming households growing either cocoa or oil palm, while the male-headed full-time Cluster 2 groups farming households with two or more tree crops (cocoa and oil palm, and sometimes citrus, rubber or cashew) (Figure 4.2). The male-headed Cluster 3 and the female Cluster 4 contain households growing single and multiple tree crops. The male Cluster 4 is nearly equally divided between 22 (53.7%) single tree-crop households and 19 (46.3%) multiple tree-crop households. Also, the female-headed Cluster 4 comprises both single tree-crop households (n=25; 75.8%) and multiple tree-crop households (n=8; 24.2%).

Finally, the four clusters differ regarding the fourth variable: the tree-crop area size (hectares). Table 4.5 shows some differences in the average cultivated tree-crop area between the four clusters, but the difference between the male-headed Cluster 1 and female-headed Cluster 4 is not statistically significant, nor is the difference between the male-headed Cluster 2 and part-time male-headed Cluster 3. However, it shows that the clusters are divided into two groups: the male-headed cluster 1 and female-headed cluster 4 have significantly smaller cultivated tree crop areas than the male-headed clusters 2 and 3, which have larger cultivated tree crop areas.

Table 4.5 Tree-crop area (ha) per cluster

	All (N = 168)	Cluster 1 (n = 48)	Cluster 2 (n = 46)	Cluster 3 (n = 41)	Cluster 4 (n = 33)	P-value
Min	1.00	1.00	3.30	1.20	1.00	
Max	44.0	21.0	44.0	26.0	11.0	
Mean	6.32	4.64[a]	8.81[b]	7.62[b]	3.69[a]	0.000
SD	5.55	3.48	7.01	5.90	2.50	
Median	4.80	3.80	6.45	5.80	3.00	

Kruskal-Wallis one-way analysis of variance means significant at $p = \leq 0.05$. Superscript letters (a, b) indicate clusters that are statistically different (a-b) (a-a; b-b) are similar to each other.
Source: Survey 2015, 2017.

4

4.3.2 Discussion of the statistical clusters

The statistical analysis revealed four clusters distinguished by four variables: gender of the household head, farming intensity, tree-crop diversity, and size of the tree-crop area (ha). Gender unambiguously divided the clusters into two, resulting in one female-headed and three male-headed clusters. The farming intensity separates the male-headed clusters into one with full-timers and one with part-time farming households. Tree-crop diversity resulted in two distinct male-headed clusters: one that produces a single tree crop (cocoa or oil palm) and one that produces multiple tree crops (cocoa and oil palm, plus one or more other tree crops).

Finally, the size of the tree-crop cultivated area does not result in unambiguous clusters but rather indicates a dichotomy: two clusters with a relatively small tree-crop area and two with a relatively large tree-crop area. It is clear that despite its importance in the clustering solution (see Chapter 2), the size of the cultivated tree-crop area is not a variable clearly distinguishing the clusters.

Based on these considerations, I label the four clusters according to their most distinguishing feature(s):

- Cluster 1: Specialized households: male-headed households specialising in one tree crop.
- Cluster 2: Diversified households: male-headed households growing multiple tree crops.
- Cluster 3: Part-time male-headed farming households
- Cluster 4: Female-headed households.

These observations, however, reveal some ambiguities related to the clusters based on gender and farming intensity. The distinction between part-time and full-time farming can also be found within the female-headed Cluster 4 (see Figure 4.1), whereas this cluster also contains specialized and diversified tree-crop farming households (see Figure 4.2). Similarly, in the part-time male-headed Cluster 3, both specialized and diversified households are notable (see Figure 4.2). These observations demonstrate that the cluster analysis resulted in two homogeneous clusters (specialized and diversified) and two heterogeneous ones (part-time farming and female-headed households).

4.4 Synthesizing the two typologies

The two approaches produced four profiles and four clusters of tree-crop farming households each. In this part, I analyse to which extent these profiles and clusters correspond with each other using a Chi-Square test. The results show a large and significant association between some clusters and farming household profiles (see Table 4.6).

There is a strong statistically significant relation between the landless and constrained farming household profiles on the one hand and the specialized cluster on the other (94% overlap) and between the entrepreneurial profile and diversified cluster (91% overlap). However, there is only a weak association between the profiles and the female Cluster 4, meaning that female-headed households are present in all four profiles, with a relatively high proportion in the absentee profile and a relatively low proportion in the entrepreneurial profile. This observation is consistent with farmers' self-identified profiles, where participants noted that female tree-crop farmers are predominantly absentee farmers, and the entrepreneurial farmers are usually males. Also, the male-headed part-time cluster shows no or a weak association with the profiles, meaning that they are present in all four profiles, be it relatively much less in the landless one. These observations support the idea that farming intensity and gender do not contribute to the uniqueness of either profiles or clusters.

Therefore, I decided to disregard the part-time and female clusters and divide the part-timers and females over the other two clusters in further analyses. Chi-Square analysis was subsequently used to explore the relationship between tree-crop diversity and the four farm household profiles from the qualitative analysis. The result is presented in Table 4.7 and shows a large and significant association. This supports the fact that the landless and constrained profiles are single tree-crop farming households, while the entrepreneurial farming households grow multiple tree crops. The absentee profile contains both specialized and diversified tree-crop farming households.

Table 4.6 Distribution of clusters among the household types

Cluster \ Profile	Landless farming households	Constrained farming households	Entrepreneurial farming households	Absentee farming household	Total
Specified (male-headed, single tree crop)					
– Observed	20*	25*	0*	3	48
– Proportion	41.7%	52.1%	0.0%	6.2%	100%
– Adjusted residue	5.1	4.3	-6.3	-2.0	
Diversified (male-headed, multiple tree crops)					
– Observed	0*	0*	42*	4	46
– Proportion	0.0%	0.0%	91.3%	8.7%	100%
– Adjusted residue	-3.7	-5.0	8.7	-1.5	
Male-headed, part-time					
– Observed	3	13	15	10	41
– Proportion	7.3%	31.7%	36.6%	24.4%	100%
– Adjusted residue	-2.0	0.5	0.2	1.8	
Female-headed					
– Observed	7	10	7*	9*	33
– Proportion	21.2%	30.3%	21.2%	27.3%	100%
– Adjusted residue	0.6	0.2	-2.2	2.1	
Total	**30 (17.9%)**	**48 (28.6%)**	**64 (38.1%)**	**26 (15.5%)**	**168 (100%)**

Chi-Square test, X^2 (9, n = 168) = 112. 862, Cramer's V = 0.473, $p < 0.001$.
a * = statistically significant relationship based on a value of the adjusted residue (AR) <-2 or >2.
Source: Survey, 2015; life history interviews, 2017.

Based on Table 4.7, it can be argued that the landless and constrained profiles can be put together in a cluster of households specialising in a single tree crop. However, it makes more sense to base the profiles on land ownership rather than just tree-crop diversity, as the farmers also identified this as an essential differentiating variable. Landownership contributes to a first clear-cut distinction between tree-crop farming households, but, as seen from the cluster analysis, tree-crop diversity follows suit. Together these two variables result in four unique profiles: in contrast with gender, size of the tree-crop area, and livelihood portfolio (related to farming intensity), which resulted in substantial spread across the clusters and profiles.

Table 4.7 Distribution of tree-crop diversity over the farmer profiles

Cluster \ Profiles	*	Constrained farming households	Entrepreneurial farming households	Absentee farming households	Total
Single tree crop (specialized)					
– Observed	30*	48*	0*	17	95
– Proportion	100%	100%	0.0%	64.4%	56.5%
– Adjusted residue	5.3	7.2	-11.6	1.0	
Multiple tree crops (diversified)					
– Observed	0*	0*	64*	9	73
– Proportion	0%	0%	100%	34.6%	43.5%
– Adjusted residue	-5.3	-7.2	11.6	-1.0	
Total	**30 (100%)**	**48 (100%)**	**64 (100%)**	**26 (100%)**	**168 (100%)**

Chi-Square test, X^2 (3, n = 168) = 144.051, Cramer's V= 0.926, *p < 0.001.* [a] * = statistically significant relationship based on a value of the adjusted residue (AR) < -2 or > 2.
Source: Survey, 2015; life history interviews 2017.

The preceding implies that the analysis in the following chapters continues with four profiles derived from this synthesis as follows:

- Profile 1: Landless farming households (caretakers and shareholders)
- Profile 2: Single tree-crop farming households
- Profile 3: Multiple tree-crop farming households
- Profile 4: Absentee farming households

These profiles are a good representation of both farmers' self-identified profiles and the results of the cluster analysis and are sufficiently unique (in the sense of showing limited overlap) to analyse differential impacts of engagement in tree-crop farming and VCCs in the remaining of this thesis.

4.5 Characterising the farming household profiles

This section further characterizes the four profiles from the previous section (see 4.4) based on the variables listed in Table 4.8.

4.5.1 The landless farming households

The landless farming households have relatively young heads (median 39 years) and an average household size of 7 persons. They all grow cocoa in exchange for a share of the produce or the land or are caretakers for absentee farm owners. None of the households grows oil palm, which explains that they are found only in the Tepa and

Dunkwa areas, as farming in the Kade area focuses mainly on oil palm. Interestingly, 23.3% of the households in this profile are female-headed, contrasting farmers' claim that females are rarely into caretaking and sharecropping because they are considered "too weak" to provide the labour needed to establish or manage cocoa farms on their own. In most of these cases, these households have adult children. These landless households manage small farms of maximally two plots and have the lowest income (median USD 556). In addition to managing landowners' farms, the majority sells labour (66.7%) to other farmers to support household incomes. Due to low incomes, they mention family upkeep and education before farm investment as key expenditures. This also explains why only one household (3.3%) spends income on properties and savings. Compared to households in other profiles, government programmes and extension services reach a lower proportion (43%).

4.5.2 The single tree-crop households

Households fitting this profile manage their own farms and are headed by relatively older people (median 52 years), 21% of whom are female. These households grow a single tree crop, mainly cocoa (92%), hence the large proportion of them living in the cocoa-dominated Tepa area (54.2%). They have a slightly larger farm size than that managed by landless farmers. Yet, they earn twice as much income (median USD 1,082.75) and an income comparable to the absentee farmers (median USD 1,388.60).

Table 4.8 Key characteristics of the farming household profiles

Household profile / Variable	Landless farming households (n = 30, 17.9%)	Single tree-crop farming households (n = 48, 28.6%)	Multiple tree-crop farming households (n = 64, 38.1%)	Absentee farming households (n = 26, 15.5%)
Average age of hh[i] head (years)	43.03^{a} yrs, SD 9.70 Median 39 Min 28, Max 65	51.79^{ab} yrs, SD 11.55 Median 52 Min 28, Max 75	55.81^{b} yrs, SD 9.21 Median 54.50 Min 37, Max 76	67.42^{bc} yrs, SD 17.34 Median 70.00 Min 27, Max 100
Average hh size (no. of hh. members)	7.37, SD 4.82 Median 7.0 Min 1, Max 20	6.81, SD 3.47 Median 6.0 Min 2, Max 16	8.84, SD 5.73 Median 7.0 Min 2, Max 32	7.92, SD 4.10 Median 8.0 Min 2, Max 18
Gender of hh head[ii]/ proportions (%)	Male 76.7% Female 23.3%	Male 79.2% Female 20.8%	Male 89.1% Female 10.9%	Male 65.4% Female 34.6%
Education of hh head[iii]	None 46.7% < Basic 16.6% Basic 36.7 SHS 0.0% Tertiary 0.0%	None 29.1 < Basic 16.7% Basic 43.8% SHS 4.2% Tertiary 6.2%	None 14.1 < Basic 17.2% Basic 56.3% SHS 6.3% Tertiary 6.3%	None 30.7 < Basic 15.4% Basic 38.5% SHS 7.7% Tertiary 7.7%

(table continues on the next page)

Household profile / Variable	Landless farming households (n = 30, 17.9%)	Single tree-crop farming households (n = 48, 28.6%)	Multiple tree-crop farming households (n = 64, 38.1%)	Absentee farming households (n = 26, 15.5%)
Location (% of hhs)	Dunkwa 46.7% Kade 0.0% Tepa 53.3%	Dunkwa 27.0% Kade 18.8% Tepa 54.2%	Dunkwa 32.8% Kade 51.6% Tepa 15.6%	Dunkwa 34.6% Kade 34.6% Tepa 30.8%
Average land size[iv] (ha)	5.59[a] ha, SD 5.51 Median 3.50 Min 1, Max 21	5.72[a] ha, SD 3.96 Median 4.30 Min 1.6, Max 18.4	9.56[b] ha, SD 8.39 Median 7 Min 1, Max 55	7.34[a] ha, SD 9.75 Median 4.2 Min1.2, Max 48.8
Average tree crop farm size (ha)	4.50[a] ha, SD 3.94 Median 3.30 ha Min 1.0, Max 21.0	4.77[a] ha, SD 3.55 ha Median 4 ha Min 0.8, Max 18.40	7.52[b] ha, SD 4.98 ha Median 6 ha Min 0.80, Max 23.0	6.13[a] ha, SD 9.0 ha Median 3.30 ha Min 1.0, Max 44
Average farm plots	2 plots, SD 1.03 Median 2 Min 1, Max 4	2.71 plots, SD 1.29 Median 3 Min 1, Max 6	4.10 plots, SD 1.64 Median 4 Min 1, Max 9	2.92 plots, SD 1.30 Median 3 Min 1, Max 6
Type of tree crop farm (% of hhs)	Cocoa 100%	Cocoa 91.7% Oil palm 8.3%	Cocoa & oil palm 100%; Other tree crops 26.6%	Cocoa 50% Oil palm 15.4% Both 34.6%
Average annual gross hh incomev (USD)	686.61[a], SD 662.24 Median 556.80 Min 22.30 Max 2,929.5	1,245.02[b], SD 918.92, Median 1,082.75 Min 27.80 Max 3,610.3	2,035.47[c] SD 1,410.50 Median 1,562 Min 118.70 Max 6,404.10	2,082.32[bc] SD 2,064.42 Median 1,388.60 Min 222.20 Max 7,809.90
% hhs with non-farm activities (%)	46.6%	58.3%	61%	77%
Proportion farm/ non-farm income[vi] (%)	Farm income 81% Non-farm 19%	Farm income 86% Non-farm 14%	Farm income 86% Non-farm 14%	Farm income 80% Non-farm 20%
Items on which farm income is spent (% of hhs that mentioned the item either as first, second or third)	Family upkeep 90.0%, Education 76.7%, Farm inv. 33.3%, Property/ savings 3.3%, Other 6.7%	Family upkeep 87.5%, Education 83.3%, Farm inv. 52.1%, Property/ savings 14.6%, Other 6.3%	Family upkeep 65.6%, Education 65.6%, Farm inv. 87.5%, Property/ savings 37.5%, Other 9.4%	Family upkeep 100.0%, Education 38.5%, Farm inv. 73.1%, Property/ savings 30.8%, Other 15.4%
Farm inputs on which most money is spent (% of hhs that mentioned the item either as first, second or third)	Fertilizer 56.7%, Agro-chemicals 56,7%, Farm labour 50.0%, Seeds 63.3%, Farm tools 43.3%, Others 10.0%	Fertilizer 66.7%, Agro-chemicals 58.3%, Farm labour 81.3%, Seeds 20.8%, Farm tools 56.3%, Others 8.3%	Fertilizer 82.8%, Agro-chemicals 71.9%, Farm labour, 62.5%, Seeds 37.5%, Farm tools 25.0%, Others 3.1%	Fertilizer 65.4%, Agro-chemicals 50.0%, Farm labour 92.3%, Seeds 19.2%, Farm tools 50.0%, Others 0.0%

(table continues on the next page)

Variable \ Household profile	Landless farming households (n = 30, 17.9%)	Single tree-crop farming households (n = 48, 28.6%)	Multiple tree-crop farming households (n = 64, 38.1%)	Absentee farming households (n = 26, 15.5%)
Access to gov't support[vii] (% of hhs)	Programmes 43.3% Extension 43.3%	Programmes 43.8% Extension 37.5%	Programmes 75.0% Extension 65.6%	Programmes 61.4% Extension 15.4%
Sale/hire of farm labour (% of hhs)	Sell 66.7% Hire 73.3%	Sell 27.1% Hire 93.8%	Sell 0.0% Hire 89.1%	Sell 7.7% Hire 92.3%

[i] hhs = households. [ii] Note that the proportion of female-headed households in the total sample is not representative of the entire farming population as a whole (see Section 2.9). [iii] = Basic = primary (6 yrs.) + JHS (3 yrs); JHS = junior high school; (see footnote 36) SHS = senior high school). [iv] Average land size is the total of farmlands per household, including cultivated, fallow and unused lands. [v] Based on n = 162 as 6 were found missing. [vi] Non-farm income based on n = 101 households with non-farm income. [vii] Government programmes were the free cocoa mass spraying and fertilizer and seedling distribution programmes in the cocoa sector, the Buabin Oil Palm Outgrower Project (BOPOP) and the President Special Initiative (PSI) for the oil palm sector (see Chapter 3). (a,b,c) Kruskal-Wallis one-way analysis of variance means significant at $p = \leq 0.05$. Superscript letters (a, b) indicate clusters that are statistically different (a-b); (a-a; b-b) are similar to each other. (*Source*: Survey 2015, 2017).

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About one quarter sells farm labour to other households to supplement their income, but the contribution of non-farm income to overall household income is low (14%). A majority (87.5% and 83.3%) mentioned family upkeep and education, respectively, as among major expenditures, with (52.1%) mentioning farm investment, which is mainly spent on hiring farm labour (81.3%). Like the landless households, less than half (44%) are engaged in government programmes, and extension services reach an even lower proportion (37.5%).

4.5.3 The multiple tree-crop households

This profile consists mainly of male-headed households (89%) who grow cocoa and oil palm and occasionally (26.6%) other tree crops (citrus, cashew). The household heads are older than the landless (median 55 years) but of similar age as the heads of the single tree-crop farming households. These households are found in all study sites, but slightly more than half (52%) live in the Kade area. They have the largest tree-crop farms (median 6 ha), consisting of four plots on average. This is reflected in their gross income (median USD 1,562), 86% of which originates from the farms. Non-farm income is primarily based on supplementary economic activities (such as oil palm processing, artisanry and small businesses); a few households have salaried work (mainly teaching or public servant) (4.7%), and none of them sells farm labour. This indicates diversification beyond the farm as well. Eighty-five per cent mentioned farm investment as a major component of their spending, indicating proactive management of the farm as a business despite the large proportion that receives government support (75%) and extension services

(66%). This group is relatively well off, as reflected in the relatively high proportion that mentioned spending income on acquiring properties and savings (37.5%).

4.5.4 The absentee farming households

Spread proportionally over the three study areas, this profile consists of significantly older farmers than the other profiles (median 70 years), with relatively many female-headed households (35%). This supports farmers' claim that many female and older farmers in this group do not have the strength to manage their own farms. They have a comparable gross annual income (median USD 1,388.60) to the multiple tree-crop farming households, 20% of which comes from non-farm activities such as pensions, salaried work and small businesses. Only 7.7% of households sell farm labour. A relatively small percentage of households mention education as one of their major expenditures (38.5%), assumedly because they have adult children. This allows them to spend more money on farm investment (73.1%) and properties and savings (30.8%) (see Table 4.8). Households in this group mention hiring labour as a major farm investment more often (92.3%). Indeed, 92.5% of them hire labour, but this could be more as they hire others to manage their farms by definition. Their farms are still involved in government programmes (61% of households) but much less exposed to extension services (15%) due to the owners being absent from the farm.

4.5.5 Farmer profiles and VCCs

This section assesses which farmer profiles are engaged in the different VCCs identified in Chapter 3 to explore how and why VCC engagement varies across different profiles. The findings show that almost one-third of interviewed households (n = 47; 32.9%) were in a basic VCC with their buyers, which is relatively widespread across the four profiles. A relatively higher proportion of landless farmers are in a basic VCC, but the difference is not statistically significant. Interestingly, a relatively high number of landless households (n = 38; 26.6%) are not engaged in VCC. The relatively high non-engagement among landless households is due to not having productive farms yet (sharecroppers) or because the owner decides about the buyer (caretakers). Among multiple tree-crop households, opting out occurs more often (see 5.2.4, 5.2.5), as they depend less on the services provided through the VCC.

Table 4.9 Engagement in different types of VCCs per household profile[62]

Type of VCC \ Profile	Landless households (n = 27)		Single tree-crop households (n = 43)		Multiple tree-crop households (n = 52)		Absentee households (n = 21)		Total households (N = 143)[a]		P-value
	n	%	n	%	n	%	n	%	n	%	
No VCC	12	44.4+	11	25.6	7	13.5–	8	31.8	38	26.6	0.000*
Basic VCC	12	44.4	16	37.2	16	30.8	3	14.3	47	32.9	
Extended VCC	1	3.7–	14	32.6+	5	9.6–	4	19.0	24	16.8	
Advanced VCC	2	7.4–	2	4.7–	24	46.2+	6	28.6	34	23.8	

[a] Of the 168 survey respondents, only 143 could be revisited for the life history interviews on which this data is based. The remaining respondents travelled, had moved to another place, or were deceased. Chi-Square test, X^2 (9, n = 143) = 42.894, Cramer's V = 0.316, test significant at $p \leq 0.05$. * = statistically significant relationship based on a value of the adjusted residue (AR), +: adjusted residue (AR) > 2; –adjusted residue (AR) < –2. *NB* Data in this table comes from the life history interviews in 2017, when the classification of VCCs was already made. Hence, it was possible to specifically ask about the type of VCC engagement and directly link the interviewees with the different VCC types, which was not possible based on the survey data collected earlier.
Source: Life history interviews 2017.

A significantly higher proportion of single-tree crop households (32.6%) than multiple tree-crop households (9.6%) was in extended VCCs. In contrast, a significantly higher proportion of multiple tree-crop households (46.2%) was engaged in advanced VCCs compared to landless (7.4%) and single tree-crop households (4.7%) (see Table 4.9). Especially in extended and advanced VCCs, there are strict requirements regarding access to land or farm ownership, favouring single and multiple tree-crop households and excluding landless households. Single tree-crop households engage in extended VCCs to benefit from the cocoa mass spraying programme (see Chapter 3). However, they seldom meet the requirements to engage in advanced VCCs that offer more benefits, including a broader range of inputs and price premiums for certified production (Laven & Boomsma 2012; Deans et al. 2018). The main hindrance for single-crop households to engage in these more advantageous advanced VCC is the obligation of contractual repayment of credit. The multiple tree-crop households with higher incomes and access to land and labour are more creditworthy and have greater capacity than the landless and single tree-crop households to implement the practices associated with advanced VCCs. The widespread engagement in basic VCCs across all profiles underscores the

[62] Data in this table comes from the life history interviews in 2017 when the classification of VCCs was already made. Hence, it was possible to specifically ask about the type of VCC engagement and directly link the interviewees with the different VCC types, which was not possible based on the survey data collected earlier.

importance of advance payments and credit facilities to support smallholder tree-crop farmers in the off-season.

Table 4.10 Households' reasons for selling cocoa or oil palm fruits to current buyers per type of VCC

Reason \ Type of VCC	No VCC (n = 38)		Basic VCC (n = 47)		Extended VCC (n = 24)		Advanced VCC (n = 34)		Total (N = 143)	
	n	%	n	%	n	%	n	%	n	%
No reason	10	26.3+	4	8.5	1	4.2	2	5.9	17	11.9
Access to loans, 'incentives', souvenirs, advance payments	15[a]	39.5	25	53.2	17	70.8	3	8.8–	60	42.0
Availability of buyer, honest scale & ready cash	9[b]	23.7	14	29.8	5	20.8	3	8.8–	31	21.7
Services included in the buying relationship (training, credited inputs, ready market, premiums, etc.)	4[c]	10.5–	4	8.5–	1	4.2–	26	76.5+	35	24.4

Chi-Square test, X^2 (9, n = 168) = 78.086, Cramer's V= 0.427, test significant at $p \leq 0.05$. * = statistically significant relationship based on a value of the adjusted residue (AR), +: adjusted residue (AR) >2; –adjusted residue (AR) < –2. P-value = 0.000.

[a-c] In the case of farmers not involved in VCCs, this meant that they opted not to engage in VCCs because (a) interest rates for loans, advance payments, or credited inputs were considered too high, or (b) there was no buyer or one considered reliable with whom to engage in a VCC.

Source: Survey 2015; life history interviews 2017.

The importance of advance payments and loans is also reflected in the reasons for choosing a buyer (see Tables 4.10 and 4.11). Households in a basic and extended VCC generally sell their products to their current buyer because of advance payments, 'incentives'(small gifts), or loans. Significantly fewer households in advanced VCCs sell to their buyers because of advance payments, incentives or loans (8.8%). However, those in advanced VCCs, refer to services such as training, credited inputs, a ready market, and price premiums (76.5%). This reason is significantly lower among the landless and single tree-crop households, which are hardly involved in advanced VCCs (see Table 4.9). The reason "Availability of buyer, an honest scale and & ready cash" is widespread across profiles (21.7%) but significantly less among those in advanced VCCs (see Table 4.10). The relations between the type of VCC and reasons resonate with the characteristics of the VCCs described in Chapter 3.

Table 4.11 Households' reasons for selling cocoa or oil palm fruits to current buyers per profile

Reason \ Household profile	Landless households (n = 27)		Single tree-crop households (n = 43)		Multiple tree-crop households (n = 52)		Absentee households (n = 21)		Total (N = 143)	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
No reason	8	29.6+	3	7.0	4	7.7	2	9.5	17	11.9
Access to loans, 'incentives', souvenirs, advance payments	11	40.7	28	65.1+	13	25.0–	8	38.1	60	42.0
Availability of buyer, honest scale & ready cash	6	22.2	8	18.6	12	23.1	5	23.8	31	21.7
Services included in the buying relationship (training, credited inputs, ready market, premiums, etc.)	2	7.4–	4	9.3–	23	44.2+	6	28.6	35	24.5

Chi-Square test, X^2 (9, n = 168) = 34.010, Cramer's V= 0.282, test significant at $p \leq 0.05$. * = statistically significant relationship based on a value of the adjusted residue (AR), +: adjusted residue (AR) >2; –adjusted residue (AR) < –2. P-value = 0.000.

Source: Survey 2015, life history interviews 2017.

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A statistically significantly higher proportion of landless households give no reason for selling their produce to their current buyer (see Table 4.11). This is likely because a significantly higher proportion of them is not in any VCC, for reasons given above. The proportion of households selling to their buyers for advance payment, incentives or loans is significantly higher among single tree-crop households (65.1%) than multiple tree-crop households (25.0%). Multiple tree-crop households (44.2%) sell their products mainly because of the opportunity to access credited inputs, training, a farmer business school, and a price premium for certified products – incentives typically related to advanced VCCs. Significantly fewer landless (7.4%) and single tree-crop households (9.3%) select their buyers for this reason, confirming that multiple-tree crop households are more often engaged in advanced VCCs (see Table 4.9). Most households in advanced VCCs reported being in an oil palm outgrower scheme or were Cocoa Abrabopa Farmers Association members.

4.6 Discussion

4.6.1 Farming household profiles and their implications for VCC

Recent studies have demonstrated that smallholders are internally differentiated (Chamberlin 2008; Cousins 2010; Zhang 2015), which equally applies to tree-crop farmers (Ataa-Asantewaa & Ros-Tonen, 2015; Rijn et al. 2015; Ataa-Asantewaa et al. 2016; Bymolt et al. 2018; Olofsson 2020). This chapter combined participatory scenario building with statistical cluster analysis to identify different profiles among tree-crop farming households in Ghana. Integrating self-profiling and cluster analysis produced consistent and distinctive household profiles based on land ownership and tree-crop diversity: landless, single tree-crop, multiple tree-crop, and absentee farming households. Remarkably, the distinction between growing cocoa and oil palm did not appear relevant in either the self-identified profiles or cluster analysis, nor did gender (see 4.2.9).

The four profiles are all different, with the landless appearing as a poor category who work for absentee tree-crop farmers in return for a share in the produce or the farm and sell farm labour to other farming households. The single tree-crop households manage their own farm and are mainly cocoa farmers, constrained in their possibilities to invest in the farm. The more entrepreneurial multiple tree-crop households with multiple income sources accumulate wealth, hire permanent labourers and invest in the farm. They can be considered the 'low-hanging fruits' (Crane et al. 2014) easily reached by government programmes and extension services. The absentee farming households are an ageing and retiring group that delegates the management of their farms to caretakers or sharecroppers. The differences between the profiles explain different ways of engagement in VCCs (see 4.5.5). In particular, access to land and farm size are important determinants for farmers' engagement in value-chain collaborations and may be why many landless households are excluded from the VCCs. Therefore, I will further explore household access to land in Chapter 6, which examines the influence of diversity in farmer profiles and VCC engagement on livelihood trajectories.

4.6.2 Comparison with other studies

Gender of the household head, size of the tree-crop area, and livelihood portfolio (related to farming intensity) appeared to be important secondary variables characterising farming households but did not result in unique profiles or clusters. This applies to both the qualitative self-profiling and the cluster analysis. This finding contrasts with Bymolt et al. (2018), who identified gender and tree-farm size as the primary variables to cluster cocoa farmers in Ghana and Côte d'Ivoire.

That is not to say that the profiles were not gender-sensitive: female-headed households appeared dominant in the absentee profile, while male-headed households dominated the entrepreneurial profile. However, both male- and female-headed households were proportionally present in the other profiles, signifying that gender did not result in unique clusters. These observations were confirmed by integrating the farmer-identified profiles and the clusters.

A closer look at the outcomes of the study by Bymolt et al. 2018 reveals that also in that study, the female-headed cluster consistently aligns with the male-headed cluster on most other variables. This is not to say that gender should not be considered in policies and value-chain collaborations. As will be seen in the next chapter, females have less access to land and are more constrained in their engagement in VCCs. However, from a cluster analytical perspective, it makes no sense to use gender as a primary distinguishing variable, as this chapter has made clear. These observations support the idea that farming in Ghana is a family or household activity (MoFA 2006) and, therefore, I follow the farmers in analysing smallholder heterogeneity from a household rather than gender perspective (see also Ataa-Asantewaa & Ros-Tonen 2015; Ataa-Asantewaa et al. 2016).

Similar to other studies (Chamberlin 2008; Hainmueller et al. 2011; Bymolt et al. 2018), this chapter found high variability in the size of the tree-crop area, ranging from 0.8 to 44 ha (see Table 4.8). In contrast with Bymolt et al. (2018), the size of the tree-crop area was not a distinguishing variable in the cluster analysis, and the clusters show large overlaps in this regard. The high variability is likely due to farmers' unreliable reportage of plot sizes, as also noted in other studies (Hainmueller et al. 2011; Ingram et al. 2014; Bymolt et al. 2018).[63] The study by Jelsma (2019), which applied cluster analysis to oil palm farmers in Indonesia, therefore grouped farm size into small, medium, and large before performing the cluster analysis. Following this example could have prevented the substantial overlap between the clusters regarding farm size, but I refrained from this as there are no pre-defined parameters for such groupings.

I identified livelihood-related variables (livelihood portfolio and farming intensity) as important variables in defining both farmers' self-identified profiles and the cluster analysis, but like gender, this did not result in unique profiles due to significant overlaps. Few studies confirm the importance of these variables in clustering (Kuivanen et al. 2017; Olofsson 2020), but in Olofsson's (2020) analysis of tree-crop smallholders in South Africa, it came out as a principal determinant in clustering. She found four clusters primarily defined by livelihood portfolio. Financial investments in the farm and the degree of hiring labour were secondary distinguishing variables. Her cluster analysis revealed that the degree of household dependence on farm and non-farm income sources (per cent ratios) and types of non-farm income sources determined the main differences between the four clusters. The different outcome may be due to the specific South African

[63] I observed consistency in reporting farm sizes, but not in reporting sizes of separate plots.

context where welfare grants (notably pensions) constitute a significant income source among the elderly, and part-time farmers with a teacher or public servant job constituted a significant proportion of her respondents.

Like Olofsson (2020), I allude to the dynamic and evolving nature of livelihood portfolios (and hence farmer household profiles) that cannot be captured entirely based on cluster analysis. As shown in both farmers' self-identified profiles and the cluster analysis, livelihood diversification is a common strategy among tree-crop farmers, which is also well-documented in the literature on rural households more broadly (Ellis 1998, 2000; Niehof 2004; Alobo -Loison 2015; Zhang et al. 2015; Kuivanen et al. 2017; Bymolt et al. 2018). This literature reveals that diversification varies with time and space, which leads to the conclusion that no two typologies are the same. This can also be attributed to the multiplicity of variables, methods and purposes underlying the typologies (Emtage et al. 2007; Kuivanen et al. 2017; Bymolt et al. 2018). Depending on the purpose, farm, farmer and household-based characteristics can be used in clustering or a combination of those (Rijn et al. 2015; Bymolt et al. 2018). The analysis in this chapter showed that unique clusters were found by using farm characteristics while taking farming households as the unit of analysis because of the family nature of farming in Ghana (MoFA 2007; Kuivanen et al. 2017; Bymolt et al. 2018).

4.6.3 Final methodological reflections

Using a single profiling method may have limited utility for various reasons, such as producing limited distinctiveness between clusters and obscuring dynamics. Despite the growing number of studies using cluster analysis to profile farmers, cluster analysis is a statistical balancing act between finding a manageable meaningful number of clusters and sufficient quality in cluster uniqueness. These two dimensions are critical for the utility of clusters for further analyses and policymaking (Mooi & Sarstedt 2011; Rijn et al. 2015) but also pose a challenge in most cluster analyses, often leading to a trade-off between what is meaningful, manageable, and distinctive (Rijn et al. 2015; Olofsson 2020). Combining a farmer-centred approach to profiling with cluster analysis improved the profiles' uniqueness and gave them meaning. Furthermore, the farmer-centred approach revealed time and spatial dimensions, which a cluster analysis as a snapshot is unable to reveal. Statistical cluster analysis aims to uncover the basic structure that underlies heterogeneity in a dataset but cannot account for dynamics in time and space. Some recent studies recognized these as inherent limitations of quantitative approaches (Kuivanen et al. 2017; Olofsson 2020). Our combination of methods revealed transient and static profiles. An example of a transient profile is where households establish tree-crop farms based on a land-sharing arrangement. After farm establishment, they usually obtain a part of the farm and transition to landowners. Another example of a transient profile is the category of farm owners who transition to absentee farmers and eventually give the farm off to caretakers. Static profiles include households managing and maintaining farms independently with little prospect for a more solid position. Examples are caretakers and landless sharecroppers who do not manage to transition to farm owners or constrained farmers with limited means to invest in crop diversification or farm expansion.

Moreover, as shown in the farmer self-identified profiles (see 4.2.8), some farming households can simultaneously belong to multiple profiles. In this way, profiles are more than ''fleeting snapshots of farm situations in time" (Kuivanen et al. 2017:163) and could be rather enduring phases of the farming landscape in time and space. This will be further explored in Chapter 5 on farmers' livelihood trajectories.

4.7 Conclusion

This chapter addressed the question of how smallholder tree-crop farmers in Ghana differ, what profiles can be identified, and how these determine VCC engagement. I demonstrated that these farmers are diverse and can be differentiated by four unique profiles based on tree-crop diversity (specialized or diversified) and land ownership. Results showed that profiles affect the nature of VCC. Landless households are often excluded because they do not meet the entry requirements regarding farm or land ownership. Constrained single tree-crop households are mostly unable to benefit from more advantageous advanced VCCs due to limited creditworthiness. Only multiple tree-crop households are favoured in advanced VCCs and support programmes but can also decide to opt out if the terms of engagement do not please them since they have the income capacity to invest in their farms themselves.

This chapter complements recent studies that have demonstrated heterogeneity among smallholder tree-crop farmers by presenting and applying a compelling approach that combines the strengths of a qualitative farmer-centred self-profiling approach and a quantitative cluster analysis to advance the utility of profiles. The profiles identified in this way are unique and distinctive and, therefore, appropriate for further analyses in the following chapters, where I aim to reveal profile-specific opportunities and constraints for farmers' engagement in value-chain collaborations.