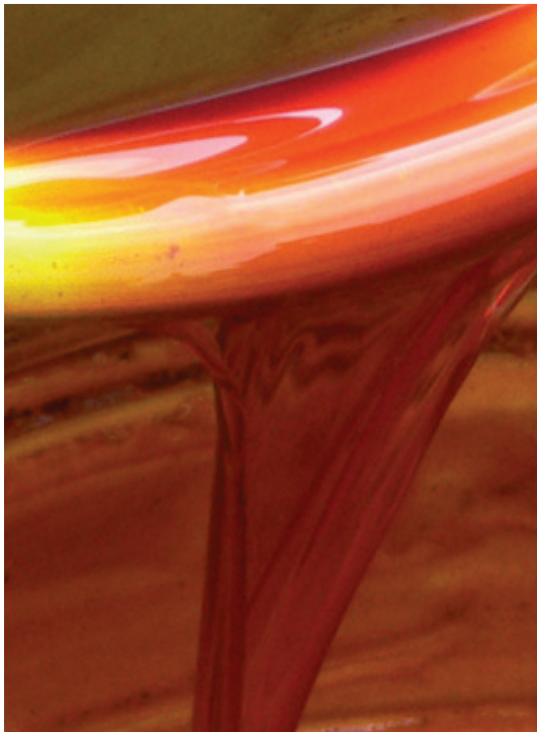
The making of quality

A technography of small-scale women's groups and a medium-scale firm processing oil palm in Ghana



Betty E. Adjei

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Betty E. Adjei

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Table of contents

List of tables

List of figures

CHAPTER 1

General Introduction

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General introduction

Development trajectories and actors in the Ghanaian oil palm sector

Oil palm is one of the world's major crops used for vegetable oils and fat production (Basiron 2007; Corley and Tinker 2003). Oil palm produces two kinds of oils: palm oil and kernel oil and gives the highest oil per unit area of any oil crop (Corley and Tinker 2003). The oils are used for food and for the industrial production of soaps and detergents and non-dairy products. Palm oil is rich in carotenoids and high in saturated fats (>50%), making it semi-solid at room temperature and solid fat in temperate climates. Currently, the oil palm sector in Ghana produces about 232,700 metric tonnes of crude palm oil used in making soaps/detergents and utilised as a staple edible oil (MOPAC 2009). The present domestic demand for palm oil is 252,432 MT with a supply deficit of about 35,000 MT (Angelucci 2013). The short-fall in demand is made up with exports from Malaysia (MASDAR 2011).

The oil palm plant (*Eleais guineensis*) is widely spread in West Africa, where it originally existed in wild groves, along the drier margins of the forest belt from Cameroon to Upper Guinea. It is also found in the equatorial regions of Angola and the Congo, where rainfall is high (Hartley 1988; Coley and Tinker 2003). In Ghana, the oil palm is cultivated mostly in the wetter parts of the country, namely Eastern, Western, Ashanti, Central Regions, and parts of the Volta Region.

There are three main varieties of the oil palm: Dura, Pisifera, and Tenera (a hybrid of Dura and Pisifera). The Tenera variety is widely grown as a plantation crop in countries where rainfall is high (minimum 1600 mm/yr.) within 5-10 degrees north and south of the equator, including South East Asia and south and central America (Coley and Tinker 2003; Kubota et al. 2009). The Dura variety, which is the oil palm variety central to this thesis, is also found in many different types of farming system in West Africa, but it is less visible in public policy and recent international initiatives around sustainable palm oil. In Ghana, total land area under oil palm cultivation is about 352,800 ha, out of which an estimated 150,000 ha (circa 40 per cent) is planted with self-seeded and protected groves of Dura oil palm (MASDAR 2011).

In Ghana, the oil palm industry has developed into a large and important industry, which comes next only to cocoa in the agricultural sector of the economy (Zu et al. 2012). By the middle of the nineteenth century, palm oil had become the major commodity produced by the

then Gold Coast for the European market, where it was used as an industrial flux and in the manufacture of soap (Amanor 1994). Upon the introduction and promotion of cocoa in Ghana, the status of oil palm as the main export crop declined in favour of cocoa. This was partly a result of the incentives given to farmers for the cultivation of cocoa as a new crop. It also related to indiscriminate felling and destruction of wild palm trees for the production of palm wine and distillation of alcohol (Asamoah 1998). Even though protective anti-palm tree felling legislation was enacted it failed to arrest the decline.

Since independence in 1957, successive governments have made several attempts to promote oil palm production through the introduction of commercial plantations (Asamoah 1998; Addo 2000). These efforts included the now defunct state farms. After independence, the oil palm sector was re-structured, but the main policy objective remained to meet internal demand, thereby reducing imports (Angelucci 2013). Between 1957 and 1978, some 22 oil palm plantations were established by the state in the oil palm belt in the Eastern, Central, Western, and Ashanti Regions of Ghana with more than 50% of these plantations located in the Eastern Region under the umbrella of the State Oil Palm Plantation (SOPP).

With a view to diversify agricultural production, the government, in 1975, made an effort to promote oil palm production through the development of oil palm estates with loans from the World Bank and other development partners. This led to the establishment of big oil palm estates in some parts of Eastern, Central, and Western Regions of Ghana. Smallholder farmers were co-opted into this sector as contract farmers on out-grower schemes. Smallholder farmers whose farms were appropriated to make way for large estates were reapportioned blocks to farm. These out-grower farmers were provided with hybrid palm seedlings, inputs, technical advice, and extension support, and were contracted to produce palm fruits to supply to the large oil mills of the core estates. From the mid-1990s these estates were privatized, with the government becoming a minority shareholder.

By 2002, an estimated area of over 300,000 ha was used for oil palm cultivation, with about 250,000 ha (circa 80%) being in the hands of small-scale farmers (PSI 2004; MOFA 2014). The area owned or managed by large plantations and contracted out-growers was relatively small: 41,000 ha or 13% of total area planted with oil palm (MOFA 2014). Nevertheless, public policy and private sector initiatives mainly target the industrial segment of the sector. In October, 2002, the Presidential Special Initiative for the development of the oil palm industry (PSI 2004) was launched, with the aim to expand oil palm cultivation up to a minimum of 100,000 ha of land in the short-term (2-5 years) and to a minimum of 300, 000 ha in the longer term (5-10 years). Under this scheme, a large proportion of land hitherto under Dura cultivation was converted to Tenera hybrids after felling of the Dura trees (Adjei

Nsiah et al. 2012a). The policy focus is to organise the myriad of small, scattered farmers into associations and groups to facilitate access to needed services and support. This dovetails with the development orientation found in market-led strategies, in particular the Roundtable on Sustainable Palm Oil (RSPO), which aims to implement standards for sustainability and to organise oil palm farmers in order to ensure compliance. In Ghana, its impact is mainly concentrated on large-scale plantations and processing.

In the literature on value chains, quality is not just presented as a technical matter but is linked to modes of governance constituting the value chain structure: the application of rules and procedures on what actions chain actors should take in value chains, what specific qualities are to be aimed for, and how they can be achieved (Ponte and Gibbons 2005). Various types of standards define the basis of participation and the parameters that govern value chains (Humphrey and Schmidt 2000). Governance of global value chains also includes coordination of spatially distributed activities and actors (Gibbon and Ponte 2005). The interest in governance leads to debates in development studies about the exclusionary effects of standards, in the sense that smallholders and firms may lack the competencies, capabilities and infrastructure to comply (Knorringa and Otieno 2012; Lee et al. 2012; Henson and Jaffee 2006, 2008).

In Ghana, the rise of new forms of governance in global value chains, in particular standards, translates into a variety of development strategies seeking ways to make smallholder farmers compliant with standards focusing on the sustainability of primary production. Accordingly, intervention strategies aim to be opportunities for producers and firms from developing countries to benefit from profitable markets through compliance and competitiveness (Reardon 2001), based on the general assumption that inclusion of smallholders and firms into (global) value chains is important for pro-poor development (Dolan and Humphrey 2000). Inclusion by way of compliance with standards can be achieved through upgrading technologies, acquisition of knowledge, and increased access to credit, extension, and inputs, among others - especially in developing countries (Vellema et al. 2012; Gereffi 1999; Schmit and Knorringa 2000; Dolan and Humphrey 2003). Industry-oriented standard-setting, as done by the Roundtable on Sustainable Palm Oil (RSPO), tends to promote uniformity and prescribe standardised practices, which may conflict with diversity in scale and in practices in agriculture and related enterprises in the South (Vellema and van Wijk 2014). The strong focus of standards on upgrading primary production also risks neglecting or excluding some of the diversity of strategies used by small and medium-scale processors, through which they demonstrate embedded capacities to serve different food markets, to handle agro-ecological variability, and to generate incomes and employment.

The small and medium-scale processing units mainly using the Dura oil palm variety provide the context of this thesis. It is that part of the oil palm sector in Ghana targeting mainly local markets for oil used in homes or local restaurants. It works parallel to the oil palm sector for industrial use that receives so much attention in public policy and RSPO-related activities (Fold and Whitefield 2012). This implies that the thesis does not focus on large and medium-scale corporations operating large plantations, contracted out-growers, and processors of oil mostly for the manufacturing sector. Rather, the prime focus of the thesis is on small and medium-scale processors targeting domestic markets, and in some cases the diaspora market. Although both parts of the oil palm sector appear to work separately, there may be unintended consequences of choices made in the dominant industry-oriented part for the more hidden and small and medium-scale processors. The need to explore this possibility is one of the reasons the present thesis focuses on accurate description of the organization of this rather hidden sector, using a technographic focus.

Presently, the small-scale oil palm processing sector contributes about 80% of national output of palm oil (MASDAR 2011; Fold and Whitefield 2012; Angelucci 2013). This part of the oil palm sector industry is supplied with fresh fruit bunches harvested on smallholder or private farms typically varying between 2 to 35 hectares. The supply of Dura is an essential input for small-scale processors found in many villages in Ghana. These processors are the main focus of this thesis. There are also some dedicated medium-scale firms, as exemplified by the case study firm presented in chapter 4, processing Dura for oil demanded in domestic or diaspora markets. In small-scale processing, semi mechanised machines or traditional methods are used. In some cases, digestion is mechanised while pressing for oil is done by hand or spindle press. In other cases the digestion and pressing are integrated and pressing is done by a hydraulic press. Women's groups working in small-scale processing are found in all oil palm growing areas in Ghana, and these are a focus of attention in the following pages. Palm oil produced by the small scale industry is mostly used as "red oil" for the preparation of food. Table 1 offers a brief summary of the different actors in the oil palm sector.

Table 1: Actors operating with different scales in the oil palm sector in Ghana

Scale of processing	**Organisation of oil palm processing**	**Link to oil palm production**
Large / industrial use 15 metric tonnes FFB/hr. Oil extraction rates between 18-21 %. Serves industrial market.	Large industrial mills, which are mechanised from sterilisation to palm oil extraction and kernel recovery. Crude Palm Oil of higher quality in terms of free fatty acids and moisture content	Large plantations (above 500 hectares) in combination with contract farming schemes for out-growers and smallholders.
Medium / industrial use Capacities range from 1.5 to about 6 tonnes FFB/hr. Extraction rates are between 5-20%. Serves industrial market.	Fully mechanised from sterilisation to oil extraction and recovery. Final products are mainly crude palm oil Some farmers have medium-scale processing mills attached to the plantation or sell to the large mills for processing and refinery.	Linked to farmers with farm sizes ranging from 35 to 500 hectares. Mill owners have nucleus plantations or out-grower schemes to feed their mills.
Small and medium scale / artisanal Capacities ranging from 3-8 metric tonnes fresh fruit bunches/day Serves market for home consumption and local out-of-home food provision.	'*Kramer'* type mill is common, which uses the spindle press for digestion and pressing of fruits and traditional methods of oil extraction and cooking. Various stages of processing, namely boiling, digestion, separation of fibre and nuts from mesocarp suspension, clarification, and oil removal, are done manually.	Smallholder or private farms ranging from 2-35 hectares. Supply of fresh fruit bunches sold directly or via intermediaries to processors, or fruits harvested at farms owned by family of processors

Sources: Field data, Adjei Nsiah et al. 2012a, Addo 2000, Fold and Whitefield 2012; Owusu 2011, Osei-Amponsah 2013, PSI 2004

Problem statement

When traveling through the rural areas in Ghana, one can regularly observe a smoky place along the road or on the edge of a village, with piles of oil palm fruits, people removing fruits from the trucks, noisy mills, and women stirring in large cooking pots. These groups of people make a living with artisanal or small-scale processing of oil palm. Mostly the women are producing palm oil of a specific quality appreciated in local markets and which also finds its way to diaspora markets. This quality relates to colour, taste, and structure. The red oil is largely made from the Dura oil palm variety. This oil is used in many types of meals in Ghana, prepared in homes or in restaurants and *chopbars* selling Ghanaian foods such as palm nut soup, *palaver sauce*, and fried plantains (Table 3, Chapter 5).

The workplace is organised around a mill, which is locally called 'Kramer' after a Dutch engineer who first set up an artisanal mill in the district (Osei-Amponsah 2013). The *Kramer* can be owned by a group of women, which is especially the case in the Kade area where NGO's support cooperatives. More usual is that the *Kramer* is be owned by a private person, who can delegate daily management of the mill to a caretaker, and collect a fee to cover cost of fuel for the running engine and hiring operators. In some case, the owner provides all the facilities required for processing for use by women at a fee. In the two *Kramers* examined in this thesis, only land and the mill were provided by the owner, and the women invested in the other facilities (spindle press, tanks for steaming fruits, construction of sheds for cooking, etc.). The female processors acquire user's rights by belonging to a *Kramer*.

The women working in the *Kramer* manage the cooking in their own pots and simultaneously perform tasks related to processing collectively. For making the red oil, the female processors source Dura fruits from farmers in surrounding villages, purchase fruits from collecting agents and petty traders, or use fruits from family farms. Small farmers harvest palm fruits from palms growing on their own fields. The bulk of the planting materials used in these farms is derived from unspecified sources, or are "wild" Dura, and usually have low yields (Addo 2000). Output of Dura is typically around 4 tons/ha compared to 12-16 tons/ha from the hybrid Tenera varieties (PSI 2004; Osei-Amponsah 2013). Small-scale processors buy fresh fruit bunches directly from farmers, or via intermediaries. Buyers of oil transact with these individual processors, but also maintain long-term relations with specific groups of processors, where they consider these to be reliable suppliers of quality oil. Likewise, farmers or collecting agents supplying oil palm fruits to the processors belong to established networks.

The smoky and messy processing practices in the *Kramer*, and also the interesting mix of individual entrepreneurial and group strategies for sourcing fruits, cooking oil, and selling oil deployed by the women working there, make these sites an interesting object of study. Of particular concern is to explain why and how such groups of women, very diverse in terms of social composition and individual and collective choices, attain a certain stability and durability of entrepreneurial activity. These small-scale women's groups processing Dura oil in southern rural Ghana are surprisingly stable, despite their very informal appearance, and some of these groups, typically of 10-20 members, as presented in this thesis, have existed for 10 years or more (Chapter 2; Table 1, Chapter 3). This contrasts with other groups induced by development agencies for the purpose of collective action which are reported to have weak organisational form and recurrently prove to be ineffective and unsustainable (Salifu et al. 2010; Tsepko 2008; Francesconi and Wouterse 2011).

This thesis takes the physical workplace as entry point for describing and understanding the nature of collective action found in the *Kramer*. By looking at how within small groups women coordinate and work together in making oil of a certain quality the thesis develops a performance and task-oriented perspective on collective action, which complements explanations rooted in identifying individual interests or organisational set-ups that are expected to result in durable groups.

What makes the survival of these small-scale women's groups even more surprising is that it runs contrary to the development direction of the oil palm industry as a whole, both in Ghana and internationally. These development efforts ought to hamper the local forms of making palm oil, so their apparent vigorous survival needs explanation, as will be attempted by this thesis.

The thesis will also address whether this neglect is justified. The widespread use of red palm oil in local diets, processed from Dura oil palm fruits, and the employment and income opportunities for women's processing groups, as well as the business strategies of medium-scale processors, are absent in policy documents. Moreover, the bias towards the use of hybrid oil palm varieties, especially for industrial processing, visible in private and public investments in R&D, leaves little space for the use of Dura oil palm, sometimes mixed with other varieties, in small and medium-scale processing. The industrial and small-scale sub-sectors continue to operate as almost separate entities; this separation was particularly intensified when efforts in the oil palm belt to incorporate independent smallholders into the industrial sub-sector through the PSI programme failed (Fold and Whitefield 2012). Also, the global sustainability standards spreading in the palm oil industry - as for example introduced by private and public actors partnering in the Roundtable on Sustainable Palm Oil (RSPO)

(Schouten 2013) - are directed towards large-scale, industrial processing and the organisation of farmers supplying these units with hybrid palm fruits. Whether this separation and neglect makes policy good sense, when so much oil palm production is based on Dura palms, will be questioned.

An unintended consequence of the dominant development trajectory in the oil palm sector it the threat it poses to the provision of red palm oil, which is an important element in local food security. A related issue is the consequences for agro-biodiversity, in particular the possible need for conservation of Dura oil palm in mixed cropping systems faced by competition from the commercial, hybrid Tenera variety preferred by large-scale industrial processors and public policy. Although Dura oil palm is rarely deliberately planted with the specific intention of supplying a niche market, either locally or internationally, it is an essential part of the configuration between farming, processing, and marketing, which materialises in the small and medium-scale processing units examined in this thesis. Small-scale oil palm farmers in rural Africa have often not been willing to adopt the higher yielding Tenera variety because consumers prefer the less fatty Dura fruits and oil, used as cooking oil, and considered a crucial quality component of traditional meals (Anon 2011). There is no doubt that the Tenera variety is a high yielding industrial crop, but many African oil buyers prefer the local Dura for culinary and other uses. Women in Ghana often refer to the indigenous oil palm as '*abe pa*' (translated: good/proper palm fruit) and the hybrid as '*agric abe*' (translated: agricultural palm fruit) (Owusu 2011). Local references to this fruit indicate that Ghanaian women distinguish between the 'accepted' and the 'new', and that the 'new' is considered to be lower in quality. According to Owusu (2011), the use of the discriminatory 'pa' for the indigenous palm fruit suggests a bias for what is perceived as natural, and therefore original and good, as against the variant introduced by western scientific methods. In relation to agro-biodiversity attention is shifted from informal and formal seed systems (Akpo 2013) to an interest in the kitchen, and the requirements of the cuisine, as a driver of agro-biodiversity (Padmanabhan 2011).

Objectives of the thesis

The thesis aims to link the performance of socio-technical practices to matters of social organisation. The technographic description of the making of red palm oil by female processors organised in small groups sets out to explain the persistence of these groups by first looking at the making of oil itself, and then presents the group as a task-oriented organisation, able to accommodate diverse interest and to combine both individual and collective action. This requires insight in the technicalities of processing and cooking as well

as into the ways women handle fluctuations in the supply of fresh fruit bunches. This approach grounds the social organisation of palm processing in the way female processors handle material transformations and address challenges of materiality. The study thus complements recent research by Osei-Amponsah (2013) focusing on the capacities of women processors to experiment with and improve quality in order to comply with requirements adopted in industrial processing, mainly defined in terms of free fatty acid levels. This thesis starts from the sensory quality of red palm oil as appreciated in local markets, e.g. its colour, taste, and texture, and endeavours to explain persistent collaboration among women partly but importantly in terms of how this specific quality is made through both collective and individual work.

The study contributes to a research tradition that first looks at viable task-oriented groups before imposing organisational formats for collective action (McFeat 1972; Richards 2000). There is a large number of NGOs present in all sectors in Ghana and at all levels of the country's socio-economic development supporting a diverse range of collective activities. Central to this increased development support for collective action in various forms, by NGOs, donors, and private investors, is the perception that rural organisations (Farmer Based Organizations - FBOs) are key partners for developing agribusiness (Salifu et al. 2010). It has been estimated that about 10,000 of such rural organisations were active in rural Ghana by 2010 (Salifu et al. 2010). Between 2000 and 2007, the World Bank allocated more than US$9 million to the development of FBOs in Ghana (AgSSIP 2007). The Ministry of Food and Agriculture (MoFA) is currently pushing production, processing, marketing, and multipurpose FBOs (Salifu et al. 2010). This thesis proposes first to understand why certain small groups - specifically in this case women's oil processing groups - are able to persist for longer periods of time, before launching interventions based on ideal-typical organisational models.

In addition to developing a socio-material understanding of small women's groups, the thesis aims to identify intended and unintended consequences of non-localised selection and regulation processes in public policy and value chain governance, in the specific case of sustainability of small and medium-scale processing of Dura oil palm and the making of red palm oil. The research intends to encourage and inform a discussion about development in the oil palm sector that recognises the contributions made by the very numerous small groups of women producers to public issues, such as food security, rural livelihoods, and conservation of agro-biodiversity. This contribution is not always linear and detecting it needs a careful description of how people perform and work together. Originally, the research intended to explore whether a niche market for the specific traits of red palm oil, particularly in the diaspora, would offer new opportunities to combine sustainable livelihoods for women and

the conservation of agro-biodiversity. The focus of the research shifted to first understand how women processors actually make this quality oil and organise around this process of material transformation, and how the task-oriented groups for palm oil relate to other task groups via sourcing of fruits and selling of oil. The thesis develops an argument in favour of plurality in public policy and development interventions in the palm oil sector, as an important condition to sustain groups, rooted in agro-biodiversity, that provide important livelihoods for rural women as well as affordable and appreciated red palm oil.

Research questions

The thesis investigates the forms of organization female processors adopt in the making of red palm oil, and identifies ways in which regulation of quality and the selection of technical recipes visible in development trajectories affect the social and material diversity underlying the performance of small-scale groups processing oil palm. It answers the following questions:

- Q1. How do women in small groups organise the making of quality red palm oil?
- Q2. How do women in small groups combine collective and individual strategies in sourcing fruits and selling oil?
- Q3. How does (at the next higher scale level) a medium-scale firm manage the linkage between sourcing, processing and marketing in the context of public and private quality requirements in the oil palm sector in Ghana?
- Q4. How do research and development trajectories in Ghana influence diversity in small-scale palm oil processing and cultivation of oil palm varieties?

Question 3, it should be noted, is important not only because there are such medium-scale firms operating in the "red" oil palm sector, but they may also represent a higher level of organization to which small groups could aspire. Question 4 specifically examines an essential agro-ecological condition for the performance of small and medium-scale processors, namely the conservation of Dura palm.

Theoretical context

The thesis contributes to literature on collective action with a performance-based analysis of the way in which women organise. This analysis is anchored in the methodological approach development by the former Technology and Agrarian Development group at Wageningen University (Richards 2001; Jansen and Vellema 2011). The thesis aims to understand the performance of two women's groups (Chapter 2 and 3) by researching the fluidity and

processual properties of collectivity - the quality of acting collectively and being regarded as a unit of collective agency by members and non-members alike. Hence, collectivity appears in sequences of individual and collective events, actions, and activities, unfolding over time as situated practices in social and material contexts (Petigrew 1997). According to Suchman (1987) courses of action can neither be predicted from knowledge of the actor's intent nor can they be inferred directly from observation of outcomes (alone). In this regard, I introduce the concept of performance to collective action discussions. Performance, as introduced by Richards (2003, 2005), refers in this thesis to the making of quality (i.e. red palm oil with specific sensory quality traits). A performance-based perspective implies that doing things has a double aspect: to achieve material outcomes and to fix social values through aligning energies, achieving social settlements, and creating emotional commitment among members. This perspective explains the existence, functioning, and durability of small groups in terms of what they do and the tasks they perform. In the two cases examined in this thesis - of women's groups and medium-scale firms - this also involves recognising how materialities, such as fluctuation in the availability of fruits and the consequences for the skilful making of specific quality traits, affect or shape social organisation.

A central issue in the literature on collective action is how groups emerge and sustain themselves. Collective action has many definitions. Ostrom (2004) states that collective action occurs when more than one individual is required to contribute to an effort in order to achieve an outcome. Meinzen-Dick and Di Gregorio (2004) see collective action as a voluntary action taken by a group to achieve common interests. These definitions imply a certain purposive rationale to the existence of collective action. The group is formed to achieve a task. The women groups investigated in this thesis were not purposefully organised or induced by external interventions. The collective form of oil palm processing emerged out of and was in some way functional to a technical practice. The examples offered, therefore, are somewhat distinct from the logic of collective action as envisaged by Ostrom and others. In the present case it is the task that creates the group (it will be argued). This perspective offers a distinct complement to the literature on collective action now to be briefly reviewed.

Economic theory of collective action is concerned with the provision of public goods (and other forms of collective consumption) through the collaboration of two or more individuals, and the impact of externalities on group behaviour. The theory underscores that rational self-interest of individuals will not act to achieve a common group interest because of the free riding problem (Olson 1965). Olson's 'logic of collective action', explores the debate on collective action as a social dilemma in which actions that are individually rational can lead to outcomes that are collectively irrational. He argues that collective action can occur in large

groups only when there are certain institutional arrangements. Williamson (1994) emphasises the regulative aspect of institutions, arguing that organisations construct institutional forms - governance structures - more effectively to manage economic transactions. Zucker (1983) and Dobbin (1994) view institutions as building blocks for organising society.

New institutionalism argues that credible commitment combined with mutual monitoring, under the protection of certain institutional arrangements, can motivate individuals to become more engaged in the realisation of shared visions (Ostrom 1990). Under this approach, individual decision making is not only influenced by individual preferences and the optimisation of behaviour (as argued by economists) but by institutional preferences as well (Bates 1995; Ostrom 1990). Commitment by individuals is to follow the rules so long as others adopt the same commitment. The long term benefit to individuals and groups are greater than cost.

The main argument of new institutionalism is that institutions provide mechanisms to enable individuals bound to groups to overcome free-rider problem (Ostrom 1990; Bates 1995). Others (Agrawal 2000; Agrawal and Gibson 1999; Baland and Platteau 1996; Campbell et al. 2001; Gibson et al. 2000; Ostrom 2000, 1990; Poteete and Ostrom 2004) have identified factors that influence the prospects for collective action: social and economic heterogeneity, group size, the existence of non-linear relations, and the mediating role played by institutions. In contrast to the neo-classical economists who view the individual as acting according to a calculated rationality, new institutionalism assumes that individuals act according to a bounded rationality. In situations where an individual decides to go against set rules, institutions play an important role in sanctioning such action.

In the resource management literature, the idea that collective action can be intentionally designed has been critiqued (Campbell et al. 2001; Steins 1999) for assuming a static rationality model, which suggests that collective management outcomes are determined by predefined principles. Ostrom (1990) argues that individuals can have agency to act (in relation to resource management) to create their own agreements and institutions, and organise and govern themselves to reduce opportunistic tendencies. Ostrom's (2004) argument may have brought the issue of agency to the fore but opponents challenge that individual agency is limited due to shared norms.

Douglas (1986) goes further to suggest that when an institution is working well, it takes over the thinking and decision making from individuals. In this sense the institutional environment is perceived as a shared structure of cognitive constraints that groups must oblige and conform to, in order to organise. The rules, as it were, predate the action. But studies have shown that collective action can fail in the presence of rules. Karantininis and Zago

(2001) identify conflicts among members as a common reason for failed collective action or shirking (Hoff and Stiglitz 1993).

In relation to my thesis, the discussion on collective action leads to questions about what explains group organisation and rule setting, and why some groups manage to sustain themselves better than others. This thesis conceptualises collective action, i.e. small groups performing tasks collectively, as an emergent outcome of social-technical practices, and as a process with unintended outcomes, rather than as reflecting a fixed organisational form or set of prior cognitive constraints. A missing component in the discussed economic and institutional literature is that social-technical practices are constantly examined and re-formed by the involved actors in the light of incoming information from, and effects of, those very practices, thus altering their character through processes of continuous rationalisation. This provides the context for detecting processes that generate collectivity in performance, which complements research focusing strongly on factors that give a plausible rationale to the existence of collective action. Action, in the present account, is seen as shaping the rules.

Research design

A study of making: performance in small groups

To explore the making of quality in the palm oil supply chain in Ghana, my research follows the inquiry of technography (Richards 2001). Technography, as explained by Jansen and Vellema (2011), is an integrative and realist methodology that moves beyond how technologies are supposed to work and the problems technological applications are supposed to solve. Technography views technology as situated action. It is not only the intrinsic characteristics of tools and artefacts that form the basis for explanation but the process of using them to make something. Its main interest lies in understanding how parties and interests coordinate and mobilise their capabilities in arriving at solutions (Richards 2003), which makes it a methodology appropriate for describing the collective action of making.

With particular interest in the performance of specific tasks, technography helps to make the connections between society, nature, and technology. Technographic descriptive accounts (Jansen and Vellema 2011) centre on (i) the use of skills, tools, techniques and know-how to achieve practical ends (i.e. the making of quality), (ii) the structure and culture of task oriented groups in a setting of distributed cognition, and (iii) the rules and routines rooted in professions affecting the selection of recipes and the regulation of performance.

In essence, technography is a processual approach, with a focus on the use of skill and know-how in performance that underlies the capacity to adjust to unpredictable and shifting

conditions. This approach allows for the explanation of how things evolve in a particular context and therefore fits well with the case study approach used in this thesis, which allows for an intensive, in-depth study of a relatively bounded social process (Yin 2005). The empirical focus in chapter 2 and 3 is on the performance by small women's groups that emerge and organise to undertake tasks related to milling palm fruits, cooking palm oil, sourcing fruits for processing, and enacting various institutional agreements implicated in these activities. The case study of a medium-scale firm presented in chapter 4 looks into endogenous capacity to link sourcing of Dura oil palm and the making of quality in the context of regulatory measures in the market. The context of these performances is further investigated in chapter 5, which aims to uncover particularly how agro-ecological conditions affect diversity in social organisation of small groups.

The thesis conceptualises quality as traits that are being made in performance, which involves making errors, and error correction or improvisation (Barber 2007). This differentiates this study from research that defines quality only technically - as criteria for assessing products or services, their technical and physical characteristics, and the processes and conditions under which these have been produced or delivered. In the value chain literature, quality is presented as a normative and regulatory concept, which centres on properties of the product or the processes specific to the production of the product (Nadvi 2008, 2000; Nadvi and Waltring 2004; Hawkins 1995). It is implied in these approaches that the quality of a product can be determined by comparing realised quality with a set of inherent characteristics (physical parameters). If these inherent characteristics meet all requirements then quality is achieved. In this study, quality is limited to the observation that buyers of oil and consumers look for a specific product and that the female processors organise their work to sustain this appreciation in the market. Accordingly, this thesis moves from a focus on quality as a technical effect to researching the composite process of making quality. Quality as an outcome cannot be reduced to component parts, e.g., soil, sun, labour, or market. Such a study of quality requires not only a detailed description of technical processes, but also analysis of the processes through which the many different elements, both technical and social, interact to form a new whole (in this study, a group of women recognised by market agents as a reliable source of red palm oil). The thesis maintains that quality is not generated through complete knowledge defined externally to chain actors or processors but through interactions among humans, tools, and materiality. It therefore shifts focus from viewing quality as fixed achievement to a technographic understanding of how evolving practices produce quality, which now becomes a dependent variable in a technical sense. Thus quality is seen not as an absolute value, but as an assessment of the current state of a dynamic

relationship between producers and consumers. The thesis thus gives room for improvisation and navigation, embedded in the performance of skilful tasks, emphasises the role of small groups in performing these tasks, and creates space for the idea that in the end quality of product is a measure of a living social relationship of production and consumption.

Methods

Case studies of two women groups, processing and cooking oil in two spatially bounded processing unit, known as *Kramer*, were made between May 2010 and November 2011. The total research population consisted of twenty four (24) female processors, located at two *Kramers* in two oil palm growing communities: Asamankese and Ekoso. In Asamankese nine women working at the *Kramer* were selected to investigate their work and behaviour in detail. In Ekoso, fifteen were selected for this investigation, since the *Kramer* had a larger population of members. Selection was based on years of experience in processing and the willingness of the women to participate and to share their experiences in processing and marketing of palm oil. For almost two years, I observed daily activities at the two *Kramers* and the interactions among the processors. I also conducted individual interviews using semi-structured schedules, key informant interviews, participant observation and field observations, and I collected life stories and studied "grey" literature. In addition, focus group discussions were held with community leaders, opinion leaders, farmers, and suppliers. Information was also collected from key informants such as the management staff of large industrial estates, researchers in the Oil Palm Research Institute of Ghana and officials of the Ministry of Food and Agriculture.

For the analysis of making oil (Chapter 2), data collection zoomed in on events related to two specific tasks: milling and cooking. Details of the technical processes were observed, and also recorded by filming and still photography. Observations in addition to interviews were particularly relevant for describing the distribution and organisation of tasks and the dynamics within both groups. Interviews and conversations were used to tease out events that revealed tensions and how they were resolved. For the skilful task of cooking, individual interviews, group discussions and observation were used to elucidate the techniques and complexities in fire management during cooking. Some life histories of a few processors were documented to show the processes of skill formation and learning. Observational data were triangulated with other information sources. The focus on cooking and milling tasks enabled a descriptive account of cooperation and individuality within the groups and their organisational forms. Analysis of data entailed filtering the rich data set from interviews, observation, discussions,

and life stories to identify phenomena which were then analysed, guided by the reviewed theories and concepts.

The investigation of the interaction between seasonal fluctuation and sourcing practices of individual processors working within small groups is presented in chapter 3. The study population included twenty (24) small-scale palm oil processors working at two *Kramers* in the same municipality. The researcher conducted semi-structured interviews on how and where fruits were sourced for processing. This was followed by open interviews, which allowed for in-depth understanding and a probe into processes and complexities in the performance of small-scale processing at an individual level. The one-to-one interviews enabled the processors to share their views and opinions on the different arrangements and strategies, and their experience with fluctuations.

The researcher also held discussions with intermediaries, such as local agents collecting fruits for the processors, and with farmers supplying fruits directly to the processors. This provided the opportunity to see their interaction with processors, and to note any frustration with inconsistency in fruit supply, and also to triangulate the information provided by the processors. Two focus-group discussions were organised in two communities to document the networks through which fruits were traded and to identify instructive events in the practices of fruit sourcing by processors and traders. Results of the focus group discussions were triangulated by interviews with oil palm farmers, suppliers/intermediaries, and processors in relation to competition, fruit supply, diversion and pricing and management of network relations. The long-term presence of the researcher at the two *Kramers* resulted in a variety of observations of events and practices associated with sourcing and processing. Interviews and conversation with several processors enabled the researchers to make estimates of changes in volumes and prices for both fruits and oil during the field work period. Data for longer term patterns could not be collected.

The unintended consequences of R&D trajectories and standard setting on diversity

This thesis shifts attention to unintended consequences of selection (i.e. the prescribed practices in public R&D and private standards) and regulation (i.e. the focus on compliance with standards concentrating on sustainability of primary producers supplying fruits to large-scale, industrial processors). It tries to identify how public and private selection norms, and the governance environment in the globally-oriented part of the oil palm industry, affects the conditions under which women's small-scale producer groups and medium-scale processing firms perform. It explores the ways in which governance mechanisms in the selection and regulatory environment, such as RSPO and sector R&D policy, constrain or enable processors

in their chosen task of making red palm oil through using local skills, tools, and know-how to manoeuvre changeable social and material conditions.

The thesis expands its scope by presenting a case study of a medium-scale firm making red palm oil (Chapter 4), to highlight endogenous capacity to integrate variability in agriculture to a viable business model supplying different end-use markets. The women's groups require comparable capacity, which may erode as a result of choices made in the selection and regulatory environments wherein small and medium-scale processors operate. An exploratory research (Chapter 5), with a wider geographical scope, further identifies unintended consequences of dominant policy frameworks and value governance on the interdependency between diversity in agriculture and local food provision, as materialized in the making of red palm oil.

Methods

Research for the case study of a medium-scale firm, presented in chapter 4, began with an initial visit to some shops in Amsterdam and The Hague, the Netherlands, to ascertain buyers' views on the quality of palm oil demanded by diaspora consumers. This led to the discovery of some firms in Ghana who supply red palm oil to these diaspora markets. The case study firm was purposefully selected drawn from a list of palm oil exporters provided by the Ghana Food and Drugs Authority. It was among a few regular exporters of red palm oil located in the West Akim municipality. Though the topic of study is potentially relevant for all small and medium-scale palm oil processing firms, research, for practical reasons, was limited to one firm in the Eastern region of Ghana. The firm was selected because it integrates exporting and processing oil and handles dynamics and frictions between international market standards and local marketing processes. Therefore it was found to be appropriate to make a comparison in practices targeting different markets.

The case study of the medium-scale processor was carried out from May 2011 to January 2013 in Kroduah in the West Akim municipality in the Eastern Region of Ghana. This case study also adopted a technographic approach to explore how the case study firm managed to make oil with specific quality traits, in demand in both domestic and diaspora markets. The study particularly examined how the firm responded to public safety standards. Interviews and observation generated data for understanding the firm's know-how in managing access to raw material in alignment with the specific demands and regulations in its markets.

Mostly qualitative techniques and tools were used, such as observation, interviews with firm employees, and key informant interviews with company managers and owners. Manufacturing and management processes at the factory were observed as well as interactions

of the firm with its suppliers of oil palm fruits. The observations were complemented with interviews to ascertain certain facts. Key informants, particularly the manager, his assistant and processing supervisor, were interviewed several times to have better insight into their operations. Field observations and ad-hoc interviews took place in two of the villages from where the firm sourced raw materials. These were used to document interactions of the firm's employees with suppliers. Secondary data from the firm were also studied to better understand how it interacts with external buyers and regulatory systems. The company provided information on fruit purchases, oil production, and export.

For detecting the intended and unintended consequences for diversity, both in terms of types of processors and in terms of oil palm varieties included in food provision, an explorative study was conducted in two regions (Chapter 5). The study started in proximity to the Oil Palm Research Institute and the University of Ghana Forest and Horticultural Crops Research Centre and an established plantation, the Ghana Oil Palm Development Company, which supplies improved planting materials to farmers. The researcher then documented the presence of Dura in areas increasingly distant from these sites (Osenase, Boso, Sukrong Wamfi, Canaan, Domponiase, and Yilo Krobo) to map the expansion of introduced hybrid Tenera varieties in oil palm production. With the help of a field Extension Officer in the Ahanta West District of the Western Region, a list of farmers in three communities (Aketenchire, Otopo and Ahimkro) was used as the sampling frame to select farmers for interviews about the presence of Dura. Information was also collected from key informants, such as management staff of the large industrial estates and the Ministry of Food and Agriculture. Visualisation of the production and use of Dura was made through transect mapping of different locations within eastern and the western regions.

Research location for technographic studies

The case studies of the two women's groups and the medium-scale firm were undertaken in the West Akim Municipality of the Eastern Region of Ghana between May 2010 and July 2012. The West Akim municipality has an area of about 1,018 square kilometres with its capital, Asamankese, located 75 kilometres north-west of Accra, off the main Accra-Kumasi trunk road. It shares boundaries with seven districts namely: Kwaebibirem to the north, Birim South to the west, Agona, Ewutu-Senya and Ga East Municipalities to the south, and Suhum-Kraboa-Coalter and Akwapim South Districts to the east (Figure 1). The population, according to the 2010 population and housing census, is 177,155 with 51.1% being female. The major occupations in the district include agriculture, employing 52.1%. Others are trade

and commerce. The main cash crops cultivated are cocoa, oil palm, and citrus, while food crops include maize, cassava, plantain, cocoyam, and vegetables. Oil palm is extensively grown as a cash crop. Some farmers are also engaged in livestock (sheep, goats, poultry, and piggery) production.

The West Akim municipality was selected for the case studies of women's groups engaged in processing of oil palm for three reasons: i) it falls within the major oil palm producing zone in Ghana, ii) no study has been done there, since most studies on small-scale processing had focused on Kwaebibrem district, and iii) most exporters interviewed indicated they source oil from this municipality because of the quality, compared to Kwaebibrem. The area has a reputation for producing good quality red palm oil and trading this to local and diaspora markets. Additionally, reports accessed from the Municipal Directorate of the Ministry of Food and Agriculture indicated that a good percentage of farmers still cultivate the native Dura oil palm variety. The Directorate of the Ministry of Food and Agriculture provided an inventory of all registered processors in West Akim municipality. In total, thirty-one *Kramers* were identified in the municipality, but not all units were active and many were located in remote areas. In the areas selected for this research, Asamankese and Ekoso, nine *Kramers* were found. Two processing units were selected from this list of 9 *Kramers* located in the towns of Asamankese (with 38,417 inhabitants) and Ekoso (with 3,659 inhabitants) (WAMA MPCU 2010).

Thesis outline

The thesis investigates the interaction between social organisation and material transformation processes in small-scale palm oil processing and detects the often unintended consequences of non-localised rules and routines on these small-scale practices. The work is organised around six chapters, four empirical chapters, a general introduction, and a general discussion.

Chapter two presents a detailed description of the making of quality by small groups of female processors located at two different *Kramers.* The chapter documents how these women organise the making of oil. It focuses on everyday practices, revealing how within the groups women organise milling and perform the delicate and skilful tasks of cooking different recipes of red palm oil. It explores how the groups transfer skill, techniques, and know-how, and how its members manage internal conflicts, and their linkages to both buyers of oil and farmers supplying fruits.

I elaborate on this perspective in chapter three, which investigates processes that generate stability and durability within the group, with a focus on the practices and arrangements in the

sourcing of fruits. I focused on practices in sourcing, and explore how the women arrange sourcing, and their linkages with suppliers, farmers, and buyers of oil. Further, I explore how group dynamics interact with and are able to accommodate the socio-economic and material characteristics of their external environments. I specifically document strategies and institutional arrangements directed towards the management of fluctuation in fruit supply and competition for oil palm fruits within groups.

Chapter four investigates the presumed omnipotence of standards by focusing on a single case study of a medium-scale firm, which processes palm oil for the local and diaspora market. The focus was to understand precisely how in a specific case trade and industry standards and regulation, integration into international markets, and related processes of standardization, affect or build on endogenous capacities for problem solving and meeting of market standards. The chapter opens with a discussion on RSPO and value chain governance. It pictures the friction between externally imposed rules and routines and the use of local skill, tools, techniques and know-how, and how resulting problems related to quality are resolved. The chapter shows that value chain governance mechanisms within the RSPO lack the flexibility to handle the diversity and improvisation characteristic of small-scale oil palm processing in Ghana.

Chapter five explores how small-scale processing, dependent on the supply of Dura fruits and therefore on the conservation of agro-biodiversity, is affected by dominant trajectories and policies in an oil palm sector focused on hybrid varieties and industrial production of palm oil. The chapter investigates the use and conservation of Dura oil palm. It also underscores the threat to Dura-based conservation of agro-biodiversity based on small-scale processing embedded in diverse farming systems and agro-ecological conditions.

Chapter six synthesises the technographic insights and findings. It critically discusses problems associated with linear explanations of collective action, and shows why an evolutionary and processual perspective, related to task performance and materiality, should be brought into the discussion. Finally, the chapter discusses the relevance of the perspective developed by the thesis for policy and practice.

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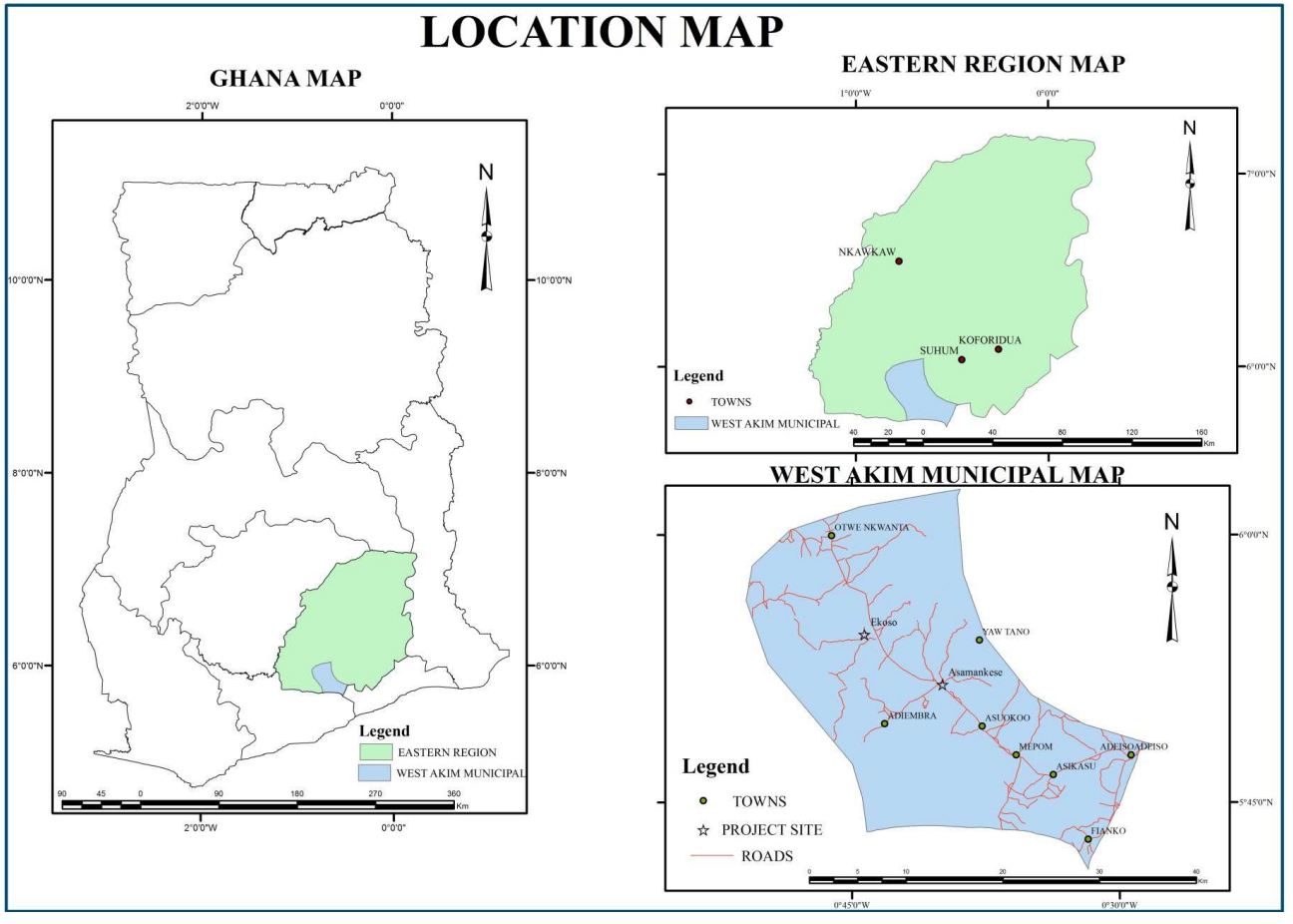

Figure 1: Locations of the research area

Source: Cartography section of the Soil Research Institute of Ghana - CSIR

CHAPTER 2

Collectivity and individuality: a performance perspective on small groups processing palm oil in Ghana

CHAPTER 2

Collectivity and individuality: a performance perspective on small groups processing palm oil in Ghana

Abstract

In Ghana, women involved in small-scale processing of palm oil combine their individual activities and entrepreneurial interests with belonging to a group of women involved in the same line of business. A technographic study of the performance of such groups, with an empirical focus on milling, cooking and learning, allows theorising about what makes these an institution wherein individual women agree to share risks and tasks with others. It also contributes to a more general discussion about collective action by shifting focus to the processes creating a level of stability and durability of group performance, rather than seeking the explanation primarily in plausible effects of the arrangement, such as benefits or incentives. The processual approach allows for diversity in the organisational manifestations of a phenomenon, namely the hybrid of collectivity and individuality.

Introduction

When traveling through the rural areas in Ghana, one can regularly observe a smoky place along the road or on the edge of a village, with piles of oil palm fruits, people removing fruits from the trucks, and women stirring in large cooking pots. Mostly, the women produce palm oil of various types. What is remarkable about the grouping is that, the women manage the cooking in their own pots and simultaneously performs tasks collectively. What this chapter seeks to find is how a diverse group of women in terms of social composition and individual and collective choices, gain stability and durability in such an entrepreneurial activity.

Palm oil processing remains one of the main entrepreneurial activities, which offer viable economic opportunities for local people particularly women, to raise incomes from agricultural production and related enterprises to improve their livelihoods. Ghana currently produces 232,700 MT of Crude Palm Oil (CPO) (MASDAR 2011) annually, which is used for food and other industrial purposes; and the small-scale processing sector contributes about 80% of total national palm oil production (Zu et al. 2012; Adjei-Nsiah et al. 2012b; MASDAR 2011) The small-scale sector is dominated by women, who play a pivotal role in

the oil palm value chain; producing or buying raw materials, processing and selling the final products in both local and international end user markets. Accessing international and industrial markets is often considered an opportunity for small-scale farmers and processors, especially in the West Akim Municipality, to gain a more remunerative price for their produce. However, the small-scale processors find it very difficult to access this opportunity. They continue to use raw materials and processing methods that are of poor quality and inefficient (Adjei-Nsiah et al. 2012a; Osei-Amponsah et al. 2014). Accessing potential market opportunities is also complicated because they are scattered and unorganised. Therefore both government and NGO efforts to address some of these problems that small-scale processors face consistently advocated the formation of groups (Onumah et al. 2007). For example, in some parts of the Eastern Region, processors were organised as formally registered groups with support from both government, Community Based Rural Development Projects and NGO's who work with several women's groups, offering skill training, financial and other supports. The underlying assumption is that by leveraging collective action, the women can improve upon their products, aggregate their surplus output, achieve economies of scale and access markets (Hellin et al. 2009; Markelova et al.). The emphasis on the formation of groups for collective action is probably a result of how discourses around groups have developed over the years and shaped development interventions in Ghana (Porter and Lyon 2006).

However, there are reports that collective action in the form of groups, cooperatives, farmer organisations among others are unsustainable and eventually fail (Salifu et al. 2012; Tsekpo 2008; Salifu et al. 2010; Salifu et al. 2012a). Group efforts may conflict with individual interests (Sow 1993, cited in Venema and van Eijk 2004). In some other cases, entrepreneurs may consciously avoid engaging in joint business activities and other forms of resource sharing due to interpersonal jealousy emanating from individual ambitions (Kuada and Buame 2000).

In the West Akim Municipality in the Eastern Region of Ghana, women who process different types of red palm oil for both local and international niche markets have been working in groups for more than a decade. What is interesting about the grouping is that they combine their individual interests with belonging to a group and collectively perform tasks with other women in the same business. What this chapter seeks to find is how small groups, which are diverse in terms of social composition and individual and collective choices, gain stability and durability in performing entrepreneurial activities such as making and trading oil. What makes them combine individual and collective interests in the same line of business? We argue that how the women organise themselves is an outcome of continuous processes

based on evolving technical practices rather than an organisational fix based on generic technicalities and individual incentives.

Many studies on entrepreneurship in Ghana, have shown that women contribute to job creation and improved livelihoods (Buame 2000; Robson et al. 2009; Lund et al. 2008; Dzisi 2008; Saffu and Manu 2004; Otoo et al. 2011) through their entrepreneurial activities. They also provide useful insight to factors driving entrepreneurial success as well as problems and challenges women entrepreneurs face generally. However, these studies mostly focus on the individual entrepreneurs with very little or no attention to how entrepreneurs organise to perform their activities. This study fills that gap by shifting the focus from individual entrepreneurs to group, wherein individual and collective entrepreneurial interests combine.

The chapter argues that organisational form emerges through processes in the performance of tasks. It focuses on processes shaping organisational form and giving groups stability. It explores group performance in the making of quality palm oil with a focus on material practices. It is based on case studies and structured as follows: First it provides a brief history of collective action in Ghana, showing the various forms of arrangements that have dominated the agricultural sector over the years. It then briefly reviews the concepts of collective action and performance to situate the chapter. Next, it gives a description of the groups to show their diverse nature in terms social composition and individual choices. For describing performance within the groups, the chapter describes the technicalities and organisation of milling and cooking within the setting of a *Kramer*. First I describe the task of milling (digestion) to show group cooperation and tensions /conflicts but at same time mechanisms to control group behaviour. Second, the task of cooking (clarification) palm oil leading to skill formation and group sustainability in the long term. Finally, the chapter discussed how task-oriented small groups (McFeat 1974) organise cooperation and sustain hybrid organisational forms, which combines both collective work and individual entrepreneurial strategies.

A brief history of collective action in Ghana

Collective action efforts in Ghana date back to the 1920's with the introduction of agri-coops. The first cooperatives were for cocoa marketing, which started around 1928 (Miracle and Seidman 1968). By 1931, formal cooperatives were introduced in Ghana by the colonial administration. This Cooperative Societies Ordinance No. 4 of 1931 set the legal framework for cooperatives and laid down the rights and liabilities of society members (Cazzuffi and Moradi 2010). In the 1950's, setting up cooperatives was preferred as an institutional form of organising local people towards economic development (ibid). At the time, the agri-coops

became a means to organise production and marketing of cash crops, particularly cocoa, coffee and cotton (Salifu et al. 2010; Havinden 1970). Later, this new approach to organising farmers dominated the cocoa sector (De Graft Johnson 1974; Miracle and Seidman 1968). Since the1950's cooperatives were viewed as an institutional reform in the agricultural sector for organising production (Havinden 1970). After independence, the Cooperatives Societies Decree (1968) of the National Liberation Council Decree (NLCD) 252 was passed (USAID 2006).

Collective action also existed among farmers as a system known as *nnoboa*, where farmers provided reciprocal labour and support for farm work (De Graft Johnson 1974; Onumah et al. 2007) in the form of communal associations, whereby farmers united in groups of either extended families or companies to purchase large tracks of land for oil palm production, especially among the *krobos* living in the Eastern Region (Anyane 1963).

The current Food and Agriculture Sector Policy (MoFA 2007) emphasises collective action and group formation to facilitate coordination among producers and processors and increased access to credit, market, and other extension services and influence policies (Salifu et al. 2010; Onumah et al. 2007). Cooperatives for oil palm production and processing have also been reported (PSI 2003). In addition, projects seeking to promote development and wealth creation among rural population promote collective action especially between 2000-2007 (Growth and Poverty Reduction Strategy (2006-2008).

Theoretical framework: collective action, collectivity, and collective performance

Collective action has been defined by Sandler (1992) as when two people collaborate in joint action and decision making to accomplish an outcome that involves their common interest or well-being. Many studies have established that individuals from all walks of life organise for various reasons. The concept of collective action has been applied to a great array of diverse phenomenon, including membership of an interest group (Olson 1965); the production of collective goods (Maxwel and Oliver 1993; Ostrom 1990), empowerment of farmers (Tsepko 2008), and management of common (open access) natural resources (Ostrom 1990) illustrating its importance in explaining human behaviour. A variety of empirical studies, including Salifu et al. (2010); Lyon (2003a, 2006), Asante (1996), Cazzuffi and Moradi (2010), and Miracle and Seidman (1968) try to identify factors and conditions that explain the formation of collective action in Ghana and the wider sub-Saharan Africa and to assess the benefits of collective action for the participants. The endeavour of this chapter is to take existing and and durable (more tha 10 years) small, task-oriented groups as entry point for

framing a performance-based perspective on how and why individual women agree to work together in the setting of a physical workplance, the *Kramer*.

Collective action and cooperation theories have emerged in a number of schools of thoughts spanning from Economics, New Institutional Economics, Management Studies, and neo-Durkheimian schools. Economic theory of collective actions holds that groups will tend to form and take collective action whenever members jointly benefit. Olson (1965) presents the logic of collective action as a social dilemma in which actions that are individually rational can lead to outcomes that are collectively irrational. Olson underscores that rational self-interest individuals will not act to achieve a common group interest because of free riding problems, and argues that collective action can exist only when there are certain institutional arrangements that allow for the satisfaction of individual socioeconomic preferences. New Institutional Economics thinking posits that collective action occurs to reduce transaction cost by providing information and market control (Lyon 2003b). New Institutional Economics view attempts to explain collective forms by assuming that institutions appear automatically without probing why cooperation occurs in one case and not another (Lyon 2003a).

In this literature, the main attention has been on theorising intentionality as incentive for individuals to organise. The focus on intentionality ignores the dynamic nature of social situations as a process (Meinzen-Dick et al. 2004). Durkheim (1893) argues that collectivity arises from interdependencies that arise from specialisation and professional complementarities. This line of thinking critiques the economists' point of view that merely examined the technical conditions for collectivity without consideration of the broader societal conditions necessary to maintain it.

Other studies try to find explanations for the sustainability of collective action in characteristics of the groups or organisations, such as heterogeneity, size, non-linear relations, and institutions (Baland and Platteau 2007; Agrawal and Gibson 2001; Poteete and Ostrom 2004; Ostrom 2000). Group size and heterogeneity and diversity in interests are widely expected to affect trust, which influence the prospects for collective action. Miguel and Gugerty (2005) have argued that social heterogeneity might undermine the ability to sustain cooperation, while homogenic cultural and or economic characteristics may increase the possibility of cooperation.

The chapter develops an alternative optic based on the idea that the organisation of collective or coordinated actions emerges from the nature of the tasks performed. The approach fits in an ethnographic interest in using performance (Richards 2005) and tasks (McFeat 1974) as entry point for describing the inner workings of collective action. This performance based view on organisation focuses on documenting sequential socio-technical

processes linking individual and collective actions and on tracing how the transmission of information and know-how unfolds over time and i interaction with social and materials contexts (Jansen and Vellema 2011; Richards 2005; Pettigrew 1997).

Performance is action, which cannot be predicted from knowledge of the actor's intent nor inferred from observation of outcomes (Suchman 1987). Performances are always assembled in changing configurations (Pettigrew 1997; Barber 2007) and therefore actions or outcomes are a result of sequential adjustments to unpredictable conditions (Jansen and Vellema 2011). The sequential adjustments to unpredictable conditions in performance may occasion an opportunity for innovative organisational forms to emerge (Leonardi and Barley 2008; Orlikowski 2002). Performance based analysis will bring out the ways in which processes are brought to bear (Barber 2007) and enhance the capacity to explore the fluid, processual and emergent dimension of collective action.

McFeat (1974) explores task performance in small groups and emphasises task as a key element to understanding group persistence. He claims that a group would continue to exist as long as there is a task to be performed. The re-occurrence of tasks and interaction among the group keep members together. Groups survive not just because of formal arrangements or structures but through a culture it creates through that interaction (Fine 1979; Fine 2012). It is the shared references that keep members together and provide a scheme of rules, norms, which offers a set of behavioural options for its members. Over time groups learn, create rules and norms, and modes of information transmission. Consequently, groups develop a structure and stability through the performance of tasks. This performance based view contradicts dominant thinking in collective action theories. When people come together and learn to act together, they specify tasks, and with time learn to act in coordination. With this understanding, this study fills a void in current studies in group organisation by contributing to on-going discussion on collective action and organisation of women's entrepreneurial activities.

Group and individual work in oil palm processing

This section reports how collective and individual choices were made and constituted the workings of the groups and the collective performance of tasks. These choices will be described, after a brief characterisation of the group and what small-scale processing entails: the different tasks, external environment how they were managed both individually and collectively. The section ends with identifying tensions within the group.

Group characteristics

The study examined performance and organisation in two groups of women processing oil for both the local and external niche markets. Fifteen women (15) at the *Kramer in* Ekoso (Table 1) and nine (9) at the *Kramer* in Asamankese (Table 2) were interviewed and observed. One striking general feature of the groups was the diversity among the women in terms of social and demographic characteristics (Tables 1 and 2). The groups were a mixture of women from different ethnic backgrounds, marital statuses: (single, married, and widowed), varied age range. The diverse backgrounds of the group members show that different categories of women in the community had a chance to participate in this economic activity.

At Ekoso, their ages ranged between 23 and 53 with processing experience from 2 to 15 years. Ten out of the fifteen were married, while five were single. The average household size was 5, and eleven of the fifteen had basic education. In Asmankese, nine women formed the group. Their age ranged between 42 and 56, with some who processed oil for almost 20 years. A bit more than half was married. Average household size was 6, and six of the nine women had basic education. The average age of the two groups (in total 24 processors) was 38 with the youngest being 23 years and the oldest 56 years. Most of the women had up to basic education, which was not surprising in this particular case, given the low literacy rate among women in rural Ghana. 62.5% of them were married while the others were single, including divorcees and widows. Years of processing experience varied between two and nineteen years.

About 50% of the women in both groups were migrants (from other parts of Ghana) who either accompanied their spouses or parents to the area, or who had decided to settle there. Interviews with women and literature indicated that the migration backgrounds are different as well. Some of them came to the area to acquire land for the cultivation of cocoa and oil palm in the area or to work as farm labourers (Amanor and Diderutuah 2001). These early land purchasing migrants were followed by other migrants, who did not have the capital to purchase land but sought work as labourers within the cocoa industry. Many of the migrants in this area came from northern Ghana and Burkina Faso (Upper Volta) (ibid.). Getting access to land for farming purposes was an important reason to migrate. Small-scale oil palm processing in the *Kramers* offered alternative income generating opportunities, and migrant women entered the women's groups via temporary work or apprenticeships.

Table 1: Social and demographic characteristics of processors in Ekoso *Kramer*

Processors n=15	**Age**	**Residential status**	**Marital status**	**House hold size**	**Years in processing**	**Education**
1	46	native	single	10	5	basic
2	35	resident	married	10	6	basic
3	53	resident	married	3	7	basic
4	46	migrant	married	10	7	basic
5	50	migrant	single	15	4	nil
6	45	resident	single	7	5	basic
7	31	migrant	married	5	5	basic
8	50	resident	married	4	4	nil
9	23	resident	single	2	5	basic
10	33	migrant	married	5	5	basic
11	35	migrant	married	10	7	nil
12	43	migrant	married	3	6	basic
13	35	migrant	married	4	7	basic
14	51	resident	single	6	6	nil
15	31	migrant	married	5	5	basic

Source: semi structured interviews, Ekoso, 2010

Table 1 Social and demographic characteristics of processors in Asamankese *Kramer*

Processors n=9	**Age**	**Residential status**	**Marital status**	**House hold size**	**Years in processing**	**Education**
1	45	resident	single	6	19	basic
2	45	migrant	single	6	2	basic
3	42	resident	married	7	19	basic
4	47	migrant	married	5	4	nil
5	50	resident	married	6	7	basic
6	42	migrant	married	5	20	basic
7	43	migrant	single	6	10	basic
8	53	migrant	married	7	8	nil
9	56	migrant	single	4	15	nil

Source: semi structured interviews, Asamankese, 2010

Table 3: Ownership of processing facilities at two *Kramers*

Item	Ekoso		Asamankese	
	Owner	**Women**	**Owner**	**Women**
Land	✓		✓	
Milling machine	✓		✓	
Shed for milling	✓		✓	
Spindle press	✓	✓	✓	✓
Shed for cooking		✓		✓
Boilers/tanks		✓		✓
Aluminium pots		✓		✓
Other utensils		✓		✓

Source: interviews and observations at Ekoso and Asamankese *Kramers*, 2010f

Though clumsy from afar, the different type of tasks performed the *Kramers* were coordinated by the women working in the two groups. For this they interacted as processors, but also team up with temporary workers and men involved in the milling. The main activities in small-scale palm oil processing included milling, cooking, and selling, which were performed by the women. The various stages in the processing process were: steaming of fruits, digestion, pressing to extract the crude oil, separation of fibre and nuts from mesocarp and clarification/cooking. The steaming was done to sterilise the fruits after fruit bunches were chopped and cleaned. Sterilisation stops enzyme action and soften the fruits for milling. Milling (digestion) involved the crushing and detachment of the mesocarp from fruit nuts to allow for easy extraction of oil from the fibre. This was a highly mechanised process in small-scale processing and mostly done by men. The digested material was pressed to release the oil, followed by the removal of the palm nuts from the fibre. The cooking and clarification of the oil involved the heating of the extracted crude oil to separate the oil from water and other impurities. After pressing, the oil usually contains some amount of water, which had to be removed gradually through cooking before the oil was either sold or stored.

In the two *Kramers*, most of these activities were done manually, except the digestion, which was done by the use of semi mechanised machine. While the tasks of milling and cooking required a certain level of skill and experience, the chopping of fruits, cleaning and nut and fibre separation required little skill. Usually men, with a certain level of skill, performed the more strenuous tasks of operating the milling machine and pressing for oil

extraction. Coordination in the *Kramers* involved not only interaction between people, but interaction between people and material objects, such as fruits, tools, and machines. In addition, a certain division of labour between women and men was visible (Table 4), which is also reported by Osei-Amponsah (2013: 35)

Table 4: Task division between men and women observed in two *Kramers* for small-scale palm oil processing

Task	**Actors**	**Tool**
Chopping and cleaning of fruits	Men and women	Cutlass, baskets, aluminium or plastic trays
Fruit steaming	Women	Pots, tanks, other containers for steaming
Digestion /milling	Men	Semi mechanised machine
Oil extraction	Men	Spindle press
Nut and fibre separation	Women/men	Hands
Oil clarification	Women	Pots, mud stoves

Source: Observations of activities and tasks performance

Individual and collective choices in the group

The palm fruit, which was the main raw material for processing oil, was seasonal and for that matter not available throughout the year. The fruits were in abundance between February and May, which was the major production season, while it became scarce during the minor season, which was between June and December. Because the fruits were not always available, the high demand during the period of scarcity resulted in competition among users and diversion of fruits by suppliers. In this regard, the women used different sourcing strategies and arrangements to ensure continuous supply of fruits. They individually arranged for credit either through advance payments from their buyers and different buying arrangements with suppliers and farmers. In addition, processing the oil was an individual responsibility. When fruits were acquired, the women teamed up to process as we will show later in the chapter, nevertheless, it behoves on the individual woman to make quality oil to position the group to negotiate for better price.

Another activity that showed individual interest was in the marketing of oil. Marketing of oil was difficult during the peak season when fruits were in abundance; however oil was in great demand during the period of scarcity. It should be noted that the price of fruits directly affect the price of oil and vice versa. When prices of fruit changed either up or down, it was translated into the price of oil. While it was the group who negotiated for better prices, it was the individual who arranged with buyers and sold the oil. Group presence in marketing was

important because it attracted buyers and created access to markets, which was not easy. The market was controlled by the market queen who controlled the supply of oil entering the market and the number of traders allowed selling each market days. The market queens control market space, making it difficult for new members to sell. With quality reputation and credibility, the women were able to sell oil at the *Kramer* without going to the market. The above observations give an indication of how processors managed the clients, sourcing and quality issues individually.

The groups reflected combination of choices that were made by individual women and choices that were handled collectively (Table 5). The observations imply that the group is not only diverse in terms of social composition as shown in Table 1, but also in choice making. The following case studies of female processors illustrate how this was done by individual women in practice: combing environments of sourcing, buyers, market with team processing.

Table 5: Individual and collective choices within two small women's groups processing oil palm in Ghana

Individual choices	**Collective choices**
Investment decision	Quality and Reputation for marketing
Sourcing strategies	Scale of operation/economies of scale
Access to fruits	Knowledge and skill formation
Sources of credit	Price fixing and negotiation
Selection of buyers	Operational space
Production of quality oil	Collateral

Source: Observations and interviews at Ekoso and Asamankese *Kramers* in the West Akim municipality, 2010

Individual strategy - Processor 1

At 8.30 am, this processor was busy preparing the stoves to steam the fruits for processing the next day. In an interview she said she had been in processing for more than 10 years. She owned the largest boiler for steaming (with capacity for 30 bags of fruits) at the *Kramer*. In the peak season (April to June) of 2010, for example, she processed an average of 40 bags/sacks of palm fruits per day and 25 in the off season. She acquired fruits from three main sources: directly from farmers, intermediaries, and family farm. The intermediaries were agents who bought the fruits from farmers and sell to processors with a commission of one Ghana Cedis for each bag of fruit. Transporting the fruits from the bulking point to the *Kramer* is the responsibility of the individual processor.

On the morning of my visit, I sat with her while she made and received several calls, some of which were relevant for understanding how she managed interactions with the external environment. Earlier in the day she had made a call to request for a truck to transport fruits from the nearby villages. To avoid delays and pilfering, most processors preferred to transport fruits themselves instead of waiting on suppliers to do so. Arranging for early transportation was important to ensure that fruits were delivered on time and processed fresh. The processors indicated that processing fruits fresh (two days after harvesting) had implications for quality but the challenge was getting the quantity for economic processing. When the truck arrived, she checked the fruits to estimate oil quantity as well as milling and extraction cost since suppliers make only visual estimations in filling the sacks.

While waiting for the fruits, a call came through from one of her intermediary suppliers to inform her about an increase in the price of fruits. The price had increased from 4.50 Ghana Cedis per bucket (local measure) to 5 Ghana Cedis just that morning. The fluctuation was as a result of high demand for fruits during the period. In the month of November 2010, prices of both fruits and oil changed about thrice, as shown in (table 6). The price increase generated a long discussion among the processors. To them, they risked processing at a loss with the trend of price fluctuation. She, however, insisted on buying the fruits at the old price until she had negotiated a new price with the buyer, who had already paid for the oil. Advance payment was common and was an important aspect of the transactions in the palm oil business. At certain times of the year when fruits were not easily accessible, it was a means to secure both fruits and oil.

Her next telephone call came from a buyer requesting oil, which she declined; on the basis that, no advance payment had been made.

Table 6: Reported price fluctuations prices for oil palm fruits and palm oil during off season in 2010

Date	**Price of fruits (per bucket)**	**Price of oil (62.5litre)**
11/11/10	GHC 2.50	GHC 95.00
13/11/10	GHC 3.00	GHC 105.00
16/11/10	GHC4.50	GHC 110.00

Source: Estimates by women during interviews, West Akim, 2010

Individual strategy - Processor 2

This particular processor did not process oil that day but went to the *Kramer* to prepare for processing the next day. She arranged for fruits from a farmer who was one of her suppliers.

She had a 4.5 acre oil palm farm but supplemented her harvest with fruits from other sources. While at the *Kramer* she supervised the chopping and the cleaning of the fruits to get it ready for steaming. She arranged for firewood to steam the fruits and for cooking the oil. Firewood was the main source of energy used in small-scale processing, which was supplied by villagers. She needed to ensure that firewood was brought on time to enable her steam the fruits overnight for milling early the next morning.

At the *Kramer* she received two phone calls from two of her buyers in Tema (near Accra.). The calls came one after the other, requesting oil and seeking clarification of the names of two drivers who were to transport oil to Tema but had not turned up. The drivers shuttle between Tema and Asamankese particularly on market days and were personally known to both the processor and her clients. They expressed concern over the phone that the oil might have been delivered to a wrong person. She, on the other hand, was worried about possible mix and adulteration that could happen in transit. She mentioned that, in transit, palm oil could be swapped intentionally or unintentionally by traders, causing contamination. The illegal use of the chemical dye Sudan IV, which had a dramatic effect on palm oil business in the area, caused many processors in the area to incur huge debts, which threatened their business.

At the same time, she had to attend to another client who had come to the *Kramer* to make advance payment for a new consignment of palm oil to be exported to Italy. According to the woman she had been doing business with these brothers for more than five years because they found her oil to be of good quality. Though the demand was not regular, since it depended on demand from the diaspora market and stock in Italy, the oil was bought at price higher than the local market price.

Managing collective responsibilities in small-scale processing of palm oil

The cases presented above document the individual entrepreneurial activities of women sourcing fruits and selling oil. This section describes collective performance in ensuring quality and organising the milling, emphasising the management of coordination. The next section elaborates this interest in collective performance in relation to the process of cooking of fruits, which emphasises learning and managing interdependencies.

Ensuring quality

Simultaneously, collective processing together at a common location provided a platform for marketing oil palm. The ability to negotiate better price at the *Kramer* depended on both the quality oil produced by the individual women and the reputation of the group as a whole. Most of the buyers preferred to deal with individuals, especially those within reputable and

credible groups. In this case, oil quality was maintained through self-regulation, which sought to reprimand and expose culprit. One woman said:

> "We will sabotage those who do not behave properly here. If you use any dye or rotten fruits to cook the oil, we will stop buyers from buying from you because your oil is not good. We have to expose such a person because her action can have a negative consequence for all of us" [Interview G.A, Ekoso, August 2, 2010]

Besides the advantage of sharing operational space, resources and getting volumes attractive to buyers, there was the need for fruits to be processed soon after harvest (at least 48 hours) to ensure oil quality. The need for a certain amount of temperature during milling for maximum oil extraction required a team approach to processing. The example provided below illustrates how a woman teamed up with other processors belonging to the group to perform the task of milling and concurrently cooked the oil individually:

> "It was around 6.00 am and five women, including the woman who was scheduled to process, were already carrying the fruits to the machine for milling. I was told milling started around 4.00 am. So they came as early as 3.00 am to warm the fruits. Two assistants fetched the steamed fruits for the women to carry to the machine. When large amount of fruits had been milled she and three others withdrew from carrying to remove the nuts from the pressed fibre to facilitate a second pressing. She had little time to eat or sit. She held her breakfast and ate as she moved from the boiler to the machine; sometimes stopping to collect the nuts to dump at one location while she and two women fetched the extracted oil to her pots, which were already set on stoves. When she was done with milling her own fruits, she continued in the group but retreated from time to time to stir her oil and check the fire. Sometimes she asked her assistants to replace her in the team while she attended to the oil. This continued until the last person in the queue for the day had her turn to mill. Milling ended at about 12.53 pm but the pressing and nut and fibre separation continued until 2.00 pm. When she was done with cooking she transferred the oil into storage containers in order to make the pots and stoves available for others to use." [Observation, 10/11/2010 Ekoso, November 10, 2010]

Organising milling

Besides sharing responsibilities for the quality of oil, which related to timely processing and proper cooking, the organisation of milling of palm fruits was a collective process. Milling involved fetching and carrying steamed fruits from the boilers to the machine to be digested and pressed. This was done in a team, since an individual processor alone could not handle the various aspects occurring at the same time. It was also necessary to maintain the temperature in the fruits while milling so as to be able to process large volumes of fruits in a day. The activities were done concurrently: some carried the fruit to be milled; others carried the macerated pulp to the presser. Additionally, others collected the raw oil after pressing into pots for cooking, while others removed nuts from the fibre for second pressing. From time to time, the particular processor who had her turn withdrew briefly to start cooking, but joined the group again while keeping an eye on her pot. Joining in the milling processes was obligatory as indicated by the machine operator:

"All the women who will process oil today have to help each other with carrying and removing the nut/fibre until they all finish. As soon as I start the engine they must stop whatever they are doing and join in" [Interview E.S, Ekoso, September 14, 2010]

The process of joining the group and, at the same time, cooking oil continued until the last person was done. The idea was to collectively support each other with labour in carrying out the task.

Different arrangements for organising milling in view of limited resources, available volumes and the perishability of fruits were observed. First, milling was done on first come first served basis and secondary on the day of the week. The first come first serve system implied that the first person to set fire to warm fruits in a particular day got the chance to mill the fruits first and continues in that order until the last person in the queue for the day. The operator in Ekoso explained that they had their own arrangements for milling; the women take turns to mill according to who cooked the fruits first. With this arrangement, the group was able to control volumes and maintain order.

Second, the organisation of milling depended on the different market days within and outside the municipality, which the processors target. This means that within the week processors have slots for specific days for processing. Those who targeted Monday and Thursday markets within West Akim Municipality processed oil on Saturdays, Mondays, and Wednesdays while Sundays, Tuesdays, and Fridays were used by processors who targeted markets outside the municipality. With this arrangement, processors were able to use other

days to source fruits and control delivery and are also able to timely process fruits in a relatively fresh state. The arrangement varied within the peak and lean seasons of fruit production. During the peak season, when fruits were in abundance, processors who had large quantities slept overnight in order to be first in line and to be able to mill early in the morning. This was because during this season large quantities of fruits were supplied to the women. This situation did not occur during the lean season when lower quantities of fruits were supplied.

The arrangements were found to be flexible enough to accommodate contingencies including fruits deterioration, as was observed in this particular situation:

> "It was about 4.30 pm and women had grouped after processing to discuss the next day's milling schedule in view of the absence of the men who pressed the oil. A stranger (a man) showed up. He lived in a different town (Oda) but came to the *Kramer* to seek permission to process his fruits because the fruit were deteriorating. He said the fruits were harvested and left on the farm for more than two weeks and had been beaten by rain, because he could not arrange for transport to Oda." [Observation, Asamankese, December 19, 2010]

Palm fruits easily deteriorate when bruised during harvesting or not handled properly. In such a situation, the fruits must be processed immediately. The example presented above shows how the condition of the fruits led to changes of the milling schedule. The women first agreed among themselves to adjust the milling schedule for the week to allow access to the new comer. Even though he was not a group member, they supported the milling as was usual at the *Kramer*, but since he had not contributed towards its purchase, the new comer had to hire the processing facilities in order to process the fruits.

Fruits deterioration and long storage periods (more than 48 hours) before processing may reduce the quality of palm oil by increasing the levels of free fatty acids (FFA). A high level of FFA implies the palm oil is very rancid and of poor quality. On the other hand, palm oil of low FFA value (≤5%) is classified as high quality and also attracts a higher price in the industrial market (Osei- Amponsah et al. 2012). Small-scale processors may have other considerations to store fruits, for example easier extraction of oil during processing (Osei-Amponsah 2013). Nevertheless, in both groups, individuals with supplied with large quantities of fruits were given the priority to process despite earlier agreed procedures and schedules.

Learning and managing interdependencies in cooking palm oil

The above describes coordinated practices in processing. This section shifts attention to processes through which skills are transmitted, visible in the learning by new members and the sharing of tools, techniques, and know-how. This becomes particularly clear in the skilful task of cooking oil.

Palm oil processing has been traditionally known to be an extension of the preparation of a local dish called palm nut- soup, but the actual process is far from simple. The complexity of managing fire and keeping a balance to reduce moisture content and preventing over cooking and burning the oil at the same time was far from easy. The technicalities involved required a high level skill and technique for performance.

After digesting and pressing, the oil contains water and the purpose of cooking (clarification) was to remove all moisture by heating till it evaporates. The processors stated that palm oil with high levels of moisture after cooking solidifies when stored for a few days and easily go rancid. Such oils were considered to be of poor quality (Osei- Amponsah et al. 2012). However, knowing the amount of firewood to keep in the fire or remove at different stages during cooking was a major challenge particularly for beginners. Fire management is important for the following reasons: i) to reduce moisture without burning the oil, ii) enhance oil quality and storability and iii) prevent oil from foaming over the pot and catching fire. The ability to manage fire to achieve quality enhances the performability of an individual processor.

Most interviewed processors reiterated that learning the skills of fire management and stirring were very essential and shared their experiences. In a semi-structured questionnaire (N=24), three main sources were identified through which women acquired knowledge and skills: family, other women at the *Kramer*, and friends. When asked to rank the most used channel for acquiring skill and know-how, majority of the women referred to their mother, grandmother, sister in law, or sister as the person from whom she learned the basics in processing, which stem from the traditional cooking processes. Also on the job learning in the *Kramer* was mentioned; this was also observed in the daily activities, wherein women consulted each other and hands-on collaboration during cooking and processing were moments of exchanging skills and know-how. Learning how to cook red oil was a process that took most women several years. In an interview, one woman said it took her five (5) years to learn how to process:

> "When I decided to go into palm oil processing I went to my sister in-law at Ahwiam in Kwaebibrem District to learn the skill. She had already been processing for years. I spent

five years working with her and through that acquired the skill and knowledge in processing and later came back to Asamankese to start my own processing." [Interview C.O.A, Asamankese, December 12, 2010]

Most women held the view that learning through continuous practice provided hands on learning in practices where close supervision was provided. Supervision was critical for three reasons, they mentioned: to prevent the burning of oil, to prevent spill over and consequent catching of fire by the oil, and to ensure that all moisture evaporates to enhance storage and oil quality. Under such conditions, processing creates the opportunity for learning and belonging to a guild of processors and consequently improves the image of some marginalised women in the communities. How do people acquire skill and knowledge in processing particularly new members? To answer to this question I present the life stories of two young processors.

Example 1, learning by a young processor

In an interview, a 31 year old woman from the Northern Region of Ghana narrates how she learnt to become a member of the group:

"I am originally from the northern part of Ghana but came to the Eastern Region with my parents, who were migrant farmers. I worked first as a labourer at the government rubber plantation while at the same went to the *Kramer* to remove nuts from the fibre. I did this for some time, till one day I was asked by one of the processors to assist her. I stopped the work at the plantation and worked with her for about five months. During these months, I saw the different ways of cooking the oil. Before I came here I only knew about *mpaanyi*, (a method whereby the digested fruit is mixed with water, cooked like soup and the oil is scooped from the top). I learnt about the timing for adding salt when cooking *zomi* [a type of palm oil] and how to manage fire when you are steaming the fruits or cooking the oil. I later worked for two processors at the *Kramer* for about one and half years. Through this I was able to save money to buy fruits and gradually started processing gradually on my own. Because I was already working with some of the processors, it was easy for me to work here as a new member and use their utensils, pots, pans, storage container. Now I have my own pot". [Interview A.B., Ekoso, February 6, 2011]

Example 2, learning by a young processor

Her story may not be different from another 22 year old woman I met at the *Kramer*, but the decisions to enter the trade were triggered by different situations. Busily carrying fruits and arranging the pots and firewood in the stoves, I became curious because she seemed to be the youngest of the processors. Apparently she had stepped in her mother's shoes to continue her business. She was a native of the area and daughter of a deceased processor who passed away few months before I arrived:

> "I used to assist my mother and cousin on work and pay basis but sometimes instead of money, they shared the kernels with me, which I sold later. At that time I did not know how to cook the oil but because I had nothing to do and needed money I assisted them with odd jobs for 2 years. When my mother's illness became worse she asked me to step in to continue her work so she would not lose her customers both for fruits and oil and also to be able to take care of my siblings who were in school. She gave me her working capital to work with and also introduced me to her fruit suppliers in the nearby communities before she finally passed on. But I did not know much about cooking the oil. Though I had been working there for some time, I did not have the skill to cook like the experienced ones. I depended on my cousin to help me. For instance you must know the right time to add salt when cooking *zomi* and when the oil is well cooked. This is a critical point because if you miss it the oil will burn. I also got help from other processors. Now I cook without supervision and have found new customers in addition to my mother's."
> [Interview A.C., Ekoso, October 12, 2010]

Having access to the group and skill formation was not all a processor needed to perform. The individual members also needed access to the physical workplace, i.e. the *Kramer*, to process oil, to store tools (pots, drums, shed, stoves etc.), and to reproduce a network with suppliers and buyers. This symbolises a crucial step in the daily performance of a processor, but not all could afford especially the new members, with cost cited as the main limitation.

The study found that most of the women accessed entry to the group through their social networks including friends, neighbours and, to a less extent, family, which invariably, were the first point where integration, resource sharing and learning started. Sharing her experience, one woman said:

> "When my husband was transferred to the West Akim municipality, I had no no job, so Grace brought me to the *Kramer* to work with her. We are from the same town in the Volta

region. I worked with her for one year and, when she was leaving this place, she left behind some of her things (aluminium pot, a shed, jerry cans, and gallons for me to start my own processing. To purchase fruits to start processing, I also received a loan of one hundred Ghana Cedis (GHC100.00)". [Interview D.B., Ekoso, October 12, 2010]

Processors depended on each other for resources such as cooking utensils (pots, aluminium pans, etc.). Cooking utensils were provided by individual processors and made available to members, though not all could afford to contribute. Interestingly, in one group no fee was charged for the use of the utensil by those who contributed to the common pool; however, broken or misplaced items had to be replaced. In the other group, members who did not own pots had to pay a token of one Ghana Cedis (GHC 1.00) per pot each day it is used, while outsiders who accessed the facility paid five Ghana Cedis (GHC 5.00). Funds accrued were used to purchase more utensils to replace broken and new ones and to pay for repair works at the *Kramer*. In an interview, one processor said she had been processing for two years but did not own a pot. She paid each time she used the pots. To her, the decision to use her start-up capital to purchase fruits for processing outweighs that of buying a pot since she could hire one.

"The pots and tanks belong to the individual women and since I do not own one I will have to pay any time I use it". [Interview S., Asamankese, December 19, 2010]

Arrangement for sharing resources at the *Kramer* enabled processors, especially new ones, to have access to facilities needed for processing, which they otherwise could not afford. By linking up with other women at the *Kramer*, new members gained access to buyers and suppliers. At certain times some old members acted as brokers for marketing oil or sub contracted to other group members when they could not meet demand. These interdependencies also extended to having access to fruits. Through the regular suppliers new members were linked to farmers and other sources for fruits.

Tensions in the performance of tasks

As expected, the high level of cooperation and interdependency, which characterised processing, was not without tensions. Conflict and tensions emanated from interaction among members and in the performance of tasks. For example, on a particular day, the last person had her turn to mill around 2pm, but she was at the *Kramer* as early as 5am to work with the team. By 2pm two processors left the work after milling their fruits. The others started

shouting and calling for them to return or else no one would assist them at the *Kramer*. It was realised at that point that the other women and the men pressing the macerated fruits were tired. Then one woman commented:

> "It is a big disadvantage to be at the bottom of the queue. When the pressers are tired they are unable to press well to get all the oil out". [Interview L., Ekoso, September 20, 2010]

Similarly, there were tensions around cooking and sharing of resources as one of the processors said:

> "One day I picked an aluminium pan to use but the owner took it from me immediately though she did not need it at the time. At times some of them will intentionally put fruits in the tanks and pots and go home deliberately to keep others away from using them. Others will intentionally put the pots on the stoves with water as if they intend to cook the fruits but really only to prevent people from using the pots. [Interview F., Ekoso, September 20, 2010]

Another woman said:

> "Sometimes some of the women do not like it when I use their utensils and even shout at me but since I need it to do my work I do not get angry, I manage to cope to get my work done". [Interview A.C., Ekoso, October 12, 2010]
> "Here you can use other people's things only that some of them talk and get angry but it is also our fault. Some use the things and do not take good care of them. Most of the women, who recently started processing, did not own pots; hence, you depend on others for some time before you can buy your own". [Interview D.B., Ekoso, October 12, 2010].

On another occasion a quarrel ensued between two processors with one asking the other not to use her pots to cook oil again. She was immediately asked by the rest of the women to rescind her decision or be banned from using things belonging to others:

> "No one at the *Kramer* can depend on her own things only to work here, we all use other people's things so if you stop someone from using your things, and others will equally stop you from using theirs". [Interview C., Asamankese, November 24, 2010]

These comments clearly show there were tensions within the groups, but how were they managed? The statement 'nobody rules anybody here, we are capable of managing our affairs' was repeated many times by the processors during the study, which prompted a closer look at the internal structure of the groups. The statement indicated that there was no defined structure in the sense of who was in charge. One of the men who operated the mill said:

> "The women sometimes make decisions without consulting me. They put up structures and bring in new people without any discussion. How they use the facilities here is completely in their own hands." [Interview K.S. (machine operator), Ekoso, September 14, 2010]

In another instance a mistaken identification of palm fruit led to a quarrel between two women. When asked why the other women would not intervene to separate the fight, they answered:

> "We quarrel and stop talking to each other all the time, but in a short time we reconcile because in this work we need each other. We always come together even when we fight". [Interview N., Ekoso, November 7, 2010]

It was clear that the groups had no structure in terms of leadership yet conflicts and tensions were resolved.

Discussion

In exploring how a group of female processors organised in small groups to make palm oil with specific quality traits, the chapter reveals that the group adopted a hybrid organisational form in the sense of combining individual and collective actions in the same line of business. The group consisted of women with diverse social composition (Table 1 and 2). Women working within the small groups made different individual and acted collectively (Table 4). At the level of processing, the women shared tasks, managed risks, and transmitted knowledge and skills to new members. Individual women needed to team up because when fresh fruit arrived it was essential to process and cook as soon as possible otherwise the quality of the oil produced declines. Moreover, demand for certain volumes, necessitated a certain degree of joint effort in milling and cooking.

By teaming up with others, the women derived certain benefits in terms of sharing a physical space for entrepreneurial activities, creating a scale more attractive for buyers, jointly

organise labour and arrange access to oil palm fruits. However, managing sourcing and marketing oil remained an individual decision. The findings show that neither economic rationality nor social ties fully explain cooperation and group stability. By focusing on practice and performance of tasks, our study offers an explanation to how such organisational forms emerge, not as an outcome of intent, but through the processes of solving everyday problems in processing.

Task performance is key to the explanation of group organisation in this particular case of everyday processing practices in a particular context. The performance of tasks related these groups to their environment, which was dynamic and complex for small-scale processing. This became visible in the way individual women and the groups handled seasonality of fruits and fluctuating market conditions. The problem of handling the technicalities of processing fruits fresh, maintaining a certain level of temperature during milling, and producing volumes of quality palm oil were essential to group cohesion and stability.

The performance-based analysis emphasises the interaction between human action and unanticipated outcomes and explains the survival of groups from the combined individual and collective performance in processes of material transformation, rather than from the qualities of a fixed and stabilised organisational form. By focusing on practices of processing we come to terms with the complexities of both the technical and natural dimensions, which imposes different kinds of demands on the group and individuals, which had to be met through an appropriate organisational form (Leonardi and Barley 2008). Therefore, there is no logic in the long held perception that a certain organisational form of collective action would produce certain outcomes and has more chance to be successful. Arguably, a particular pattern of entrepreneurial behaviour is only suitable to a particular context and not fixed.

Know-how and skill are important for the performance of tasks, formed through iterated practices over time (Amanor 1994). In the case of oil palm processing, knowledge and skill were shared through daily interactions between experienced processors and new members (described in two examples presented above). Routine practices, improvisation, and adjustment formed skill and the use of techniques required for performance. This process of establishing, using, and sharing know-how over time, this from experienced processors to new members, is where Fine (2012, 1979) suggests to find traces of group culture, which, in the case of the two *Kramers*, may be captured by the blending of individual freedom to make quality and the collective endeavour to help each other in making this work via lending pots, sharing recipes, or organising processing to manage volumes. Here, Fine refers to culture created through practice by the group over time. In line with Mcfeat's (1974) argument, the information generated through tasks performance and passed on and used in similar tasks,

sustained the groups because it made it easy for new members to join and remain. As was indicated in examples of young processors learning the job, these women worked for years as helpers. They were never recognised as group members at the *Kramer* until they acquired enough skill, which is a clear indication of the link between know-how, task performance, and practice, and to become member of a group of women generating income, acting as small-scale entrepreneurs, and being recognised by their profession in the community.

According to McFeat (1974), the performance of specific tasks generates rules, procedures, and routines agreed upon by members to control behaviour. This assertion is also supported by Fine (1979), who posits that it is the repeated interaction that produces rules and norms and provides a set of behavioural options. It becomes evident that the set of unwritten rules used by the group to regulate milling and sharing of tools cautioned inappropriate behaviour, diffused tensions among processors and contributed to group persistence and stability. However, these rules emerged along the way, while performing the tasks and responding to ad-hoc situations. Accordingly, Fine argues that structural forces alone do not shape organisational outcomes, rather group culture, 'the way they do things', explains group behaviour.

This argument is substantiated by our observations, which confirm the analysis of Lyon (2003b) who claimsthat when groups make and enforce their own rules sustainability becomes more likely. But the rules were not static as they were modified to address changing situations in the performance of tasks. Moreover, the groups organisational form cannot be described as fixed as it changed with the seasons. Membership at the *Kramer* changed within the year with new or old member re-joining the group during the peak season. At certain times within the year, when fruits were difficult to get, some members were not encouraged to process as the risk of incurring high debt, which had a negative implication on the form of organisation. Again this brings to the fore the choices that individual could make as entrepreneurs. It is suggested therefore that instead of looking for a perceived uniform organisational design, we should appreciate a mixture of institutional modalities that best suit the task and the purpose of a particular group. The two case studies of women's demonstrated sufficient internal variety in terms of social and demographic characteristics but also in preferred styles to act in the markets for fruits and oil or to handle risks to explain why they were able to sustain their viability (Hood 1995; Amanor 2009).

Conclusion

Women's groups are often presented as an important entry point for development interventions. The case studies of small women's groups processing palm oil, which exist for more than a decade, open a discussion on how to conceptualise the performance and stability of women working together in groups. The discussion suggests that the form, performance, and sustainability of groups can best be considered as an emergent outcome of what they do. We focused on everyday practices, revealing how within the groups women organise milling, perform the delicate and skilful task of cooking, and arrange the external linkages with buyers, suppliers and other actors in the villages.

Detailed investigation of these practices of making palm oil in two groups reveals that the groups manage to survive by continuously balancing individual choices For example, from who to source fruit and for what price, with collective choices, for example how to include new members, how to determine prices asked from buyers, or how to ensure the quality appreciated by the market. This balancing act results in evolving modes of organising work, resolving internal tensions and managing interdependencies within processing. The groups developed the skill to bring people together in the making of quality palm oil. Rather than looking for a fixed organisational form, we show that the sustainability of the groups depends on alternating organisational configurations, tailored to the nature of work, the seasonality of processing, and to the interactions of small groups with their environment.

The question why groups persist can be investigated by starting from the tasks groups perform, including a thorough description of the (technical) contents of the task, and its organisation. In other words, understanding why women act collectively requires looking at what people do (performance), which suggests a less organizational view on collective action, and emphasizes action and performance. The performance-based perspective on collective action placed the making of quality palm oil are the centre and shows the importance of understanding how teams develop and use skills and techniques. We relate the viability of existing small groups to their capacity to organise and cooperate in order to solve day-to-day problems, such as processing ripening fruits in time, their capacity to transmit information over time, shown by the process of inclusion of new members in a set of tasks varying from peeling fruits to the delicate task of cooking and fire management, and to the small-group's capability of handling changes in its environment, such as the recurrent fluctuations in the supply of fruits for processing. Our study of the making of quality palm oil re-appreciates the argument by McFeat in the 1970s that the study of small groups emphasises group structure,

induced by the contents of the task. A focus on task performance may provide a better understanding for why a group organizes in a particular way.

CHAPTER 3

The blending of individual and collective strategies: the social and material dimensions of women's groups processing and sourcing palm fruits in Ghana

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Abstract

In Ghana, women involved in small-scale processing of palm oil combine individual entrepreneurial interests with belonging to a group of other women involved in the same line of business. They join to solve problems of managing volumes of bunches of fruits for economies of scale and create a market attractive for buyers. However, they face a contradictory force related to access to fruits and competition. Nevertheless the group persists. What is remarkable about the grouping is that both had existed for more than a decade. Yet individual women manage sourcing on their own but simultaneously perform tasks collectively. How and why do the women combine individual and collective interests and what makes the group persist? The chapter argues that social organisation cannot be exclusively explained by looking only at the social and institutional aspects. This is because the social organisation and institutional arrangements are reproduced in practices that link to materiality. It therefore aims to explore the hybrid organisational form by shifting focus to how the materiality of seasonal scarcity of fruits influences the organisational form and durability of a group of women entrepreneurs. The chapter concludes that the consistency and viability of the group and its institutional arrangements attuned to materiality can be explained by the group's capacity to accommodate both individual and collective strategies.

Introduction

The role of entrepreneurship in economic development has gained an increased interest, especially in the areas of employment and wealth creation (Da Silva 2009; Robson et al. 2009). In Ghana, female small-scale entrepreneurs make major but sometimes unrecognised contributions to economic development and the well-being of their families through various entrepreneurial activities (Osei- Amponsah 2013). However, in spite of the contribution of women towards economic development, they are constrained by several factors including financial and technological, which tend to limit their ability to grow their businesses and exploit opportunities. In the small-scale palm oil sector, Ghanaian women are constrained by the supply of good quality material for processing. Women dominate the small-scale oil palm sector in Ghana, which contributes about 80% to total national Crude Palm Oil (CPO)

production (Adjei-Nsiah et al. 2012a; MASDAR 2011). Figure 1 shows the contribution of the sector to oil production over time. It offers employment opportunities for many women who are involved in producing oil, buying raw materials, and processing and selling the final products in both local and international markets.

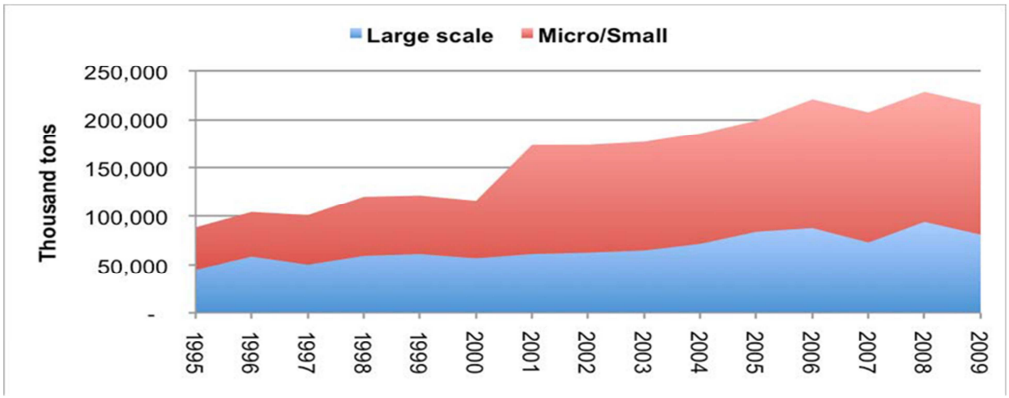

Figure 1: Sources of Crude Palm Oil production in Ghana, 2002 - 2009
Source: MASDAR (2011)

Tackling entrepreneurial problems involves exploiting opportunities but also obtaining resources, developing strategies and organising to achieve it (Eckhardt and Shane 2003). Over the years, several efforts aimed at supporting the entrepreneurial activities of low-income groups emphasise collective action as a way to realise more secure and higher incomes, to access production and processing technologies, to enter markets, and to obtain credit (PSI 2004) Nevertheless, studies have shown that in Ghana most induced forms of collective action are short lived and have weak organisational forms (Salifu et al. 2010; Salifu et al. 2012; Onumah et al. 2007).

In the West Akim Municipality in the Eastern Region of Ghana, women entrepreneurs, who process red palm oil for both local and diaspora markets, combine their individual entrepreneurial interests with belonging to a group of other women, involved in the same line of business. These groups manage to stay intact for more than a decade(Table 1); although the individual members also have to secure a consistent supply of good quality fresh fruit for processing during times of scarcity and to manage access to competitive markets for oil. What is interesting about these groups is that the women manage the sourcing individually and simultaneously perform tasks in processing collectively. What makes such a group of women

combine individuality and collectivity? How does the group manage fruit scarcity and gain stability and durability in a competitive entrepreneurial activity?

The chapter is arranged as follows: first it gives a brief review of collective action in Ghana to position the chapter. This is followed by the methodology section, describing the technographic focus on sourcing practices. Next it provides a brief description of the agro-ecological conditions for oil palm production and how its influences on fluctuation in fruit supply. It also shows how seasonality and fluctuation in fruit supply affect processing in terms of frequency and volumes and outlines the different sourcing strategies and arrangements used by women to address the problem of fluctuation in sourcing fruits. Three cases of individual sourcing strategies are presented to highlight the specific strategies and arrangements to ensure continuous supply. The chapter continues with a discussion on group participation and the different institutional arrangements and mechanisms that provide stability. The discussion suggests that group stability is an outcome of the flexibility within the group to accommodate individual strategies. The chapter concludes that, despite the differences in strategies and arrangements pursued by individual women, the group persists because of its capacity to accommodate the diverse and evolving strategies and institutional arrangements of its members.

Theoretical framework: collective action, entrepreneurship and performance

Collective action

Since the 1920's, Ghanaian policies have considered collective action in the form of agricultural cooperatives and farmer organisations as a major strategy to enhance entrepreneurial activities and to contribute to local economic development (Cazzuffi and Moradi 2010). The Cooperative Societies Ordinance of 1931 Act, set the legal framework for the cooperative societies in Ghana (Cazzuffi and Moradi 2010) and since the 1950's cooperatives had been in operation till now. Their aim however, is to assist to access credit and other support from government and donors (Tsekpo 2008). By the 1950's, collective action became the means for organising production and marketing of cash crops, particularly cocoa, coffee and cotton (Salifu et al. 2010; Havinden 1970; De Graft Johnson 1974; Miracle and Seidman 1968). Onumah et al. (2007) observed that before the period of formal cooperatives, collective action existed as a system known as *nnoboa*, whereby farmers provided reciprocal labour and support for farm work. Cooperatives in the form of communal associations also existed whereby farmers united in groups of either extended families or companies to purchase large tracks of land for oil palm production among the *Krobos*, a tribe

in the eastern region of Ghana (Anyane 1963). More recently, the drive for collective action in the agribusiness sector has also featured in both government and NGO programmes and projects. The Growth and Poverty Reduction Strategy (2006-2008) and Food and Agriculture Sector Policy (FASDEP II, MoFA 2007) are but a few of the current policy documents emphasising the organisation of farmers in groups.

Collective action is defined by Sandler (1992) as when two people collaborate on joint action or decision making to accomplish an outcome that involves their common interest. In that sense, the rational self-interest individual will not act to achieve a common group interest because of free riding problem (Olson 1965). The assumption here is that only in rare circumstances will individuals act in a co-ordinated and co-operative manner (Sandler 1992, Olson 1965). Proponents of this model of organisation assume that individuals would act collectively when they anticipate certain benefits, and thus reduce individual interest and increase cooperation (Wagner 1995). Others (Baland and Platteau 2007; Agrawal and Gibson 2001; Poteete and Ostrom 2004; Ostrom 2000) have argued that non-linear relations, including heterogeneity, group size and institutions, influence the prospects for collective action.

Collective action observed in the groups investigated in this research seems to be a natural element in the consistent collaboration among women working in the same line of business, which combines well with individual strategies and entrepreneurial interests but is also able to handle conflicts and tensions. However, an exclusive emphasis on incentives and benefits or on the combination of factors conducive for cooperation falls short of an understanding of the performance and viability of groups, wherein the boundaries between collective and individual behaviour are blurred.

Entrepreneurship

A range of recent studies in entrepreneurship in Ghana (Wrigley-Asante 2012; Dzisi 2008; Chu et al. 2007; Robson et al. 2009; Buame et al. 2013; Buame 2000; Davis and Shaver 2012; Kuada 2009; Obeng et al. 2010; Kuada and Buame 2009; Lund et al. 2008; Saffu and Manu 2004; Britwum et al. 2006; Otoo et al. 2011; Robson et al. 2012) have focused mainly on the capacities and attributes of individual entrepreneurs, often without explaining how activities take place and are organised. Focusing on individual entrepreneurial characteristics, behaviour, and the social context (Low and Macmillan 1988) does not fully explain why and how entrepreneurs combine individual strategies with belonging to a group.

This chapter argues that material conditions form a context for joint action and shape perceptions, behavioural patterns and activities of entrepreneurs. By taking the material

conditions of entrepreneurial activities as an entry point, we may be able to explain the behaviour of the women in this particular case. The research explores the specific ways in which the materiality of processing itself and of the supply of fruits becomes entangled in the practices and organisation of entrepreneurs and their activities. For this purpose, we investigate how fluctuation and sourcing play a role in the organisation of women in small-scale oil palm processing. Detailed investigation of sourcing practices shows how the group of women processing oil palm fruits survive during times when supply of fruits is limited.

Performance and materiality

Collective action can be viewed as an organisational form to mobilise capacities of local people, including women, and to respond to state and market failures in the provision of essentials of public goods (Porter and Lyon 2006). Many studies of collective action focus on production and marketing (Salifu, et. al 2010; Lyon 2003a, 2003b; Cuzzaffi and Moradi 2010; and Miracle and Seidman 1968). While the chapter does not deny that benefits and incentives bring about cooperation (Ferguson and Kepe 2011), there may be other ways of explaining cooperation or how people organise themselves, other than incentives. This chapter links the emergence of collective action to performance, i.e. the use of skills, tools, techniques, and know-how to make oil of a specific quality. This interest in how people interact with materiality offers an alternative explanation for women organise in groups and why these groups stay intact. Performance, as Richards (2005) argues, has both material and social dimensions, which may not become visible by adopting an exclusively technological or economic stand.

Materiality plays a significant role in how people organise (Orlikowski 2002; Orlikowski 2000; Leonardi and Barley 2010) which also apply to groups. Leonardi and Barley (2010) argue that the distributoin of resources in organisational fields determines organisational outcomes. Vellema (2011) argues that technological artefacts and material conditions form a context for action and shape perceptions, behavioural patterns, and activities. In line with this, Benton (1991) claims that human action is contingent on biophysical and natural conditions. The general implication of this is that organisation revolves around the interaction between social and material practices (Orlikowski 2002). Therefore, perspectives on collective action that consider intentionality as incentive for organising ignores the fact that what people do does not always derive from conscious deliberation or thoughtful reflection (Rouse 2007). Social organisation evolves and emerges in response to changes in processes, thus creating different dynamics and outcomes (Leonardi and Barley 2008) that may be unintended. Social

reality is not a steady state in which event outcomes can be predicted (Pettigrew 1997). Yet this emergent aspect of organisation remains largely unexplored empirically.

Results

This chapter takes the sourcing of fruits, and the observed fluctuations, as entry point for documenting how material conditions influence the organisational dynamics of small women's groups processing these fruits. Our investigation takes a technographic approach, which emphasises social-technical practice and leads to a description of making. The chapter focuses on sourcing as an example of market transaction and a mixture of social relations of networks, negotiation, and management of relations. We demonstrate how two groups, with 9 and 15 female processors respectively, in the West Aakim municipality organise to manage the materiality of fluctuation, through a variety of strategies and institutional arrangements. In this chapter, all 24 women working at two *Kramers* compose the research population.

Small-scale palm oil processing involves various steps, starting from the acquisition of fruits, steaming or sterilisation, milling (digestion) and clarification (cooking). The various processes require that women team up in processing because when fresh fruits arrived, it was essential to process and cook them as soon as possible to prevent quality loss. Moreover, demand for certain volumes for economies of scale attractive enough to buyers, necessitated a certain degree of collective action. Interestingly, in sourcing fruits women mostly acted individually. This section first presents the social and material conditions under which women source palm fruits. Then it identifies different sourcing practices and institutional arrangements.

Social and material conditions

Group characteristics

Women working in the two groups had varying experiences in processing with most having up to basic education, given the low literacy rate among women in rural Ghana. Interestingly, the groups were a mixture of women of different ethnic backgrounds, marital statuses (single, married, and widowed) and age. The average age of the group was 38 with the youngest being 23 years and oldest 56 years. More than 50% of respondents were migrants (from other parts of Ghana than the eastern region) who accompanied their spouses or parents to the area. About 62.5% of the respondents were married, while the remaining group was single, divorced, or widowed.

Blending individual and collective strategies

While some had access to land for cultivating oil palm through their own arrangements or through husbands or other family members, seven (7) women out of the 24, representing 29%, had no access to land for cultivating oil palm. The average farm size among group members was about 2.5 acres with the largest being 12 acres and the smallest 2 acres (Table 1). This is not surprising since access to land for cultivating oil palm in the study area was difficult, particularly for women. Those who had access through their husbands or his family could have access to land as long as the husband was alive. If the husband dies she must go into other land arrangements. Accessing land generally for non-indigene or any landless individual was through the shared cropping system (*abunu*) where the land owner takes 50% of whatever is harvested or the (*abusa*) where the proceeds are shared into three parts. Under this arrangement, the land can only be taken back when the trees become old and stops bearing (for details on tenure arrangements in oil palm (see Adjei Nsiah 2012; Amanor 2001).

In spite of this diversity the women collectively performed the tasks. The group is not only diverse in its social composition. Table 1 also shows differences in entrepreneurial performance as reflected in frequency in processing and volume of oil processed. Nevertheless, the group had persisted for over a decade.

Agro ecological conditions and fruit fluctuation

Oil palm production fluctuated throughout the year as a result of the agro ecological conditions in Ghana (Table 2 distinguishes the main agro-ecological zones in Ghana on the basis of climate, the natural vegetation and influenced by the soils) (MASDAR 2011). The oil palm grows in the wet semi-deciduous forest zone where rainfall is at least 1500 mm per annum and well distributed, with high relative humidity and minimum monthly temperatures not below 20ºC (ibid.). The semi-deciduous forest zone is characterised by a bimodal rainfall pattern (major and minor raining seasons) which supports all year round plant growth. The major rainy season is from March to June with the heaviest rainfall in June and the minor season from September to October. The oil palm tree produces twice in a year with the major production season from February to April and minor season from June to December.

Generally, fruits are in abundance between February and April and become scarce between June and December. However, this production trend had implications for processing in that, fruit availability fluctuated. Fruits were in abundance in the peak season and therefore, large volumes of oil were processed as compared to the lean season. Scarcity of fruits in the lean season brought processors to competition, to the extent that sometimes processors were unable to process for weeks for lack of fruits.

Table 1: Social and demographic characteristics and processing capacities of female processors working in small groups (N=24)

Processor n=24	**Age**	**Migration status**	**Marital status**	**Farm size**	**Years in processing**	**Education**	**Household size**	**Volumes processed**			**Continuous processing**	
								High	**Med**	**Low**	**yes**	**no**
1	46	indigene	single	2	10	basic	5		✓		✓	
2	35	indigene	married	12	10	basic	6	✓			✓	
3	53	indigene	married	2	3	basic	7			✓		✓
4	46	migrant	married	2	10	basic	7	✓			✓	
5	50	migrant	single	2	15	none	4		✓		✓	
6	45	indigene	single	4	7	basic	5	✓			✓	
7	31	migrant	married	3	5	basic	5		✓		✓	
8	50	indigene	married	2	4	none	4			✓		✓
9	23	indigene	single	0	2	basic	5		✓		✓	
10	33	migrant	married	0	5	basic	5			✓		✓
11	35	migrant	married	0	10	none	7	✓			✓	
12	43	migrant	married	0	3	basic	6			✓	✓	
13	35	migrant	married	0	4	basic	7		✓			✓
14	51	indigene	single	4	6	nil	6			✓	✓	
15	31	migrant	married	0	5	basic	5		✓		✓	
16	45	indigene	single	4.5	19	basic	6	✓			✓	
17	45	migrant	widow	3	2	basic	6		✓		✓	
18	42	indigene	married	6	3	basic	7				✓	
19	47	migrant	married	4	19	none	5		✓		✓	
20	50	indigene	married	3	7	basic	6			✓		✓
21	42	migrant	widow	0	20	basic	5			✓		✓
22	43	migrant	married	3	10	basic	6	✓			✓	
23	53	migrant	married	2	8	none	7			✓		✓
24	56	migrant	single	2	15	none	4		✓			✓

Source: Semi structured interviews at Ekoso and Asamankese, West Akim, 2010

Table 2: Average rainfall by agro ecological zone

Agro ecological zone	**Mean annual rainfall (mm)**	**Major growing season (days)**	**Minor growing season (days)**
Rain forest	2,200	150-160	100
Semi-deciduous forest	1,500	150-160	90
Forest/savannah transitional	1,300	150-160	60
Coastal savannah	800	100-110	50
Northern savannah (Guinea)	1,100	180-200	0
Northern savannah (Sudan savannah)	1,000	150-160	0

Source: MASDAR (2011)

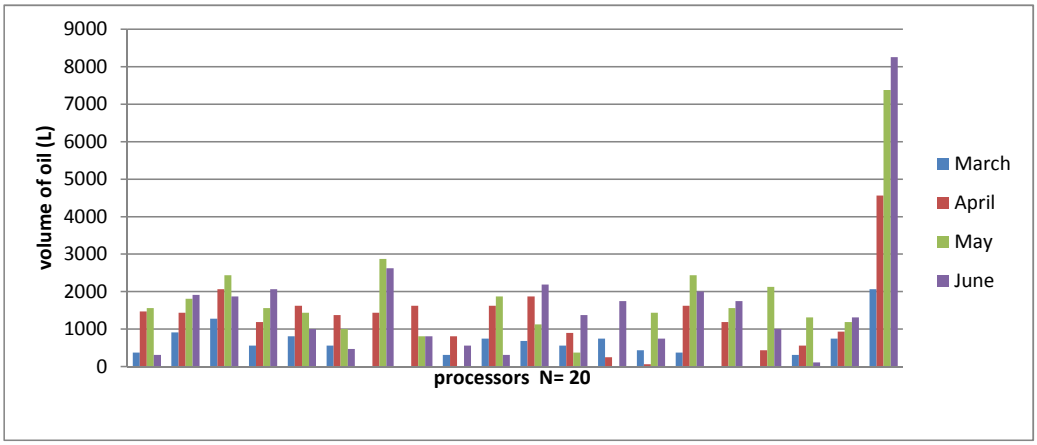

Figure 2: Fluctuation in volume of palm oil processed (Litres) between March and June, 2011. Source: Field observations and interviews carried out at Ekoso and Asamankese *Kramers*, 2011.

Observations of processing activities of twenty of the women at two *Kramers* for a period of four months during the peak season show the fluctuation of volumes of oil produced (Figure 1). This could be attributed to individual sourcing strategies and arrangements, which

will be discussed later in the chapter, but paramount among them was that fruits were not always available in larger quantities for processing, even during the bumper season.

Price setting

Pricing of palm fruits was determined by the prevailing market price of oil, which responded to seasonal fluctuation in supply and demand for fruits and oil. Palm oil price was mainly derived from the price of the fruits and vice versa, but the quality of the oil was also used in negotiations between processors and buyers (Osei-Amponsah 2013). An increase in the price of oil attracted a corresponding increase in the price of fruit. When the price of oil increased on the market, that of the fruits also increased and when the price of palm oil decreased on the market, the price of fruits also decreased. As to who fixes the price of fruits or oil, different views were expressed by the different actors in the supply chain. Processors on the one hand were of the view that the price of fruit was determined by farmers; while some farmers claimed it was the buyers (processors, intermediaries, exporters) who fixed the price. To quote what one famer said:

> "The buyers come with their own price and we are forced to accept because the fruits may go bad. They have more power because they decide whether to buy the fruits at the selling price or not''. [Interview Azuma, Akim Boso, June 26, 2010]

In a group discussion attended by about 50 farmers and suppliers/traders at Akim Boso in the West Akim municipality, both farmers and intermediaries/traders debated on who had power to fix the price of fruits. While farmers blamed the intermediaries/traders and processors for determining the price of fruits, one of the suppliers present maintained this was not true. However, after coming under intense pressure from the group, she conceded that fruit buyers had some power in fixing the price. Nevertheless, there was some space for negotiation as one processors indicated. She said:

> "We have to make the farmer or supplier understand whether we will make profit if we buy the fruit at the price he is quoting or not" [Group discussion, Tasi, Akim Boso, June 26, 2010]

The price of fruits and oil fluctuated in response to the seasonal changes. This occurs uniformly across market centres in the district. In the peak season, when fruits were in abundance, prices of both fruits and oil were lower compared to the lean season. During the

peak season, more processors were able to access fruits for processing; however, marketing of fruits was a problem for farmers due to overall quantities of fruits harvested in the area. Some farmers were compelled to sell fruits on credit in order to reduce post-harvest losses. Other buyers (exporters, local restaurant operators) preferred very fresh fruits, as compared to the old ones. Very fresh fruits were used to process *zomi*, while fruits that were few days old were used to process *ngopa*. The fermented oil extracted from the fibre was used for soap making.

Interviewed farmers told that they sold on credit because of glut and the highly perishable nature of fruits. This enabled processors to acquire larger volumes of fruits for processing, even without ready cash. Selling fresh fruit, suitable for making oil for soup, on credit was encouraged by the higher prices for the edible oil in the market. The availability of fruits during the peak season and the credit facility enabled more women to process large volumes of oil compared to the lean season. The reverse happened during the lean season when processors had very limited supply of fruits and buyers competed for fruits. In this case both fruits and oil were paid for in advance to prevent diversion and cheating by both farmers and traders and processors as well.

In an interview, one of the processors revealed that between February and July 2010 (peak season), she paid between 8-10 Ghana Cedis (5-8 Euros) for a bag (83kg) of palm fruits, which was used for making for 62.5 litres of oil sold at 30-35 Ghana Cedis (15-20 Euros). She also acknowledged that though prices paid for palm fruits and palm oil fluctuated in response to the season, prices of palm fruits and oil changed on a regular basis depicting a higher price during the lean season, and a relatively lower price during the peak season. This was observed on three occasions during the research period. For example, the price of a bag (83kg) of palm fruits was 25 Ghana Cedis in October 2010, and 80 Ghana Cedis for 62.5l of oil. This however changed to 30 Ghana Cedis per bag of fruit and 100 Ghana Cedis for 62.5l of palm oil before the end of November 2010. By the end of December 2010 the price per bag (83kg) of palm fruit was 45 Ghana Cedis, while palm oil was being sold for 140 to 150 Ghana Cedis.

Table 3. Fluctuations in price of fruit and oil at Ekoso *Kramer*, October-December, 2010

Month /2010	**Qty of palm fruits/bag**	**Price (GHC)**	**Volume of palm oil (Litres)**	**Price of oil (GHC)**
October	3 bags (249kg)	75	62.5	80
November	3 bags (249kg)	90	62.5	100
December	3 bags (249kg)	135	62.5	150

Source: Observations and estimations by women during interviews

Sourcing practices of women

Sources of fruits supply

Having looked at fluctuations of fruit supply and its effect on supply and pricing, we now focus on how processors find ways to manage fluctuation. What practices did they engage in to ensure that they had sufficient fruits for processing? Accessing fruits for processing especially during the lean season was a challenge; nevertheless, some of women continued processing. We identified three main sources where women acquired fruits for processing: a) their own or family farms, b) local farmers and c) traders or intermediaries.

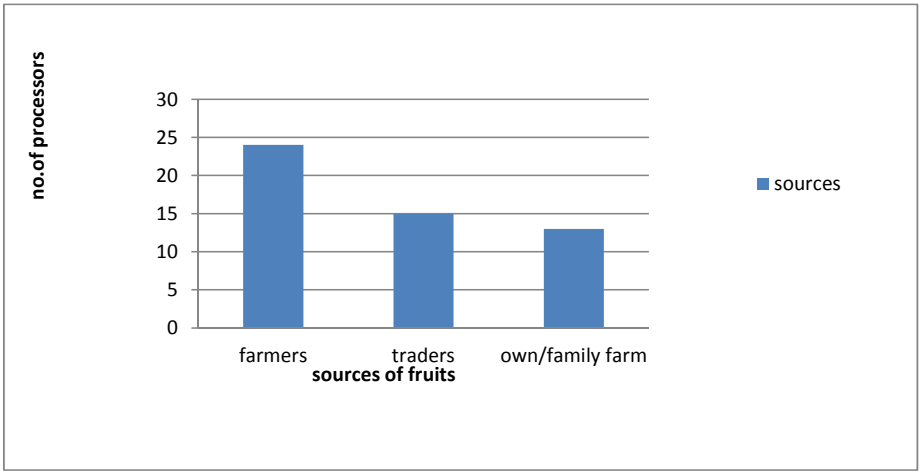

Figure 3: Number of women purchasing fruits from specified sources (N=24)
Source: Field observations and semi-structured interviews with female processors at Ekoso and Asamankese, 2010
Note: For processing women combine fruits from different sources.

Most processors accessed fruits from all three sources to ensure continuous supply of fruits Semi structured interviews revealed that all twenty four (24) processors acquired fruits from farmers, while 15 (representing 62%) from traders/ intermediaries and thirteen (54%) of respondents from their own or family farms (Figure 3). Some combined sources, however, the most preferred to source fruits directly from farmers, and if possible to use fruits from their own or family farms. The mixing of sources was related to the limited access to land by the female processors (Table 1). Access to land for oil palm cultivation was particularly difficult for women and migrants in the area, also not by entering into the different types of tenure arrangements (see details Adjei Nsiah 2012; Amanor and Diderutuah 2001).

Blending individual and collective strategies

To better understand sourcing practices and how related arrangements were carried out by the women, we first explain the different sourcing channels, and continue with four specific cases to show how individual women source fruits and act in the group.

Own/Family Farm

Even though oil palm farming and processing were among the main livelihood activities in the area, not all the processors interviewed had access to land for cultivation. Seven (7) women out of the 24, representing 29%, had no access to land for cultivating oil palm. However, 17 (70 %) women had access either through their husbands or parents (family). But the average farm size was 2.5 acres. About half of the group (see Figure 2) indicated they sourced fruits from own/family farms. However, the supply of fruits from this source, as indicated by processors, was insufficient to sustain continuous processing.

Farmers

Another source of fruits supply was local farmers, who mostly cultivate small plots. From this source fruits were supplied after each harvest, which was done fortnightly. To ensure regular access to fruits after each harvest, the processors entered into different arrangements with the farmers. Also, these arrangements varied with the different seasons in relation to demand and supply. During the lean season when fruits were scarce, some farmers demanded payment in advance before supplying the fruits because of the demand, whereas fruits were sold on credit during the peak production season because supply exceeded demand. In the lean season advance payment was necessary to prevent fruits being diverted by farmers and traders. The advance payment and other arrangements in sourcing will be addressed in the following section.

Fruits were diverted to other buyers willing to purchase at prices higher than the prevailing market price. This was actually witnessed when in a group discussion with fifty (50) farmers (Akim Boso, West Akim Municipality, June 26, 2011), almost half (23) indicated they sold their fruits to a medium-scale processing factory in that particular month instead to the processors. Some of the reasons given by farmers for diverting the fruits were:

1. pricing was standard and transparent since it was based on weight instead of visual estimation used by the processors;
2. less labour cost since fruits were bought on bunches;
3. no transportation incurred, reducing production cost;
4. instant cash payment.

Intermediaries/traders

The traders and intermediaries were mostly women who bought the fruits from famers or travelled far to other oil palm growing areas to purchase the fruits and supply the processors. Within the municipality, processors depended on local agents to purchase the fruits from farmers. According to the traders, it was important to involve with agents who lived in the communities and who knew the farmers to avoid the purchase of stolen fruits. Time spent on searching for fruits in the villages and the costs incurred in bulking the fruits were mentioned as reasons for using local agents. For each bag of fruits supplied by a local agent, there was a commission charge of one Ghana Cedis (GHC 1.00). Traders who did not have their own working capital to purchase the fruits demanded advance payments from processors before supplying fruits. The monies received were also deposited with the local agent for the purchasing of fruits. Besides cost, untimely delivery of fruits was mentioned as problem related to accessing fruit from this source. This also affected fruit freshness and subsequently oil quality. At times fruits stayed in bags for days before being transported, which in turn affected fruit quality and consequently that of oil. Moreover, diversion of fruits to other buyers with ready cash was also mentioned as a problem associated with sourcing from traders. Nevertheless, they provided another channel for accessing fruits besides farmers and own/family farms.

Individual sourcing strategies

In the previous section we identified three main sources of fruit supply. The study found that eight (8) processors (33%) out of twenty four (24), accessed fruits from all three sources (i.e. farmers, traders and own/family farm), seven (29%) sourced from farmers and traders, while four (17%) depended solely on farmers for the supply of fruits (Table 4). Only five processors (21%) sourced from their own and other farmers. None of the processors depended solely on their own/family farms or traders.

This section sheds more light on the individual sourcing strategies and related institutional arrangements. We present four case studies to show how the women combined different strategies to source for fruits and different arrangements in sourcing. The case studies show that sourcing fruit was complex and involved individual processors combining different sourcing strategies and making a variety of arrangements with farmers, suppliers, and buyers, to ensure regular supply. Cases 1 and 2 are examples of women in the group who could be considered well-endowed, while cases 3 and 4 represent marginal processors.

Table 4: Types of individual sourcing strategies (N=24)

Individual sourcing strategies	**No. of processors**
Own/ family farm	0
Farmers	4
Traders	0
Own/family farm + farmers	5
Own/ family farm + farmers + traders	8
Farmers +traders	7
traders +own/family farm	0
Total	**24**

Source: Semi-structured interviews with processors at Ekoso and Asamankese, 2010

Case 1: farmers, traders, and family farm This first case study reports the sourcing strategies of a processor using fruits from all three sources, own farm, farmers, and traders. In an interview, she indicated that she obtained fruits from her husband's farm for processing. Her husband owned a 12 acres farm, which was acquired through shared cropping system (*abunu*). Fruits harvested from the farm were supplied to her for processing. Besides the farm, four women in the village also supplied her fruits on regular basis. The women were not farmers but intermediaries who bought fruits from several farmers in and around the community to supply. In addition to the intermediaries and the farm, she also sourced fruits directly from eight farmers, who were both small and medium-scale farmers within and outside the municipality. These farmers supplied fruits every fortnight after each harvest directly to her. To avoid over supply, the farmers alternated in the weeks they harvested and took turns to supply. Fruits were sold in bunches, which she said fluctuated in quantity with the seasons. To her, it was important that fruits were bought from credible sources. She said:

> "I buy the fruits only from people I know. If someone brings me fruits and I don't know the person, I will not buy because sometimes people steal from other people's farm and sell". [Interview N., Ekoso, Novermber 7, 2010].

During the lean season, the high demand for fruits among different users: processors, fresh fruit sellers, palm oil and soup base exporters, local restaurants operators, and medium-scale manufacturing companies, triggered competition. This often resulted in fruit diversion by farmers and suppliers, especially when prices offered were higher than the market price. One

way of securing supply by the processors was to make advance payments, to prevent fruit diversion and ensured continuous supply of fruits. Besides, since most of intermediaries did not have their own working capital, she made advance payments to pre finance their purchases and to facilitate their access to fruits. In the case of the traders/intermediaries, monies advanced to them were also used to pay local agents to purchase fruits from local farmers. Unlike the lean season, fruits were mostly purchased on credit during the peak. On the arrangements, she said:

> "Now that the fruits are scarce I pay the farmers in advance or else they will sell to others. But when the fruit is in season they even beg me to buy on credit sometimes." [Interview N., Ekoso, August 5, 2010].

A major problem for her was the frequent changes in prices for the fruits. She claimed that if the price of the fruits went up and you had someone's money, you have to ask if she agrees to an increase before you process. On one occasion I witnessed an incident between her and an intermediary over price increase. Apparently the supplier came to inform her about an increase in the price of the fruits that morning. She had already accepted an advance for a certain amount of fruits but feared the increase in price will affect the quantity to be supplied. The fruit was sold at 4.5 Ghana Cedis per bucket the previous day but increased to 5 Ghana Cedis the following morning. She therefore needed the processor's consent before purchasing the fruits at the new price. She then explained that the price increase was a result of increase in the price of oil on the market. The processors on her part indicated she would only accept the fruits at the new price if the buyer of oil also agreed to adjust the price since she had already made payments.

The arrangements for selling and buying oil were similar to that of the fruits. In the lean fruits production period, demand for oil increased requiring buyers to make advance payments. She in turn used the money to purchase fruits. In that case she was obliged to process for the buyer who made the advanced deposit. She maintained that during the period of scarcity, new buyers emerge with higher price offers, and they disappear again in the peak season. To her, it was better to continue processing and to try to constantly supply existing customers:

> "I want to keep my customers so I continue to process even if I don't make profit. I have been doing business with my buyers for many years and therefore try to process oil for them even during the lean season when fruits are scarce so that they will also buy during

> the peak season. Some buyers may come during the period of scarcity but you will not see them again when there is glut. It is important to satisfy my client when there is oil shortage instead of those who are not regular buyers here". [Interview N., Ekoso, October 12, 2010]

Having a regular customer or client helps to establish and build trust over time. It also guarantees a market for oil even when there is glut. With these arrangements in place she was able to process oil twice a week in the lean season and thrice during the peak season, processing between 35-40 bags (2.905- 3.320t) during the lean season per processing and 50-70 bags (4.150-5.910t) during the peak season.

Case 2: Farmers, traders, own farm The strategies of the processor described in this second case also combines three different sources (own farm, farmers and traders) to acquire fruits for processing. However, she did not only source for fruits but also oil during the lean season as a strategy to manage the fluctuation problem. She owned an oil palm farm of about 4.5 acres in size, which was acquired by her late husband through the shared cropping (*abunu*) system. After the death of her husband, she took over the farm and entered into a new tenure arrangement; access to the farm enabled her to support her processing business. She processed the fruits from the farm but also acquired fruits from farmers and traders. She sourced from farmers and traders mostly during the peak season when fruits were in abundance and cheap. But she indicated a high preference for the traders citing the following reasons:

- It saves time required to search for fruits in the villages;
- It is easier and faster, with less stress in dealing with the traders/intermediaries than with farmers
- Fruits are removed from the bunches before selling, which makes it easy for processing
- They save you the trouble of buying stolen fruits.

In the lean season, she used advanced payment to secure supply from farmers. What was striking in her case was that she also gave monies to other processors to buy fruits and process for her, especially during the lean season, as a way to hedge volumes to meet client demand. Monies advanced to fellow processors were in turn deposited with farmers to ensure supply of fruits. Paying for fruits in advance committed both suppliers and the processor to not only access fruits in the lean season but also to assure farmers a market during the peak season. There was a reciprocal component that she was obliged to buy fruits supplied by the farmer during the peak season. She made similar arrangements with buyers to pre-finance the

processing of oil especially during the lean season. An example was a retailer in Italy whom she supplied. He deposited money each time there was need for a new consignment. This money at times was distributed to other processors, depending on the situation of fruits, to purchase more fruits for processing.

She did not only source for fruits but also oil, especially in the lean season. She revealed that it was not profitable to process when fruits were too expensive in the lean season. Rather, she bought oil from processors in the remote villages, who would have otherwise transported their oil to the market, as well as from other *Kramer*s. In the peak season, when the fruits were in abundance, and marketing of oil was a major problem, she bought oil from other processors with a little profit margin and stored this oil. In that case she would have enough oil in stock to meet demand in period of scarcity. With these arrangements she was able to process about 1.375 MT of fruits in the lean season and between 2500 -3750 MT during the peak season.

Case 3: Farmers and traders In this third case study, we look at the strategy of a processor who accessed fruits mainly from farmers and traders. She indicated that she acquired fruits from farmers both within and outside the municipality. Among the farmers, some were her regular supplier and from others she did not buy directly. Since she did not live in the village and did not know the farmers, she relied on three local agents to buy the fruits from as many farmers as possible. She mentioned that in some villages it was not easy to get the fruits directly from the farmers because of competition. So in some cases she used the wives of farmers as agents to source for fruit. She said*:*

> "I use agents and pay commission but if a farmer's wife can ensure that her husband keeps all the fruits for me then I pay her the commission". [Interview V., Asamankese, January 18, 2011].

The fruits supplied by agents were on commission basis. However, she had to pre finance them to enable them to purchase the fruits, since most of them did not have their own working capital. In her case, because she travelled to dense oil palm growing areas, she sometimes bought more fruits, which she sold to other processors at the *Kramer*. She sometimes teamed up with other buyers in transporting the fruits to reduce costs.

Fruits supplied by the traders were bought with commission and transportation cost added to the actual cost of the fruits. In view of the high costs, she preferred to get more fruits from the farmers themselves for which no commission was charged. She made advance payments

to commit farmers to ensure supply. However, the advanced payments only occurred in the period of scarcity. This ensured that she was supplied each time the farmers harvested, usually twice a week during both the peak and lean seasons. However the quantity depended on money available.

The sale of the oil was done along similar line: buyers making deposit for a certain quantity of oil to be processed for them. This was a way to ensure that processors do not sell to new buyers but also with reciprocal commitment from the buyer to buy from her at all times. By accepting payments in advance, she was committed to supply a certain quantity of oil within a certain period, while the buyer was assured of supply. This arrangement was necessary because fluctuation and scarcity of fruits invariably reflected similar trend in palm oil supply. That is when fruits were in season oil supply was regular and there was no competition. But when fruits were out of season there was high level of competition not only for fruits but also for oil.

Case 4: Farmers The final case study focuses on a processor who accessed fruits only from farmers. She indicated that she preferred to get her fruits from farmers for the following reasons:

> "I do not like to buy my fruit from traders because of high prices and the problem of not getting the fruit fresh. I like to move around and buy the fruits myself. In that case I reduce cost and am sure of what I buy. Most oil palm trees in the area are now old and very tall so farmers are replanting new palms and mix the fruits. The young ones do not produce much oil, so I am careful what I buy". [Interview A., Ekoso, November 11, 2010]

She was connected to more than fifteen farmers in the neighbouring communities who supply her fruits. This began when she met one farmer in a car who promised to supply her fruits and in turn linked her up with nine others in the community and had since sourced fruits from them. She said she gave advance payments to farmers to secure supply but also for other reasons such as farm maintenance to ensure a good relationship in the interest of her business.

She recounted a day when a farmer came to request for money to pay for his child's school fees and defray it by supplying fruits later, which she gave the farmer as a form of advance payment. She maintained that she made advance payments to oblige farmers to supply fruits each time fruits are harvested otherwise they will divert to other buyers. She was however quick to add that farmers diverted fruits sometimes, even when she had paid in advance for fruits. To her such act could lead to an end of the relationship between her and a farmer:

> "In that case, I ask for my money back and end the relationship. I will not buy from him when the fruits are in season and difficult to sell. But if a farmer/supplier is honest in supplying fruits, then I am also obliged to buy all her /his fruits during the peak season when fruits were in abundance and even cheaper elsewhere." [Interview A., Ekoso, November 11, 2010]

She shared an instance where a farmer bolted with her money after failing to supply fruits for over two years now without a trace. To her if a farmer supplied fruits throughout the period of scarcity; she reciprocated the gesture of honesty by buying from the same suppliers during the peak production period even though it is difficult to market fruits.

Institutional arrangements in sourcing

The case studies of individual processors show a variety of sourcing strategies. To cope with competition for fruits in the lean season and frequent changes in price, processors made use of advance payments and informal contracts. These arrangements are further described here to demonstrate how these built coherency and created stability in the interactions between different actors in the supply and demand site of market. This section also presents how these arrangements shape individual strategies and relate to practices that coordinate actions in the group. Besides individual sourcing strategies, the presence of a coherent and reliable group, which was recognised by suppliers, farmers and buyers, contributed to arranging transactions in sourcing fruits and selling oil.

Advance payments and informal contract

Advance payments in sourcing were observed as an institutional mechanism, which aimed at guiding the behaviour of the actors in the transaction of business. In a way, advance payments had a dual purpose: first to commit suppliers to supply fruits in the lean season and second to oblige processors to buy from farmers in the peak season when fruit were in abundance. The obligation on the part of farmers or suppliers and the expected reciprocity with the purchase of fruits during the peak production period was mostly triggered by the fluctuation in the supply and availability of the fruit. In the case of the oil, advance payment was not so much to secure supply; instead it enhanced the processors access to fruits during the period of scarcity. For this reason, processors were compelled to regularly supply buyers who facilitate sourcing and guarantee market for the oil. Processors conversely revealed that they were compelled to maintain the same sources of supply of fruits to secure access and regular supply of fruits especially during periods of scarcity. Diversion and frequent price

fluctuation of both the fruit and oil was a major challenge. Regardless, they continued such arrangements. What this shows is that sourcing was not only about incentives; rather it was about securing the supply and demand of a commodity whose availability depended on nature.

Paying for fruits and oil in advance was to ensure regular supply of fruits and oil, but most importantly prevent diversion of fruits and oil and guarantee market for fruits and oil. This arrangements in a way committed parties (fruit suppliers and buyers) to a form of contract, which could best be described as informal. Informal in the sense that there was no written documentation and the arrangement was not legally binding. Such verbal and open contracts are common in rural Ghana. The contracting was not only inspired by market uncertainties, but more importantly, crop seasonality and fluctuation. With such contracts, processors were able to make assumptions as to the quantity of fruits to be supplied and subsequently the quantity of oil. Nevertheless, frequent price fluctuation of both oil and fruits as well as the informal nature of the contracts presented a challenge. The contracts were open and seemed fluid and complicated, while changes in prices sometimes made advance payments a disadvantage. Yet processors were compelled to continue the arrangements to be able to keep their suppliers and buyers all year round. To them, maintaining the arrangement helped to build trustful relationships necessary for securing fruits supply and market for oil.

At the level of sourcing practices, processors constructed diverse relationships with suppliers and buyers, which were essential for sustaining their entrepreneurial activities. The data suggests that suppliers and buyers were moving targets and the relationship between processors, suppliers, and buyers was fluid and changed with time. Advance payments were not enough to secure relationships and fruit supply. The different arrangements were motivated by seasonality and fluctuation came with risks; yet the processors accepted the whimsical nature of the arrangements and managed these accordingly in order to maintain relationships with buyers and suppliers and to build trust.

Group cooperation

So far, we established that members of the group manage fluctuation through individual sourcing strategies and institutional arrangements. The question as to how the group continues to function as a whole, despite these seemingly individual tendencies, still remains. We observed certain internal mechanisms, which may explain why the group remained intact for over a decade despite the diverse social and demographic characteristics of the processors (Table 1) and the competition for fruits amongst group members who processed during the lean season.

Competition for fruits during the lean period was not only between the processors and other users, such as fresh fruit sellers and exporters, local restaurants operators (*chop bars*), and medium-scale manufacturing companies, but also among the group members. The women rather managed competition by having multiple supply sources rather than struggling over a few suppliers (farmers and traders). The more suppliers a processor had the more her chance of meeting demand and working in the group.

However, competition for fruits was controlled within the group by establishing boundaries of networks. The women had an understanding that each group member should look for her own suppliers/farmers and respected the boundaries of the supply network of others by not competing for fruits from same farmers and suppliers. Though blurred, this boundary setting norm limited competition and conflicts within the group. Where a farmer or supplier supplied other members within the group, there was an understanding that supply was sufficient to meet the demand of the individual processor active in that area. Sharing fruits among processors, in consent with the consent of the farmer, took place.

Moreover, within the group not all members were able to process regularly, especially during the lean season due to scarcity of fruits and lack of resources to source. But those with wider networks and resources accessed fruits all year round. This implied that some group members were temporarily absent, as a result of fluctuation. By this temporary exclusionary mechanism, competition for fruits was limited among a select group of members. Interestingly, those who were unable to access fruits during the lean season went to the *Kramer* to join in the processing, as was the practice of the group. There is the need for the women to team up with group members to cook fruits as soon as they arrived because the quality declines and the demand for certain volumes, required joint effort in processing. Hence, the need to join other women even when they did not process themselves and by so doing stayed connected to the group.

Furthermore, individual women, who were more endowed with resources and access to wider networks, wielded a level of control over activities at the *Kramer* (e.g. cases 1 and 2). They influenced decision making, for example fixing the price for pressing of oil, since they installed additional presses. They also had farms from which they sourced and had access to more buyers of oil, who provided capital in the form of advance payments to process on regular basis, even during the lean season. They also subcontracted other processors when they had more demand and brokered by buying of oil and selling. So, besides competition and cooperation, the group also showed a certain hierarchy, which though subtle, shaped the behaviour of members.

Discussion and conclusions

The study shows that there is fluctuation in palm fruit supply as a result of seasonal crop production pattern. This natural condition invariably leads to scarcity of the raw material during a certain time of the year. Our findings indicate that in order to manage fluctuation and scarcity in fruit supply, individual members used different strategies to access fruits from multiple sources. Furthermore, there were certain institutional arrangements, which the group members had with buyers, suppliers and farmers in the form of advance payments, informal contracts.

The case studies indicate that besides the differentiation in group, processing capacities and strategies depended on individual access to resources and scope of network as well as institutional arrangements. The study shows that incentives in the form of advance payments and informal contracts were not enough to sustain economic activity. Despite these arrangement partners did not always keep to their obligations. Women were prepared to accept breach of such informal contract, in order to secure continuity in the supply of fruits and to uphold the spatially bounded networks from which was sourced and by so doing they managed seasonal fluctuation problems. The arrangements were replicated and reproduced over time as processors, farmers, traders and buyers re-manufactured relationships through negotiations and trust building all to ensure adequate supply to ensure the survival of business. What we see here is that the relationships and networks attunes to material fluctuation. We argue that the material conditions of fluctuation in a way forces continuity in relationships between processors, buyers and suppliers, and therefore links practice to materiality.

The non-uniformity of strategies among the members of both groups shows the capacity of these groups to accommodate such entrepreneurial diversity. It leads to the understanding that collective action cannot be explained exclusively by looking at similarities or shared interests among members. On the contrary, the balancing of individual and collective actions provided some stability to the group, which materialised in rules for competitions and an implicit hierarchy in the group. This institutional set-up did not readily lead to conflicts of interest between processors, indicated by the observation that members with less resources and networks to process continuously still joined in collective processing activities.

Taking these observations together, we suggest that the group was able to stay intact because the effect of sourcing and fluctuation, triggered by ecological conditions, was managed by integrating individual strategies and different institutional arrangements into the everyday collective practices of processing. The group exhibited flexibility in integrating

individual arrangements and strategies for managing fluctuation, but there were mechanisms that ensured stability within the group. Findings show that if you look at groups mainly from the perspective of the individual actions and benefits, you may lose out on other explanations. Our analysis enriches the understanding of how individuals interact with the environment but also exposed emerging and underlying mechanisms that explain consistency and viability over time.

CHAPTER 4

Governance and upgrading strategies in the Ghanaian palm oil sector: do global standards constrain endogenous enterprise development?

This chapter forms the empirical basis for a contribution to a co-authored paper (P. Oosterveer, B. Adjei, S. Vellema, M. Slingerland) accepted by Global Food Security

CHAPTER 4

Governance and upgrading strategies in the Ghanaian palm oil sector: do global standards constrain endogenous enterprise development?

Abstract

Linking small and medium-scale enterprises to global value chains has been presented as a way of enhancing economic development in developing countries. However, the proliferation of standards and certification schemes poses a challenge. In the palm oil sector, one form of governance dominates the discourse in policy and practice: the standard set by the Roundtable on Sustainable Palm Oil (RSPO), which impacts mainly on process upgrading, i.e. improved efficiency, in the field of primary production. This chapter shifts attention to the relation between governance and upgrading in the Ghanaian palm oil sector wherein small and medium-scale enterprises dominate. A case study of a medium-scale processing firm supplying red palm oil to domestic and diaspora niche markets is used to examine how the firm's efforts in product upgrading depend on its capacity to use skills and techniques to develop high value food product, handle fluctuations and to act flexibly to ensure regular supply of oil. The chapter highlights endogenous capacity to integrate variability in agriculture into a viable business model for supplying different end-use markets. The women's groups examined in the previous chapters represent a similar capacity, which may erode as a result of choices made in the selection and regulatory environments wherein small and medium-scale processors operate. This opens a discussion on whether the current focus on voluntary RSPO-standards targeting primary production constraints endogenous forms of upgrading for which other forms of governance may be more conducive.

Introduction

Standards and certification schemes have become important due to intensification of cross-border trade and rising concerns over food safety and quality issues and more recently over environmental, labour and welfare effects of agricultural production. Standards include agreed criteria for technical and physical characteristics of products or a service performance, or requirements for the process under which these have been produced or delivered or can be assessed (Nadvi and Waltring 2004; Hawkins 1995). Standards can be seen as tools of

simplification, unification and specification (Ewald 1990) and shape global trade, address agro-food industries, consumer environment and food safety concerns (Ponte 2007). They may be generic, addressing a particular issue or field, for example international standards such as ISO9000 (on quality), ISO14000 (on environment), SA8000 (labour standards). Or, standards can be specific, addressing such as phyto-sanitary and food safety risks in the food processing industry (Navdi 2002). Standards may be mandatory, public or voluntary private initiatives (Nadvi 2008, 2000; Nadvi and Waltring 2004), which differ in terms of compliance requirements and certification practices.

Over the last few years, discussions within the literature analysing global value chains have underscored the importance of standards and certification in relation to market access. Otieno and Knorringa (2012) identify two contrasting perspectives on the relationship between standards and development: firstly, standards can be exclusionary, and secondly, standards may provide opportunities for small-scale and marginalised producers and enterprises to access remunerative markets. Standards can be exclusionary; in that, firms lacking competencies, capabilities and infrastructure to comply cannot access markets (Knorringa and Otieno 2012; Lee et al. 2012; Henson and Jaffee 2006, 2008). On the other hand, compliance with standards may provide opportunities for firms to benefit from profitable export markets and firms can become competitive (Reardon et al. 2001; Knorringa and Otieno 2012). Compliance with standards can lead to upgrading of firm capacities (Gereffi 1999; Schmit and Knorringa 2000; Dolan and Humphrey 2003). However, while value chains offer opportunities for higher-value activities and facilitates market access, inclusion in value chains wherein standards are imposed can also create barriers to upgrading (Humphrey and Schmitz 2002; Vellema et al. 2012) depending on how tightly they are controlled or governed.

The recent rise of a variety of sustainability standards in the oil palm sector, particularly the Roundtable on Sustainable Palm Oil (RSPO), has impacted on agricultural practices and the social and ecological environments of oil palm production worldwide, and the way cross-border food provision is governed. In the case of Ghana, such impact is mainly concentrated in plantations and farms supplying large-scale processing firms. For the small and medium-scale firms processing different qualities of oil for both the domestic and diaspora markets, RSPO seems to be of less concern. These firms are more affected by generic and public regulation regarding specific safety and quality requirements. A clear example of this in Ghana is the enforcement of general food safety regulations after detection of the prohibited use of the dye Sudan IV in red palm oil. In food products, the use of Sudan IV is illegal mainly because of its harmful effect over a long period of time. Nevertheless, processing firms opted to use the ingredient to make the appreciated colour of red palm oil, which was

hampered by the scarcity of the natural ingredient, the fruits from the Dura oil palm variety, which generates the specific quality traits of red palm oil: a combination of colour, texture, and taste. Red palm oil is widely used in Ghanaian diets and finds a niche market in the diaspora.

This chapter investigates the interaction between dominant sustainability standards in the international oil palm industry with the problem solving capacities of firms processing for alternative domestic and international markets. This broadens the analysis for assessing the impact of global value chain standards from effects within the direct influence of certified producers to indirect and unintended effects for a sector and other industrial players. How do integration into international markets and specifically the related process of standard setting affect endogenous problem solving capacities? This chapter has an exploratory nature, using a single case study of the use of skills in the business strategy of a medium oil manufacturer in Ghana, to identify possible consequences of voluntary standards like RPSO for upgrading opportunities and endogenous economic development.

The chapter is structured as follows. First, it relates the research to recent interest in endogenisation brought forward in the global value chain literature (Helmsing and Vellema 2011). Then it explains the methodology used to investigate the problem solving activities of the case study firm. Next, it gives a brief description of the oil palm industry in Ghana to show its structure and contribution to the economy. The chapter then looks at the RSPO standard for palm oil and its mode of governance to understand how it may shape processes not only at large industrial scale but also at small and medium-scale firm levels. In the next section we present a single case study of a medium-scale firm to show strategies in product and process upgrading and its capacity to adjust to unintended situations. It highlights the firm's capacity to solve the problem of matching volume and demand, especially in periods of scarcity. In the discussion, we explore whether the introduction of global sustainability standards, such as RSPO, has unintended consequences for small and medium enterprises in the oil palm sector in Ghana that are not included in the certification schemes and auditing procedures accompanying such standards.

Theoretical framework

Two concepts are central to the literature on global value chains: governance and upgrading. This section discusses both concepts and develops an agenda for investigating the indirect and unintended effects of the dynamics within global value chains on firms operating within a wider economic sector and endogenous development.

Global value chain governance

Governance has become a central issue to global value chain debates in recent years. In the global value chain (GVC) literature, governance relates to management strategies crossing the nodes of the chain, to methods and measures to implement those strategies, and systems of monitoring actions and outcomes. It stems from the need to build competitive advantage (Nadvi 2008; Nadvi and Waltring 2004) requiring that firms set, measure and enforce the parameters for performance (Humphrey and Schmitz 2002; Dolan and Humphrey 2000). Governance highlights practices and organisational forms through which a specific division of labour is defined as well as how production and distribution are conceptualised and established (Gibbon et al. 2008).

Three underlying governance processes have been discussed by Gibbon et al. (2008); i) governance as driving force, ii) governance as coordination and iii) governance as normalisation. We focus on the third explanation to analyse the concept of governance in the context of this study.

Governance as driving force

This perspective is derived from the work of Gereffi (1999), which distinguishes between two types of governance structures: producer driven and buyer driven. The primary assumption is that the mode of governance typifies the power of lead firms to dictate conditions within a chain. Further work based on this logic (Dolan and Humphrey 2000; Schmitz and Knorringa 2000) investigates the role of global buyers, which may lead to exclusion or inclusion of economic actors.

Governance as coordination

Following from the producer –buyer driven perspective on governance, another dimensions focused on governance is the coordination of spatially distributed activities and actors (Gereffi et al. 2005). Governance is required when there is little interaction between trade partners, to coordinate fragmented activities across geographic spaces (Ponte and Gibbon 2005). As lead firms increasingly depend on outsourcing as a means to off-load or transfer some of its core activities unto suppliers who are globally dispersed, coordination of these fragmented activities and actors become imperative.

Governance as normalisation

The third conceptualisation of governance posits that governance is about re-aligning a given practice so that it conforms to a standard norm. Here governance is viewed as the application of rules and procedures concerning on one hand what action buyers should take

when governing value chains and on the other hand what specific qualities suppliers should aim at and how this can be achieved. Ponte and Gibbon (2005) have used convention theory to examine the normative environment within which value chain actors operate and the frameworks influencing the designations attached to products and services they exchange.

Upgrading

In the value chain literature, upgrading is defined as the capacity to innovate to increase the value added to products and processes (Humphrey and Schmitz 2002, 2003) or to improve capabilities and performance (Ponte and Erwert 2009; Gereffi et al. 2005). Upgrading is also linked to firms acquiring capabilities to make better products, improve processes to make these products, and/or taking over new functions (Ponte 2009), which requires purposive action (Morrison et al. (2008). In line with this, Humphrey and Schmitz (2002) identify four types of upgrading:

a. Process upgrading, which implies transforming inputs into outputs more efficiently by reorganising the production process or introducing superior technology;
b. Product upgrading, which emphasises moving into more sophisticated product lines or developing new products, which can be defined in terms of unit value;
c. Functional upgrading, which has to do with producers acquiring new functions in the chain to increase the overall skill content of activities;
d. Inter-sectorial upgrading, which concerns suppliers using the knowledge acquired in a particular chain function to move into different sectors.

This typology suggests that firms may benefit either from upgrading their production processes, which is an impact related to sustainability standards, or by improving their products, taking on new functions, or moving into new areas. While capabilities and performance is important in upgrading, it is often presumed to be acquired through vertical integration whereby technological knowledge is transferred through interaction with lead firms (Ponte and Ewert 2009). In that sense, the framing of upgrading also has an implicit normative expectation (Ponte 2007, 2005; Gibbon et al. 2008) on how firms move towards process upgrading. Relevant for this chapter is that governance in the international oil palm industry strongly focuses on process upgrading induced by sustainability standards. Other types of standards relevant for small and medium firms in the sector, in particular emphasising product upgrading, receives less attention.

Indirect and unintended effects of global value chains

This chapter focuses on a case study of how a medium-scale firm strategizes in a context of changeful market demand and uncertain supply of raw materials. The firm serves domestic markets for food products and has been able to operate in international niche markets for red palm oil. The case study shifts attention from an interest in upgrading resulting from compliance with global standards to understanding how upgrading links to the use of certain skills, techniques and capabilities to manage technical change and develop products tailored to specific resources and constraints of firms operating in specific circumstances. This perspective received very little attention in the literature on global value chains.

Looking at business strategies anchored in the resources and capacities of firms has been discussed in strategic management literature. This opens a perspective on seeing upgrading of firm capabilities as endogenous. Penrose (1959), for example, argues that firms can capture value by developing competencies that are difficult for others to replicate and therefore linked to a firm's unique capacity to source; in our case, Dura oil palm fruits, or oil processed from this oil palm variety. Strategic management literature also suggests that firms obtain sustainable competitive advantage by adopting strategies that exploit their internal strengths, while neutralising external threats and avoiding internal weaknesses (Barney 1991). This implies that when capabilities are heterogeneous they become difficult for competitors to replicate (Barney 1991), which then leads to competitive advantage. Hence, our interest to examine how the case study firm operates in a context wherein its main raw material, Dura, becomes scarce, while access to it is vital for its position in both the domestic markets and in diaspora niche markets.

We complement the strategic management argument by introducing the concept of endogenisation. Endogenisation is the progressive development of local capacities and control often triggered by external factors (Melese and Helmsing 2010). In our case, the external factors are demand in international niche markets as well as the regulatory frameworks governing palm oil. Helmsing and Vellema (2011) discuss that value chain governance and upgrading conditions the process of inclusion, but must also align with the local business system and skills for impacting positively on developmental outcomes. Therefore, the analysis of upgrading in global value chains should also identify its unintended effects on the formation and use of skills, tools, techniques, and know-how within a related industry serving alternative markets, and to detect in what ways global value chains may indirectly harness performance, competitiveness, and development of endogenous economic activities. From the perspective of small and medium-scale firms that engage in upgrading to access markets, it is important to appreciate their evolving practices rather than to focus all attention on

compliance with a generic standard prescribing the application of right procedures and techniques or rules. In addition, the chapter shifts focus from the strong interest of standards, and the studies thereof, in process upgrading to product upgrading, which is related to capacity of firms to tailor their good and services to various domestic and international markets and use available resources while manoeuvring daily and changing practices within specific contexts.

Findings

The oil palm industry in Ghana

In Ghana, the oil palm sector provides employment opportunities and incomes to rural people through oil palm production and related activities. The oil palm industry is seen as a key sector for sustained economic growth and development (GoG 2003), with over 636,000 households in rural communities engaged in cultivation and related activities (GLSS 2000). The crop is cultivated mostly in the wetter parts of the country particularly the Eastern, Western, Ashanti, Central and parts of the Volta Regions where annual rainfall is high. In most of the areas where oil palm grows in Ghana, they also occur in traditional farms and wild groves, which mainly consist of the Dura type (MoFA 2011), providing raw material for processing. Palm oil is also an essential ingredient used in food preparation, especially in the coastal and forest zones and a good source of vitamin A (ibid.). Presently, the total land area under oil palm cultivation is about 300,000 ha, out of which 250,000 ha (80% of total land area) is in the hands of small-scale farmers (PSI 2004, see also Chapter 5). Estimated total land area under cultivation in 2010 was 360,000ha with about 266,000 ha (80%) in the hands of private smallholder farmers. Current Crude Palm Oil (CPO) output is estimated at 397,502MT (MoFA 2011). With increasing demand for palm oil globally, Ghana is strategically looking to expand the oil palm sector, not only to meet its huge domestic deficit for quality industrial palm oil (Adjei Nsiah et al. 2012a), but also to increase export.

The palm oil industry in Ghana has been shaped by two different markets: palm oil for local consumption and for industrial use in food and soap manufacturing, which has evolved into two sub-sectors (Fold and Whitefield 2012). The industrial subsector consist of medium and large-scale oil palm plantations and mills, characterised by more efficient technology, economies of scale, higher productivity on farms (in terms of yields) and mills (in terms of quantity of oil extracted), and by the quality of crude palm oil as well as further refined palm oil products. Presently, there are four large-scale oil palm plantations mills (Ghana Oil Palm Development Company (GOPDC), Twifo Oil Palm Plantations (TOPP), Benso Oil Palm

Plantations (BOPP), and Norpalm Ghana), eight medium-scale mills (most of which have small oil palm plantations), and about 400 small-scale processing units (MoFA 2011). Medium and large-scale mills mostly process palm oil for industrial manufacturing. While the small-scale sector consists of private small-holder oil palm cultivators, who largely sell their fruit bunches to small-scale mills or *Kramers* (see chapter 2 and 3). Palm oil processed at small-scale level is sold in the local markets, the West African sub region, and niche ethnic markets in some European countries (Asante 2012; MoFA 2011). In the diaspora market, red palm oil is highly valued especially by West Africans.

While current discussions in the palm oil sector emphasise large-scale industrial production and global sustainability standards (e.g. RSPO), which impact mainly on upgrading processes of primary production, recent development in small-scale processing has given rise to concerns of food safety and quality issue. The small and medium firms processing palm oil for the local and export market are confronted with challenges of providing safe and quality products (Adjei-Nsiah, et al 2012b; Osei-Amponsah et al. 2013; MoFA 2011; Angelucci 2013) both for the domestic and diaspora market. However, with a focus on the large industrial sector, which is only about 20% of total production, what will happen with the palm oil sector (80%), which lies outside the domain of large industrial production and processing under RSPO?

The Round table for Sustainable Palm Oil

The Round Table on Sustainable Palm Oil (RSPO) is a multi-stakeholder arrangement, which aims to promote more sustainable production and consumption practices in palm oil through the market (Glasbergen 2007). The expansion in palm oil production to meet increasing global demand has stimulated economic growth in producing countries but also contributed to environmental and social problems such as the destruction of tropical forests, climate change and the threats to small-holder livelihoods. RSPO was initiated to address this daunting problem. Within the past few years, RSPO has been influential in governing value chain interaction and agricultural production (Djama et al. 2012; Silva- Castaned 2012; Hospes et al. 2009), and in directing the social and environmental performance of lead companies (Glasbergen 2007). Viewed as a non-state or a private governance arrangements in the market place (Bernstein 2011), the RSPO has attracted several criticisms. Ponte, Gibbon, and Vestergaard (2011) have argued that its major limitation as a private standard is its inability to substantially address the more complex social and environmental problems. The RSPO has also been criticised for not being able to affect micro processes in upstream and local production networks (McCarthy et al. 2012) and the challenge remains as to how to include

smallholders (Van Opijnen et al. 2013) most of whom fall outside the domain of RSPO. Others have argued that private standards, such as RSPO, may have privileged access, and exclude others from accessing the market, partly because legitimacy of private standards in governing global commodities is created in the interaction between multinational lead firms and international NGO's (Schouten 2013). While debates around RSPO have generated a wide variety of studies, they have mostly focused on dynamics and effects closely linked to global value chains.

This chapter shifts focus from analysing governance in global value chains and how RSPO impacts on agricultural production, to understanding the linkages of this emerging regulatory and selection environments and the way small and medium-scale firms work on process and product upgrading. The RSPO's one-sided perspective on large-scale food manufacturing excludes other important private actors and practices in the making of exportable palm oil. We argue that mainstream industrial standards, like the RSPO, which emphasise best agricultural practices in large-scale industrial production and sustainability, may have unintended consequences for small and medium-scale firms. The scheme leaves aside existing opportunities tilted towards more endogenous development tailored to other forms of governance and business strategies.

Case study: Upgrading in a medium firm supplying domestic and diaspora markets

The case is of a medium firm that processes palm oil for both local and diaspora niche markets. The firm's strategy is depicted in Figure 1. Located in the Eastern Region of Ghana, the firm has been operating over the last 30 years. This firm specialises in processing and trading in red palm oil and other related products in the domestic market. In the diaspora market, it competes with other West African and Asian companies supplying edible palm oil. In both the local and diaspora markets, the palm oil quality standard is translated into specific taste, colour, and flavour expectations, which require a highly qualified capacity to make the right blend. The firm employed about 50 workers, which include local women processors with processing experience. At the same time, the products were regulated under the generic public food safety standard, under section 2(3) and section 47 of the Food and Drugs Law 1992 (P.N.D.C.L. 305B). In recent years, EU regulation on Sudan I-IV dyes is being enforced to ensure the safety and quality of palm oils entering the market.

The next section focuses on the processes of making the oil and sourcing practices. It shows how product upgrading was done. Then it documents the problem solving capacity of the firm, which manoeuvres changeable market environments and responds to public regulation and private standards, and by so doing position itself in the market.

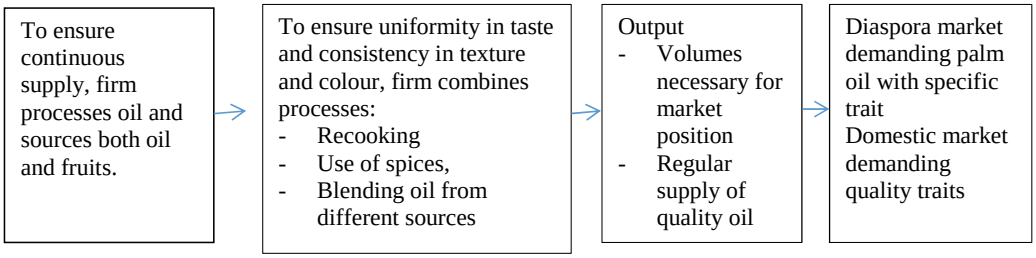

Figure 1: Firm's strategy towards sourcing resources, upgrading and market access
Source: Composed by author

Product upgrading

The firm made two brands of processed palm oil: *zomi* (literally meaning heated oil) and *ngo pa* (meaning ordinary red oil). The difference between the two lies in the raw material used and whether or not additives were added. Processing fruits very fresh (between 2 to 5 days after harvesting) was considered important to obtain the desired taste, flavour and oil texture. Generally, when processing delays, fruit deterioration may reduce oil quality and increase free fatty acid (FFA) levels (Osei-Amponsah et al. 2012). Being aware of this, every effort was made to process fruits fresh. *Zomi* oil, which has a relatively better quality and sells at a higher price than ordinary red oil, was mainly processed from very fresh fruits while a few days old fruits was used to process *ngo pa*. Freshly harvested ones were most suitable for *zomi* oil, which was cooked with salt. Fruits that were a few days old were processed as *ngo pa* oil and spiced.

The process of making palm oil involved several steps including fruit sterilisation, digestion, extraction, and clarification (cooking). These activities were mostly mechanised except the cooking, which was far from easy and required a lot of skill and experience. Often after digestion, the macerated fibre was pressed to extract the crude oil. The oil will contain some amount of water at this stage, which has to be eliminated through heating. Getting the moisture out of the oil requires a lot of skill to maintain a balance between high and low heat intensity while cooking the oil. High heat intensity can cause oil bleaching and burning and subsequently affect the quality (destruction of red pigmentation in palm oil), while low heat intensity will retain moisture, which makes the oil to solidify and become rancid when stored. Therefore, the firm was very careful as to who was allowed to process the oil as well as closely who monitor the cooking process.

The processes of making the right kind of oil required close monitoring and supervision at the level of processing as well as the needed capacity to take corrective measures to ensure

uniformity in oil. Improvisation and correcting errors in the making of quality strongly related to untimely delivery of fruits and cooking mishaps. The state and type of fruit used for processing palm oil was mentioned as important for oil quality. But since the firm did not have the capacity to meet its fruits requirements, it accessed from other sources (examined in detail in the next section), which sometimes caused delays in processing. The oil from such fruits was cooked with traditional herbs and spices and further blended with 'good' oil to improve quality. And the fruits were processed fresh as *ngo pa*, which allows for the use of spices.

Mistakes made during cooking also required the firm to take other measures for making quality. When heat intensity during cooking was too much, burning could occur, resulting in poorly scented oil and bleaching. What the firm did was to use freshly prepared oil to blend the burnt oil in order to attain uniformity in taste and colour. Though the specific estimation in proportion or quantities of fresh oil required to make the blend could not be ascertained, it was mentioned that approximately one pot of burnt oil would be required to mix six pots of freshly cooked oil to get the right taste for export. These practices showed the level of skill and internal measures to ensure quality, which required innovativeness and adjustments to achieve uniformity in product quality.

Table 1: Export volumes case study firm (2011, 2012, and 2013)

Year	**No of freight containers**	**Approximate oil volume (Litres)**
2011	38	3,648,000
2012	35	3,360,000
2013 (as on January 11)	10	9,600.000

Source: data gathered from interviews, Krodua, January, 2013

Internal control measures took the form of supervision, monitoring of activities and taking immediate corrective measures at each stage of the process. On average, the firm produces about 7,500 litres of palm oil a week. No specific figure could be given to that effect other than export figures (Table 2). The firm also faced difficulty in meeting fruit demand for processing. However, the available figures presented in Table 1 show a level of consistency in volumes. This could be attributed to certain sourcing strategies in place which include sourcing for both fruits and oil.

Process upgrading

Production of the oil palm fruits, which is the main raw material for processing, was seasonal. The oil palm crop produces twice in a year with the peak fruit production period being between February and May, and becomes scarce during the lean fruit production period from September to December. Fruit fluctuation presented some constraints to meeting demand. There was competition for fruits during the lean production season requiring that the firm maintained multiple sources to ensure regular fruit supply.

The firm owns about 22 acres of oil palm farm from where it acquires fruits for processing. However, this was inadequate for realising the volumes of oil they needed to be exported. In an interview with the director, it was revealed that only about 30% of total fruits requirement was supplied by the farm. The remaining 70% was sourced from other sources, which included the Oil Palm Research Institutes (OPRI), smallholder farmers, and intermediaries. Apart from OPRI, which supplied hybrid Tenera, fruits supplied by local farmers and intermediaries were mostly a mix of oil palm varieties. The large-scale farmers usually cultivate high yielding oil palm varieties under good management practices, while small farmers mostly used a mixed type of fruits.

To address fruit fluctuation and irregular supply, two strategies were adopted by the firm. First, fruits were purchased and processed in large quantities during the peak season when fruits were in abundance and cheap for storage. In an interview, the manager disclosed that it was not economical to purchase fruits when the fruits were not in season: “We process oil only during the major season because it is cheaper”. This was also in response to price fluctuation often triggered by the fruit seasonality problem. Fruits were relatively cheap during the peak production season and expensive during the lean season. During the off-season not only were prices higher but the fruits were also in high demand resulting in competition.

Second, the firm did not limit its sourcing to fruits only but also purchased oil to ensure regular market supply. It was estimated that about 70-80% of palm oil exported was sourced from outside the firm. The oil was from about twenty (20) local women processors in five villages (Table 2). In the villages, local agents served as intermediaries who collected the oil from the different processors and bulked the fruits. Women bulked oil in different containers to accumulate volumes of oil each time the women processed, until enough quantities had been collected. The oil is then transported to the firm. By this strategy, the firm managed to mitigate its current low oil production capacity to match the demand and supply especially in periods of scarcity.

Table 2: Oil volumes sourced by medium-scale firm, April-May 2012

Months / Weeks	**Village**	**Volume (Litres)**	**Volume oil recooked for packaging (Litres)**
April/ 1st	Takorase	1,140	338,400
2nd	Topiase	23,5000	2,990
3rd	Wenchi	3,195	2,985
4th	Akawani	2,625	4,395
May /1st	Akwatia	3,600	2,985
2nd	Wenchi	2,775	3,150
3rd	Takorase	3,495	2550

Source: Company documentation, 2012

To ensure quality demanded in the market, there must be uniformity in taste, colour, and texture, which are specific traits required by consumers. In the case of the firm, palm oil sourced from different processors was recooked with spices to improve quality (taste, smell, and colour) for the market. The use of herbs and additives to enhance oil quality was mentioned as a further step to develop a unique product for a market position in the diaspora. In this way, consumers were able to use taste and other traits to distinguish the firm's products from others.

The relation between the firm and palm oil suppliers was purely based on trust built over the years. After the country was black listed for exporting adulterated palm oil contaminated with Sudan IV dye the firm conducted trainings for its palm oil suppliers with the aim to avoid the illegal use of this chemical and other undesired practices. The manager said:

> "These are women we have worked with for many years, they know the kind of oil we want and process it for us. We know the type of oil (*zomi* or *ngo pa*) that each village supplies. Besides, the oils come with different labels on the containers to indicate the village the oil is coming from, so that we can trace the one should there be any suspicion of contamination". [Interview manager W., Kroduah, June, 2012]

Ensuring traceability was part of the daily routines in the firm. The containers for holding the oil sourced from outside the firm came with different markings, which communicated the origin and brand. Another mechanism for ensuring safety and quality standards was the combination of monitoring by both the local agents, processors themselves (self-regulation)

and the firm. There were regular visits to the villages and interaction between the firm and the women, through which they also monitored their activities. They visited the villages two or three times every week depending on season, to collect oil and ensure adherence to quality standards, which included checking the physical characteristics of the oil (colour, texture) and taste before transporting. Through these routine practices external activities were monitored to ensure food safety and quality.

Discussion and conclusions

This case study has revealed how practices and strategies were constituted in response to food safety and quality requirements framed in the public domain and the specific end-use market. The chapter has established that, the firm responded to externally imposed rules and regulation (standards) through upgrading. However, developing high value food products does not depend only on the application of rules and procedures (process upgrading) but also the use of skills and endogenous resources and capabilities. The study shifts attention to how firms combine process and product upgrading, while global value standards tend to push towards one specific form of upgrading: process upgrading. The case study firm installed internal governance, and linked its practices to public regulation on food safety. In general, the study suggests that alternative combinations of governance and upgrading may provide space for small and medium enterprises (SME's) to utilise endogenous capabilities and resources to enter markets and to become competitive.

The case study of the medium-scale firm shows that a certain level of skill is required in making quality and supplying different palm oils to different markets. This requires not only technical skills in the making of oil but also managerial ability to handle processes and take corrective measures in the interactions between the firm and its independent suppliers of fruits and oil. The case study emphasises the utilisation of endogenous resources and capacities to develop food products, i.e. different oil brands with specific quality traits, which are valued in both domestic and diaspora markets. The study also reveals how the firm's practices had a level of flexibility to handle unintended consequences in cooking palm oil as well in managing fluctuations in the supply of fruits. This case shows that the regulatory environment, driven by the desire to ensure public food safety requirements, enabled the firm to upgrade its products. Public safety and quality standards were made relevant through daily practices and the performance of skilful tasks. It incorporated safety requirements in its daily navigation through unanticipated events and changeful agro-ecological conditions, which are normal rather than exceptional in small and medium-scale processing.

This capacity to make quality appears to contradict the tendency in global standards to prescribe generic practices and to check the application of procedures and techniques stipulated in the standard. The current logic of RSPO will not easily fit the logics of small-scale women's group or medium-scale firms operating outside the industry-oriented plantations and processing plants. Standard-setting within the larger-scale industry tends to increase the level of managerial control over primary production within the span of influence of companies, while the small-scale and medium-scale processors need to manage uncertainties and vulnerabilities outside their organisational boundaries. Despite RSPO's good intention to enhance the sustainability of agricultural production, its scope is limited to integrated processing and production of oil palm oriented towards industrial use. An unintended implication of this type of standardisation is crowding out of the capacities of small and medium-scale processors to navigate technical and organisational problems in the whimsical reality of agriculture and to supply quality oil to local and international food markets.

The strong focus in policy and literature on RSPO-like standardisation fails to recognise the diversity in firms and practices tilted towards making a product that may give firms competitive advantage in specific end use markets. This case study described the capacities and skills required to develop food products highly valued in both local and diaspora market. These capacities and skills evolve in practice and are quite unique for either a firms or for small women's group. The competitiveness of such small and medium-scale processors depends on the use of specific capabilities, which include skills that cannot be replicated by rivals. This contrasts with the unifying and standardising tendency underlying the RSPO mode of governance. An exclusive reliance on standards mainly affecting process upgrading may have unintended consequences for the availability of a diverse food product portfolio on the market.

Moreover, current policies driving development in the sector tend to favour large-scale industrial production, which continues to attract both governmental and external support. However, this situation may stifle endogenous economic development. The indirect exclusion of small and medium-scale firms in the oil palm development agenda has implications for employment and job creation. In Ghana, SME's play an important role in the economy (Abor and Quartey 2010; World Bank 2002) as in many sub-Saharan African economies (Jackson et al. 2008). SME's contribute to economic growth through the generation of employment, productivity, and innovation (Aryeetey et al. 1994) contributing about 70% to Ghana's GDP (Abor and Quartey 2010). Furthermore, the SME's in the oil palm sector provide incomes and livelihood opportunities for many households. Therefore, neglecting small and medium-scale

firms as a potential source of wealth creation (Rankhumise and Rugimbana 2010), could have negative outcomes for poverty reduction especially in the rural areas. Therefore, any policy that ignores rather than embraces diversity in the sector, will not only impact negatively on local food provision but also on sustainable rural livelihoods. In contrast, the chapter emphasises the relevance of medium-scale firms and their capacity to diversify. It also recognises the importance of the use of skills, tools, and techniques tailored to the specific resources and capacities of firms for endogenous practices and economic development. The objectives and managerial systems attached to global sustainability standards may create a hidden imbalance in favour of better endowed oil palm firms. The case study suggests that strategies addressing the public interest in food security can benefit from a grounded understanding and appreciation of the practices and capacities visible in small and medium enterprises. Intervention strategies can try to capitalise on endogenous strengths for developing food products with unique qualities, which are fundamental to local diets and may command higher value in niche markets.

CHAPTER 5

Food provision and agro-biodiversity in Ghana: the need for plural development pathways in oil palm

Betty E. Adjei, Samuel Adjei-Nsiah, and Sietze Vellema

CHAPTER 5

Food provision and agro-biodiversity in Ghana: the need for plural development pathways in oil palm

Abstract

The impact of oil palm production and processing on environmental sustainability has received a lot of attention. Besides continuing investments in planting materials and techniques to improve production, the rise of a variety of standards and the functioning of the Roundtable on Sustainable Palm Oil (RSPO) in recent times has impacted on agricultural practices and the social and ecological environments of oil palm production worldwide. In the case of Ghana such impact is mainly concentrated in the oil palm belt in the Eastern Region. We develop the argument that a one-sided focus on the sustainability of oil palm production for industrial processing has an unintended impact on the conservation of the local Dura variety, which is important for local food provision and is in demand in diaspora markets. Oil palm related food products available in local food markets contain a varying degree of processed fruits from the Dura variety, depending on season and location. This study identifies different configurations of end-use markets, modes of processing, and farming and land tenure practices, underlying the use of the non-hybrid Dura variety. The processes resulting in either conservation of or threats to Dura can be detected here. The different configurations strongly depend on the degree of flexibility in linking the availability of fruits in different farming systems, to choices made by processors, and to selling Dura-based products in a variety of end-use markets. The resilience of such socio-technical configurations may be undermined by development pathways, adopting an exclusive and perhaps purist approach to industrial production based on improved (and possibly certified) hybrid oil palm varieties or to a niche proposition , i.e. providing a price incentive for the specific qualities of Dura and consequently for the conservation of this oil palm. Our discussion considers the implications for agro-biodiversity conservation that emphasises blended food products and embedded configurations.

Introduction

The value of agro-biodiversity is widely recognised. It encompasses all the elements of biodiversity that have relevance to agriculture and food, and the agro-ecosystems. It includes a wide variety of species and genetic resources as well as the many ways in which farmers employ the diversity to meet their needs (MacGuire and Almekinders 2000). Agro-biodiversity plays a significant role in providing sources of food and generating viable livelihood opportunities for local communities and rural entrepreneurs. The diversity is enhanced in farming practices with mixed cropping, but can be negatively affected by a shift to mono-cropping.

Globally, the need for food security and pressure for economic and agricultural development have led to adoption of policies and practices some of which are inimical to the conservation of biodiversity. This system of agriculture requires clearance and expansion into new land and replacement of low yielding (indigenous) varieties by large-scale mono-cropping of high yielding varieties (HYV). This may lead to biodiversity loss (Kooten et al. 2000) of the larger agricultural environment. Similarly, a focus on fewer "mass market" crops or crops of high commercial value (Sumberg et al. 2003) or "major crops" (Biodiversity International 2010:1-16) may lead to the neglect of valuable varieties. As of now, only about 30% out of the world's pool of biodiversity is used to meet 95% of the world's food energy needs (Padulosi 2000; Wilson 1992). It therefore stands to reason that low value or minor crops that are poorly managed or neglected by research and development agenda should be given more attention.

In Ghana, oil palm (*Elaeis guineensis*) has developed as a crop exploited in the wild into an industrial crop within the last hundred years. It is now cultivated mostly in the wetter parts of the country, particularly the Eastern, Western, Central Regions and parts of the Volta Region. Three types of oil palm identified in Ghana are the Dura (self-seeded and semi domesticated), Pisifera, and Tenera. Various farming systems adapted to oil palm cultivation include inter cropping with other food crops and can also integrate oil palm with livestock production, which is normally practiced by small farmers, while monoculture systems is mostly practiced by large plantations.

The crop produces two types of oil: palm oil (extracted from the mesocarp of the palm fruits) and palm kernel oil (extracted from the seeds of the palm fruits) both of which are of food and industrial importance. An estimated 54% of the households in Ghana use palm oil in food preparation (MASDAR 2011). It contributes significantly to foreign exchange earnings from exports and provides incomes for farm households, and continues to be one of the main

drivers of economic and rural development in the country. In local food markets, the "red" palm oil (i.e. oil from self-seeded non-hybrid Dura palms) is valued above palm oil from plantation hybrids because of its unique food quality.

Over the years, the Ghanaian government has shown an interest in increasing oil palm production for both local use and export through research and development of improved hybrid materials to promote higher yields. These efforts have been supported through various agricultural policies and programmes such as the State Farms (Addo 2000), the Presidential Special Initiative (Palm 2003) and, recently, Roundtable on Sustainable Palm Oil (RSPO) and Organic Certification initiatives. However, government interventions in the oil palm sector consistently seek to promote increased production through the use of hybrid planting materials and places little emphasis on the Dura (the self-seeded) variety.

Presently, scientific information and knowledge about Dura is scan. On its current use, no study has been done. Moreover, the impact of research and development options as well as certification initiatives on the conservation of Dura has not been assessed. So how has the persistent focus on hybrid oil palm influenced sustainable use and management of Dura oil palm and related local businesses?

Current value chain initiatives including the RSPO and the National Organic Program (of United States) and EU Organic standards for the oil palm sector seek to promote biodiversity conservation but they seem to be more inclined towards conservation of biodiversity within mono-cropping farming systems than in agro-biodiversity systems of a more diverse configuration as is the case for Dura. Continued government efforts to increase oil palm production using HYV may not lead to sustainability and discriminates against Dura due to its lower productivity. The question is whether these initiatives will lead to the conservation of Dura?

We argue that a one-sided focus on the sustainability of oil palm production for industrial processing has an unintended impact on the availability of the local Dura variety, which is important for the local food provision and is in high demand in diaspora markets. Against this background, this chapter examines farming and processing practices to better understand the context within which Dura survives and to identify consequences for agro-biodiversity and food provisioning.

Based on case studies conducted in selected oil palm growing areas in Ghana, we have outlined the chapter as follows. First we present the history of oil palm production in Ghana to highlight the threats detected to Dura survival. Next, we present a mapping of diversity at the species, ecosystem levels and at farming and processing levels, to show how resource users draw on diversity to meet certain goals. By presenting these practices, our aim is to

show that diversity in oil palm is made by combining the different elements to achieve an end: genetic, species, ecosystems farming and processing. Therefore, the discussion explores practices that link agro-biodiversity to farming and processing to advance the argument that Dura is reproduced through these processes and consequently its conservation.

Conceptual framing: agro-biodiversity and human practices

Agro-biodiversity is fundamental to agricultural production, food security, and environmental conservation (Thrupp 2000). The Convention on Biological Diversity defines agricultural biodiversity as "all components of biological diversity of relevance to food and agriculture, and all components of biological diversity that constitute the agro-ecosystem: the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem, its structure and processes" (Biodiversity International 2010: 1-16). The Food and Agricultural Organisation (Lambrou and Laub 2006) defines agro-biodiversity as the variety and variability of animals, plants, and microorganisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry, and fisheries. It comprises the diversity of genetic resources used for food, fodder, fibre, fuel, and pharmaceuticals. It also includes the diversity of non-harvested species that support production and those in the wider environment that support agro-ecosystems as well as the diversity of the agro-ecosystems. Thrupp (2000) further extends the definition to cover the ways in which farmers can exploit biological resources to produce and manage crops, land, water, insects, and biota. Agricultural biodiversity in traditional farming systems support and sustain important agricultural wild biodiversity, livelihoods and food security (ibid.). In this research, agro-biodiversity is conceptualised as the different oil palm types (species/genetic), the different ecological zones (ecosystems) for optimum production, and how, in practice, these differences are exploited to use, manage, enhance, and conserve agro-biodiversity.

We find the current analysis of biodiversity insufficient to explain diversity in practice. This chapter holds the view that processes and practices people engage in are part of the explanation of the process of biodiversity loss or conservation, which may not be visible with current analyses of patterns in biodiversity. These processes are changing with all kinds of adjustments and improvisation with unintended outcomes, which points at the dynamic and evolving nature of biodiversity and conservation. We argue that diversity and conservation are emergent properties of socio-technical practices. By this approach, the study brings on board yet another dimension of mapping diversity and adds to ongoing discussion on the many ways

in which farmers exploit biological diversity to meet market demand while managing the ecosystem. However, the chapter makes no claim to biophysical analysis nor examine benefit sharing as elements of sustainability.

Methods and research locations

The study was carried out from May 2010 to July 2011, in two oil palm growing regions in Ghana, namely the Western and the Eastern Regions of Ghana (Figure 1). In the Western Region, data was collected from the Ahanta West District while in the Eastern Region the data was collected from West Akim, Kwaebibrim and Yiro Krobo Districts. The selection of the different locations was based on the fact that oil palm performs differently in different agro-ecological zones with optimum production occurring within the oil palm belt. Methods of data collection included individual interviews using a semi-structured questionnaire, focus group discussions, key informant interviews, participant observation, field observations, life stories, and grey literature.

Two processing groups were selected, based on distance to the research stations. One group, located at Ekoso, 25 miles from the Oil Palm Research Centre in Kade in Kwaebibrem District of the Eastern Region, with a semi-mechanised method of processing is included in the study. The other group, which used traditional processing methods, was located at Sukrong Wamfi, Canaan, and Domponiase near Adieso, about 63.3 km from Kade. The people selected for the sample were those in active processing during the research period. In all 24 processors were purposively selected and interviewed using an interview check-list. They were interviewed on material selection and the changing trends in small-scale palm oil processing. In addition, ten (10) farmers, selected from Sukrom, Akim Boso and Osenase were interviewed in detailed on farming practices in the West Akim area. A focus group discussion was organised at Huhunya near Asesewa in Yilo Krobo District in the Eastern Region, which was complemented with key informant interviews and triangulation of multiple data sources.

In the Ahanta West District of the Western Region of Ghana, farmers were selected by means of stratified sampling. With the help of the field Extension Officer, a complete list of all the farmers in three communities, namely Aketenchire, Otopo and Ahimkro, was made and every third name on the list was selected for individual interviewing. Twenty farmers (20) were selected for the study. The individual interviews were semi-structured in nature and were used to collect qualitative data on farm sizes, type, and source of planting materials, yield data, source of market, and price of fresh fruit bunches, farming systems, input use,

management practices, and land tenure. In addition to the individual interviews, focus group discussions were also held with community leaders, opinion leaders and leaders of farmers associations. Information was also collected from key informants such as management staff of the large industrial estates and Ministry of Food and Agriculture.

Visualisation of the production and use of Dura was made through transect mapping of different locations within Eastern and Western Regions. The mapping was done to enable an assessment of practices further away from the two national institutions working on oil palm (the Oil Palm Research Institute and the University of Ghana Forest and Horticultural Crops Research Centre) and an established plantation (the Ghana Oil Palm Development Company), which supplies improved planting materials to farmers. The limitation of our study however, was that we focused on a specific crop (linked to sector and certification policies), but intend to show the agro-biodiversity at farm level.

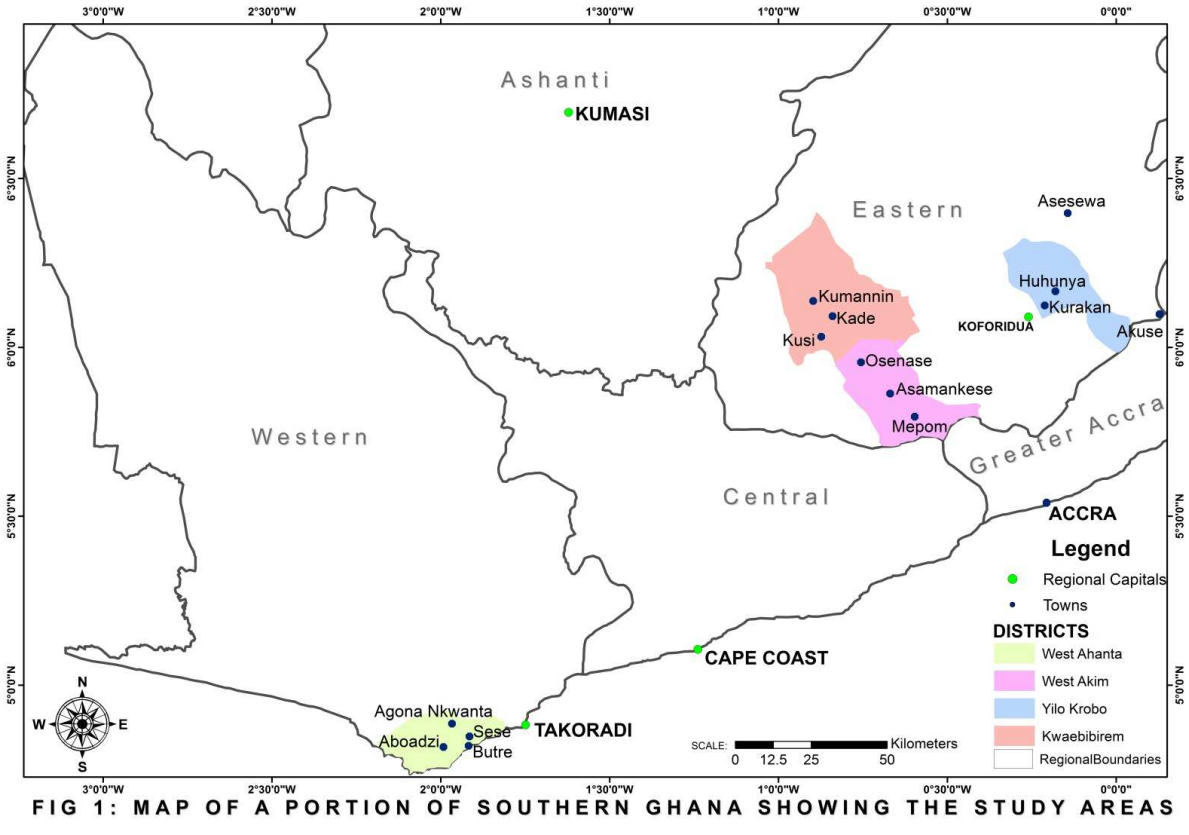

FIG 1: MAP OF A PORTION OF SOUTHERN GHANA SHOWING THE STUDY AREAS

Figure 1: Map of Southern Ghana showing study areas
Source: Cartography section of the Soil research Institute of Ghana- CSIR

Context: the history of oil palm development in Ghana

Exploitation of oil palm in the then Gold Coast started in the early part of the 19th Century and has been part of a long standing development trajectory. By the middle of the nineteenth century, palm oil had become the major staple commodity produced for the European market by the then Gold Coast where it was used as an industrial flux and in the manufacture of soap (Amanor 1994). The Krobo area became the major supplier and by the mid-nineteenth century produced about 60% of total Gold Coast exports of palm oil (Wolfan 1953, cited by Amanor 1994). In the Krobo area, palm fruits were harvested in the wild, processed, and exported to Europe. After the passing of Oil Palm Ordinance Bill in 1913, an oil palm plantation and a mill were established by the Germans at Bukuno also in the Krobo area to boost the palm oil trade. Exploitation in the Ahanta West District in the Western region also started as early as in the 19th century from the wild during, which period farmers harvested and processed the fruits into oil for sale to the Europeans.

Large-scale commercial plantings were not done until in the early decades of the 20th century, particularly after the passing of the Oil Palm Ordinance of 1913 (Dickson 1969). In 1911, the United Africa Company (UAC) acquired a concession of land at Butre to establish an oil palm plantation. The total land acquired was estimated at five thousand seven hundred and sixty six (5766) acres. At the same time, an oil mill was established at Sese also in the Ahanta West District. Palm oil obtained from the Sese Plantations was considered as one of the most highly coloured African palm oils (Hunter and Krakenberger 1946). However, upon the introduction and promotion of cocoa in Ghana, the status of oil palm as the main export crop declined in favour of cocoa partly as a result of the incentives given to farmers for the cultivation of cocoa as a new crop and also indiscriminate felling and destruction of wild palm trees for the production of palm wine and distillation of alcohol (Asamoah 1998).

Protection and anti-palm tree felling legislation failed to arrest the decline. Ghana became a net importer of palm oils by 1955. After independence in 1957, successive governments made several attempts to promote oil palm production through introduction of commercial plantations (Asamoah 1998; Addo 2000). Between 1957 and 1978, about 22 oil palm plantations were established by the state in the oil palm belt in the Eastern, Central, Western, and Ashanti Regions of Ghana with more than 50% of these plantations located in the Eastern Region under the umbrella of the State Oil Palm Plantation (SOPP). These attempts however made little impact on production as a result of mismanagement, lack of mills to process fresh fruit bunches (FFB) during peak production periods and the siting of these development projects in locations which were not climatically suitable for oil palm production because of

partisan political influences. Only 18,000 ha of land were estimated to be under cultivation by 1974.

Beginning from 1975, the government endeavoured to diversify agricultural production in an economy dominated by cocoa production, and made additional efforts to promote oil palm production through the development of oil palm estates with loans from the World Bank and other development partners. This effort led to the establishment of big oil palm estates in some parts of Eastern, Central and Western regions of Ghana. Smallholder farmers were co-opted into this sector as contract farmers in out-grower schemes. Smallholder farmers whose farms were appropriated to make way for large estates were reapportioned blocks to farm. They were provided with hybrid palm seedlings, inputs, technical advice, and extension support. They were under contract to produce palm fruits to supply the large oil mills of these estates. From the mid-1990s, these estates were privatised with the government becoming the minority shareholder. By 1998, the oil palm industry had grown rapidly from 18,000 ha in 1974 to about 279,000 ha with about 12.6% of the land under cultivation being owned by the large estates together with their out-growers and small holders (Addo 2000).

Very little effort was made at expanding the industry between 1990 and 2000. It is estimated that by 2002, about a little over 300,000 ha was under cultivation with about 250,000 ha (representing 80%) being in the hands of scattered unorganised small-scale farmers (Presidential Special Initiative 2004). The output of these farmers is known to be about 4 tons compared with the 12-16 tons produced by the Estates. In a bid to assist these unorganised small-scale farmers to plant improved materials and adopt good agricultural practices that will lead to increase in yield, the president of the Republic of Ghana announced a Special Presidential Initiative for the development of the oil palm industry in October 2002 (ibid.). The president's vision was to make the oil palm industry one of the new key drivers of economic growth and wealth creation. The aim was to cultivate a minimum of 100,000 ha of land to high yielding oil palm seedlings in the short-term (2-5 years) and a minimum of 300, 000 ha in the long term (5-10 years). The successful development of the oil palm industry was to be underpinned by seven strategic requirements. These include land acquisition, the legal framework, the incentive framework, funding, skills, infrastructure, and sustainable agriculture, especially, the welfare of affected communities. By the third year of operation (2005), the total number of nurseries stood at 34 in the six regions of the forest belt. Under the scheme a large proportion of land hitherto under wild Dura was cultivated to Tenera hybrid seedlings after felling the Dura. In the Ahanta West District of the Western Region alone a total of about 224,057 seedlings (planted to 1494 ha of land) were raised by

NORPALM, a technical firms operating in the district and supplying seedlings to about 900 farmers in the district to replace Dura oil palm.

The revised agricultural sector policy (MoFA 2007) emphasises the commercialisation of activities in the sector with market-driven growth in mind. It aims at promoting the use of certified planting material (Tenera in the case of oil palm), to increase per hectare yield of small holders. In the last few years, certification schemes such as the RSPO and Organic certification has been introduced in the oil palm sector particularly in the Eastern Region. Such schemes support mono-cropping with vegetative management system to restore the functional aspect of plant diversity (Letourneau and Pedro 1998).

Threats to Dura conservation

The study revealed that Dura conservation is constrained by socio-economic and environmental factors, which include market conditions and commercialisation of agriculture. Buyers of palm fruits (mainly processors) discriminate against Dura in the pricing of the fruits due to its lower oil yield per quantity of fruits processed. While the oil extraction rate of Dura fruits ranges between 9 and 11 % that of Tenera ranges between 18 and 22%. At the time of this study, which was in the lean season, a ton of fresh fruit bunches at the farm gate in the Ahanta West District in the Western Region of Ghana was purchased at eighty Ghana Cedis (GHC80.00) at the farm gate and sold at the factory at one hundred and twelve Ghana Cedis (GHC112.00) for mixed fruits (comprising of a mixture of Dura and Tenera fruits) and one hundred and twenty Ghana Cedis (GHC120.00) for Tenera fruits. In the Kwaebibrem District of the Eastern Region, where Tenera is the predominant oil palm variety cultivated by farmers, a ton of fresh fruit bunches was sold at one hundred and sixty Ghana Cedis (GH160) at the time of the study.

Although farmers and processors are of the view that Dura has superior characteristics, which makes it more preferable for soup and edible oil, there is neither a specialised market nor premium price paid for the Dura fruits or oil processed from its fruits. This is discouraging Dura cultivation and has resulted in its replacement with the improved Tenera seedlings, due to its higher oil yield.

Commercialisation of agriculture and the related policy preference for high yielding hybrid varieties poses a threat to the conservation of Dura variety. In the oil palm belt in some parts of the Eastern, Central and Western Regions of Ghana where farmers are entering commercial cultivation of oil palm, Dura trees were felled when fallowed lands were cleared for planting the Tenera variety. Since 2004, about 1490 hectares of Dura plantation in the Ahanta West

District in the Western region have been replaced with Tenera under the Presidential Special Initiative on oil palm (Ahanta West PSI, Oil Palm Farmers Association). In the marginal areas like the Krobo area where Dura was once an important economic crop, commercial cultivation of crops such as mangoes has led to mass felling of the Dura to give way for the establishment of mango plantations. Besides, the long gestation period of Dura is discouraging the youth from its cultivation. Within the cocoa production system, Dura trees are often left in the cocoa plantations to provide temporal shade for the young cocoa trees, and are then removed gradually as the plantation ages. However, with the shift from cocoa based cropping systems to food crop based cropping system in areas like the Manya Krobo District in the Eastern Region conservation of Dura is severely threatened. This is partly as a result of indiscriminate use of herbicides and felling of Dura to cultivate food crops. An analysis of cocoa purchases in the Eastern Region of Ghana (Figure 2), which also include that of the Manya Krobo District, shows that cocoa production in the Eastern Region of Ghana begun to decline rapidly in 1983/84 as a result of severe drought, which led to rampant bushfires and destruction of cocoa farms in the country including those in the Manya Krobo area. Attempts to replant these cocoa farms failed partly because of the declining rainfall. Most farmers in the region are therefore shifting from the cultivation of cocoa to food crops cultivation.

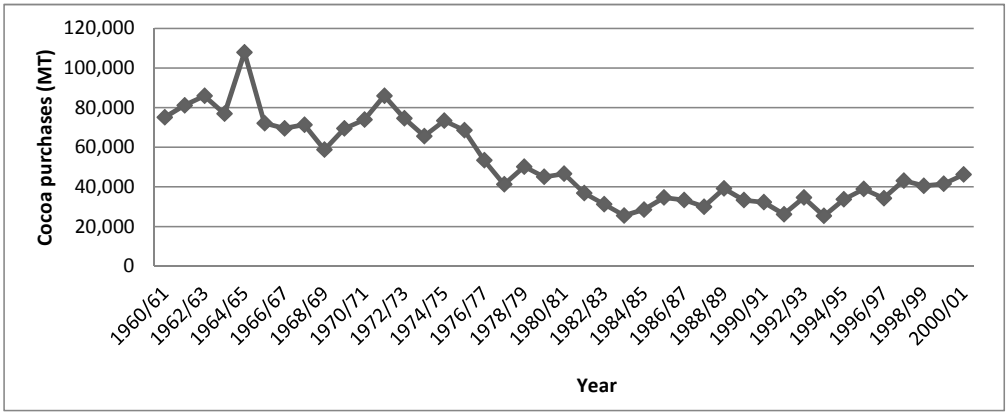

Figure 2. Analysis of cocoa purchases in Eastern Region of Ghana from 1960/61 to 2000/2001

Source: Institute of Agricultural research, UoG, Kade.

According to the farmers, rampant use of herbicides in the cultivation of food crops such as maize and cassava destroys newly germinated palm seedlings on newly cleared lands for food crop cultivation. Environmental factors such as climate change and bush fires pose a severe

threat to the cultivation and conservation of Dura variety. The Krobo area, which once produced the bulk of Ghana's palm oil, can no longer support oil palm cultivation because the area is increasingly becoming drier due to changing climatic conditions. A study of the variability in annual rainfall from 1951 to 2000 by Owusu and Waylen (2009) revealed that mean annual rainfall totals within all the five agro-ecological zones of Ghana have experienced significant declines in rainfall. The dry conditions predispose the area to fire outbreaks, which destroy young oil palm seedlings, which spring up when the seeds are spread by rodents, particularly squirrels.

Land tenure arrangements in the oil palm growing areas are mostly through the share cropping system, inheritance, or gifts (Gyasi 1994). Share cropping arrangement generally involves proportional sharing of the proceeds of the plantation between the landholder and the tenant. In an area where land is particularly scarce, a crop may be farmed on the *abunu* system while in areas where land is relatively abundant the same crop will be farmed on the *abusa* system. Land may be given to a kin on *abusa* terms while it would be given to strangers on *abunu* (Amanor and Diderutuah 2001). The arrangements for crops under *abusa* and *abunu*, are worked out on the basis of the labour and capital invested. Both systems are explained in Adjei Nsiah (2012) and Amanor and Diderutuah (2001). Under the *abunu* system of share cropping, the landowner (most of whom do not have enough resources to invest in the land) provides land while the tenant farmer provides inputs and labour. In such a situation, the field may be shared between the tenant and the landowner after five years on 1:1 basis or the tenant may maintain the farm and use a third of the income from the sale of the fruits for field maintenance, keep a third of the money and give a third to the landowner. In the *abusa* system of sharecropping, the landowner provides land and inputs (fertilizer, planting material, money for maintenance while the tenant farmer provides labour. When the trees come into full bearing, the land owner takes two thirds of the proceeds while the tenant farmer takes a third. The *abusa* system of sharecropping is prevalent with out-grower schemes of the large industrial estates, whereby a tripartite contract is signed among the management of the estate, the tenant farmer and the landowner. The landowner provides land, the estate provides inputs (fertilizer, planting material, money for maintenance and extension service) while the tenant farmer provides labour. When the trees come into full bearing, the fruits are sold to the company which then deducts part of its input cost at source. Farmers using these kinds of arrangements will opt for high yielding Tenera. Most farmers interviewed indicated that it is considered uneconomic for both the tenant farmer and the land owner to maintain Dura due to lower yields, the longer period that it takes to start bearing fruits and lower pricing of fruits.

Contrary to this, Dura trees were found on outright purchased lands, like the *huzas*, and on small-scale in mixed cropping system.

Diversity in agriculture

The different oil palm types observed in different ecological zones, farming and processing practices are presented here. Three different types/varieties of oil palm can be identified in Ghana; the Dura (which has a thick shell and a thinner mesocarp), the Pisifera (which is shell-less) and the commercial variety, Tenera (which has a thicker mesocarp and a thinner shell than the Dura) which is a hybrid developed by crossing the Dura palm with the shell-less Pisifera variety. These varieties are dilated upon by Purseglove (1985) and Webster and Wilson (1980, cited in Baryeh 2001). It is worth noting that two types of Dura can be identified in Ghana. These are local Dura, which is self-seeded and tended (to some extent) by farmers and "improved" Dura, which is used in the breeding of the Tenera hybrid.

Table 1: Varieties of oil palm and their characteristics

Type of fruit	**Thickness of shell**	**Thickness of mesocarp**	**Size of endocarp**
Dura	Thick shell	Thin mesocarp	Large
Pisifera	No shell	Thick mesocarp	No endocarp
Tenera	Thin shell	Thick mesocarp	Medium

Source: Purseglove (1985) and Webster and Wilson (1980).

The oil palm tree crop thrives in areas with well distributed rainfall of at least 1500 mm per annum with high relative humidity, minimum monthly temperatures not below 20ºC and a total insolation of 1500 hours per annum. In Ghana, the suitable and the favourable areas for oil palm cultivation thus delineated fall within the evergreen forest and the moist semi-deciduous forest zones. Table 2 shows the five (5) main agro-ecological zones: Rain Forest, Semi-deciduous Forest, Transitional Zone, Coastal Savannah, and Northern Savannah (Guinea and Sudan Savannah) defined on the basis of climate, reflected by the natural vegetation and influenced by the soils.

The climatically suitable areas include mainly parts of the Eastern, Central, Western, and Ashanti Regions and parts of Volta and Brong Ahafo regions. While the marginal areas are remnants of the once continuous belt of semi wild oil palm and parts of the Ahanta area west of Takoradi, Dzodze and Ohawu in the Volta Region (Van der Vossen 1969, cited in MASDAR 2011).

Table 2: Average rainfall by agro ecological zone

Agro ecological zone	**Mean annual rainfall (mm)**	**Major growing season (days)**	**Minor growing season (days)**
Rain forest	2,200	150-160	100
Semi-deciduous forest	1,500	150-160	90
Forest/savannah transitional	1,300	150-160	60
Coastal savannah	800	100-110	50
Northern savannah (Guinea)	1,100	180-200	0
Northern savannah (Sudan savannah)	1,000	150-160	0

Source: MASDAR (2011)

At the level of farming, Dura can be identified in different farming practices. In most areas considered marginal for oil palm cultivation the local Dura variety forms part of the fallow system. Farmers tended and harvested Dura when the fallowed land was brought into cultivation. When the fallowed land was cleared for cropping food crops, the palm trees were heavily pruned to create enough space for planting food crops. Dura was common in cocoa growing areas. On the cocoa farms, they were used to provide shade for young cocoa seedlings while the fruits are harvested for food/and or for sale or felled for the production of local gin.

The improved Dura was more common in areas where large industrial oil palm estates or institutions involved in oil palm research are located and resulted from segregation of the Tenera hybrid seeds. In the Ahanta West District of the Western Region, the improved Dura is widely cultivated by small holder farmers mostly due to lack of access to the hybrid Tenera seeds produced by the Oil Palm Research Institute (OPRI) of the Council for Scientific and Industrial Research (CSIR), located at Kusi near Kade in the Eastern Region (Osei-Amponsah 2013). Farmers therefore picked germinated seedlings from old plantations or from their old farms for planting.

In the Kade area, the proximity to institutions such as the Oil Palm Research Institute at Kusi, University of Ghana Forest and Horticultural Crops Research Centre at Okumaning and the Ghana Oil Palm Development Company also at Okumaning and Kwae all in Kwaebibrem

District, has resulted in the used of improved Dura. Farmers interviewed in two communities in the West Akim Municipality indicated that they accessed planting materials from vendors and old plantations. Further sampling of immature fruits on two farms at Nyankomasi (a village near Kade) indicated a high percentage (about 70%) of improved Dura, which the owners erroneously assumed it to be Tenera. Undoubtedly Dura still persists either in its improved or semi-domesticated form due to these practices.

Diversity in food

Oil palm is an important food ingredient in Ghana but the three identified types have different qualities, which make it suitable for food or for industrial purpose. Dura fruit is mostly used for the preparation of soup (palm nut soup) or processed into edible palm oil used in cooking several dishes (Table 3). The fruits of the Dura have lower oil content between (9 and 11%); compared to Tenera (18 and 22%) but have unique food qualities demanded in the local and diaspora markets. The oil is lighter, highly coloured and tastes better (perceived qualities). The fruit is used as soup base and because of its characteristic flavour and colour (Corley and Tinker 2008) On the contrary, the hybrid Tenera has more oil but less carotene but mostly preferred for industrial purposes (Poku 2002). Due to its low oil content, it is uneconomical to process only Dura on commercial basis but processing Tenera alone for food may not give the quality demanded on the market. Therefore processors use a mixture of fruits of different varieties of oil palm (Table 4) to have a balance between oil quality and quantity.

Proximity and access to improved planting material, the agro-ecological conditions (Table 1) were found to influence the availability of a particular type/variety of oil palm in an area and the level of blending practised by processors. In the Ahanta West District of the Western Region, the improved Dura is widely cultivated by farmers, especially in communities around the Norpalm plantations but there is also a wide span of Dura in the wild. Large-scale cultivation of Dura in the Western Region is mostly due to lack of access to the hybrid Tenera seeds produced by the Oil Palm Research Institute (OPRI) located at Kusi near Kade in the Eastern Region. In the Kade area in the Eastern region, which has the largest acreage of oil palm under cultivation, processors used more Tenera and less Dura. However, further away in Ekoso a sample of 100 fruits picked randomly from different sacks indicated a high (60%) percentage of improved Dura, 30% local Dura and 10% Tenera. In Asamankese sampling indicated 50 % improved Dura, 30% Dura and 20% Tenera. In some remote areas visited (Caanan) within the same region but further from the Oil Palm Research Institute and Ghana Oil Palm Development Company, Dura (local and improved) fruits were the most common

fruits processed (see Table 4). There were other processors who mixed Tenera with Dura intentionally to meet market demand. In the table below we present such combinations observed in the month of March, 2011.

Table 3: List of palm oil/oil palm based local dishes

Name of dish	**Description**	**Main ingredients**
Fried plantain and beans ("red red")	Ripened plantain fried and eaten with boiled cowpea mixed with palm oil	Ripened plantain, cowpea, pepper, onion, salt and red palm oil
Etor	Boiled or roasted yam, plantain or cocoyam mixed with red palm oil	Yam, plantain or cocoyam, red palm oil, onion, pepper and salt
Edibi	Kenkey made from unfermented maize dough mixed with red palm oil	Unfermented maize dough, red palm oil, onion, pepper and salt
Apreprensa	Roasted maize flour mixed with red palm oil and boiled	Roasted maize flour, red palm oil, onion, salt
Palava source	Boiled cocoyam leaves mixed with agushi and red palm oil	Cocoyam leaves, red palm oil, agushi, tomatoes, onion, salt
Palm soup	Soup prepared from palm fruits	Palm fruits, fish or meat, tomatoes, pepper, salt
Gari and beans	Boiled cowpea mixed with red palm oil and eaten with gari	Gari, red palm oil, cowpea, onion, pepper, salt
Gari fortor	Gari mixed with palm oil	Gari, red palm oil, onion, pepper, salt
Akankye/Apitsi	Mashed ripened plantain mixed with red palm oil and roasted	Repined plantain, red palm oil, onion, pepper, salt
Tatale	Mashed ripened plantain fried in red palm oil	Repined plantain, red palm oil, onion, pepper, salt

Source: Authors' compilation of local palm oil dishes based on interviews and observation, West Akim, 2012

From another sampling done at seven (7) different processing sites (*Kramers*) within the Municipality, different combinations were observed (Table 4). Processors also remained some flexibility in how to mix fruits, depending in availability (Table 5).

Table 4: Proportions of different oil palm varieties used in blending by small-scale processors in West Akim municipality (N=10)

Location	**% Tenera**	**% Dura**	**% improved Dura**
Sukunu wanfi	20	40	40
Kwapong	10	40	50
Caanan	0	80	20
Asuokow 1	30	10	60
Asoukow 2	20	40	40
Asamankese	20	30	50
Ekoso	10	30	60

Source: Data collected at 7 different *Kramers* in West Akim municipality by cutting the fruits to determine the type of fruits based on the thickness of the kernel 2012

Table 5: Ratio of Tenera to Dura fruits used in processing into palm oil by a processor at Ekoso

March	**Total number of fruits supplied (in bags) 83kg/bag**	**Quantity of Tenera (in bags) 83kg/bag**	**Quantity of Dura (in bags) 83kg/bag**	**Volume of oil extracted (L)**
1st processing	32	17	15	625l
2nd processing	40	22	18	750l
3rd processing	38	10	28	625l
4th processing	38	20	18	750l
5th processing	47	9	39	520l
6th processing	15	5	10	270l

Source: Field observations and interviews at Ekoso, West Akim, March, 2011

The conservation of Dura

The threats notwithstanding, we identified certain practices, which sustain Dura within the farming systems (where farmers intentionally conserve local palm trees as source of food, income, as well as temporal shade for young cocoa trees and recycle hybrid materials) and in small-scale processing.

In most areas considered marginal for oil palm cultivation the local Dura variety forms part of the fallow system and is only tended and harvested when the fallowed land is brought into cultivation. The local Dura is common in cocoa farms where they are sometimes used to provide shade for young cocoa seedlings and later sold to palm wine producers and alcohol distillers. On fallowed plots, the Dura is maintained and tended concurrently when the land is cleared for food crop cultivation. Farmers with limited access to hybrid planting material use germinated seedlings from old plantations or old farms for plantings, which has led to unintentional conservation of Dura and maintenance of diversity in oil palm.

A visit to some selected communities in the study area (Akyem Boso, Nyankomasi, Sukrong Wamfi, Caanan, Nyanoa, Ekoso, Edwenase, Kwapong and Manya Krobo areas) showed that there still existed a considerable amount of Dura trees, which is used for processing. In Sukrong Canaan, a village located about 62 kilometres from Kade for example we encountered a farmer who owned about twenty (20) acres of local Dura plantation from which he harvested fruits that were processed for a buyer in Accra. Also in Akim Boso there were farmers who still maintain the Dura to supply to processors, local restaurant operators, and fresh fruits sellers.

In addition, the preference for Dura oil in local food provision sustains Dura cultivation in the farming system. The fruits are either used for the preparation of soup (palm nut soup) or processed into edible palm oil. A visit to some communities in the study area (Sukurong, Akim Boso, Ekoso and Kwapong) and important markets, notably Asamankese and Adaeso, showed that there still existed a considerable market for the Dura and buyers travel from far (Accra, Tema) to these communities to buy both the fruit and oil. The fruits were in high demand not only by processors, but also local restaurant operators (popularly known as chop bars), exporters of palm soup base, fresh fruit sellers, and individual consumers. In the markets and along the roads the fruits were sold together with the hybrid Tenera to give buyers the opportunity to combine the different varieties in any proportion desired, which revealed the current practice involving the use of Dura.

A group of women processors interviewed during the study indicated they mix Dura with Tenera because the local Dura is no longer available as the trees are being felled and replanted with hybrid Tenera (*agric*) and other tree crops:

> "In the past we used only the local oil palm because that was what farmers cultivated but now most farmers have felled the local trees and replaced them with the *agric* because it gives more oil and is profitable". [Interview O., Ekoso, September 20, 2010

They also claimed that oil from Tenera sometimes looks pale, which agrees with the findings of Musonge and Baryeh (1991). On the other hand the Dura has a nice colour when processed but has less oil content, as one woman put it:

> "The oil from *agric* [hybrid oil palm] sometimes looks white and solidifies after sometime unlike the oil from the local, which is very red." [Interview O., Ekoso, September 20, 2010]

One other processor claimed she intentionally mixes Tenera with Dura because:

> "The oil from *agric* looks pale so any time I have *agric* [hybrid oil palm], I mix it with local [Dura] to improve the colour and the taste". [Interview N, Ekoso, October 12, 2010]

Pure Dura oil may not be found on the open market according to the processors because of scale of production but also consumers do not pay premium price. However, on a small-scale it can be processed on request, at a premium price.

In the rural areas where Dura is common, processors use traditional processing methods, since the semi mechanised machines discriminate against it and may not even be available. The larger nuts or kernels facilitate the scrubbing of the fruits with the traditional method while the semi mechanised method is less appropriate for Dura. One woman mentioned that even when she had Tenera she added more Dura to aid scrubbing (fruit digestion). She said the use of Dura and the traditional processing method enhances the marketing of the oil, especially during the peak season when the price of oil is low. During such periods, buyers use criteria such as processing method and whether or not Dura was used to price palm oil because consumers were of the view that traditionally processed Dura is of superior taste. She said it was expensive and tedious to carry fruits to another town to mill but also easy to extract the oil from the nut of the local palm fruits because it has a thin fibre using the traditional method unlike agric (Tenera), which has more fibre, requires more water and the nuts do not sell well.

Discussion

The findings from this study reveal that Dura oil palm faces strict competition from the commercial Tenera variety. Agricultural policies since independence have favoured large-scale planting of high yielding Tenera variety at the expense of Dura (PSI 2003; MoFA 2007;

MASDAR 2011). Oil palm history in Ghana clearly shows consistent policy focus on high yielding hybrid varieties. Undoubtedly, there is high demand for palm oil both internally and externally and therefore it is economically rational and logical to opt for varieties that will surge production levels. There is high demand for oil palm both locally and externally. Unintentionally, this orientation poses a serious threat to the conservation of the Dura palm despite its preference by Ghanaian consumers for the preparation of food. Although there is an action plan to conserve biodiversity in Ghana, no conscious efforts are being made to conserve Dura. The tree crop has been ignored by policy makers for a very long time and is excluded from the public research and development agenda. Hence, it is relevant to explore whether a policy focus on commercial or industrial crops will have unintended consequences not only on agro-biodiversity but also on food security.

In recent years, one of the tools being considered to promote biodiversity conservation particularly of underutilised crops is through the market (Bioversity International 2010:1-16; Nill and Bonhne 2006). Objective of the Roundtable on Sustainable Palm Oil (RSPO), an international, multi-stakeholder initiative, is to promote the growth and use of sustainable palm oil. The organic standards equally promote practices that ensure sustainability through non-application of chemicals, non-felling of trees, use of cover crop for soil conservation and erosion control. Documented evidence of such biodiversity and market linkages include production of rattan in Columbia, Ojon nuts in Hunduras, Fynbos flowers and rooibos in South Africa, Phytotrade in southern Africa, and Fairwild label in Brazil's Amazon (IUCN) and date palms in North Africa. Bioversity International has been concerned with developing neglected and underutilised species (NUS) into value chains for biodiversity conservation and pro-poor growth (Bioversity International 2010).

The assumption is that market led initiatives will lead to conservation of agro-biodiversity. Though standards and certification schemes have been viewed as tools to link market and sustainable production they may not necessarily lead to expected outcomes. Brooks (2006) have observed that in practice, some of these schemes have failed to deliver the expected benefits due to a combination of factors including economic and agricultural development policies. Low valued or "minor" crops for example, often receive less attention in research and development programmes but have values other than monetary and therefore must be given equal research attention. Identified value chain interventions (RSPO and Organic standards) in Ghana seem to be more inclined towards conservation of biodiversity within mono-cropping farming system than in agro-biodiversity system of a more diverse configuration of farming, processing, and trading practices as in the case of Dura.

For years resource users (farmers and processors in our case) have adopted certain practices to use, enhance, and conserve agro-biodiversity. These practices need to be recognised and strengthened as one of the ways to conserve agricultural biodiversity. Observed farming and processing practices seem to conserve the Dura. The local Dura, which is usually self-seeded and spread by rodents and squirrels, is not intentionally planted in a plantation-like manner as is done with the hybrid Tenera. Hence, the Dura palms are not closely spaced, which allows it to be intercropped with other (food) crops. Dura-cocoa intercropping provides shade for young seedlings. In areas marginal for optimum oil palm production, Dura is cultivated for household consumption. In marginal areas for oil palm cultivation, Dura is the only source of palm fruits for domestic consumption and farmers make conscious efforts to conserve it for food for the household, and a source of income.

Small-scale processors utilise the unique qualities of Dura to make palm oil demanded by consumers. Even in areas where other oil palm types are available, processors blend the fruits to balance quality and quantity. Dura dovetails well with traditional processing methods, which still persist in remote villages where processors have neither access to hybrid Tenera nor to semi-mechanised mills. Hence, Dura does not only have the potential to contribute to conservation of agro-biodiversity but also to rural livelihoods, particularly of women.

The importance of conserving diversity of oil palm genetic resources for food security and the ecosystem are recognised (Bennett-Lartey et al. 2008). Yet to date, the only institution in Ghana, which has been making a conscious effort at conserving the Dura variety for future use is the Oil Palm Research Institute. Within the last few years, the Institute has been collecting Dura materials from various parts of the country for conservation with the view of using them for breeding. In some instances farmers have been paid to conserve Dura in their fields. At the community level, conservation of Dura and agro-biodiversity hinges on the link between farming practices and processing. The study recognises that the existing configuration in, which Dura is conserved, is precarious if policy focus continues to be on hybrids. A more diverse portfolio of pathways towards the development of the oil palm sector, which includes providing oil with specific traits to local markets and developing a niche position in international markets, is therefore necessary. This can be complemented with public efforts to elaborate and strengthen national strategies and policy for in-situ conservation and sustainable use of wild plants relevant for food production. We have argued that conceptualising diversity only at species, genetic and ecosystem levels is not enough to explain how conservation can be realised. This is because conservation evolves and changes in socio-technical practice.

Conclusion

We started this investigation from the original assumption that the specific traits of Dura-based products would enable its conservation by strengthening a niche proposition in local and international food markets. However, conservation of Dura is anchored in a variety of configurations linking end-use markets, processing, and farming. The flexibility of these configurations is illustrated by temporal and spatial variations. This is most concretely manifested in the blending of oil palm varieties in order to make processing economically viable while still using Dura. We conclude that the unique quality of Dura does not suffice to ensure its conservation; the variety needs to be a viable part of dynamic configurations. Hence, conservation strategies building exclusively on market-led conservation strategies that require a high level of purity may contradict this.

We also conclude that the second market-led strategy, i.e. that of certification of industry-oriented oil palm production, primarily considers hybrid-based production systems and aims to realise biodiversity conservation outside the boundaries of these production systems. We consider the conservation of the Dura oil palm variety as dependent on the capacity of linked buyers, processors, and farmers to navigate in changeful natural and economic conditions. The implication for policy is to aim at multiple developmental pathways. These contrasts with the dominant public policies and private strategies observed in Ghana, which tend to rely strongly on single recipes, e.g. expansion of hybrids and certification, and reveal a lower level of flexibility. There is therefore, good reason to include multiple development pathways in policy frameworks and market-led strategies targeting sustainable development of the oil palm sector.

CHAPTER 6

General discussion and conclusions

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Introduction

This thesis explores the making of quality oil in small and medium-scale oil palm processing enterprises in Ghana. This concluding chapter presents an overview of the main findings of the research and links them to broader theoretical and methodological discussions on collectivity, governance, and performance. It also provides reflections for policy and practice and ends with recommendations for future research.

In Ghana, women organise themselves in groups for small-scale palm oil processing and related enterprises, which provides important livelihood opportunities in oil palm producing communities. In the West Akim municipality, the main area of research for this thesis, groups of women process Dura oil palm fruits and make red palm oil with specific quality traits appreciated in local and diaspora markets. However, the current global attention for market-based sustainability standards and the related certification schemes in the palm oil sector risk marginalising the role of small-scale oil palm processing in rural livelihoods and local food security. Likewise, in Ghana, public sector policies and private investments are largely biased towards the use of high yielding hybrid planting materials and industrial and export-oriented production systems. An indirect effect of both developments is that market dynamics and public policies discriminate against the native/semi domesticated Dura. The making of quality palm oil based on local varieties by small-scale processing units receives much less attention, while this configuration can positively impact biodiversity conservation, local livelihoods, and endogenous economic development.

Many studies emphasise that the making quality is a matter of selecting the right technical recipes, regulating the activities of actors in the chain through standards, or exploiting a specific quality to construct a niche market in a competitive playing field (Osei-Amponsah et al. 2012, 2014; Tagoe et al. 2012). This thesis located the making of quality in the interactions between social organisation and material transformation processes in small-scale palm oil processing and detected the often unintended consequences of non-localised rules and routines on these small-scale practices. The focus of the thesis on groups of women making palm oil with a specific quality mainly serves the purpose to analyse how women's groups

and medium-scale firms navigate material and social conditions and to explain why and how the making of quality leads to sustainable forms of collectivity.

The thesis argues that quality is an emergent property that needs to be made continuously under changing material and social circumstances. The making of quality, which goes beyond following technical prescriptions or complying with standards in mainstream or niche markets, leads to specific and hybrid forms of coordinated action. Making quality entails improvisation, navigation, repair, and adjustment and, in the case examined in this thesis, the ability to coordinate and organise collective tasks, and transfer skills to new members. The collective dimensions of making quality are visible within the women's groups, but also in the interactions between small and medium-scale processors with farmers supplying fruits or traders buying oil.

My study of women working together in making quality (Chapter 2 and 3) at a small-scale mill (*Kramer*) sets out to understand the persistence of small groups that act in such a way that members, as well as farmers supplying fruits or traders buying oil, continue to recognise the value of the processing group at the *Kramer* and the institutional arrangements underlying cooperation and the group's relationships with the environment.

The case study of a medium-scale firm (Chapter 4) also demonstrates that this enterprise adopts a certain flexibility to organise the sourcing of fruits and the supply of different markets. The small-scale women's groups and the medium-scale firm exemplify endogenous capacity to navigate in changing conditions, in order to make palm oil of a certain quality.

Both enterprises depend on the conservation of agro-biodiversity, in particular the Dura palm, although scarcity of Dura fruits leads to clever mixing of oil palm fruits while still maintaining the demanded quality traits. An unintended consequence of the contemporary interest in sustainable palm oil and large-scale processing, visible in global standards and the direction in R&D trajectories discussed in Chapter 5, may be the erosion of the contributions of small and medium-scale entrepreneurial activities to food security in Ghana.

The rest of this chapter is organised as follows. The section below presents the main findings to answer the research questions derived from the objectives. Next, the chapter discusses the main theoretical and methodological implications for studying collective action and governance and links the thesis to broader debates. Finally, the study reflects on the implications of this study for policy and practice and provides an outlook for further studies.

Main Findings

The point of departure for this thesis is a focus on what people do (Richards 1993, Jansen and Vellema 2011) in order to relate the making of quality to the persistence of small groups in processing oil palm. Accordingly, this thesis has two main objectives. First, the study aims to explain how women processors actually make quality, and why and how small-scale women's groups organise around this process of material transformation in the making of red palm oil. Second, the study examines why and how non-localised rules and development pathways, in particular R&D policies and value chain governance, enable or constrain these existing practices of collective performance, which are grounded in diversity of both entrepreneurial activities and natural resources.

This thesis conducted case studies of small-scale groups of female processors and a medium-scale palm oil processing firm in the West Akim municipality of Ghana. The study of the women's groups looked in detail at processes of making to explore (Chapters 2 and 3) how diverse groups of women processors perform collectively, and when organised as a group resembling a guild, perform and coordinate tasks and gain stability. Through a technographic lens (Jansen and Vellema 2011) I investigated how both quality and collectivity emerge in the interaction between material transformations and social organisation. A technographic approach allows for a systematic description of the interaction of people, skills, tools, techniques and know-how, and relates this process of making to the formation and performance of task-oriented groups, and the establishment of the rules of a profession and specialisation.

To address the second research objective, the study switches from a micro-level analysis to a meso-level analysis. Chapter 4 presents the case study on how a medium-size firm handles both quality and safety requirements in the market and the problem of capricious access to palm fruit and oil, which necessitates improvisations and navigation. How the dominant R&D trajectory in the Ghanaian oil palm sector influences diversity in small-scale palm oil processing and cultivation of oil palm varieties conservation of agro-diversity is examined in chapter 5.

The collective nature of performance in making quality

Making quality in small groups

The first research objective, to investigate the interaction between social organisation and processes of material transformation (sourcing and processing oil palm fruits and making oil with specific quality traits), was investigated in chapters 2 and 3. These two chapters

investigated how the women organise their work and solve problems to achieve a practical end, namely red palm oil, and how the task-oriented groups persist. The detailed description of milling and cooking tasks in Chapter 2 reveals how individual processors agree to share risks, transfer knowledge and skill, and manage conflicts and tensions. Findings show a hybrid form of organisation whereby women combine individual and collective interests. The insights also illustrate the skilful nature of making red palm oil (i.e. cooking different recipes), which involved several coordinated activities and rules guiding collective performance as well as interactions between women's groups and their social and material environment.

Insights illustrate how women in the groups understood and used rules for regulating the actions and performance of members. In performing the milling and cooking tasks, rules emerged to guide group and individual behaviour. Rules guiding milling and cooking and the sharing of processing equipment were established to define the schedule for milling and enable each member to process fruits on time to ensure quality. Milling on a particular day was based on a first-come first-served basis, whereby the first person to set the fire at the *Kramer* was considered to be the person with the right first to mill. Each member milling on a particular day was obliged to join the team throughout the milling, to assist and to be assisted by the group.

Rules regarding cooking different recipes define processes of skill formation and membership. Individuals without the skill for processing oil were not considered members until they acquired the skill through a laid down procedure. This is illustrated by material showing how younger women who entered the *Kramer* with no experience in making palm oil were given the opportunity to assist in non-core tasks for a number of years and by so doing learned the skill of processing through practice, and thus gradually assumed membership. The duration varied between two to five years.

Making quality and realising volumes to meet market demand required joint effort in milling to ensure that fruits were processed fresh. During milling a certain level of temperature was required to ensure maximum oil extraction, which required that women helped each other to carry the steamed fruits quickly to the machine. With the volumes of oil they cooked, this was not possible for an individual, as she was also concurrently cooking the oil. Women also cooperated to achieve a reliable, sizeable, and consistent volume of oil, which made the groups attractive to buyers. This collective realisation of scale supported women to negotiate better prices for both oil and fruits. Prices of both the oil and oil palm fruits changed with the seasonal fluctuation in oil palm production, becoming low during the peak season when fruits were in abundance and high during the lean fruit production period.

The changeable market environment required that they teamed up to ensure a reputation for quality at the *Kramer*, and thus credibility with buyers and suppliers.

In chapter 3, I investigated the practices in sourcing, and explored how the women arranged the linkages with suppliers, farmers, and buyers of oil. Sourcing fruits links the performance and durability of the group to agro-ecological conditions and competition for fruits. In the relationships with those supplying fruits or buying oil, it was important that these actors continued to recognise the group and its members as a reliable buyer of fruits. The production of palm fruits, which is the main raw material for processing, fluctuates with the season. Fruits were in abundance during the peak season from March to May and scarce during the off season from September to November, triggering increase in demand and competition.

To ensure continuous supply of fruits for processing all year round, some of the women maintained networks of farmers, suppliers and buyers and used different strategies to source fruits, made informal contracts arrangements with farmers, suppliers and palm oil buyers and used advance payments to secure regular fruit supply and marketing of oil. Nevertheless, this seeming self-interest did not affect cooperation in the group, and groups were flexible enough to accommodate temporary absence of women who lacked resources to source fruits for processing the whole year round and opted out during the lean season when fruits were scarce and expensive. In the peak season, these women joined the group again. The flexibility in groups and the individual and collective capacity to handle fluctuations in raw material supply and market helped ensure the persistence of the group form.

Blending collectivity and individuality in small women's groups

The findings show that the groups maintained a certain level of flexibility in how they organised processing oil and sourcing fruits. The study reveals a level of differentiation among groups, in the sense of who is an (active) member and who is not, and also in terms of composition according to season, and in terms of social hierarchy (some women are more influential). Nevertheless, belonging to a group was an enabling institutional condition for engaging with various entrepreneurial activities.

The data substantiate that the group was a blend of individually managed entrepreneurial activities and collective performance, and that its form, structure, and functioning responds to the demands of making quality in palm oil processing. Hence, it is the precise contents of the tasks, e.g. timely processing of fruits combined with fire management and the use of specific recipes to ensure quality, which explain how women organise themselves and do not act individually. A group would exist in a certain form as long as there is task to be performed, as

also suggested in McFeat's (1974) pioneering and seminal analysis of small group cultures. For as long as the activity reoccurs, the group keeps together. Consequently, the group's sustainability is a result of continuity in membership but also in the formation and transmission of skills, know-how, and location.

I conclude therefore, that collective action and its organisation and structure in small-scale palm oil processing in the West Akim municipality proved to be an emergent outcome of continuous processes based on evolving socio-technical practices. Analysis of the case studies underscores the capacity of the groups to develop and maintain collective capacity to manoeuvre changing institutional and material environments within which groups perform. It is shown in this thesis that the way people perform tasks in material transformation evolves into an organisational form flexible and robust enough to manage the interactions of social organisation and material environments. I conclude then that collective action evolves and sustains itself through performance of tasks. Therefore, rather than looking for a fixed organisational form to fit to all members, it should be appreciated that groups have a greater chance of surviving if their form accommodates both collective and diverse individual interests and institutional preferences, and is shaped and reproduced in accordance with the contents of the tasks performed.

Intended and unintended consequences for diversity

This thesis also examines the normative public and private selection and governance environment within which grouped processors and medium-scale firms perform. I explore ways by which governance mechanisms, such as RSPO (Roundtable on Sustainable Palm Oil), and sector policy constrain small and medium-scale processing firms to use skill, tools, and know-how to manoeuvre within changeable natural and social environments. It seemed that most governance mechanisms lack flexibility to accommodate diversity, which may have unintended adverse outcomes for rural livelihoods, local economic development and food security.

The case studies of women's groups processing oil palm (Chapters 2 and 3) reflect a diversity of entrepreneurial strategies. The groups ensure it is possible to combine collective and individual interests to make palm oil, a vital component of food security in Ghana. Likewise, the case study of the medium-scale processing firm demonstrates that this company had the capacity to improvise when sourcing of fruits was uncertain, and to switch between markets. Both the women's groups and the medium-scale firm have the level of skill required in making different palm oil recipes and to manage processes between the processing units and external suppliers. However, it is not yet clear what makes them continue to exist despite

pressure from standard setting in the market for palm oil, and a public policy focus on industrial manufacturing, and agricultural intensification based on hybrid oil palm varieties. The question remains whether the viability of these local organisational forms will stand the test of time in the face of these trends in market governance and public policy. In particular, the regulation of performance in (global) value chains and the related preferred way of organising producers, and the selection of recipes for public research, may be in tension with the types of groups and firms central to this study. The consequences of regulation and selection are discussed below.

Regulation

Quality standards and certification schemes have become important due to the intensification of production and cross-border trade. Increasingly, standards framed by partnerships between multinational lead forms and international NGO's (Vellema and van Wijk 2014) shape the way food provision and production processes are governed. Standards provide criteria or external points of reference, by which a product's technical, and physical characteristics and /or processes and conditions can be assessed (Nadvi and Waltring 2002). Increased food safety and quality standards have brought about shifts in consumption patterns (Narayan and Gulati 2002). In the value chain literature, governance is viewed as the framework and institutional structure by which rules (standards) are set and implemented (Gereffi et al. 2005) or as sets of practices and organisational forms through which a specific division of labour is defined, and through which production and distribution are conceptualised and established (Gibbon et al. 2008). Compliance with such standards is often accompanied by induced forms of collective action to arrange access to productive assets, such as inputs, credit, technology, and land (Markelova et al. 2009; Poulton et al. 2006).

In chapter 4, the issue investigated was the presumed potency of standards by focusing on a single case study of a medium-scale firm, which, like the small groups of female processors addressed in earlier chapters, makes palm oil with specific quality traits for the local and diaspora market. The case study of this firm confirms that the making of quality red palm oil is a skilful task of cooking different recipes, meeting both public food safety standards and consumer preferences. The case study reveals the firm's capacity to manoeuvre, improvise, and innovate in addressing concrete problems in making quality, through which the firm generates know-how. Fluctuation in fruit supply required the use of different strategies to source both fruits and oil to ensure regular supply of product on the market. The firm developed strategies to manage oil shortage by buying from other processors. The oil was re-cooked and blended to attain consistency in taste, colour, and texture while measures were put

in place to monitor and trace any source of adulteration. The firm manoeuvred changeable environments by the use of skill, tools, and techniques.

The case study of the firm suggests that small and medium-scale processors in the Ghanaian oil palm sector combine process and product upgrading. Process upgrading basically reflects efforts to increase profits by transforming inputs and output; product upgrading places emphasis on moving to more sophisticated product lines and developing a portfolio for different end-use markets (Humphrey and Schmitz 2002). The dominant forms of value chain governance in the oil palm sector, in particular RSPO, strongly shifts momentum and focus to process upgrading, and pays little to no attention to the entrepreneurial strategies of small and medium processors.

As an unintended consequence, global sustainability standards may undermine the role of these processors in providing cooking oil to local markets and erode the diversity of meals where red palm oil is used. Moreover, conservation of agro-biodiversity identified in value chain standards in Ghana (RSPO and Organic) seem to be more inclined towards conservation of biodiversity around mono-cropping farming systems, than towards protecting the functional link between agro-biodiversity and small and medium-scale processing, as in the case of Dura palm cultivation. This may have unintended adverse consequences for the survival of Dura, and subsequently change the interdependency between local food provision and agro-biodiversity.

The case studies of both the firm and women's groups show evolving practices in the making of quality red palm oil. This may contradict the prescribed practices included in many standards. The case studies reveal diversity in the way firms and groups, targeting different end use markets, strategize to make quality. Groups and firms organise differently from the norms advocated in value chains; it is important to further document how they manage skilful tasks and navigate changing social and material environments, while drawing upon endogenous capabilities and practices to make quality. This contrasts with the unifying and standardising tendency underlying the RSPO mode of governance. The thesis shows that standard setting and governance in value chains, which directs performance towards a certain level of uniformity, may be inappropriate in the context of the Ghanaian oil palm sector, due to the diversity of farming systems, plant material, scale of operation, and target markets. The current logic of RSPO governance leads to a constraining impact on small and medium-scale processors and lacks a mandate to respond to vulnerabilities outside its specific domain.

Selection

The study reveals that Dura oil palm is still a vital component of local diets. Palm oil processed from Dura is appreciated as a food ingredient due to its unique characteristics, though of low oil content, while the hybrid Tenera, which has high oil content, is preferred for industrial oil production. However, the intensification of Tenera (hybrid) production, the dominant orientation in public policy for the oil palm sector, seemingly discourages proper management of Dura.

Chapter 5 explored how the groups of women processing Dura continue to perform in the light of the dominant development pathway for industrial palm production, which focuses on hybrid varieties and industrial production of palm oil. It examines how the dominant trajectory affects the making of quality by the groups and consequently the conservation of Dura and agro-biodiversity. The study shows that the way the women organise and make palm oil affect the conservation of agro-biodiversity, i.e. the conservation of Dura. That is, they blend it with other types of oil palm, particularly that produced from the hybrid Tenera, to make commercial quantities of quality palm oil. The availability and use of Dura also depends on agro ecological conditions. In marginal oil palm production areas, Dura is the main source of raw material for processing at the small-scale. In such areas Dura trees are kept on farms not only to provide shade in mixed cropping systems, but also to sell to processors and thereby activity at the margins tends to conserve this material.

This leads to a reflection on the original premise of the research that a niche position in the export or diaspora market would positively contribute to the conservation of Dura. However, this seemed to be a too linear line of thinking that does not fit well with ideas of navigating an uncertain environment and the necessity of improvisation practices that underlie the performance of groups. Conservation of Dura is rather anchored in the variety of configurations linking grouped processors to both end-use markets and farming practices. The unique qualities of Dura oil palm do not suffice to ensure its conservation; the variety needs also to be a viable part of these dynamic configurations through which women's groups and firms continue to source Dura and farmers continue to keep Dura as part of their farming systems. The different configurations strongly depend on the degree of flexibility in linking the availability of fruits in different farming systems to choices made by processors, and to selling Dura-based products in different end-use markets. I conclude that conservation strategies building on market-led conservation strategies that require a high level of purity may contradict the way groups organise to make quality red palm oil for food.

However, the resilience of such socio-technical configurations may be undermined by the technical recipes and development pathways selected in public policy. Likewise, value chain

standards' governance, which tends to prescribe rules and routines requiring a certain organisational form in sustainable production of hybrid oil palms, may result in friction with the type of groups and technical practices central to this study. The selection and agenda-setting processes in the oil palm sector systematically by-pass existing forms of collaboration and institutional arrangements for making oil with a specific quality appreciated in local food markets and central to daily diets in Ghana as well as in the diaspora.

Towards a performance-based theory of small groups

The groups central to this study are examples of women working together to make quality, to organise and distribute work, to maintain a position in the market, and to share resources and tools. Can these groups be analysed as forms of collective action? The concept of collective action has been applied extensively in the areas of agriculture, rural development, and natural resource management. Many scholars build on the work of Ostrom (1990) to explain collective forms of social organisation. Ostrom's introduction of individual agency into the discussion of institutionalism is illuminating in the sense that it moves the explanation from seeing institutions as a constraint (institutions play an important role in sanctioning where an individual decides to go against set rules) to an explanation in which institutions are seen as enabling (commitment by individuals to follow the rules as long as others adopt the same commitment). Then, the long-term benefit to individuals and groups is greater than the cost. Ostrom (2004) concludes that collective action occurs when more than one individual is required to contribute to an effort in order to achieve an outcome. Meinzen-Dick and Di Gregorio (2004) perceive collection action as a voluntary action taken by a group to achieve common interests, which may take several forms - as a formal organisation or a set of rights and responsibilities related to the use of a common resource (Meinzen-Dick and Di Gregorio 2004).

Collective action theory seeks to understand the rationales and conditions for how groups of individuals cooperate and overcome social dilemmas, and partly conceptualises cooperation void of the opportunity to realise self-interests and strongly focuses on incentives as the motivation for collective action. The premise of such an argument is that individuals rarely act in a co-ordinated and co-operative way if there is no incentive for all to share the costs of collective action (Hardin 1968; Olson 1965; Sandler 1992).

However, this thesis explains the persistence of women's groups as an emergent outcome of the performance of tasks and the nature of socio-technical practices, which offers an alternative or complementary explanation for group cooperation. The precise form and

dynamic of small groups wherein women act collectively then becomes a consequence of the interaction of users with materialities through tools, techniques, and know-how. Collective action is an unintended but logical organisational outcome rather than a fixed and induced organisational form. This explains the focus in this thesis on processes generating cooperation, instead of looking for factors that give a plausible rationale to the prior existence of collective action.

I argue that it can be misleading to assume collective action to be intentional action to deal with unintended situations, as if the group was somehow separate from and independent of group action. My thesis show (Chapters 2 and 3) that collective action and cooperative organisational forms emerge out of task performance, and the functionality of collaboration may also explain that group members are prepared to compromise and achieve social settlements necessary to ensure persistence of the group. This central finding, which adds to Sidibe (2013) and Vellema (2011b, 2002), uses materiality to explain cooperation among women, and invariably, the group structure. As pointed out in chapters 2 and 3, women agreed to organise around solving practical problem of volumes, quality, and fluctuation and to handle market uncertainties and reputation. The collaboration provided new members an opportunity for skill formation. At the same time, actors supplying fruits or buying oil continued to recognise the group and its members as a valuable institutional arrangement. The study shows that the survival of the group is tied to its flexibility and capacity to handle group composition and differentiation, attuned to material challenges. Of particular importance is that the character of the organisational arrangement varies in terms of individuality and collectivity, which results in the ability to accommodate material fluctuation through seasonal variety in the composition of the group; not all members produced the whole year round, while some members returned during the peak season or were hired as workers during times when fruits were scarce. It is here that we see endorsement of the idea that collective action is not the product of a fixed organisational form but something that shifts and moulds itself to accommodate emergent or unintended outcomes.

My thesis demonstrates that rule setting is an evolving practice, through which groups develop their own set of rules to regulate social-technical practice. Furthermore, it shows that the rules pertain to the performance of a specific task. Chapter 3 illustrates a hybrid organisational form, which allows a level of flexibility in structure and function to accommodate the changeful institutional and dynamic agro-ecological environment of making quality. It suggests that how people organise to solve problems is situational (Suchman 2007). This understanding will contribute to knowing how to make social connections with material outcomes (Richards 2003).

My technographic study examined the use of skills, tools, techniques and know-how to deliver oil with specific quality traits to the market, the structure and performance of groups executing the tasks of processing and sourcing, and the rules and routines associated with belonging to an association performing specialised tasks (Chapter 2 and 3). Chapters 4 and 5 examined how these processes of making link to the wider social and economic fabric, in particular via the selection of recipes and the regulation of performance. The processes of material transformation in making quality red palm oil involve both effective co-operation and co-ordination of tasks. This means that materials play an important role in how people organise. In this sense it matters that red palm oil is not just palm oil but that it is, specifically, red. Production, especially where mixing of source materials is concerned, has to be so organised so that it is red enough. Vellema (2002) observed the need to understand materiality in how contract farming works and how materiality plays a role in the way people organise socially (Vellema 2011). In this regard, rather than looking for a generic set of rules to guide how people should organise to make quality, there is the need to shift focus to the material dimension to understand what type of organisational set-up will work in a specific context. The thesis then proposes a performance-based understanding of collective action, which considers materiality as a constituting factor of collective action.

Implications for development practice, policy and further research

Groups and value chain governance

From a developmental perspective, value chains, standards, and governance present certain options for inclusion through compliance and upgrading, and exclusion due to non-compliance and opting out (Otieno and Knorringa 2012; Lee et al. 2012; Henson and Jaffee 2006, 2008). Value chain governance seeks to re-align a giving practice to reflect a standard or norm (Gerrefi et al. 2008; Humphrey and Schmitz 2002; Dolan and Humphrey 2000), and the norm is intended to change the behaviour of producers and entrepreneurs.

The growing interest in market-led development and the inclusion of marginalised groups in value chains links developmental outcomes to compliance with quality standards, and makes the mode of governance and collective action instrumental in achieving quality standards. In this way they create not only an enabling environment, to stimulate collective action and improve cooperation, but also a way to govern the behaviour of groups, individuals, producers and retailers. The usual approach is formally to organise collective action, which operates under rules and by-laws prescribing how cooperatives should be formed, organised, managed and distribute benefits (ICA 1995).

The thesis was partly motivated to address this normative thinking in both public and private policies of how people should organise. The technographic study shows that, in practice, the dynamics of collective action or organisation of women do not fit the stereotypes promoted by, for example, the Department of Cooperatives in Ghana or NGOs promoting collective action development. Dominant forms of value chain governance, which emphasise application of prescribed rules, practices and routines, fail to capture non-mainstream options.

The women's groups, central to this study, have invented and revised evolving organisational forms. Deduced from these insights is that how people organise varies, depending on the content of task. In the collective approach to task performance, the focus was on institutions for coordinating actions at the *Kramer,* and for sustaining arrangements with the external environment. The flexibility and institutional variety observed in these groups may clash with current formal organisational models associated with value chain governance. An implication, following from this thesis, is that, instead of assuming know-how for organising, practitioners in the fields of market and value chain development must identify what exists, and what works best for those concerned if they want to achieve stability and durability in collective action.

I make the argument that modes of governance emphasising the application of rules and routines to achieve quality may fail to capture non-mainstream options. Market strategies such as the RSPO and Fair Trade, which reflect an emphasis on compliance, lack the flexibility to manage the flow of materials at production level, where the actual tension of integration is most manifest. This thesis shows that at the production level, farmers and processors navigate diverse agro-ecological conditions and the materiality of planting material to make quality palm oil. Groups and firms use skill, tools, and techniques to manage technical change, material transformation, and product development, which suggest that rules and routines and routines are not enough to ensure quality. The RSPO type of governance aligns well with public R&D in Ghana, which discriminates against small-scale processing practices that configure with the sourcing of Dura or enable the mixing of oil palm fruits by female processors. It is an observation from this thesis that value chains, and rural development interventions framed in formal institutional framework, need a second look. Groups should be allowed space to make their own rules, which work for them in practice. Externally imposed rules may frustrate entrepreneurial practices.

Policy recommendations

Research and development policies in the oil palm sector in Ghana have mainly focused on increased production through expansion and intensification of oil palm production with the

use of hybrid planting material. Drawing from this thesis, the following two recommendations are made to inform policy.

Multiple development pathways

Past and present policies have consistently relied on single recipes in the oil palm sector, consistently resulting in a lower level of flexibility. The preference for hybrid oil palm in Ghana may have unintended consequences for food provisioning and conservation of agro-biodiversity of oil palm and other crops found within mixed crop farming systems incorporating Dura. In the same way, market-led strategies, which primarily consider hybrid-based production systems and aim to realise biodiversity conservation outside the boundaries of these production systems, may stifle the capacity of farmers to navigate in changeable natural and economic conditions. The implication for policies aiming for economic development along value chains is the need to create room for multiple development pathways. Hence, there is need to foster opportunities for emergence or retention of multiple development pathways to ensure not only inclusion of divergent views, but also to direct R&D activities towards working with appropriate materials fitted the contexts of women' s groups and medium-scale firms, as examined here. The processes of joint learning and co-innovation reported in Osei-Amponsah (2013) would undoubtedly make a valuable contribution to this endeavour. The contribution of this thesis lies in the appreciation of the skill of female processors organised in small groups.

Organisational diversity and institutional variety

In development policy, there is a normative view on how people should organise. This study shows that the way women organise to make quality palm oil does not fit the stereotype of organisational models promoted by the department of cooperatives, the ILO, and various other organisations promoting collective action. These induced models are still being pursued as a way to organise groups and to encourage entrepreneurial activities. Interventions framed in such formal and designed frameworks need to be reconsidered as they lead to the neglect of the processes generating viable organisational forms anchored in endogenous capacities to solve problems in production, processing and marketing. Similarly, imposition of rules leaves little room for diversity in groups. Policy makers need to identify what exists and what works and is sustainable rather than imposing a fixed and categorical form, which may not work in a specific context or for certain tasks.

Suggestions for further research

The thesis understands collective action and governance in the palm oil supply chain from a practice and socio-material perspective. The research used rich descriptive accounts of practical realities of small-scale processing by women's groups to show how groups are formed and sustained. The performance-based perspective on small groups can be enriched by unravelling how the observed collective dynamics relate to different socio-cultural contexts. The technographic study on which this thesis is based mainly looked at the performative actions of women, but did not unpack how these are related to gender relations in the wider social fabric. This is certainly a topic to be developed further in future study.

Understanding groups and collective action as an emergent outcome of performance requires insight in both social and material dimensions within which making is situated. The thesis reveals specific configurations that support conservation of agro-biodiversity in oil palm. However, actual bio-physical analysis of oil palm diversity requires a methodology that embraces biological analysis of the different oil palm types (species/genetic) (Thrupp 2000) and how these interact with changeable agro-ecological conditions (Akpo 2013). Investigating the technical and material dimensions of social organisation requires a methodological approach combining the social and material dimensions of collective performance. However, it may be complemented by comparative analyses that link evolving collective performance more systematically to patterns and diversity in bio-physical environments.

Conclusions

This thesis concludes that the cooperative form of processing oil palm observed in West-Akim, Ghana, is based on evolving practices. It highlights the role of materiality in understanding how people organise oil palm processing and production. Specifically, the bio-physical dimensions of fluctuation of oil palm and changeful market conditions within which the women work co-determine organisational form and the strategies for sustaining the groups. Apparently, group form and persistence strongly rely on the efficacy of available institutional arrangements to handle unexpected events in the social and material environments of the groups. The interaction between social organisation and material transformation shapes the ways groups and entrepreneurs engage to provide food and conserve agro biodiversity. There is therefore the need for policy advisors and development practitioners to integrate these dimensions in analysing collective performance and designing interventions that are likely to yield better results. Openness to observed organisational

diversity will give small-scale processors more chance of participating in value chains, while contributing to a more sustainable food provision and economic development.

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Summary

Palm oil is an important in local diets and domestic markets in West-Africa. Current attention for private sustainability standards and certification schemes in the palm oil sector, particularly the Roundtable on Sustainable Palm Oil (RSPO), has the risk to marginalise the role of (red) palm oil in local food security and in the employment and income opportunities for women's groups making it. Moreover, this thesis relates the making of red palm oil, which supports conservation of the Dura oil palm, to the wider pattern of declining agro-biodiversity. The original assumption of the research was that a niche market for red palm oil, particularly in the diaspora, would support sustainable livelihoods for women and the conservation of agro-biodiversity. Preliminary field work, however, showed that such a direct relationship between end market and oil producers does not exist. Hence, the research focus shifted to an important interface in the chain of red palm oil: groups of women and medium-scale firms processing Dura fruits.

This thesis starts from the sensory quality of red palm oil as appreciated in local markets, e.g. its colour, taste, and texture, and endeavours to explain persistent collaboration among women partly but importantly in terms of how this specific quality is made through both collective and individual work. Central to the thesis are descriptions of the making of red palm oil by two women's groups (Chapter 2 and 3) and a medium-scale firm (Chapter 4) in the West Akim Municipality of the Eastern Region of Ghana. The thesis expands its geographical scope for identifying unintended consequences of non-localised rules (e.g. in public sector policy and private sustainability standards) for the making of red palm oil and the conservation of agro-biodiversity (Chapter 5).

The thesis links the performance of socio-technical practices to matters of social organisation. It takes the physical workplace as entry point for describing and understanding the nature of collective action found in the women's groups. The technographic description of the making of red palm oil by female processors organised in small groups sets out to explain the persistence of these groups by first looking at the making of oil itself, which involves milling, cooking and sourcing, and then present the group as a task-oriented organisation, able to accommodate diverse interest and to combine both individual and collective actions. By looking at how within small groups women coordinate and work together in making oil of a certain quality the thesis develops a performance and task-oriented perspective on collective action, which complements explanations rooted in identifying individual interests or

organisational set-ups that are expected to result in durable groups, i.e. a diverse group of individual women working together for longer periods (> 10 years).

Chapter 2 presents everyday practices in the women's groups, revealing how they organise to perform different tasks in processing and join together in milling the fruits, ensure quality, manage risks, and transfer skills, techniques, and know-how to new members. It substantiates that the group's form, structure, and functioning responds to the socio-technical nature of the making of quality. The case study analyses collection action as an emergent outcome rather than as an organisational fix based on technicalities and incentives.

Chapter 3 investigates the stability of the small women's groups in relation to seasonal fluctuation in the supply of fruits. It identifies different strategies and arrangements used in sourcing by individual women within the groups and in their network relationships. The chapter finds that the women combine collective action in the group with individual strategies in sourcing fruits. This organisational flexibility creates capacity to handle fluctuation in raw material supply while keeping the group intact.

The case study (Chapter 4) of a medium-scale processing firm supplying red palm oil to domestic and diaspora niche markets examines how the firm's efforts in product upgrading depend on its capacity to use skills and techniques to develop high value food products, handle fluctuations, and act flexibly to ensure regular supply of oil. The chapter highlights endogenous capacity to integrate variability in agriculture into a viable business model for supplying different end-use markets. The women's groups examined in the previous chapters represent a similar capacity, which may contradict the current emphasis on prescribed practices manifest in public and private standards dominant in the selection and regulatory environments wherein small and medium-scale processors operate.

Chapter 5 explores how small-scale processing in different locations in Ghana depends on the supply of Dura fruits and therefore on the conservation of agro-biodiversity, and is affected by R&D trajectories and policies dominant in the oil palm sector. The chapter argues in favour of multiple development pathways complementing current policies that rely strongly on single recipes, such as hybrid oil palm varieties or certification.

Chapter six synthesises the technographic insights and findings. It discusses why an evolutionary and processual perspective, related to task performance and materiality, should be brought into the discussion on groups. It identifies implications for research methodologies, policies, and development interventions, which are more inclined to strive for uniform practices rather than building on organisational forms emerging out of the making of quality red palm oil by small groups of female processors or medium-scale processing firms.

Samenvatting

Palmolie is belangrijke in lokale diëten en binnenlandse markten in West-Afrika. Een mogelijk consequentie van de huidige aandacht voor private duurzaamheidstandaarden en certificering in de olie palm sector palm, in het bijzonder de *Roundtable on Sustainable Palm Oil* (RSPO), is dat het onbedoeld de rol van (rode) palmolie in lokale voedselzekerheid en in het creëren van werkgelegenheid en inkomen voor vrouwengroepen marginaliseert. Bovendien leidt het maken van rode palmolie met vruchten van de Dura oliepalm tot mogelijk behoud van deze palm en is daarmee gerelateerd aan het bredere patroon van afnemende agro-biodiversiteit. Oorspronkelijk wilde het onderzoek bestuderen of een niche markt voor rode palmolie, vooral in de diaspora, bij zou kunnen dragen aan duurzaam levensonderhoud voor vrouwen en tevens tot het behoud van de agro-biodiversiteit. Echter, verkennend veldwerk toonde aan dat een dergelijke directe relatie tussen eindmarkten en olieproducenten niet bestaat. Vandaar dat het onderzoek de focus verlegde naar een belangrijke schakel in de keten van rode palmolie: groepen vrouwen en middelgrote bedrijven die Dura oliepalmvruchten verwerken tot rode olie.

Dit proefschrift gaat uit van de sensorische kwaliteit van rode palmolie gewaardeerd in lokale markten, zoals de kleur, smaak, en textuur. De studie probeert de langdurige en blijvende samenwerking tussen vrouwen die de rode palmolie maken te verklaren vanuit begrip over hoe deze specifieke kwaliteit wordt gemaakt door zowel collectief als individueel werk. Centraal in het proefschrift staan rijke beschrijvingen van het maken van rode palmolie door twee vrouwengroepen (hoofdstuk 2 en 3) en een middelgrote onderneming (hoofdstuk 4) in de gemeente Akim in de Eastern Region van Ghana West. Het proefschrift verbreedt zijn geografische reikwijdte voor de studie naar onbedoelde gevolgen van niet-gelokaliseerde regels (bijvoorbeeld zichtbaar in beleid van de publieke sector en private duurzaamheidsstandaarden) voor het maken van rode palmolie en het behoud van de agro-biodiversiteit (hoofdstuk 5).

De thesis koppelt sociaal-technische praktijken aan sociale organisatie. Het neemt de fysieke werkplek als ingang voor het beschrijven en begrijpen van de aard van de collectieve actie in de vrouwengroepen. De technografische beschrijving van het maken van rode palmolie door vrouwelijke verwerkers georganiseerd in kleine groepen heeft tot doel het voortbestaan van deze groepen te verklaren door eerst te kijken naar het maken van de olie zelf, met taken zoals het malen, koken en opkopen van oliepalm vruchten, en zodoende de

groep te beschouwen als een taakgerichte organisatie, die in staat om uiteenlopende belangen te accommoderen en individuele en collectieve acties te combineren. Het gaat hierbij om een diverse groep van individuele vrouwen die voor een langere periode samenwerken (> 10 jaar). Door te kijken naar hoe binnen kleine groepen vrouwen acties coördineren en samenwerken bij het maken van de olie van een bepaalde kwaliteit ontwikkelt het proefschrift een performance en taakgericht perspectief op collectieve actie. Dit perspectief is een toevoeging aan benaderingen die het (voort)bestaan van groepen uitleggen vanuit gerealiseerde individuele belangen of de effectiviteit van organisatorische ontwerpen.

Hoofdstuk 2 beschrijft de dagelijkse praktijk in de vrouwengroepen, en laat zien hoe zij organiseren om verschillende taken uit te voeren, en samen optrekken in het verwerken van vruchten, het realiseren van kwaliteit voor opkopers, het managen van risico's, en het overdragen van kennis en kunde aan nieuwe leden. Het hoofdstuk onderbouwt dat de groepsvorm, -structuur, en -functioneren ontstaan vanuit de socio-technische eigenschappen van het maken van de kwaliteit. De case studie analyseert collectieve actie als een resultaat dat voortkomt vanuit praktijken en niet als een ontworpen organisatorische oplossing.

Hoofdstuk 3 relateert de stabiliteit van de kleine vrouwengroepen aan de omgang met seizoensgebonden schommelingen in de aanvoer van fruit. Het identificeert verschillende strategieën en regelingen die individuele vrouwen binnen de groep en hun netwerk hanteren bij het opkopen van vruchten. Het hoofdstuk constateert dat de vrouwen collectieve actie in de groep combineren met individuele strategieën in het opkopen van vruchten. Deze organisatorische flexibiliteit creëert vermogen om schommelingen in de aanvoer van ruw materiaal te hanteren en tegelijkertijd de groep intact te houden.

De case studie van een middelgroot bedrijf (hoofdstuk 4) die rode palmolie levert aan binnenlandse en diaspora nichemarkten onderzoekt hoe de inspanningen van de firma om door de markt gewaarde producten te maken afhangen van de wijze waarop zij in staat is te improviseren in het verwerkingsproces tijdens onregelmatige aanvoer van ruw materiaal en kwaliteit te garanderen en producten te vernieuwen ongeacht de wisselende samenstelling van het ruwe materiaal. Het hoofdstuk belicht endogene capaciteit om variabiliteit in de landbouw te integreren in een levensvatbaar business model dat verschillende markten bedient. De vrouwengroepen beschreven in de voorgaande hoofdstukken kennen eenzelfde capaciteit. Deze bevindingen lijken in tegenspraak met de huidige nadruk op voorgeschreven praktijken zoals zichtbaar in de publieke en private normen die domineren in de selectieomgeving en regelgeving waarbinnen kleine en middelgrote verwerkers opereren.

Samenvatting

Hoofdstuk 5 onderzoekt hoe de kleinschalige productie van rode palmolie op verschillende locaties in Ghana afhankelijk is van de levering van Dura vruchten en daarmee leunt het behoud van agro-biodiversiteit. Het hoofdstuk laat zien hoe dit wordt beïnvloed door de R & D-trajecten en het beleid dominant in de oliepalm sector. Het hoofdstuk pleit voor meerdere ontwikkelingspaden die een aanvulling zijn op het huidige beleid dat sterk verankerd is in een beperkte aanpak, vooral hybride oliepalm rassen of certificering.

Hoofdstuk zes brengt de technografische inzichten en bevindingen samen. Het bespreekt waarom een evolutionair en procesmatig perspectief op taakuitvoering en materialiteit van sociale organisatie bijdraagt aan de discussie over de werking en continuïteit van groepen. Het hoofdstuk identificeert de implicaties voor onderzoeksmethodologie, en voor beleid en interventiestrategieën, die in de regel meer geneigd zijn om te streven naar uniforme praktijken in plaats van voort te bouwen op organisatorische vormen die voortkomen uit het maken van de specifieke kwaliteit van rode palmolie door kleine groepen van vrouwelijke verwerkers of middelgrote bedrijven.

About the author

Betty Ekua Adjei was born in Sekondi, Ghana. She obtained a BSc degree in Agricultural Extension and Economics from the Cape Coast University, Ghana. In 2004, she was awarded a NUFFIC scholarship to pursue a two year degree programme at the Wageningen University. In 2006, she completed an MSc in the Management of Agro ecological Systems and Social Change.

Her carrier as a civil servant started with the Ministry of Agriculture in 1996, working with the Agricultural Extension Services Department in Sekondi-Takoradi and later in the Ashanti region. In 2000, she joined the Human Resources, Development, and Management department of the Ministry of Food and Agriculture as a lecturer in the premier Agricultural College, affiliated to the Cape Coast University of Ghana, where she currently works. She has also worked with Winrock International and USAID in the Ghanaian cocoa sector. Her experiences in these areas sparked her interest to further pursue a PhD in the social sciences.

In April 2009, she was awarded a NUFFIC fellowship to pursue her PhD studies with the former Technology and Agrarian Development group and finished her dissertation at the Knowledge, Technology and Innovation group at the Wageningen University.

Betty Ekua Adjei
Wageningen School of Social Sciences (WASS)

Completed Training and Supervision Plan

Wageningen School of Social Sciences

Name of the learning activity	Department/Institute	Year	ECTS*
A) Project related competences			
Technography: Technology Researching and Development (TAD 30806)	WUR	2010	6.0
Advanced Social Theory (RSO 32806)	WUR	2009	6.0
Property Rights, Conflicts and Natural Resources (LAW 313606)	WUR	2010	6.0
Monitoring and Evaluation to improve impact of food and nutrition security (International training prog. On food and nutrition security)	WI	2009	3.0
Research proposal	WUR	2010	3.0
B) General research related competences			
Introduction course	WASS	2010	
A practical course on the methodology for fieldwork and Qualitative data analysis	CERES	2009	2.0
Competencies for Integrated Agricultural Research	CERES	2009	1.0
Qualitative data analysis for development research	CERES	2009	1.0
Qualitative Data Analysis with Atlas TI; a hands-on practical	WASS	2013	1.0
C) Career related competences/personal development			
Information literacy PhD & End note Introduction	WGS	2009	0.6
PhD Competence assessment	WGS	2009	0.3
Techniques for writing and presenting a Scientific paper	WGS	2009	1.2
Scientific writing course	WGS	2009	1.2
Scientific Publishing	WGS	2013	0.3
Total			**32.6**

*One credit according to ECTS is on average equivalent to 28 hours of study load

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