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# Value Chain Development to Benefit Smallholders in Ghana

## The effectiveness of selected interventions

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ACDEP | Association of Church-based Development Projects |
| ADB | Agricultural Development Bank |
| FAO | Food and Agricultural Organization of the United Nations |
| FBO | Farmer-based organization |
| GIZ | Deutsche Gesellschaft für Internationale Zusammenarbeit (German development agency) |
| MOAP | Market Oriented Agricultural Project |
| MoFA | Ministry of Food and Agriculture |
| NGO | non-governmental organization |
| NRGP | Northern Rural Growth Project |
| USAID | United States Agency for International Development |
| VCD | Value chain development |

Currency: Ghanaian cedi (GH¢): USD 1.00 = GH¢ 4.39, mid-2017

# ABSTRACT

This study examines interventions in two agricultural development projects in Ghana which aimed to build competitiveness of selected value chains to generate growth and reduce poverty – the Northern Rural Growth Project, implemented between 2009 and 2016, and the Market Oriented Agriculture Programme, which began in 2004 and is still in place. These projects aimed to sustainably increase rural households' income through the development of inclusive and profitable agricultural commodity and food value chains to generate agricultural surpluses and to benefit from improved access to remunerative markets.

In this study, the efficacy of four sorts of value chain interventions implemented by the two projects are examined in the context of the strengthening maize, pineapple, mango, and citrus value chains:

- Facilitating interactions among value chain actors to encourage technical and institutional innovations,
- Improving the operations of individual actors, such as producers, service providers, traders, and processors;
- Helping develop new services for producers or initiating new producer institutions; and
- Improving infrastructure.

The study sought to identify how, where, and when might it be appropriate to intervene in value chains, particularly to benefit smallholders. While the lessons from this study do not comprehensively answer these questions, a better understanding is provided on the reasons behind the outcomes the projects attained in seeking to strengthen agricultural commodity value chains and some guidance is offered on how interventions aimed at doing so should be designed.

# 1. INTRODUCTION

Intervening to strengthen value chains has emerged as an attractive approach to develop agriculture and reduce poverty. Many international organizations, non-governmental organizations (NGOs), donors, ministries, and multinational companies adopt value chain development (VCD) as a key strategy to promote private sector development in the agriculture sector and poverty-reducing economic growth (Humphrey and Navas-Alemán 2010; Ton et al. 2010). The key reason is the belief that such value chains can be developed in ways that generate social benefits.

The concept of value chain can be thought of as a metaphor for connectedness in the interactions of various actors involved in the production, transportation, transformation, packaging, and marketing of a commodity (Humphrey and Navas-Alemán 2010). At the core of VCD is the assumption that private and public-sector agencies can intervene to influence connections and interactions between value chain actors in ways that will improve the total value of goods and services generated and the distribution of such value among the actors involved (Roduner 2007). VCD emerged to take advantage of new opportunities in international markets for agriculture and forest products produced with environmental and social responsibility (Stoian et al. 2016). The approach is particularly suitable for working backwards from an identified market opportunity for a commodity to enable a group of producers to meet that demand (Donovan et al. 2016).

Broadly, the approach is to build competitiveness of value chains selected for their potential for growth or contributions to poverty reduction. The interventions employed to build competitiveness that take advantage of the connections within value chains fall into two broad categories: those designed to influence the connections by facilitating interactions among actors, and those designed to improve the operations of value chain actors. The latter may include increasing the scale of their operations, helping actors meet market-driven quality requirements, improving service provision, or offering enabling policies and institutions (Ton et al. 2010). VCD thus offers a new framework to fashion strategies to create opportunities for smallholders to participate in more remunerative activities or to “upgrade” their activities, particularly with the private sector taking the lead. VCD contrasts sharply with traditional development approaches that focus narrowly on improving the capacity of farmers to improve productivity or to better manage natural resources (Donovan et al. 2016).

Many of the projects in Ghana implemented by the Ministry of Food and Agriculture (MoFA) with assistance from donor partners adopted aspects of value chain development (Kolavalli, Mensah Bonsu, and Zaman 2012). Two recently concluded MoFA projects, the Northern Rural Growth Project (NRGP), which ran from 2007 to 2016, and the Market Oriented Agricultural Project (MOAP), implemented from 2005 to 2016, sought to facilitate interactions among actors in selected value chains. The German-supported Out-grower Value Chain Fund, now entering a third funding cycle, has since 2005 provided grants and loans for processor-led or buyer-led initiatives that link financial institutions and smallholder producers. The Ghana Commercial Agricultural Project, implemented since 2012 with support from the World Bank, also includes a component that offers grants to private sector entities that propose activities that benefit smallholders. The now concluded Agricultural Development and Value Chain Enhancement project, funded by USAID, made use of traders

or buyers to give smallholder producers access to credit, services, and markets. Some of ongoing projects, such as the Ghana Agricultural Sector Investment Program, the Financing Ghanaian Agricultural Project and the Ghana Incentive-Based Risk-Sharing System for Agricultural Lending project, employ aspects of value chain development.

## 1.1 Objective

The objective of this study is to assess the effectiveness of selected value chain interventions made in two agricultural development projects in Ghana: NRGP and MOAP. The assessment examines immediate outcomes, with a focus on understanding the reasons for the outcomes.

While the extensive literature on VCD suggests the nature of changes that need to be made to potentially strengthen value chains for the benefit of poor participants – such as by increasing the level of trust among actors, for example (Webber and Labaste 2010) – it is deficient in identifying interventions that can effectively deliver the desired changes. What is the best way to facilitate trust building, for example? Or, how can one solve the problems of coordination or assist individual actors? This study examines the interventions made to evaluate how they have performed in terms of achieving the desired outcomes under different conditions.

Given the study methodology, data deficiencies, the complexity of value chain interventions, and the (often) slow pace at which value chain interventions may yield desired outcomes, this study does not attempt to empirically attribute outcomes to interventions.

## 1.2 Study approach

This study examines only the interventions that are of the VCD type, that is those designed either to influence connections between actors or to assist individual agents. The latter, which includes training of producers in good agricultural practices, is an important activity of traditional agricultural development projects as well.

This study is based on qualitative information. The empirical strategy for the study involved several steps. The study began by taking stock of interventions made by the two projects: the nature of interventions, expected outcomes, and outcomes achieved. The study examined all the interventions by gathering (sometimes conflicting) information from various parties that were involved. Where the numbers were manageable, all the interventions were examined. For example, MOAP organized three regional value chain committees, so the study examined all of them. Where the numbers were large, a sample was taken. For example, the study examined only a sample of 15 of the 43 value chain committees established by NRGP.

At each step, the study looked for opportunities to make more rigorous assessment through collection of quantitative data. Following the study of a sample of value chain committees, 17 participating banks were surveyed to collect information to corroborate the information obtained from the value chain committees on credit supply from formal financial institutions.

In conducting the study, the study team interviewed program officials, officials of MoFA at the regional and district levels involved in the program, and various actors in the value chains. The team also visited productions sites (farms and factories or plants) to see first-hand the practices carried out and to interact with the actors involved. In some cases,

members of the study team observed meetings. More details on how we collected information and our sampling approach are provided at the beginning of each section.

The rest of the report is organized into six sections. The next section presents the concepts that underlie value chain development. The third section offers more details on the interventions made by the two projects and the theory of change implicitly adopted by the projects. Findings from the examination of value chain committees and an analysis of the information collected from rural banks are presented in section four. Section five presents overviews of the three horticultural value chains in which NRGP intervened – pineapple, mango, and citrus. The overview of each value chain includes the performance of the sub-sector, production and marketing challenges, interventions made in the value chains, and some preliminary findings. The last section synthesizes the findings to offer explanations for the nature of outcomes and suggests a way ahead for VCD interventions to achieve greater and more reliable success.

# 2. CONCEPTS

## 2.1 Value chains

The intuitive understanding of value chains that most people have – of a series of value-adding activities that extend from various stages in farm production, through post-harvest handling, processing, and marketing until the product reaches its final destination – is adequate to understand value chain development. However, when it is defined as a "sequence of *interlinked agents* and *markets* that transform inputs and services into products with attributes for which consumers are willing to pay" (Devaux, Velasco, and Jager 2012), the opportunities for interventions become clearer.

Value chains were initially conceptualized to examine the effectiveness of various operations within individual firms to see how they contributed to firm strategies. Depending on whether they used raw material or intermediate products to produce intermediate or final products, this examination may have been limited to only a portion of the value chain as defined above. Expanding the boundaries of such an analysis from upstream activities to marketing that reaches consumers yields the types of value chain analyses that are in practice today. The analyses of coffee and textile sectors in Kenya are examples of the use of value chain analysis to identify strategies to build competitiveness (World Bank 2005). The concept when expanded to include actors and operations across countries leads to the notion of global value chains (Gereffi and Korzeniewicz 1994).

Value chain governance is the control any firm may exercise along the chain by specifying what type of product needs to be supplied, by whom, in what quantity, when, and at what price (Bolwig et al. 2010). Although the concept is intuitive, characterization is often imprecise. Such control, or the "lead" role played by agents who exercise such control, may have implications for the distribution of benefits from the value chain among various actors. This is because the lead firms can dictate the terms of participation to their immediate suppliers and transmit the demand upstream all the way to producers (Gereffi and Korzeniewicz 1994). Such power that governance offers may make some players capable of imposing rules that make them gatekeepers to participation in value chains (UNIDO 2011).

## 2.2 What is value chain development?

Intuitively, VCD involves building competitiveness of selected chains for the benefit of one or more of the actors involved in the value chain. Becoming more competitive entails doing things differently and better, which we can be characterized as innovation: “the use of new ideas, new technologies, or new ways to doing things in a place or by people where they have not been used before.” (Barnett 2004). Fundamentally, VCD requires changes in the production and or marketing of goods and services (Horton et al. 2016).

While the macro-economic perspective of VCD is to strengthen competitiveness of a certain sector, the micro perspective is to reduce poverty, particularly through targeting marginalized actors in the upstream segments of a chain (Stoian et al. 2016,). Such “inclusive” VCD seeks to benefit marginalized actors through improving their productive operations and, thereby, to generate social benefits, such as poverty reduction, income, employment generation, sustainable environmental performance, and gender equity (UNIDO 2011, cited in Donovan et al. 2016).

Because VCD requires working with various actors, it forces development partners, government, and NGOs to work with private sector firms, rather than just the producers. This need to work with non-producer actors in agricultural value chains is consistent with the emerging interest in putting the private sector in the lead in developing agriculture. VCD approaches, therefore, offer a convenient strategic transition to increasingly working with private sector firms in developing agriculture. Building on the “interrelatedness” of actors in value chains, to some extent, enlarges the scope of interventions or opportunities to intervene to benefit producers upstream. Value chain thinking enables one to identify opportunities for investments downstream that could potentially benefit producers upstream. This is because improvements in businesses downstream are expected to have positive effects on producers upstream as well (IFAD 2014).

### *Value chain upgrading*

How does one develop value chains? The value chain upgrading literature suggests several pathways for value chain development. Broadly, chain upgrading entails improvement in processes or products (Bolwig et al. 2010; Gereffi 1999 in Bolwig et al. 2010). The improvement may involve delivering larger volumes, improving quality to match existing standards, or improving logistics to get better prices for the same product (Gibbon and Ponte 2005 cited in Bolwig et al. 2010). To achieve these improvements, some actors in value chains need to acquire new capabilities.

A framework for strategies to upgrade small-producer value chains has three elements that are relevant for this study: (1) improving process, product, or volume; (2) changing or adding functions; and (3) improving value chain coordination (Riisgaard et al. 2010). The authors refer to the first set as “doing things better or bigger” through improvements in technology and management. It includes improving the efficiency of processes, producing more sophisticated products, or simply increasing the volume of whatever is being produced. In agricultural development, increasing agricultural productivity through adoption of improved technologies is equivalent to improving processes. Similarly, improving the quality of outputs is tantamount to product improvement.

Producers can also upgrade themselves by changing or adding to the functions that they undertake, either upstream or downstream. They can undertake downstream activities, such

as processing or even simple marketing functions, such as grading before they sell. They can also provide themselves with services, such as tractor services, which they have hitherto purchased from others. In line with the assumption that value chain actors can benefit from trust building, the third avenue to improve coordination encourages the development of mutually beneficial non-market mechanisms.

### *Rationale for intervening in value chains*

Coordination and information failures are prominent justifications for interventions in value chains. Proponents offer several arguments, focusing on the need for strengthening networks, cooperation, and complex interactions: Firms or producers cannot become competitive on their own because they depend on the environment of suppliers and service providers, and networks when developed, enable individual enterprises to specialize in their core competencies, which in turn improves the competitiveness of networks (Altenberg 2007). Succeeding in increasingly complex food systems to take advantage of new opportunities emerging, such as from urban demand, requires cooperation among the value chain actors, such as in addressing shortfalls in raw material supply to better meet emerging demand (Donovan et al. 2016). And, innovation requires complex interactions among diverse actors because innovation capacity requires effective linkage, information flows, incentives for cooperation, and an appropriate policy environment (Hall 2016 cited in Donovan et al. 2016).

Insufficient or nonexistent information flow among value chain actors also contributes to mutual mistrust (Berg et al. 2006). Because of low levels of trust and weak relationships among them, producers, buyers, equipment service and input providers, and financial institutions have reduced incentives to invest in upgrading. Trust, coordination, and interfirm cooperation, on the other hand, enable actors to develop mutually beneficial relationships (Webber and Labaste 2010). Several value chain guides developed by development organizations consider building trust and sustaining interaction among value chain actors to be essential to VCD (Donovan et al. 2016).

Trust building among actors enables individuals to benefit by moving away from spot exchanges in which the actors do not have information on the strategic behavior of others. The reasoning is that smallholders' market transactions usually reduce their rewards and increase their risk: volumes are often small, and therefore only low supplier capabilities are developed; prices negotiated at every exchange have higher uncertainty; quality grades are poorly specified; complex product information is poorly transmitted; and traceability, which consumers are beginning to demand, is absent (Riisgaard et al. 2010).

Finally, the key rationale for VCD is that private and public-sector agencies can intervene in the connections and interactions between value chain actors in a way that will improve the total value of goods and services generated and in how such added value is distributed among the value chain actors (Roduner 2007).

### *Interventions*

Value chain development programs intervene to achieve two broad sets of outcomes: to improve relations between smallholders and other actors, and to improve the operations of selected actors (Donovan et al. 2016). VCD programs achieve the first outcome by encouraging partnerships among farmers' organizations, input suppliers, banks, and private agribusiness companies along a specific value chain; strengthening private business

linkages; and building public–private partnerships (IFAD 2014; Henckes 2009). The second are achieved through various interventions that fall under private sector development.

**Platforms**: VCD programs usually establish discussion and coordination platforms for facilitating interventions among value chain actors, including farmers, traders, processors, input suppliers, credit suppliers, market information providers, insurance services, policymakers, extension agents, and researchers. Platform participants are expected to come together to diagnose problems within a value chain, identify opportunities, and find ways to achieve their goals (Birachi et al. 2013). Platforms are expected to be effective because the interactions among individuals and organizations with diverse and conflicting interests stimulate innovation (Horton et al. 2016). Platforms may thus result in new products, processes, norms, and behavior that could not have been achieved otherwise (Horton et al. 2016; Thiele et al 2016).

Actors in a value chain have incentives to participate in such platforms because they all can potentially benefit from the increased value of goods and services generated – provided that they expect the interactions through the coordination platform to lead to innovations. For smallholders, interactions with actors in platforms may bring benefits in several forms: more secure market linkages, access to new services for production; an understanding of market demand and requirements; and access to services, such as credit and improved production technologies. Wholesalers, processors, and other downstream enterprises may benefit from improved quality and raw material supply, reduced transaction costs, and enhanced social and environmental credentials (Birachi et al. 2013; Donovan et al. 2016).

**Developing individual actors**: The interventions to improve the operations of individual value chain actors are drawn from private sector development strategies. Donors have contributed to the growing recognition of the need to develop private sector firms in the last few decades as they have endorsed the role of the private sector in economic development. This emphasis on developing private sector has coincided with the decline in development assistance in relation to trade, foreign direct investment, and remittances (Kindornay and Reilly-King). The consensus on private sector developed at the end of 1990s followed a simple logic: poverty reduction is the objective of development; central to development is economic growth; economic growth is best achieved through private sector; and government has a role to play in making private sector flourish (Schulpen and Gibbon 2002). The development community increasingly views the private sector not just as a development tool but also as a development agent (Blowfield and Dolan 2014).

Private sector development is primarily associated with offering a conducive environment for the profitable operations of private sector firms, as measured by indicators such as World Bank's "Doing Business" indicator. But a conducive environment may be only a necessary, but insufficient, condition. Other problems that may need to be addressed to facilitate private sector development are low productivity and weak linkages with other firms, restricted access to information and financing, lack of technical or managerial expertise, and missing infrastructure (Küblböck and Staritz 2014).

New approaches that attribute a larger role for the state in private sector development have gained ground in recent years. One of them is the so-called neostructuralist approach characterized by Bielschowsky (2009), Ciuriak (2013), and Lin (2011) (Küblböck and Staritz 2014). While this approach emphasizes the important elements of the neoclassical approach – creation of a business-enabling environment and the importance of market forces – it also

stresses that these factors alone are insufficient for sustainable private sector and economic development. They recommend selective state interventions using various instruments for dialogue with the private sector and partnerships with selected firms.

Private-public partnerships have been used to effectively implement public policies, proving particularly effective in overcoming infrastructural challenges. Drawing on resources and capabilities in the private sector makes sense for implementing public policies. Private sector development, on the other hand, aims to strengthen the private sector itself and selected enterprises, with the expectation that doing so will benefit disadvantaged economic actors, such as smallholder producers. Whether the interventions benefit the relatively weaker actors and how the benefits from private sector development may be shared are important to assessing the effectiveness of private sector development to benefit smallholders.

### *Can value chain development benefit smallholders?*

For smallholders, VCD approaches offer them opportunities to more profitably participate in the value chains they are a part of or help them get into value chains where they can earn higher incomes. These opportunities arise from building the competitiveness of value chains or strengthening the capabilities of producers to participate in remunerative chains. Competitiveness – the ability to offer products and services of the quality demanded in local and world markets at competitive prices – is improved with innovations that improve efficiency. These innovations can come from actors anywhere in the value chain,, including producers, actors upstream of producers who supply producers inputs and services, or downstream of producers in, for example, transportation and marketing. Innovations involve the adoption of new technologies or ways of organizing activities and exchanges that reduce costs or improve productivity. Regardless of where innovations take place in a value chain, producers can expect to benefit. This is because value chains are developed to be inclusive and to deliver social benefits, key among which is improving the incomes of weaker agents upstream, such as smallholder producers.

VCD is implemented by working not only with producers but also other value chain actors – in a liberalized sector, they would be private enterprises. The thinking is that an efficiency improvement anywhere within a value chain would also benefit the producers because of the interconnectedness of value chains: producers can benefit by producing more, at lower costs, or of better quality. They may get these opportunities through mutually beneficial relationships with buyers downstream or from similar relationships with suppliers upstream.

Such out-grower relationships are now new. Many medium and large processors build relationships with their suppliers to ensure reliable supply of raw material. Pineapple exporters are an example (Takane 2004). But as private enterprises, firms are likely to build such relationships with more capable producers. Value chain development activities of large agribusinesses are not necessarily pro-poor or smallholder-focused, as they are more likely to be associated with more capable and often larger producers (Vorley 2001). Getting smallholder into these relationships by improving their capabilities or subsidizing businesses to work with smallholders would involve a possible trade-off between making the value chain pro-poor or more competitive (Altenburg 2007). To make value chain development inclusive, value chain efforts need to consider bottlenecks and tradeoffs in linking poor households with higher value markets (Stoian et al. 2016). But there may be situations in which agri-food

companies have the incentives to work with smallholders if they are expecting to be rewarded for improving their social and environmental credentials by doing so.

# 3. VALUE CHAIN INTERVENTIONS

This study examines interventions in two projects which aimed to build the competitiveness of selected value chains to better generate economic growth and reduce poverty. The Northern Rural Growth Project (NRGP) was implemented at a cost of US$103.54 million between 2009 and 2016. It aimed to sustainably increase rural households' income through the development of inclusive and profitable agricultural commodity and food value chains to generate agricultural surpluses and to benefit from remunerative markets in southern Ghana and abroad (IFAD 2013). NRGP established District Value Chain Committees (DVCC) to develop inclusive and profitable commodity and food value chains. It expected the committees to strengthen collaboration between members of farmer-based organizations (FBO) in the districts and other value chain actors, such as financial institutions, agro-input dealers, aggregators, processors, and others.

The other project, the Market Oriented Agriculture Programme (MOAP), is ongoing. Begun in 2004, the fourth phase of the program ended in 2016 at a cost of nearly €33.4 million. A new phase began in 2017 with an infusion of funds for developing infrastructure in the savannah ecological zones in northern Ghana. The program has aimed to build the capacity of agricultural producers and other actors involved in processing and trade to make them competitive in national, regional, and international markets. MOAP followed a value chain approach to agricultural development, using a multi-level process which encompasses the strengthening of activities of input dealers, farmers, processors, and traders and their interlinkages, while supporting service delivery and improving framework conditions for agricultural growth (GIZ 2014).

## 3.1 Typology of interventions

Following the concepts examined, the interventions of the two projects can be sorted into four categories, designed to 1) facilitate interactions among value chain actors, to encourage technical and institutional innovations, 2) improve the operations of individual actors, such as producers, service providers, traders, and processors, 3) help develop new services for producers or initiate new producer institutions, and 4) improve infrastructure. Details of the four categories fallow.

### *Facilitating interaction: District Value Chain Committees*

NRGP established DVCCs to serve as district value chain governance structures to bring together at district level actors and stakeholders to plan, coordinate, and oversee value chain activities and services in the maize, soyabean, and sorghum value chains (ACDEP 2015). The DVCCs were expected to benefit smallholder farmers (members of FBOs) by linking them with other actors in the value chains they are a part of, such as aggregators, financial institutions, input dealers, processors, and others (NRGP 2016). The organizers drew members from associations of different actors or individual members, including different categories of farmers, such as smallholder farmers, nucleus farmers, or commercial farmers. This, according to the program, was to ensure that the interests and concerns of different categories of farmers were represented. Other actors or stakeholders included were mechanization service providers (tractor owners), rural financial institutions, district level

aggregators, transporters, district-level staff of MoFA, and others. Though the DVCCs were administrative-area-based, the activities were commodity focused.

MOAP also began by establishing district-level crop-based value chains, but they consolidated them later to establish regional crop-based committee. This was because in many cases district-based committees did not attract a full spectrum of value chain actors. For example, it established two pineapple-focused DVCCs in 2012, but merged them to establish a Regional Value Chain Committee for pineapple in 2013.

MOAP also helped producers to organize themselves formally. For example, it helped Volta Value Chain Cooperative Union to register with the Cooperative Department of Ghana in 2013. This cooperative union, which has 13 producer groups – seven mango and six pineapple – and a total membership of 204 producers, began as the Kpando Value Chain Council in 2010, and later, the Volta Value Chain Council.

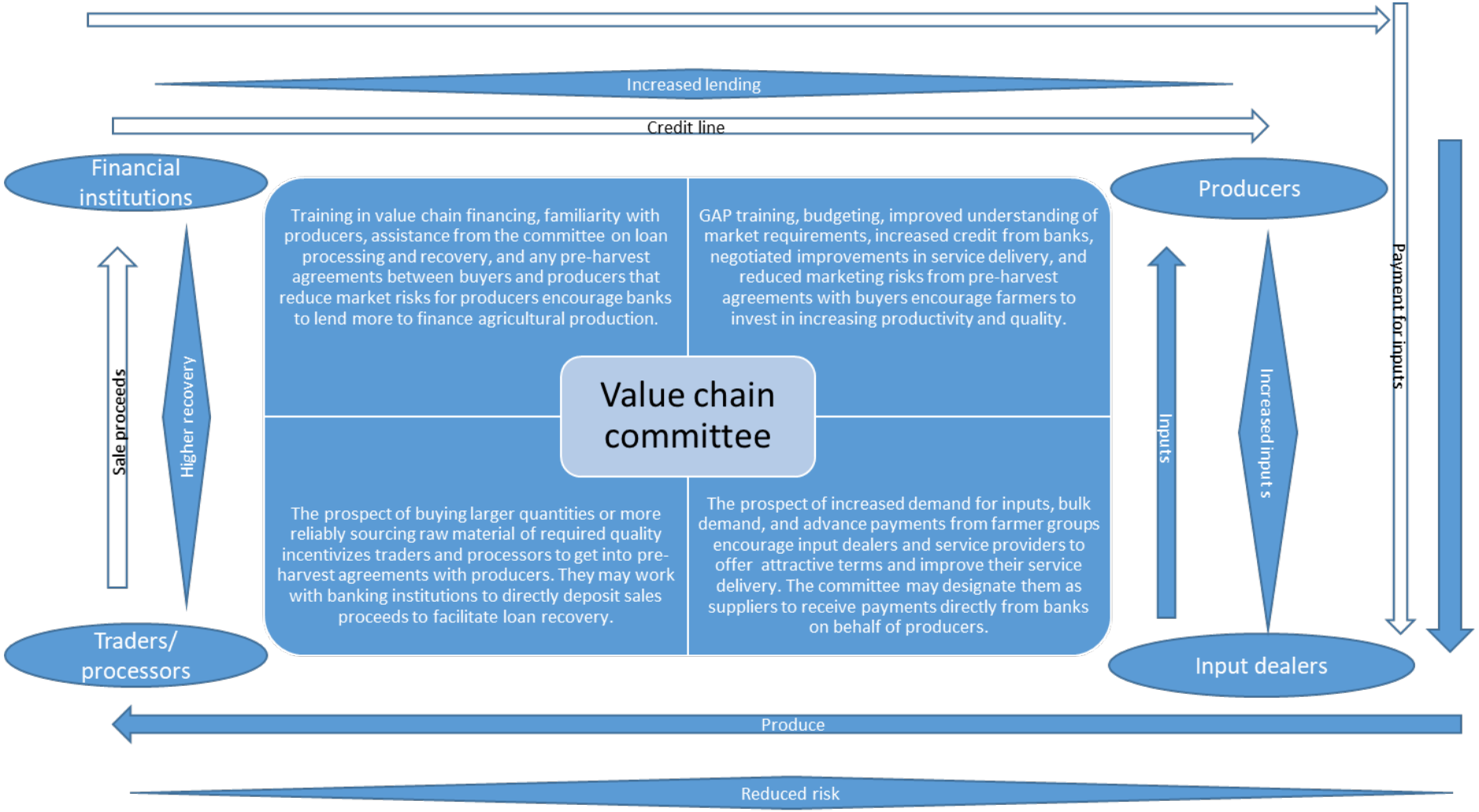
The two projects expected marginally different outcomes from the value chain committees they established. Both expected that the producers and other value chain actors interacting with each other would enter into mutually beneficial relationships, and that banks would lend more to participating producers. In addition, MOAP expected that stakeholders would use the platforms as forums to articulate their needs, and as a mechanism to deliver services to meet those needs. NRGP additionally expected that increased bank lending would enable producers to engage in larger transactions.

The theory of change anticipated four outcomes from the value chain platform interactions and the additional assistance the projects offered to individual actors (Figure 1):

- Banks lend more to producers;
- Producers adopt improved practices and increase their demand for inputs and services;
- Buyers and producers engage in pre-harvest agreements that reduce producers' marketing risks; and
- Loan recovery improves as traders deposit sale proceeds in the bank.

Interactions in the committee are critical to these outcomes. Banks lend more because they are influenced by the training offered on value chain financing and the value chain committees assist them with the screening of loan applications and loan recovery. Producers adopt improved practices with their improved access to credit – and the training on improved practices. Traders get into pre-harvest contracts with producers, buy from farmers and deposit the sale proceeds in producers' bank accounts. The banks recover their loans and make the remainder available to producers. Finally, the banks having recovered their loans, continue the cycle of financing production, which encourages technology adoption and productivity growth in a virtuous cycle.

**Figure 3.1: Theory of change employed in value chain committees**




Source: Authors.

The two projects emphasize the role of credit because of the widely held perception that access to credit encourages farmers to invest in improved technologies (Miranda et al. 2017; Karlan et al. 2014; Giné and Yang 2009). However, banks in Ghana direct only 4 percent of their lending to the agricultural sector (BoG 2017) and only 6 percent of farmers borrow from formal credit institutions (World Bank 2012). Banks are reluctant to finance agricultural sector due to perceived and actual risks inherent in lending to this sector. Banks view lending to agriculture to be risky because of a history of default on loans, land tenure issues, weather risks, and perhaps, inappropriate credit products (Mude and Barrett 2012). Additionally, farmers are either unable to obtain credit because they lack collateral or are reluctant to risk losing their assets pledged as collateral in the event of an adverse shock (Farrin and Miranda 2015). The cost of credit is an additional factor that undermines the agricultural credit market in Ghana (Mishra et al. 2017) – interest on agricultural loans range from 24 to 41 percent per annum in Ghana – and discourages borrowing (BoG 2017).

## 3.2 Strengthening individual actors

Both projects intervened to strengthen individual actors. Broadly, this was done by offering training and advice or resources in the form of subsidies, grants, or equipment. The activities to strengthen different stakeholders were as follows.

Both projects trained farmers in good agricultural practices. Unlike more traditional agricultural programs that make technology adoption the focus of attention, the training offered by the two projects sought to change producer attitudes to make them treat agriculture as a business rather than a subsistence activity. The training included farming as a business, understanding costs of business, business planning, evaluating the business, tracking income and expenses, getting good financial services, business and household expenses, farm business risk and marketing, and attainment of business goals through an FBO.

Because product certification is often necessary to gain access to remunerative markets for horticultural products, NRGP helped producers to obtain certification for their produce. For example, the program helped two pineapple-producing FBOs obtain organic certification in 2016. They did this by absorbing the membership costs for the producers and assisting in the establishment of local offices for the certification agencies.

The projects intervened to strengthen other actors, including tractor service providers, financial institutions, and processors. NRGP offered both producers and non-producers new tractors at subsidized prices. They also offered credit to those who could make an upfront payment of 10 percent of the costs.

Both projects trained staff of financial institutions to improve their understanding of financing in agriculture: value chain financing, crop budgeting, loan monitoring and recovery, group dynamics, cash flow analysis, and agricultural insurance, among others. Bank branch managers, general managers, and credit officers attended these training programs. MOAP, for example, trained representatives of the Agricultural Development Bank (ADB) and 15 rural banks on the production cycle of pineapple, input requirements, gross margins, and linkages within the pineapple value chain. Value chain-focused projects implemented in the past had offered similar training to the staff of financial institutions. The content of the earlier training programs included cash flow management, loan appraisal, agricultural risk

management, agricultural insurance, value chain finance, loan recovery management, and loan disbursement.

MOAP, which supported the development of fruit value chains, trained small-scale processors through what it called ‘processor business school.’ Project staff trained 12 small scale processors and 2 large scale processors in fruit drying and fruit juice production principles and practices, hazard analysis and critical control points, Food and Drug Administration standards and certification criteria, and contract farming.

Both projects organized producer groups. They invited both existing and newly organized FBOs to participate in value chain committees. MOAP also developed a facilitator’s manual for organizational development.

Through various forms of partnerships, both NRGP and MOAP worked with producers and downstream actors to organize training and to develop new services for smallholders.

- Both projects organized, in partnership with private actors, extension activities or training for farmers. Partnering with HPW Fresh and Dry Ltd., MOAP established 10-acre block farms in four communities, Fotobi, Adeiso, Akwanase, and Pipawani, all in the Eastern region. Trainees were given an acre of land to raise pineapples on which they adopted all recommended practices. NRGP recruited two well established producers of maize and guinea fowl to train farmers in the production of those commodities. The trainers were also expected to offer the trainees marketing support. However, as these arrangements came at the end of the program, they could not be fully implemented.
- MOAP assisted processors and producer organizations to initiate services to enable farmers better adopt recommended practices. It assisted the Volta Value Chain Cooperative Union, a producer organization in the Volta region, to establish its Own Management Technology Centre to offer pruning and weeding services to members. It entered into an agreement with Fruittiland, a processor, to offer citrus growers pruning, weeding, and harvesting services. In all these cases, the project supplied the needed equipment and tools and met some of the operating expenses.
- MOAP also helped the Own Management Technology Centre organize a team of consultants with expertise in agronomy, group and organization development, business planning and proposal development, and GIS and mapping, among others, to enable the Technology Centre offer technical assistance to its members. The project sustained the team of consultants, which was 17 strong in 2015, by employing them in its operations. It hoped that the group would remain available to the Own Management Technology Centre to meet the demands of its members for expertise after the project ended.

As in other agricultural development programs, the two projects invested in developing infrastructure. The productivity-enhancing investments that NRGP made included development of irrigable land (2,112 ha), development of flood recession schemes (1,003 ha), construction or rehabilitation of small dams (36 ha), rehabilitation of schemes of the Inland Valley Rice Development Project (650 ha), river pumping schemes (150 ha), construction or rehabilitation of farm access tracks (100 km), rehabilitation or construction of feeder roads (646 km), and construction of warehouses (9) and pack houses (4).

# 4. VALUE CHAIN COMMITTEES

In examining the outcomes of establishing value chain committees, we focus on four issues that emerge from the underlying theory of change:

1. Did the value chain committees attract a full set of value chain actors? Did the committees function as expected?
2. Did producers improve their access to credit as anticipated?
3. Did the producers adopt good agricultural practices to increase yields and profits?
4. Did farmers improve their access to markets with better prices or with reduced price risks?

We use information collected from 15 DVCCs established by NRGP. Because the objective was to understand whether establishing such committees leads to expected outcomes – rather than to assess the effectiveness of committees or to identify factors associated with successful outcomes – we chose to examine committees that were judged by the project to have been successful. We purposively sampled 15 best-performing committees from the list of 46 DVCCs that were assessed by the Association of Church-based Development Projects (ACDEP), the NGO that NRGP entrusted to organize the committees. ACDEP evaluated the committees on five indicators: governance, functionality, internal operations, external relations, and sustainability. They rated three DVCCs as very good, 25 as good, nine as fair, and nine as weak. Our sample included all three committees rated as very good and 12 that were rated as good. We sampled the 12 that were rated as good to capture geographical diversity, including distance from key urban market centers such as regional capitals. The regional distribution of the DVCCs examined was 2 out of 7 committees in total from the Upper West region, 4 out of 13 from Upper East, 7 out of 19 from Northern region, and 2 out of 7 from Brong Ahafo.

The study team assessed the committees by typically beginning with a discussion with DVCC members in a group. Some of the executives of the committees, who were contacted prior to the visit, organized this first meeting, which usually lasted less than half a day. The study team followed the group meetings with detailed discussions with selected individuals representing various actors, such as, traders or aggregators, input dealers, tractor service providers, bank representatives, and farmers. The farmers were either representatives of farmer organizations or ‘lead’ or ‘nucleus’ farmers. The study team travelled to the communities of at least two participating FBOs to meet with the member farmers as a group. In all, the study team interacted with more than 120 DVCC members and nearly 600 smallholder farmers belonging to 38 FBOs in the 15 districts. The team also interviewed 23 input dealers, 27 district level aggregators, 15 tractor or bullock service providers, 12 bank representatives, and 8 other stakeholders (see Table 4.1 in Appendix 1).

The team sought to understand from different actors what they expected to gain from participating in DVCCs, whether the outcomes realized were what they expected, and what they thought would be the prospects for the committee. The team also held meetings with project administrators, facilitating agencies, and MoFA representatives in all 15 districts, examining records of committee proceedings wherever available.

## 4.1 An effective institution?

A full complement of key agricultural value chain actors – traders and aggregators, input dealers, producers, input suppliers, tractor service providers, and bankers – participated in all

but two of the DVCCs. Financial institutions did not participate the committees in Kumbungu and in Sawla-Tuna-Kalba districts. The committees had between 7 and 21 members, including one or two representatives of FBOs. Representatives of other support institutions, such as MoFA, the Department of Cooperatives, and the Business Advisory Centres of the National Board for Small Scale Industries, participated in several of the committees.

The members of the committees did not always fully represent all value chain agent types, such as producers, input suppliers, or traders. This is because the organizers appointed to the committees whomever they could persuade to serve. For example, between 36 and 103 FBOs were registered in the districts in which the study was carried out. These FBOs by district had a total membership of between 348 and 3,319 (Table 4.2 in Appendix). But only a few FBO executives were members of the DVCC in each district. A better approach to obtain FBO representation on the DVCCs would have been for an umbrella organization for FBOs in a district to select DVCC members on behalf of all FBOs. However, only one district studied had such an organization, and, moreover, although well-established, it did not participate in the committee. It was reported that it did not do so because its leaders were anxious that a competing producer institution might emerge to challenge it.

As anticipated, different categories of actors in value chains expected to benefit from their involvement with the committees. Financial institutions, perhaps, were the least enthusiastic, as evidenced by their not participating in two each of the NRGP and MOAP established fruit value chain committees. Those value chain actors that participated expected to expand or to receive increased support for their value chain activities. Farmers expected to gain greater access to credit and better prices. Input dealers expected to sell more inputs. Tractor service providers expected to find clients in groups, hoping to reduce their transaction costs of moving from one small plot to another, and to receive immediate payment for the services they provided, if the farmers could gain access to credit from banks. Traders expected to buy from more farmers.

What did participants think was the role of the DVCCs? All members participated in an orientation in which they were briefed by project staff on the purpose of value chain committees. Nonetheless, they had diverse interpretations of the purpose of the committees. Some felt that the DVCC constituted a self-help group, while others felt that they were a ‘coordinating body’ that would be consulted by the project implementers – sort of a “board set up to oversee NRGP in the district”. Other responses included: “facilitators of business transactions between value chain actors;” or that their role is “to enhance visibility of supply chain activities of actors, improve information flow, and provide assurance or confidence to banks by ensuring that only interested farmers apply for loans, make effective use of resources and repay such loans;” and “to assist farmers to gain access to credit for their farming activities and be the voice of farmers.” Overall, most leaned towards viewing the DVCCs as being a coordinating body. One of the chairmen opined that “the NRGP has wasted its time setting up these committees because we are not used by the national and or regional authorities, so we cannot do anything.” A member of another DVCC expressed that they expected to work with government as a representative of farmers, but because the government did not contact them, members lost interest in meetings and other activities.

### *Participation of producers*

Most producer groups indicated that they were motivated to join the DVCC because it “promised to link them to markets and other value chain actors and offered them access to

training and capacity building." Others noted that they were attracted to the committee because they saw an opportunity to benefit from other aspects of the program, such as matching grants to buy farm machinery. A few FBOs indicated that they were motivated by gaining access to credit, but they perceived the credit to be "free cash," "soft loans," or freely supplied farm implements or inputs. In one district in Northern region, several FBOs reportedly disbanded themselves after they understood that the NRGP was not disbursing cash or inputs, but was only linking them with a financial institution.

Most of FBOs that participated in the committees existed before the project was initiated. Twenty-eight of the 38 FBOs interviewed were organized between 2010 and 2014, a significant portion of them by MoFA. More than one half reported that NGOs, such as Technoserve, Send Ghana, and USAID projects, helped them in organizing themselves. Only in a few districts – Garu-Tempane, Bawku West, Pru, and Sene West, for example – were they organized to specifically participate in DVCCs. These FBOs noted that the organizers advised them that "they needed to be in groups to benefit from government and or NGO support." Groups limited their membership to 15 to 20 farmers, a size which they felt made them most effective. More generally, FBO members stated that they organized themselves to offer each other economic and social support and to attract government and NGO support, a motive that was also noted by an earlier study of NGOs (Salifu et al. 2012).

### *Committee operations*

The committees established under the NRGP project were expected to meet four times a year, once every quarter:

- A pre-season meeting between January and March to develop crop budgets,
- A second quarter meeting to screen credit applications from FBOs and also to plan crop monitoring visits;
- A third quarter meeting to organize joint-crop monitoring, including yield forecasting, visits with the bank, and aggregators; and
- A last quarter meeting to discuss loan repayments including visits to farmer groups or communities to encourage loan repayment.

NRGP appeared to have organized the activities of committees in order to achieve the key objective of increasing producers' access to credit and ensuring repayment.

The meeting minutes and other DVCC documents suggest that the committees closely followed the meeting schedule in the first year after establishment, but stopped meetings in 2016 when the NRGP project came to an end. Project staff organized the last meeting to inform the committees that the project had come to end, and they gave them a copy of the assessment ACDEP had made. Until the end of the project, NRGP staff organized meetings and field visits and met the food and travel expenses for committee meetings and outings. Only in a couple of districts did participants themselves meet any of the expenses: banks apparently offered vehicles for the committee members to go on crop monitoring visits in one year. One committee in the Upper East region disbanded after two years because the members were reluctant to attend meeting unless adequately compensated. It then was re-established with new members.

The information the study collected suggests that after the termination of the project, limited business interactions took place among committee members that could be attributed to the relations built through committee interactions. Some DVCC members, however,

reported maintaining relations with other committee members even after the meetings were discontinued. Aggregators, input dealers, and tractor owners indicated that they interacted and transacted business with farmers that they worked with in the committees. However, they also noted that they had known many of them, primarily prominent farmers, before they joined the committee.

Could the committees achieve what was expected of them, and did they fully understand what was expected of them? Some members of MoFA suggested that the committees could achieve little because some of the committees were led by farmers who the MoFA staff thought had limited leadership capabilities. They also felt that limited participation in committees – by just one or two key actors, such as aggregators and tractor owners – constrained what the committees could achieve.

The committees established by MOAP faced similar difficulties in sustaining themselves during and beyond the project life. MOAP began by organizing district level committies, but they did not attract participation from a full complement of value chain actors. For example, in 2012 the project organized three district value chain committees – Abura-Asebu-Kwamankese, Assin, and Ajumako-Enyan-Essiam. MOAP convened the initial meetings and met all costs: transport allowances for participants and the costs of lunch and snacks. Two farmers who interacted with the study team in Assin Foso said that the former DVCC helped them to come together to share ideas and information and to discuss the difficulties they were facing. The meetings also gave them an opportunity to interact with district MoFA officials. However, according to leaders of an FBO in Assin, it was mostly producers who attended the DVCC meetings. Other value chain actors, such as traders, did not participate because their operations extended beyond one district, and they preferred to meet producers at the regional level.

In late 2013, MOAP replaced the three DVCCs with a regional citrus value chain committee with representation from MoFA, five citrus growers' FBOs, and small and large scale processors. The minutes of its meetings in 2016 suggest that this regional committee had no permanent representation from traders, transporters, chemical input dealers, or financial institutions. The committee discussions were usually about training for producers or small scale processors. The chairman, the value chain officer, and one processor, Borthapreku, who interacted with the study team, suggested that many committee members had become apathetic after the organizers stopped offering transport allowances and refreshments at meetings.

## 4.2 Did producers gain additional access to credit?

The theory of change for investment in value chain development critically depended on financial institutions lending more to producers to trigger the desired outcomes from the interventions. Many farmer groups we interacted with, however, were expecting to receive "better prices and inputs" from the aggregators on their committees.

### *Continuing constraints to producers obtaining formal credit*

Many "feared" banks and were unfamiliar with loan processes. Some who had previously borrowed from banks were concerned about risks from unfavorable weather conditions, fluctuating market prices, and delays in credit disbursement that jeopardize timely operations. Nevertheless, many farmers, especially nucleus farmers who work with out-growers, looked forward to gaining access to credit from formal institutions. They had faced

difficulties borrowing in the past because they did not have the collateral needed to borrow and were hesitant to organize into groups the out-growers they did not trust, as they would then be obligated to offer some collateral against loans to the out-growers. Even large farmers complained of having to travel long distances to work with banks and the high rates of interest on loans.

Committees regarded crop budget preparation as an important activity, as suggested by the scheduling of committee meetings. In the budgets they prepared, the major expenditure was fertilizers – two bags of compound fertilizers (NPK) and one bag of nitrogenous fertilizer, usually ammonium sulphate, per acre – which added up to cost between GH¢ 284 and GH¢ 370. Fertilizer accounted for more than 50 percent of the costs (Table 4.1). The other major out of pocket expense was ploughing, costing between GH¢ 80 and GH¢ 90 per acre. Seed costs were for certified open-pollinated variety seeds. If the producers recycled their seeds and used family labor to plant, weed, and harvest, their need for credit ranged from GH¢ 360 to GH¢ 460 per acre. What role this crop budgeting exercise played, apart from reminding them of the costs of practices recommended to them through training on good agricultural practices, is not clear.

**Table 4.1: Maize crop budgets prepared by committees**

| | Costs/revenues (GH¢/acre) | |
|---|---|---|
| **Activity/Input** | **2015** | **2016** |
| Costs | | |
| Ploughing | 80 | 100 |
| Seed (10kg) | 40 | 45 |
| Fertilizer (NPK – two 50-kg bags) | 200 | 260 |
| Fertilizer (ammonium sulphate – one 50-kg bag) | 84 | 110 |
| Sowing | 60 | 60 |
| Weed control | 80 | 80 |
| Total costs | **544** | **655** |
| Income | | |
| Yield per acre (50-kg bags) | 10 | 10 |
| Price per 50-kg bag (GH¢) | 120 | 150 |
| Gross revenues | 1,200 | 1,500 |
| Gross margins | **656** | **845** |

Source: Fieldwork 2016/17.

Seven of the committees we interacted with did not prepare any crop budgets in 2016; and only five prepared budgets for 2017. All but three committees noted that they did not receive any applications for credit from farmer groups in 2017, although the banks in some of those districts reported receiving loan applications directly from farmer groups.

The project expected financial institutions to lend more to producers as the banks became more familiar with producers and other actors in the committees. Participating bank representatives noted that they expected the committees to help in screening applications and recovering loans. They also expected the committees to urge producers to apply for loans well in advance of cropping seasons. One bank manager in the Upper East region, however, noted that they are wary of groups recommended by MoFA or NGOs. He added that such groups often think that the loans given to them at the behest of MoFA or NGOs are grants.

While farmers were motivated to participate in committees to improve their access to credit and increased credit flow was central to the theory of change, many farmer groups we met with were reluctant to borrow from banks. Some farmer groups had turned down credit offers from banks because on previous occasions their crops failed from poor rains, which resulted in their having to sell off assets to repay the loans. When a group that had a long history of borrowing from a bank was asked why it only had eight members, the study team was told that other farmers in the village did not want to join the group because they were unwilling to borrow for rainfall-dependent farming. The producers noted that, while access to credit allows them to boost yields by increasing the use of inputs, it also exposes them to risks from rainfall failure. These farmers stated that they will only consider borrowing when they are able to irrigate their fields. None of them mentioned the possibility of insuring their crops against unfavorable weather conditions, although crop insurance has been piloted in their communities.

Others farmers noted that the terms of repayment, the requirement to pay immediately after harvest, and the interests charged –usually between 28 to 32 percent per annum – discouraged them from borrowing. Farmers were disappointed that the committees had not persuaded the banks to lower the interest rates.

Only 17 of the 39 producer groups that the study team interacted with had applied for and received credit from banks in 2016. Of these, four had approached the bank independently and the other two had done so through other NGOs. Discussions with committees also suggested that the number of groups they recommended to the banks had declined over the years largely because those who borrowed earlier had failed to repay. Three farmer groups that had defaulted indicated that they did so because of poor harvest from unfavorable weather conditions.

NRGP recommended producers borrow to cultivate new crops in some districts, which left some producer groups with a distaste for borrowing. The project recommended crop diversification in some districts and strengthening of competitiveness of existing crops in others. As a diversification strategy, for example, the project recommended producers in Lawra district to cultivate soyabean. However, the members of three FBOs in the district, who had borrowed to cultivate soyabean, complained that they were unable to sell their produce that had been produced collectively. One of the groups gave its members their share of the produce and asked them to repay their share of the loan. Rather than selling their soyabean in bulk to a buyer, the members were forced to sell soyabean by bowls in local markets over several months. Farmers producing new crops do not always face such difficulties, however. Maize, for example, was introduced successfully in the past into districts such as Bawku West and Sene West. However, in the case of soyabean, the absence of a market for a product that is demanded primarily by the livestock feed industry appears to have made the difference.

### *Continued significance of informal credit*

While formal credit supply for agricultural production is limited, informal credit arrangements are pervasive. Producers borrow informally from those who supply inputs and services and from traders who buy from them. It is not clear, however, how pervasive the practice is. Traders usually buy at least a portion of their traded commodities from producers that they support, earning a significant share of their trading profit from buying soon after harvest and selling at higher prices a few months later. Nearly all the aggregators and

traders, input suppliers, and tractor service providers that were interviewed indicated that they extend credit in the form of cash, agro-chemical inputs, tractor services, or a combination of them to selected group of farmers with which they regularly do business. They extend credit informally to producers familiar to them from previous business exchanges, family relations, or social interactions. The borrowers are typically required to repay immediately after harvest in the form of farm produce valued at prevailing market prices. For instance, a farmer borrowing GH¢ 1,000 in cash or in the form of inputs from an aggregator, would be required to repay with 10 bags of maize at harvest, if the price is GH¢ 100 per bag at harvest. Those who borrow inputs or services are expected to pay back a certain number of bags. For example, four to five bags of maize in exchange for three bags of fertilizers. For ploughing, one bag of produce after harvest, regardless of the crop grown. For tractor services, repayment at the end of the season is typically one bag of grain per acre ploughed instead of the GH¢ 70 charge if paid immediately after receiving services.

The terms of a grain-for-inputs informal contract that an aggregator, acting as an agent for off-takers, entered into with 153 out-growers in Builsa North district in the Upper East region in 2016 is presented in Table 4.2. He had increased the number of farmers he works with from 30 in 2011, but he did not recruit new farmers from among members of FBOs participating in the DVCC. Also, of the 23 input dealers interviewed during this study, more than 15 indicated that they offered credit to farmers before they joined the DVCC. None of the committees, however, made any effort to encourage such links between producers and participating traders.

**Table 4.2: Conditions of a grain-for-inputs agreement between farmers and an aggregator acting on behalf of off-takers in Builsa North district, 2016**

| Items to be supplied | Quantity | Cost (GH¢) | Repayment in kind |
|---|---|---|---|
| **Maize** | | | |
| Seed | 9 kg / acre (Mamaba) | 81.00 | 6 bags / acre |
| Ploughing | acre | 70.00 | |
| Fertilizer | 2 NPK + 1 ammonium sulphate | NPK – 125 / bag<br>ammonium sulphate – 95 / bag | |
| **Rice** | | | |
| Seed | 45 kg / acre | 100.00 | 5 bags /acre |
| Ploughing | acre | 70.00 | |
| Fertilizer | 2 NPK + 1 ammonium sulphate | NPK – 125 / bag<br>ammonium sulphate – 95 / bag | |

Source: Fieldwork 2016/17.

Farmers find such credit arrangements to be convenient and acceptable because they gain timely access to inputs and services, and at harvest, even though the prices are at their lowest, they do not feel cheated. For example, in 2016, the cost of ploughing in most of the districts varied between GH¢ 50 and GH¢ 80 per acre and the price of grain at harvest was between GH¢ 60 and GH¢ 80 per bag. A farmer is therefore less ‘grieved’ to receive a service worth averagely GH¢ 65 and to repay with a bag of grain 3 to 4 months later at harvest. The actors who give this kind of credit do not charge any interest, but will earn decent returns from higher prices later after storing the grain for a few months.

### *Lending by rural and community banks under the Northern Rural Growth Project*

Our discussions with committees and producer groups suggested that financial institutions had not increased their lending. The number of credit applications that the committees had forwarded – they could not supply us with precise numbers – clearly were much smaller that the number of producer groups with which they were working. The bank representatives, while parroting all the benefits from training and collaboration with the committees, did not indicate that they had significantly increased credit supply to agriculture. Importantly, the farmers groups we met with even showed reluctance to borrow. Given the importance of credit flow to the theory of change, the study included a survey of participating banks. An analysis of the information collected through the survey follows.

This analysis makes use of information obtained from a survey of 18 banks that participated in the DVCCs. NRGP supplied a list of 24 banks that participated in these committees and in the training programs, but contact information for only 18 banks. These all were the head offices of rural and community banks.

The study team sent to the 18 banks a questionnaire, which sought information on their lending to agricultural sector in the last ten years, their participation in value chain committees, and their perceptions of how participation in value chain committees may have influenced their lending operations (Appendix 2). The study team then followed up by visiting the banks to help them fill out the questionnaire. One of the 18 banks claimed that it did not participate in DVCC activities, so was excluded from the study. The remaining 17 banks worked with at least one DVCC. Although the study sought information on lending in the previous ten years, the banks were able to supply information on their credit portfolios for only the last 5 to 6 years, and on loan recovery for a much shorter period.

This section assesses the influence of the participation of these banks in value chain committees based on their lending practices by answering two questions:

- Did the banks significantly change (increase) their lending for agricultural production over the period in which they participated in value chain committees?
- Did they make changes in the credit products they offered to farmers or in the processes of loan approval and recovery?

In our discussion below, we examine the extent to which banks participated in the DVCCs. Thereafter, we examine trends in banks' lending, the share of loans to the agricultural sector in their total lending, the interest rates charged, recovery rates, and whether participation had any effect on overall lending. Finally, we review the lending practices of the banks and whether those practices were influenced by the training that bank officers went through under the NRGP project.

**Participation in District Value Chain Committees**. Six of the banks examined started operations in the 1980s, five in the 1990s, and the remaining six in the 2000s. They began by mobilizing savings and transitioned into lending, usually a year later, by offering salary loans, which entail minimal risk. They have participated in committee activities for more than two years – of the 17 banks, 6 started participating in DVCC activities in 2011, 5 each in 2012 and 2013, and 1 in 2014. Credit managers represented 15 banks in DVCC activities and

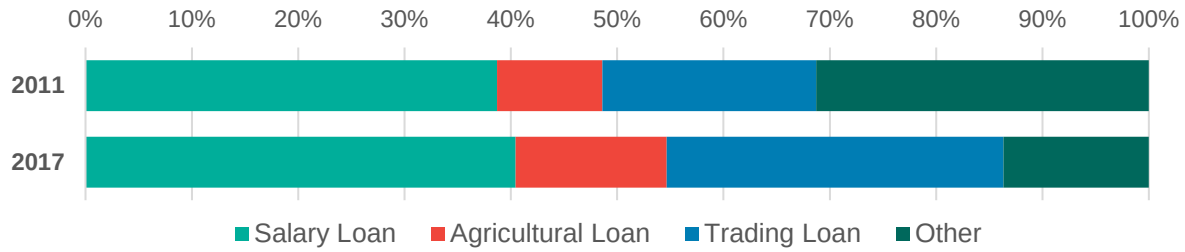
bank managers themselves represented the other 2 banks. Four of them took on executive roles in the committees – three as treasurers and one as an assistant secretary.

The bank representatives took as much interest in the committees as other members. All except one attended the DVCC meetings regularly. Asked when the last meeting they attended was, seven reported 2017, five 2016, three 2015, and one 2013. These dates correspond with the dates of the last meetings reported by other committee members. Seven banks reported meeting with some of the participants in the committees after the NRGP program ended in 2016 – three to explore options to continue to work together and the rest to wind up some issues before they stopped meeting altogether.

Bank staff members participated in seven training sessions on value chain financing. They recalled that the topics included value chain development and finance, cashless loan models, loan monitoring and recovery, crop budgeting, terms of repayment, group dynamics, cash flow analysis, inventory credit, and agricultural insurance.

**Lending performance of the banks**. The banks advanced loans for agricultural production, but such lending constituted the smallest share in their portfolios, Other types of loans made included for trade, including of agricultural commodities; salary loans; and other types, including microfinance loans. The share of agricultural production loans, however, varied considerably among the banks, ranging from 1 to 30 percent of the value of all loans made by a bank. Moreover, the share of agricultural production loans in the total lending portfolio of the banks examined increased slightly from 10 to 14 percent between 2011 and 2017 (Figure 4.1). However, although agriculture production received the smallest share from the banks examined, this share is considerably higher than the share of agricultural lending at national level, which stood 4 percent at the end of 2017 (BoG 2017).

**Figure 4.1: Types of loans by percentage share across loan portfolios for banks surveyed, 2011 and 2017**




Source: Authors' compilation based on IFPRI 2017 bank survey.

In 2017, the most recent year for which we have data, the study banks lent between GH¢ 1 million and GH¢ 13 million, with an average of GH¢ 7 million. Lending to agricultural production ranged between GH¢ 40,000 and GH¢ 757,000, with an average of GH¢ 320,000. The volume of lending increased considerably from 2011 when average total lending and agricultural lending were GH¢ 2.4 million and GH¢ 235,000 respectively, but the increase was higher in non-agricultural sectors.

In 2017, the banks lent to an average of 438 farmers, 374 of whom received through 28 groups and the rest as individuals. The highest number of farmers lent to by one of the banks studied is 2,300 farmers, who included members of 161 groups. The groups that borrowed from these banks had 5 to 18 farmers with an average of 13. The number of farmers receiving agricultural loans per bank did not increase significantly over the period examined.

An average loan from the banks is usually adequate to buy inputs for only two acres. In 2017, it was around GH¢ 730, which is equivalent to the credit requirements banks estimated as being necessary for cultivating two acres of maize – at GH¢ 400 per acre. Credit managers explained that their agricultural loans are designed to cover only the cost of fertilizers and ploughing services, which add up to about 70 percent of budgets developed by DVCCs. Because most farmers typically use family labour and recycle seeds, they usually request loans to cover only the cost of ploughing and fertilizers.

The average size of loans grew over the years but fell in 2017 (Table 4.3). Some of the respondents attributed this decline in the average loan per farmer and reduced demand for credit in general to the implementation of Planting for Food and Jobs program which supplies seeds and fertilizers subsidized to various degrees to producers who pay a portion of the costs on receiving the inputs and the balance after harvest. The government of Ghana began subsidizing fertilizers under the Fertilizer Subsidy Program in 2008, but the subsidies were suspended in 2014 because it did not have the resources. It subsidized 90,000mt in 2015 (32 percent of total use) and increased it to 300,000mt by 2017 (67 percent of total use). In 2017, 60 percent of fertilizer was still officially supplied through the Fertilizer Subsidy Program, which was implemented alongside the Planting for Food and Jobs program that year. However, from 2018 onwards the two programs were rolled into one.

**Table 4.3: Agricultural lending by banks, 2011 to 2017**

| Year | Total agricultural loans per bank (GH¢) | Farmers per bank | Amount lent per farmer per bank (GH¢) | Groups per bank | Farmers per group |
|---|---|---|---|---|---|
| **2011** | 234,797 | 548 | 428 | 33 | 13 |
| **2012** | 226,750 | 399 | 568 | 24 | 13 |
| **2013** | 289,899 | 356 | 814 | 24 | 12 |
| **2014** | 355,902 | 369 | 964 | 23 | 14 |
| **2015** | 321,963 | 391 | 823 | 27 | 12 |
| **2016** | 376,962 | 377 | 1,000 | 29 | 11 |
| **2017** | 320,400 | 438 | 731 | 28 | 13 |

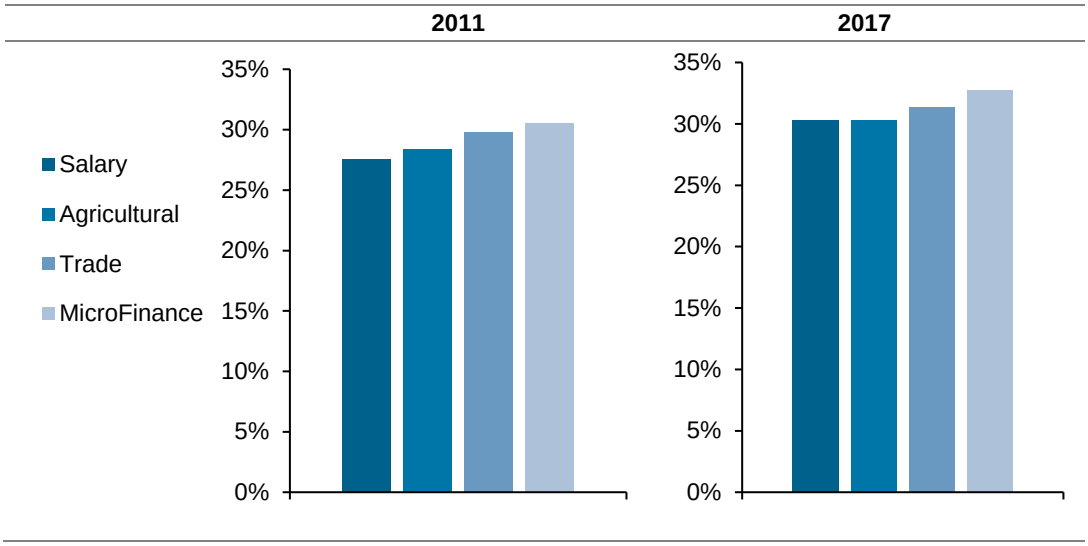
Source: Authors' compilation based on IFPRI 2017 bank survey.

The data from the banks suggest that the groups usually borrow without interruption for about four years before defaulting on loans. In 2017, the banks lent on average to 28 groups (Table 4.3). The number increased from 2014 only to fall by one in 2017. In the last one or two years, banks seem to have discontinued lending to many groups that they had lent to in the past. The average number of groups discontinued per bank over the period for which they provided information is 13. Defaulting on loans, however, was not the only reason. The banks suggested that groups stopped requesting loans for various other reasons, such as groups losing key individuals that negotiated on their behalf; termination of projects such as NRGP that have served as intermediaries; changes in perceived risks from changing rainfall patterns, and access to subsidized and free inputs from initiatives such as the Planting for Food and Jobs program.

***Interest rates charged***: Although banks consider agricultural loans to be the riskiest, they charged lower rates of interest on agricultural loans than on other loans. The interest on loans did not vary much across banks and subsectors. The average rate of interest bank charged on loans was 30 percent in 2017. Interest rate increased by about 2 percentage points between 2011 and 2017. The banks levied the highest rate of interest on microfinance loans, at 32.75 percent in 2017, and levied the lowest rate on salary loans, nearly

2 percentage points less than the rate on trade loan (Figure 4.2). A few banks noted that they levy lower rates of interest on agricultural loans because of the support they receive from projects such as USAID's Financing Ghanaian Agriculture Project and by the Royal Bank. The average agricultural interest rate for the country was 33.2 percent in 2017, slightly higher than the rates charged by the banks examined (BoG 2017).

**Figure 4.2: Average interest rates of financial institutions, by type of loan, 2011 and 2017**




Source: Authors' compilation based on IFPRI 2017 bank survey.

Banks levy similar rates of interest on loans to individuals and groups, with only a marginally higher rates on individual loans (30.5 percent compared to 30.0 percent in 2016). In addition, the banks require individual borrowers to offer collateral, usually guarantors, while they find mutual assurances sufficient from borrowers in groups. In addition to interest, the banks levy a services change, which varies from 1 to 6 percent of the loan amount. The average service charge on the agricultural loan is 4.1 percent, which includes 1.0375 percent for life and death insurance, with the rest covering commissions and agricultural insurance. However, only two of the banks included agricultural insurance in their service charges; the rest indicated that they might in the future. The insurance the two banks used was Multi-peril Crop Insurance, which is priced at 3 percent of the loan value by the Ghana Agricultural Insurance Pool.

Despite all these charges, groups of individuals can borrow at 30 percent because of the subsidies banks receive for lending to small-scale farmers. Some bank officials noted that interest charges on group loans would be 38 percent, including a four percent processing fee, if programs, such as the Financing Ghanaian Agriculture Project of USAID, did not absorb processing fees and other services charges. The support that the banks receive from various programs, particularly in the form of subsidization of interest rates, may have influenced them to increase lending to agriculture as much as did their participation in value chain committees.

***Loan recovery***: The recovery of agricultural loans, which is poorer than that of trade loans, deteriorated over the years. Banks recovered 83 percent of agricultural loans in 2016 compared to 90 percent for trade loans. The recovery of agricultural loans fell from 89 percent to 83 percent between 2013 and 2016. This is higher than the 60 percent recovery

by all rural and community banks in 2009 reported by Nair and Fissha (2010). Recovery of trade loans are stable around 90 percent, except in 2014 when it reached 93 percent. According to the banks, the reasons for defaulting on agricultural loans are crop failure due to drought, flood, pest, diseases and bushfires; low prices obtained by farmers; weak loan supervision and monitoring; and diversion of loans to other activities.

Individual borrowers repay better than group borrowers. In three out of the four years for which we have data, individual borrowers repaid better. The banks offered two reasons for better recovery of loans to individuals. First, individual borrowers are mostly medium to large-scale farmers who are capable of repaying even if the crop is damaged for some reason. Second, individual borrowers are required to pledge collateral or offer one to two guarantors who maintain accounts in the same bank. Groups of borrowers, on the other hand, promise to exert peer pressure on each other to ensure repayment. The banks noted that group borrowing may distort individual incentives. For example, some members may withhold their payment until others pay. This influences repayment by the entire group when one or more members face some idiosyncratic shocks such as sickness, crop loss, or having to incur large expenses for funerals, etc. As a result, some banks noted that they are inclined to disengage from group lending.

***Has lending to agriculture increased?*** Agricultural lending fell in real terms and the recovery of agricultural loans also did not improve during the period studied. The banks marginally increased the number of farmers they lent to one to two years after the formation of the DVCCs. The average number of groups and farmers supported increased from 13 groups and 117 farmers per bank in 2009 to more than 33 groups and 500 farmers per bank in 2011. But the growth was not sustained. Some of the committees suggested that any increase in lending in the initial years may have been a ‘good will gesture’ from the banks to demonstrate their willingness to work with the development project.

The banks provided sketchier information on recoveries compared to lending, but many of them reported that recovery rates fell after they began working with committees. Several banks noted recoveries as being as low as 75 percent. The data they provided suggests that the recovery on agricultural loan increased to about 90 percent in 2014, but fell to 85 percent in 2015, and to 83 percent in 2016. Many of the farmers’ groups that were introduced to the banks by the DVCCs subsequently became ineligible to borrow because they failed to repay.

**Banking practices**. The training on value chain financing given to banks under the NRGP project aimed to influence the way the banks lend to farmers, expecting that they would make credit products more attractive to farmers and change their processes to make borrowing more convenient for applicants. All but two of the banks surveyed felt that the training they received had influenced to various degrees their screening of applicants, loan disbursement, and terms of repayment.

***Screening and collateral***: Sixteen of the surveyed banks indicated that the committees played some role in pre-screening their agricultural loan applications by scrutinizing or identifying group members, evaluating crop budgets presented, and assessing the credit worthiness of applicants. The committees typically forwarded the approved applications to banks with a cover letter. The banks noted that they did take into consideration the committee recommendation in addition to their own assessment of the merit of the applications, including the credit history of applicants. They also acknowledged benefitting

from committees encouraging farmer groups to make credit applications well in advance of the season.

The committees, however, worked with the banks only in the first two or three seasons. Only three banks worked with DVCCs after completion of the project. The three committees involved with the banks were reported to have a committed membership that made contributions to generate some revenues for their operations. However, none of the committees this study examined continued activities beyond termination of the project.

The banks required collateral for most forms of loans, including agricultural loans, particularly for loans to individuals. The banks preferred guarantees from one or two account holders in the bank, followed by titles to movable and immovable properties. Seventy one percent of the banks required a guarantor on individual loans, in addition to pledging as collateral movable or immovable properties, such as vehicles, farm equipment, houses, etc. None of the banks required collateral on group loans. However, groups are usually required to maintain a balance in their accounts. Only one or two banks indicated that they require a deposit equivalent to 10 to 20 percent of the loan amount requested – this is usually required of first-time borrowers.

***Loan disbursement***: The banks usually disbursed loans directly to individuals or group members even when they borrow as a group. Only two of the 17 banks surveyed indicated that they disburse loans through group executives. They usually disburse the entire loan amount, except in the case of large loans when the borrowers may not need all the funds at once.

All the banks disbursed a portion of the loan in the form of inputs. Millennium Village Project of the Millennium Development Authority encouraged banks initially in 2000 to make “cashless” disbursements. The banks noted that although the NRGP was not the first project to encourage the cashless loan model, it helped them to implement the model. Most of the banks (14) included in this study began making cashless disbursements only after they began working with the committees.

In cashless disbursements, banks give the borrowers vouchers to collect inputs and services from vendors that they have already paid. The vendors are usually committee members recommended to the banks by the committees. Eleven of the seventeen banks made cashless disbursements to group borrowers. Although cashless disbursement is recommended for group borrowers, one bank indicated that it has adopted the practice for individual loans also. However, by the time the survey was conducted, only four banks were continuing the practice.

Seven banks that ceased making disbursements in kind noted several problems: prices charged by selected vendors may not be competitive; vendors recommended by DVCCs may not have the type, quality, and quantity of inputs required; and having received payments, vendors often lack the incentives to supply inputs and services in a timely manner.

***Banks loan repayment mode and terms***: Farmers are required to begin repayment 6 to 12 months after the loan is disbursed, depending on the duration of the crop. The interval before repayment includes a 4 to 6 month grace period, which corresponds with the crop

growth period plus 1 to 2 months post-harvest period, The repayment period is from 4 to 6 months.

Several banks surveyed noted that the training they received from the DVCC program of NRGP encouraged them to revise their terms of repayment on agricultural loan to increase the grace period and to increase the number of installments over which a loan can be repaid. The banks noted that agricultural loans, like other loans, did not include a grace period previously, and farmers were therefore required to start the repayment a month after the loans were disbursed. Some banks have now increased the loan term from 6 to 8 months, including a 4-month grace period. Specifically, 15 banks indicated that they have increased their grace period as result of the training. Currently, the average grace period applicable to agricultural loan is 4 months with an average repayment period of 8 months. The revised term may make it easier for borrowers to repay, but it also increases the costs of loans.

Group loans are repaid by group executives, individual members, or by buyers. Of the 17 banks surveyed, loans were repaid exclusively by group executives in three, exclusively by members in another three, by traders in one, and by various combinations of the above in the remaining 10 banks. A few banks suggested that buyers or traders repay on behalf of borrowers by directly depositing the sales proceeds in the banks. Our interactions with committee members or producer groups, however, did not suggest that traders were depositing sales proceeds in banks to enable the banks could recover the loans to producers. Such repayment by traders would require a tripartite agreement between producers, lending institutions, and traders. As noted, producers rarely sold to aggregators or traders participating in the committee, let alone having prior agreements with them – at least in the districts examined.

Nearly 80 percent of the banks indicated that they are willing to reschedule repayment if borrowers defaulted because of a crop failure from adverse conditions. In such cases, they usually reschedule the payment of the unpaid amount, at the same rate of interest. Two of the banks indicated that, in addition to renewing the old non-performing loans, they will also consider giving a new loan to increase the farmers' ability to repay both the loans.

***Banks loan supervision and recovery***: All the banks indicated that they supervise the loans they make to both groups and individuals to ensure that the funds are used for the stated purpose on the loan application. Credit officers supervise by visiting farms before loan approval, during crop growth, and during harvest.

Of the 17 banks, 15 banks reported that the committees assisted them in loan recovery, usually by committee executives and MoFA staff accompanying credit officers on their monitoring visits. Three of the 15 banks noted that the DVCCs assisted by organizing bulk sales to aggregators who paid the producers through the bank they had borrowed from. In these cases, the committee executives and farmers' group representatives informed the banks when borrowers harvested or sold the crop, seizing farmers' grain in some cases. They noted that these activities took place only in the first one or two years of the NRGP project as project activities were being organized.

This survey confirms the gloomy picture that prevails of the limited role that rural banks in Ghana play in supplying credit for agricultural production. The banks that were studied direct only about 10 percent of their total lending to agriculture. The banks, which are expected to serve the entire districts, on average lend to 438 farmers, to the tune of GH¢ 730 per farmer.

Default on agricultural production loans continues to be higher than on other loans, and the rate has increased.

### *Banks working with value-chain committees organized by the Market Oriented Agricultural Project*

The participating banks in the MOAP-project organized committees did not do better in lending to agriculture that did those under the NRGP project. A progress report of MOAP (2013) stated that financial institutions participating in value chain committees increased their lending to agriculture by, for example, GH¢ 67,200 by ADB and GH¢ 38,400 by Mfantsiman Rural Bank. This report also stated that participating banks also enlarged their customer base because the project encouraged farmers to open bank accounts – for example, by 225 customers for ADB; 219 for MCB, 197 for Kakum Rural Bank, and 237 for Opportunity International.

Three participating banks told the study team of the following instances of lending:

- In August 2012, ADB extended credit of GH¢ 79,200 at 20 percent interest and loan tenure of 18 months to 66 pineapple growers organized into 6 groups;
- Opportunity International Savings and Loans advanced GH¢ 30,000 to 50 farmers, and
- Kakum Rural Bank extended credit of GH¢ 12,000 to one pineapple group.

These financial institutions, however, had dropped out of the value chain committee and discontinued lending to the farmers when the study team met with them in 2016. ADB and Ekumfiman Rural Bank indicated that they discontinued lending because of default on loans and because of the poor saving habits of producer-borrowers. Primarily, the borrowers failed to maintain a balance in their accounts.

The value chain committees were by then working with a different set of financial institutions: Assinman, Akatakyiman, and Enyan Denkyira Rural Banks. Assinman and Akatakyiman Rural Banks indicated that they had participated in value chain trainings, but had not yet given out any loans to the farmers.

Three banks had representatives on the citrus value chain committee -- Assinman, Akatakyiman, and Enyan Denkyira Rural Banks – but there are no indications of them having lent to citrus producers. The pineapple value chain committee also had representatives of the same three banks as the citrus value chain committee. The banks announced in a meeting in 2016 that they would roll out a loan package for pineapple producers in 2017. The study team could not confirm whether the banks had done so. Altogether, four banks that had participated earlier in fruit value chains had ceased lending when the study team met with them.

## 4.3 Technology adoption and productivity

Producers adopt improved technology, according to the theory of change, when they obtain higher access to credit. Technology adoption is an innovation that leads to improvements in the value chain.

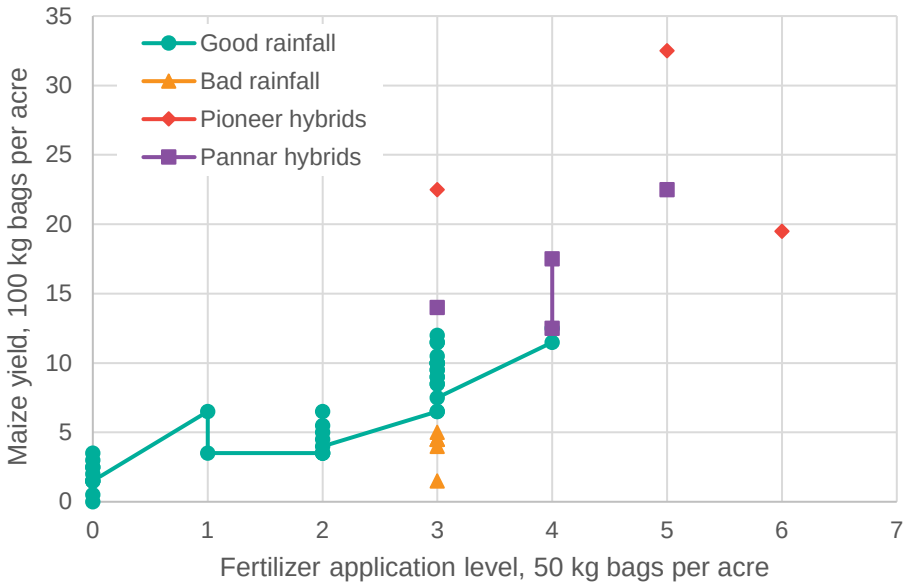
In meeting with 39 farmer-based organizations in their communities, the study sought information on maize yields their member farmers obtained under three conditions: with and without fertilizers, in good and bad rainfall conditions, and by using different seeds. Each

group that participated in the study estimated yields for the situations with which they were most familiar – usually without fertilizer, with a few bags of fertilizer, and under good or poor rainfall conditions. Only a few mentioned yields with hybrids.

Producer groups reported maize yields as low as five 100 kg bags per acre in the Lawra district of Upper West region to 12 bags per acre in several of the other districts, usually from using improved open-pollinated varieties, such as Obaatanpa. The yields were usually associated with application of two bags of NPK and one bag of nitrogenous fertilizer per acre, a routine recommendation. Farmers in some districts, such as Sissala West, indicated that they apply 5 bags of fertilizer – three bags of NPK and two bags of Ammonium sulfate – to open-pollinated varieties, including Obaatanpa, Sanzalsima, Bihilifa and Wang Dataa varieties, to boost yields to 15 bags or more per acre. There were one or two reports of application of similar quantities of fertilizer to imported hybrid maize varieties to harvest 20 to 35 bags per acre.

Yields reported by farmer groups under good and bad rainfall conditions and using improved varieties allow estimates to be made of the incremental yields that can be obtained from fertilizer applications and the extent to which yields are affected by rainfall. Although the number of observations were limited for some scenarios, plotting of the yields shows that yields are as low as 2 bags per acre without the application of any fertilizers (Figure 4.4). Application of two bags of fertilizers increases yields to about 5 bags. By taking it up to three bags, yields are almost doubled to 9.5 bags, but under bad rainfall conditions, yields are down to 4 bags per acre. As expected, the two hybrids yielded much higher – 21 and 24 bags per acre for Pioneer and Pannar varieties, respectively.

**Figure 4.4: Maize yield response to fertilizer application, by rainfall conditions and variety**




Source: Fieldwork 2016/17.

The kind of technology promoted by NRGP has yielded only modest growth in maize yields over the last two decades – maize yields increased by only 1.2 percent per annum between 1995 and 2012 (Hazell, Diao, and Magalhaes 2019). Crop budgets prepared by the value chain committees, information provided by farmers groups about how much fertilizers

they applied, and the amounts lent by banks to cover expenses of maize production all suggest that the project did not make any effort to promote the use of superior maize varieties available in the country.

Producers perceive that fertilizers are too expensive to increase profitability by using in larger quantities. Many farmers noted during discussions that the “two plus one” fertilizer package only enables them to maintain yields where soil fertility has declined or generate marginal increases in maize yields, but they would be reluctant to apply larger quantities. A 50 kg bag of fertilizer was between GH¢ 100 and GH¢ 120 in 2016. An input dealer indicated that farmers feel that a bag of fertilizer should only costs half as much as a bag of maize for fertilizer use to be profitable.

Some large-scale producers who are either ‘lead’ or ‘nucleus’ farmers or tractor service providers on the DVCCs stated that they were applying 4 to 6 bags per acre. They, nevertheless, continued to recommend 3 bags of fertilizer per acre to smallholder farmers because they felt that the high cost of hybrids seeds and the added cost of higher doses of fertilizers were too expensive for the average smallholder to adopt, a sentiment echoed by farmer groups. Farmers noted that the seed costs of two popular hybrids, which ranged from GH¢ 125 to GH¢ 360 per acre, was too much for them.

### *Increased fertilizer sales*

Nearly all the input dealers on the DVCCs reported growing sales of both fertilizers and herbicides. In nearly all districts, even where the DVCCs reported declining numbers of farmers receiving bank credit through them, input dealers reported growing sales. Most input dealers did not attribute the growing sales to the DVCCs. Instead, they suggested that the number of farmers using agro-inputs was on the increase due to an increased awareness of the benefits of fertilizer use in the general population.

Many stakeholders were of the view that the increased use of fertilizers, principally from increasing proportion of farmers using fertilizers, is perhaps due to cumulative effect of training offered to farmers on good agricultural practices by MoFA, NRGP, and other programs, such as USAID’s Agricultural Development and Value Chain Enhancement project, the Alliance for a Green Revolution in Africa, SEND Ghana, and Technoserve among others. We gather from discussions with maize farmers that such training usually recommended the application of 2 bags of NPK and 1 bag of Ammonium sulphate per acre; application of fertilizers 2 weeks after planting by dibbling; appropriate use of selective herbicides; row planting with a spacing of 20cm x 60cm, harvesting while the crop is still standing; and proper drying and storage to minimize aflatoxin infestation.

### *Input supply: The mechanization problem*

Producers expected to be able to negotiate better terms with tractor service providers. They were expecting to improve access to services in three ways: timely plowing, accurate field measurements, and negotiated service charges. The suppliers too expected to do better than before through increased demand for services from groups that have plots close to each other and, possibly, advance payment from producer groups that have obtained credit from banks.

But most committees were not successful in negotiating agreements between producers and tractor service providers. In one district, with the assistance of MoFA and ACDEP, the

committee drafted an agreement for producers and tractor owners to enter into, but the tractor service providers were not willing to accept the terms. In another district, the agreement they had entered into was observed by both producers and services providers for one year, but the following year when producers failed to get credit the service providers pulled out. In another two districts in 2015, the committees indicated that they negotiated lower charges and accurate measurement of plowed area, but several producers the study team interacted with suggested that they did not benefit from the agreement.

Without being able to offer each other incentives, producers and tractor service providers could not achieve mutually agreeable terms. The demand for tractors in most districts exceeds supply. In many districts, resident tractor service providers numbered fewer than 10 – usually one or two of them were on the committees – each owning one or two tractors. If pressured to offer services at terms more favorable to producers – by lowering charges or accurately measuring plowed area – they can cross the borders to offer services in Togo and Burkina Faso, levying even higher charges. Several DVCCs found tractor service providers reluctant to serve DVCC farmer groups if they are under pressure to accurately measure the area plowed or reduce their usual service charges. Most farmer groups relied on itinerant tractor owners from southern part of the country with whom the DVCCs could not coordinate or negotiate terms.

## 4.4 Market access and prices

Producers and traders were expected to enter into pre-harvest contracts that improved access to markets for producers – that is, a buyer where there was none before, higher prices, or reduced price risk. Traders, however, did not enter into agreements with producers on the committee or buy from them to a significant extent. Producers in two committees entered into memorandums of understanding with aggregators to supply maize, but the agreements did not last beyond one season because the producers felt that the aggregator offered them bad prices and preferred to buy from them immediately after harvest when prices are the lowest. Only five groups sold to aggregators on their committees (Table 4.4).

**Table 4.4: Source of market for Farmer-based Organizations interviewed**

| | | Who typically buys your maize? | | Reason? |
|---|---|---|---|---|
| District Value Chain Committee | No. of FBOs interviewed | DVCC Aggregator(s) | Other Aggregators | |
| Bawku West | 2 | Most times (1) | Most times (1) | Familiar with DVCC aggregator |
| Builsa North | 3 | Never | Always (3) | Price difference and time of sales |
| Garu-Tempane | 4 | Never | Always (4) | Does not know DVCC aggregators |
| Kasena-Nankana West | 5 | Sometimes (1) | Always (3) | No difference in terms or prices |
| Central Gonja | 2 | Never | Always (2) | Time of sales and distance |
| Chereponi | 2 | Never | Always (2) | Time of sales and distance |
| East Mamprusi | 3 | Always | sometimes | Prior relationship with DVCC agg. |
| Kpandai | 2 | Never | Always (2) | Time of sales |
| Kumbungu | 1 | Never | Always | Market location |
| Sawla-Tuna-Kalba | 3 | Never | Always (2) | Already had market |
| Yendi | 1 | Never | Always | No contact with DVCC aggregator |
| Lawra | 3 | Never | Always (3) | Price difference and time of sales |
| Sissala West | 2 | Never | Always (2) | Already had market |
| Pru | 2 | Sometimes (2) | Sometimes (2) | Previous transaction bad |
| Sene West | 3 | Most times (1) | Sometimes (2) | Same price as other traders |

Source: Fieldwork 2016/17.

Few transactions occurred between DVCC members because producers expected higher-than-market prices and traders expected to buy larger quantities at market or at lower-than-market prices**.** In a few cases in which farmers did sell to aggregators on the committees, it was because of relations that predated their committee interactions. In five districts where the study team was able to get information on prices offered to producers and the prices they expected, the difference in price expectations were at least 10 percent and as much as 25 percent (Table 4.5). In Builsa North district, farmers complained that in 2015 one of the DVCC aggregators offered to buy their maize at GH¢ 85 per 100 kg bag while market prices were between GH¢ 95 and GH¢ 100. In 2016, the same aggregator offered to buy at GH¢ 80/bag while market prices were GH¢ 90. Farmers were prepared to send their maize to a market almost 20 km away to sell to other traders at the market price. They suggested that their negotiations with most DVCC aggregators were not fruitful because the aggregators did not offer 'acceptable' prices.

**Table 4.5: Maize prices offered versus expected by DVCC farmers, GH¢/100 kg bag**

| District | Prices offered by DVCC aggregators | Prices expected by DVCC farmers |
|---|---|---|
| Builsa North | 80 | 90 |
| Kasena-Nankana West | 70 | 80 |
| Sissala West | 75-80 | 110-120 |
| Lawra | 120 | 150 |
| Pru | 100 | 110 |

Source: Fieldwork 2016/17.

The traders on the committee had no incentives to offer higher prices to clinch deals with producers because they usually had a set of farmers that they "support" who are obligated to sell to them soon after harvest. In Lawra district, for example, the aggregator on the committee sourced maize from a different district where she supported some producers since the GH¢ 120/bag that she offered farmers in the DVCC committee was not accepted. In Pru district, an aggregator who had entered into a memorandum of understanding with farmer groups in 2015 terminated it because some of the farmers who were party to that memorandum sold to itinerant traders who offered marginally higher prices. Other farmers were unwilling to sell their maize immediately after harvest because the prices then were around GH¢ 100/bag. Farmers, at least those who could, preferred to store the grain and sell later in the year when the price increased to about GH¢ 150. Traders, on the other hand, preferred to buy when prices are low immediately after harvest and sell at higher prices later in the season.

Farmgate prices reported by producer groups suggests that there are significant differences between districts (Table 4.6). Some of the traders seem to be taking advantage of these differences rather than buy from producers in their districts.

**Table 4.6: Farmgate price of maize reported by producer groups in different districts, GH¢ per 100 kg bag**

| District | 2015 | 2016 | 2017 |
|---|---|---|---|
| Bawku West | 110 | 120-130 | |
| Builsa North | 80-100 | 110-130 | 150 |
| Garu-Tempane | 90-110 | 100-120 | |
| Kasena-Nankana West | | 80-120 | 135-145 |
| Central Gonja | 80-120 | 60-120 | 130 |
| Chereponi | | 80-120 | 120 |
| East Mamprusi | | 80-100 | 100 |
| Kpandai | 100 | 100-200 | 160 |
| Kumbungu | | 80 | 70 |
| Sawla-Tuna-Kalba | | 80-150 | 150 |
| Yendi | 80 | 100 | |
| Lawra | | 120 | |
| Sissala West | | 50-80 | 50-90 |
| Pru | 80-120 | 80-150 | 150 |
| Sene West | | 120-160 | 180 |

Source: Fieldwork, 2016/17.

A typical trader on the committees has limited scope to negotiate terms because of the nature of trading they engage in. They are typically small buyers who trade in and around the area they live in. They buy grain from farmers at harvest, from November to February, store it for a few months, and then sell during the lean season from May to September. They are predominantly women who trade in several crops. They usually travel to small community markets nearby aggregating small quantities to store or resell. A few of them may sell to traders in larger central markets, such as Tamale, Techiman, and Kumasi. Others may sell to small-scale food processors and food vendors or retail to individual consumers. Few traders have the capacity to buy a thousand bags of maize, let alone “mop up” the produce of hundreds of growers. The study did not come across any large aggregators. Such traders may have been buying from the aggregators on the committees.

Some traders serve as agents for larger buyers, such as poultry farms, food processors, and feed producers in southern parts of Ghana, who are usually referred to as off-takers. The off-takers usually specify the price at which they wish to buy a stated quantity and offer a margin per bag to the agents. Many of the traders who act as agents of off-takers offer producers even lower prices to fatten their margins. In one district, an aggregator stated that in 2016 the off-takers offered him GH¢ 100 per bag of maize and GH¢ 120 per bag of soyabean. He, in turn, offered farmers GH¢ 80 and GH¢ 100 per bag, respectively.

To develop markets for crops like soyabean introduced into some districts, NRGP took traders on “trade missions” to areas where the markets were thin, where there were few or no buyers. The study has no evidence to suggest whether the efforts were fruitful in increasing market opportunities for producers in those areas. However, several aggregators and agents buying soyabean indicated that they did not go to these areas because they were not certain that they could purchase significant quantities at prices that would make it worthwhile to incur the needed transport and other costs.

# 5. HORTICULTURAL VALUE CHAINS

This section presents overviews of three horticultural value chains – mango, pineapple, and citrus – in which MOAP intervened. We examine performance of the sub-sectors, production and marketing challenges, the interventions made, and some immediate outcomes. Overviews are offered because many programs have intervened in these value chains in the past, which makes it difficult to identify the specific outcomes that can be attributed to the recent interventions. Additionally, enterprise-specific information could not be obtained by the study to assess the impact of interventions that sought to improve the operations of downstream actors and producers. Nonetheless, the context of the challenges facing the subsectors and their overall performance may suggest to readers the relevance and effectiveness of recent interventions.

First, seeing high potential in the Ghanaian horticultural sector, over the past decade the government of Ghana, with the assistance of development partners, has invested considerably to develop the sector as part of a broader effort to increase non-traditional exports overall. These public investments have focused on pineapple, citrus, and mango. Close to US$100 million has been invested in these value chains by projects such as MOAP, the Millennium Development Authority, the African Development Bank's Export Marketing and Quality Awareness Project, USAID's Trade and Investment Promotion for Competitive Export Economy project, and the World Bank's Horticultural Exports Industry Initiative (van den Broek et al. 2016).

The fruit sector offers considerable growth potential because of the opportunities to export, to add value for exports, and for import substitution. It ranks fourth in importance in Ghana, after cocoa, gold, and petroleum (van den Broek et al. 2016). Ghanaian consume fruit juices widely, and consumption is growing. A report by the Millennium Cities Initiative in 2013 estimated that about 10.4 million liters of fruit juice is consumed yearly in Ghana, and primarily imports meet the demand. It was recently reported that the country imports about US$150 million worth of fruit juices yearly, and that production in country – worth about US$40 million – meets only about 28 per cent of total domestic demand (Goldstreet Business 2017).

Growing domestic processing of pineapples, citrus, and mangoes caters to both local and export markets (van den Broek et al. 2016). Much of the processing involves only juicing, drying, and cutting. Production of jams, jellies, and marmalades offers additional value-adding opportunities. The World Bank estimated that Ghana's processing capacity in 2009 was about 40,000 tons of pineapples and about 30,000 tons of citrus per year (World Bank 2010). Capacity to process mango was estimated at 60,000 tons per year (Zakari 2012). Processing capacity is likely to have increased considerably in the last few years, which has put considerable pressure on the availability of quality raw materials.

Private firm have invested considerably in fruit processing, especially in juice production. They include Blue Skies, HPW, Peelco, Pinora, Sunripe, Biotropical, and Fruittiland.

- Blue Skies exports ready-for-shelf packages of cut pineapples and mangoes to UK, Dutch, and Swiss supermarkets, and to Italy and France. The company produces freshly squeezed juice for the domestic and export markets. It also produces fruit-based dairy-free ice cream.
- HPW produces fresh-cut and dried pineapple, mango, coconuts and bananas.

- Pinora, which is known for processed pineapples and oranges, is introducing a mango line for puree and juice.
- Peelco produces fruit juice products including pineapple, mango, and orange drinks as well as fresh-cut fruits.
- Sunripe processes pineapple, mango watermelon, pawpaw and passion fruits and has a processing capacity of about 20 tons of juice per day.
- Fruittiland produces orange and pineapple juice concentrates for export.
- Biotropical exports about 80 tons of organic sweet orange and lemon peels annually, mainly to Germany.
- Integrated Tamale Fruit Company produces dried mango slices and chunks to sell in domestic and export markets.

A majority of the domestic fruit processors organized themselves into the Fruit Processors & Marketers Association of Ghana in 2008.

Domestic processors face difficulties sourcing raw material around the year. Major fruit processors report importing more than half of their raw materials, such as mangoes, pineapples and papaya, especially during the local off-season. Blue Skies, for example, imports mangoes from various countries, including Brazil, Burkina Faso, South Africa, and Senegal in lean seasons (Zakari 2012). Recent news reports claim that most of the major fruit processors operate at less than 10 percent capacity (Goldstreet Business 2017).

Fundamental problems of low yields, poor quality, and high cost of production plague horticultural production in Ghana. Processors could make better use of existing capacity with a year-round supply of raw materials, but local producers need to improve the quality of the fruit produced, including by obtaining certification to supply to firms that export their outputs.

The study team did extensive field work in 2016 and 2017 to collect the information that is used in the following narrative. As in the study of the NRGP project, the study team had discussions with project managers and participants in value chain committees, in addition to attending some meetings. The team followed up with FBOs involved in fruit production particularly to understand the level of adoption of some of the technologies the project was promoting. Additionally, processing firms and participating banks were also consulted.

In examining the citrus value chain, the study team interviewed and held discussions with 47 seven actors: three staff of MoFA, six processors of citrus fruits, three financial institutions, 30 farmers, and five FBO executives. The team also visited about ten farms belonging to members of an FBO and citrus processing plants or company offices.

For the pineapple value chain study in the Central region, the team had meetings with three staff of MoFA, one large scale and six small scale processors of pineapple and other fruits, three financial institutions, 12 farmers, and two FBO executives. The team also visited about ten farms to assess the extent of adoption of improved management practices. The team also spoke to mango and pineapple producers, agricultural extension agents, and other actors in the Volta region.

Details on the three fruit value chains now follow, organized using a similar outline. Following a brief introduction on the historical role of each crop, including interventions made, the performance of the sub-sector in terms of production and exports is discussed. This is followed by discussions on technology, yields, and profits and on marketing, areas

which offer insights on the problems of each sub-sector that need to be addressed and the opportunities that can be exploited to develop it. Finally, a sub-section discussing interventions in the sub-sector summarize the outcomes observed by the team in each value chain study.

## 5.1 Pineapple

Farmers produce pineapple, the most important horticultural crop in Ghana, widely in the southern parts of Ghana, including Greater Accra, Central, and Eastern regions. Farmers also produce it in the transitional savanna belt in Brong-Ahafo, Ashanti, Volta and Western regions. Although pineapple is drought resistant, it performs best with a well-distributed medium to high annual rainfall. Hence, major production is limited to transitional and forest agro-ecological zones: coastal areas, the Accra plains, Aburi-Nsawam in Eastern region, Kasoa and Awutu areas in Central region, and in Sogakope, Vakpo, Ho, and Adidome in Volta region.

The information the study team collected from pineapple producers and processors and from MoFA staff in Central and Volta regions show that in Central region alone 3,320 ha are planted with pineapple, of which nearly 2,000 ha are cultivated by medium to large-scale producers and the rest by more than 1,500 smallholder producer. The Sugarloaf variety is widely grown in the Central region, especially in the districts where MOAP worked with producers. In Volta region, an estimated 200 smallholders cultivate nearly one acre each on average. Most of the smallholders studied in Volta region cultivate the Sugarloaf and Smooth Cayenne varieties, while large and medium-sized producers there, who may produce for export, cultivate the MD2 variety.

### *Performance*

Ghana's pineapple sector is dualistic in structure: a few large or medium-sized producers, who may export, and many smallholder farmers, who sell fruit in local markets or as out-growers to exporters or processors. Pineapple leads the horticultural exports of Ghana. Driven by high demand for fresh pineapple in the European market and the availability of low-priced airfreight, the sector nearly doubled in size between 1994 to 2004 and increased its share in the European market from 7 to 10 percent between 1999 and 2004 (Gatune et al. 2013).

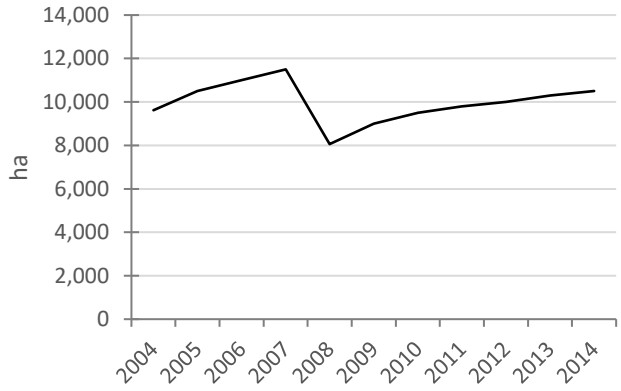
Unfortunately, this growth in pineapple exports did not last long. Soon after 2004, the volume of fresh pineapple exports fell as European markets began to prefer MD2 – a variety supplied from Costa Rica – over Smooth Cayenne exported from Ghana (FAO 2009). Because of the switch in demand, fresh pineapple exports declined rapidly from the peak of 71, 000 mt in 2004 to 35,000 mt in 2008. Exports have hovered around 40,000 mt since 2013.

The change in European tastes for fresh pineapple proved to be an insurmountable technical challenge for Ghana's smallholders (Gatune et al. 2013). Small producers who supplied 50 to 70 percent of the export volume could not quickly switch to production of MD2. They were unfamiliar with the intensive practices required for producing MD2 and could not invest in production costs that were three times higher.[1] As a consequence, the pineapple

[1] The shift to MD2 requires that farmers incur costs in replacing existing varieties with the new MD2 variety. MD2 also requires intensive use of specific chemical inputs in order to achieve maximum output (Gatune et al., 2013).

area harvested in Ghana declined from 11,500 ha to 8,000 ha between 2007 and 2008. But as farmers switched back to cultivating Smooth Cayenne, the area harvested gradually increased to 10,500 ha in 2014 (Figure 5.1).

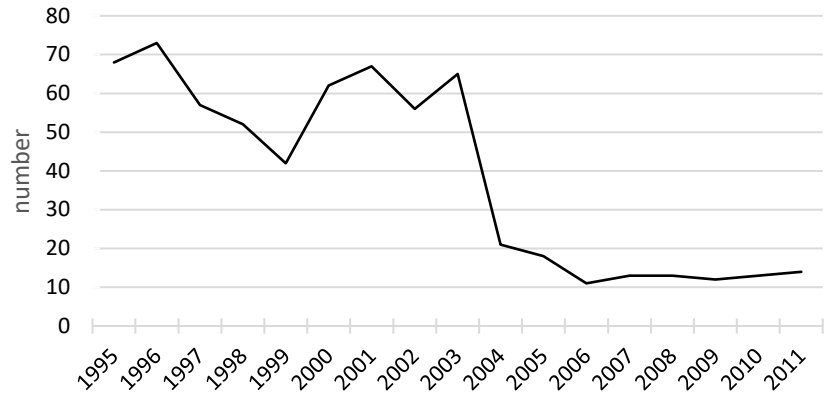
**Figure 5.1: Pineapple area harvested, 2004 to 2014, ha**




Source: FAOSTAT 2017.

The industry suffered severe repercussions. Employment in the sector fell from a high of 10,000 to 3,000 workers by 2015. About three-quarters of the members of the Sea-Freight Pineapple Exporters of Ghana industry association folded their operations. The number of fresh pineapple exporters declined from an average of 60 before 2004 to about 14 in 2013 (Figure 5.2).

**Figure 5.2: Fresh pineapple exporters in Ghana, 1995 to 2011, number**




Source: FAOSTAT 2017.

Ghana government and donor agencies intervened by offering technical and financial assistance to the sector. The government of Ghana in 2005 granted US$ 2 million to the pineapple industry for producing MD2 planting material. MoFA, in collaboration with the African Development Bank's Export Marketing and Quality Awareness Project, invested US$ 25 million in 2005 to develop infrastructure and to equip farmers with knowledge of the production practices required to meet export requirements. USAID supported the establishment of Bio Plantlets Ltd., a commercial tissue culture laboratory to produce pineapple planting material. Despite these interventions, only about 18 percent of pineapple producers cultivated the MD2 variety in 2015 (Mensah and Brummer 2015). Most smallholders continue to cultivate the traditional Sugarloaf and Smooth Cayenne varieties, which are now exported processed rather than as fresh whole pineapples.

Although production and exports have declined in the past decade, the shift to MD2 – with MD2 now being planted on about 18 percent of the pineapple area – has increased yields by nearly ten-fold from 6 mt/ha to 63 mt/ha between 2005 and 2014, if the data from MoFA and FAO are to be believed. The growth in yield is credited to large-scale farmers who have adopted good agricultural practices for pineapples: planting in rows to maintain optimal population, grading and selection of suckers, proper application of fertilizer, use of plastic mulch, regular weeding, and proper harvesting. Ghanaian producers, however, still harvest less than Costa Rican farmers do – annual pineapple yields in Costa Rica are nearly 120 mt/ha (Gatune et al. 2013).

Smallholders face an additional barrier in the form of certification, which became a requirement in late 2001 to enter the European market. Most producers and exporters market pineapples that are EurepGAP certified, while a small proportion produce pineapples that are certified organic. Producers can earn higher returns from organic certified pineapple farming compared to EurepGAP certified (Kleemann et al. 2014).

### *Technology, yields, and profits*

Traditionally, producers manually hoe pineapple fields without clearing tree stumps to prepare the fields, plant haphazardly at a low density, weed irregularly, and use carbide to force fruiting. Because the producers force their entire fields at the same time, all their fruits also mature at the same time, exacerbating seasonal pineapple gluts. They plant at a low density to get a population of 20,000 compared to almost 30,000 planted per acre in Costa Rica (Gatune et al. 2013). With 20,000 suckers in one acre, they harvest between 8,000 and 10,000 fruits, of which 60 to 70 percent may weigh less than one kilo.

A key practice that producers need to adopt to improve production is to conserve moisture and control weeds by using plastic mulch. They may need to invest as much as GH¢ 2,000 per acre because nearly 3 rolls, which cost GH¢ 850 each in 2016, are required to mulch an acre. The other practices they need to adopt are to plant in rows with a higher population, grade and select suckers for planting, apply fertilizers, force using ethylene gas, and harvest with appropriate tools. With these practices, producers can shorten the production cycle to 14 to 16 months, compared to 18 to 24 months taken with traditional practices.

By adopting improved practices, producers can almost double productivity and profits. This is despite incurring higher costs, which can increase by 70 percent from an estimated GH¢ 5,030 to GH¢ 8,660 per acre. Yields double from 10,000 fruits harvested per acre under traditional practices to 19,200. Depending on the proportion of the harvest sold and the prices obtained, producers can increase their gross margins from between GH¢ 1,370 and GH¢ 3,770 per acre to between GH¢ 3,628 and GH¢ 11,615.

### *Marketing*

Smallholder pineapple producers sell to buyers who retail in nearby fresh fruit markets or produce on contract to sell to exporters or processors. They usually obtain better prices when they sell to exporters, but they need to make bigger investments in production to produce fruits of higher quality.

Women traders buy pineapples at the farm-gate to retail in nearby markets or to sell to retailers in more distant markets. They usually price fruits by sorting them into several

grades, depending on size and firmness of fruits: 2 kg fruit @ GH¢ 1.00; 1.5 kg fruit @ GH¢ 0.60; 1.0 kg fruit @ GH¢ 0.40; and 800 gm fruit @ GH¢ 0.30. Buyers expect to get small fruits at no cost when production is at peak. They also expect producers whose farms are inaccessible to transport their fruit to the nearest road for them to pick up. Producers report that traders often threaten to walk away if the producer does not agree to the price a trader offered or objects to the trader's grading practices. Producers often fail to sell all that they have produced, even under these unfavorable terms – they reported not harvesting as much as 30 percent of their pineapple production. Producers that adopt traditional forcing practices make it even more difficult for themselves by harvesting all their fruit at the same time.

The smallholder share of pineapples exported from Ghana has declined. Between 2001 and 2004, it was reported that about 40 percent of the nearly 60 exporters of fresh pineapples from Ghana did not produce the fruit they shipped, relying entirely on smallholders for their supplies, with the rest relying partly on outgrowers. Until demand shifted towards the MD2 variety, smallholders were believed to produce 50 percent of all fresh pineapple exported from Ghana (Gatune et al. 2013). The shift in market demand and the inability of smallholders to transition from the Smooth Cayenne to the MD2 variety radically diminished their opportunities in the export market. The number of fresh pineapple exporters also has since declined steeply from the 60 in 2004 to 14 in 2013.

Access to European markets also has become more restrictive since 2001 because of the requirement of certification by bodies such as EurepGAP. Fairtrade and organic certification are also becoming necessary. Several fruit exporters and processors that purchase pineapple from smallholders in Central and Volta regions require organic certification. It is estimated that up to 40 percent of total (including fresh, fresh cut, and dried) pineapple exports from Ghana are organic or fair trade certified (Kleemann 2011). Production of organic pineapple gives higher returns compared to that which only is EurepGAP certified because of higher prices obtained for organic fruits, even with lower yields on organic farms (Kleemann et al. 2013; 2014).

### *Project interventions*

MOAP offered training on good agricultural practices to pineapple producers – to 110 producers who are members of five FBOs in three districts in Central region and to 120 producers who are members of six FBOs in four districts in Volta region. Those trained reported training in turn over 1,000 smallholder producers.

Discussions with farmers and visits to their fields confirmed that the following were the improved practices recommended to them:

- Removal of basal leaves of suckers before planting to expose and eliminate hidden pests as compared to direct planting;
- Planting of suckers in rows with spacing 45 by 25 cm within rows and one meter between rows;
- The use of neem extract to treat suckers before planting and as an insecticide after planting;
- Grading and planting of different sized suckers in sections to facilitate split forcing;
- Use of plastic mulch to minimize weed growth and to conserve moisture;
- Use of ethylene gas for floral induction to enhance maturity, instead of carbide;

- Identifying maturity by pulling a leaf in the crown of the fruit - the easier it comes out the more mature it is; and
- Cutting the base of the fruit from it sucker with a sharp straight hoe rather than breaking fruit off by hand.

Members of three producer groups interviewed in Ekumfi district in Central region suggested that the recommended practices are beneficial. They reported having adopted some of them to a limited extent, but that other practices require out of pocket expenses that they cannot make. Several farmers noted that, while they all believe that mulching with plastic is beneficial, the costs limited them from adopting the practice. They also recognized that using ethylene gas for forcing is 100 percent effective at causing floral induction compared to carbide, which they felt was about 60 to 70 percent effective.

Two producers indicated that they are able to harvest significantly more by adopting the improved practices they learned from MOAP's good agricultural practices training: ridging, use of plastic mulch, curing of suckers, and planting in rows. They reported harvesting between 18,000 and 19,000 fruits from 23,000 suckers planted – with less than 20 percent small fruits. They also report that in Essuehyia in Ekumfi district, 20 to 50 farmers had resumed or entered into pineapple production since 2014 after learning about the benefits of producing pineapples with these new practices.

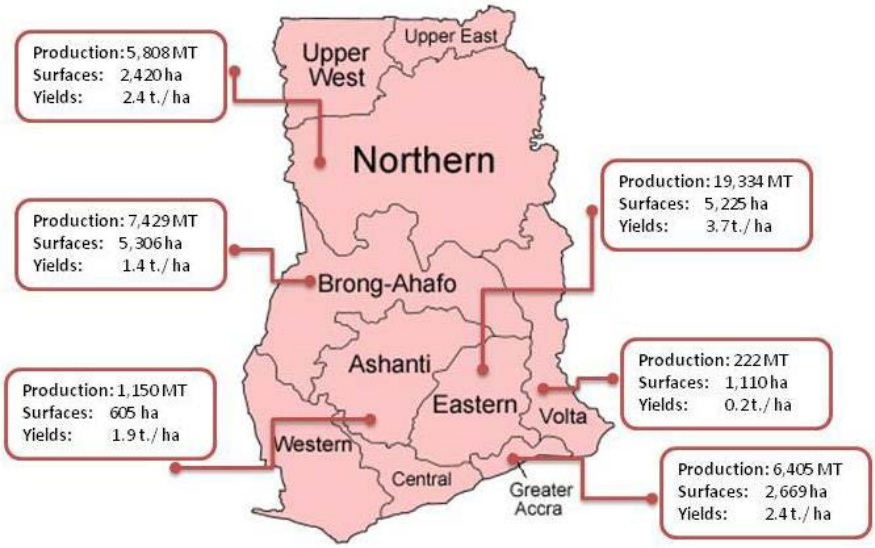
The leaders of two producer groups in Ekumfi district who produce organic fruits to sell to the HPW fruit exporting firm reported that all members of the two FBOs use plastic mulch, and visits to the fields of two members confirmed this. The leaders also noted that they have strengthened their relationship with HPW, which they said is supplying them with plastic mulch, presumably on credit. By having their production certified, which requires them to adopt some of the recommended practices, members of the two groups suggest that they now have a ready market for their produce with HPW at prices higher than they usually were able to sell at – they report selling to HPW 7 tons per week at GH₵ 1.08 per kg compared to the price of GH₵ 0.80 they received from local traders for fruits weighing between 1 and 2 kg. Verbal contracts are in place between HPW and the two producer groups to supply organic pineapples. Farmers reported having developed a forcing and harvesting calendar in collaboration with HPW to maintain consistent supplies and to avoid gluts.

## 5.2 Mango

Some suggest that mango will be a next big tree crop in Ghana because investments in mango can be recovered sooner than in cocoa, oil palm, or citrus: five years compared to seven years for citrus, eight years for cocoa, and ten years for oil palm (Zakari 2012). Smallholders produce the bulk of mango grown in the country: they own about 76 percent of the total mango cultivated area, and most are members of mango producer organizations.

Though mango is grown in all parts of Ghana, commercial production is limited to Northern region, the transitional belt of Brong-Ahafo and Ashanti regions, the coastal savannah in Greater Accra region, and Eastern and Volta regions (Figure 6). Producers in the Eastern region who cultivate on more than 5,200 ha produce nearly one half of the country's mangoes (Zakari 2012).

**Figure 5.3: Mango production in Ghana, 2009/10**




Source: USAID/TIPCEE (Zakari 2012).

Although production and export of Ghana's mangoes lag behind that of Côte d'Ivoire, Burkina Faso, and Mali, Ghana has an advantage over other fresh mango exporters in West Africa because of its climate which provides two harvest seasons in the south of the country – a major season from April to July and a minor season from December to February.

The government has invested considerably to develop the mango sector. Between 2013 and 2017, GH¢ 52 million was spent by the Export Development and Investment Fund to establish 20,000 acres of mango plantations for export in the savannah areas of the Northern, Upper East, Upper West, Volta and Brong Ahafo regions. The project helped farmers to establish mango with the ultra high-density plantation technology to obtain high yields and superior quality fruit.

Mango production was commercialized in Wenchi district in the early 2000. The Wenchi Mango and Citrus Farmers' Cooperative was organized in 2003/2004, beginning with 40 members, some of whom did not yet have any trees. Now the cooperative has 154 members. When they began production, fruit flies severely damaged the fruit, but producers continued because they were able to sell in markets for fresh fruit which were not as demanding of quality as processing firms. Most smallholder producers in the region were out-growers of larger elite farmers. The larger farmers were required to work with outgrowers as a condition of their having accessed funds from the Export Trade Agricultural Investment Fund. Although mango farming was not intensive, it was profitable, and it attracted more growers.

The mango industry developed in northern Volta around 2002. Afforestation projects, such as the Forest Resource Use and Management project, introduced mango into the area in 1993 when they trained lead farmers and MoFA staff to establish nurseries for tree crops, including mango. By 2002, farmers had established mango farms in Kpando and Hohoe districts. While the Forest Resource Use and Management project ended in 2005, USAID's Trade and Investment Project for a Competitive Export Economy continued mango development. Between 2006 and 2009, the USAID project, with the West Africa Trade and Investment Hub, sought to increase the export competitiveness of mango produced in Ghana by training farmers in orchard management for effective control of pest and diseases in accordance with EurepGAP standards.

Mango is now produced in 14 of the 25 districts in the Volta region. About 270 farmers cultivate about 1,620 ha of land to produce annually about 12,500 mt. Keitt, Kent, Haden, Julie, Erwing, Palmer, and Springfield are the varieties they commonly cultivate. They usually fruit during a single season, which runs from May to August (Abu et al. 2011). Mango producers can make use of a US$ 2 million communal field fruit and vegetable pack house at Vakpo with a holding capacity of 30 mt. This structure was developed by the Export Marketing Quality and Awareness Project of MoFA with funding from the Africa Development Bank.

In 2008, USAID's Trade and Investment Project for a Competitive Export Economy organized a mango farmers' association in northern Volta region – the Afadjato Valley Co-operative Mango Farmers and Marketing Society, with members from Kpando, Hohoe and neighboring districts. With only a few farmers in mango production then, it was reportedly a profitable enterprise. However, this encouraged more plantings by both old producers and new entrants, resulting in production outstripping demand in subsequent years and eroding profits.

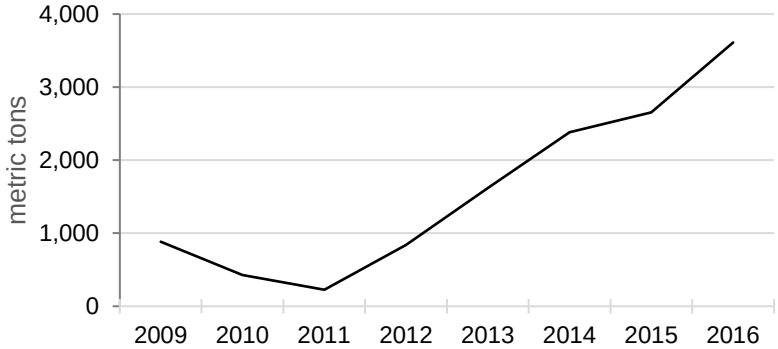
### *Performance*

Ghana produced an estimated 90,300 mt of mangoes on 12,200 ha in 2016, an increase from 40,000 mt on 6,900 ha in 2009. Productivity grew from 6.0 mt/ha in 2009 to about 7.4 mt/ha in 2016, but these yields still are lower than in neighboring competing countries, like Côte d'Ivoire, Burkina Faso, and Mali. Burkina Faso, for example, produced an estimated at 120,000 mt on 12,250 ha with a productivity of 9.8 mt/ha in 2008 (FAOSTAT 2017).

Ghana, however, is increasing its production of certified mangoes through the interventions of private enterprises, such as Blue Skies, Bormarts, and the Integrated Tamale Fruit Company, and those of several projects supported by bilateral and multilateral agencies. Large scale producers, nucleus farmers, and smallholders now produce mango that are GlobalGAP or organic certified. It is estimated that 21 percent of the mangoes produced in Ghana are certified. This has been achieved with the support of projects that have met in full or in part the costs of certification, supported the certification process, and trained farmers in the best agricultural practices required to meet certification.

Exports of mango from Ghana grew from 226 mt in 2011 to 3,611 mt in 2016 (Figure 5.4). The share of production exported also has nearly doubled, although from a small base, from 2.2 percent in 2009 to 4 percent in 2016 (FAOSTAT 2017).

**Figure 5.4: Total mango exports from Ghana, 2009 to 2016**




Source: Eurostats (EU Trade Help Desk).

### *Technology, yields, and profits*

Low plant population, absence of irrigation, poor nutrient management, inadequate control of fruit fly and bacterial black spot, and improper harvesting contribute to low productivity of mangoes under traditional practices. Smallholders typically plant about 100 trees per ha, whereas the ultra-high density plantation technology with new varieties and improved practices calls for 700 trees per ha. Producers can potentially increase yields by more than 200 percent by merely increasing the density of trees (Singh et al 2017). But growers do not have access to mango seedlings, as there are few nurseries. Moreover, farmers lack an adequate understanding of practices to control fruit flies and other mango pests and diseases, such as the Bacterial Black Spot, which significantly reduce the quality and quantity of mango produced. Between 20 and 50 percent of fruit is lost post-harvest because of fruit flies, diseases, and the lack of a cold chain along the long distances to markets – fruit is often transported unrefrigerated for up to 72 hours (Zakari 2012). Bush fires that ravage the area during the dry season also destroy mango farms.

### *Marketing*

**Domestic fresh market**: Fresh market traders buy mangoes at the farm gate. When they fail to come to the farm gate, producers carry what they can to nearby markets or leave the fruits unharvested. Traders usually visit farms to inspect the fruits before they ask the growers to harvest them into crates. The crates typically contains 40 to 45 fruits and weigh between 45 to 50 kg, although producers are paid only for 40 kg. A crate sold in the peak season of 2016 at GH¢ 30 and at GH¢ 50 at the end of the season. The Kent variety usually commands higher prices. A significant portion of mango produced in Volta region is not sold because production often outstrips demand from local traders. Thirteen mango farmers interviewed at Kpando reported that as much as 60 percent of their produce was not sold in some years.

Producers in the Brong Ahafo region, who also sell by 45 kg crates, indicate that they get better prices from traders than from exporters or processors. Traders, however, usually only buy small quantities. They sold mangoes to traders in 2016 at GH¢ 35 to GH¢ 45 per crate (or GH¢ 1.00 per kg). In 2017, they sold mangoes at GH¢ 1.40 per kg to traders.

The USAID West Africa Trade Investment Hub reports a trend of increasing nominal prices for mango in the region. Mango intended for local consumption sold at farm gate for GH¢ 0.55/kg in 2011, GH¢ 0.90/kg in 2014, and GH¢ 1.00/kg in 2016. Mangoes suitable for international markets sold at higher prices at farm gate: GH¢ 1.20/kg in 2013, GH¢ 1.40/kg in 2014, and GH¢ 1.80/kg in 2016. Higher quality fruit fetches 50 to 100 percent higher prices.

**Export market**: Ghana's mango exports mostly go to Europe through processors or fresh fruit exporters, prominent among whom are Blue Skies, Bomart, Integrated Tamale Fruit Company, Kingdom Premium Fruits, and HPW Fresh & Dry Ltd. These processors and exporters typically require fruit with GlobalGAP or organic certification. Some producers in the Volta region also reported selling their mangoes directly to buyers from Togo.

### *Project interventions*

MOAP intervened in both Brong-Ahafo and Volta regions. It began its efforts in Brong Ahafo region in 2007 by working with seven mango FBOs in Kintampo North and South, Nkoranza North and South, Atebubu-Amantin, Wenchi, Techiman, and Sunyani Districts. It began operations in Kpando area of Volta region in 2010, working with the Afadjato Valley Co-

operative Mango Farmers and Marketing Society. The project in both regions trained producers on improved production and post-harvest management practices, helped producers obtain certification for the produce, initiated new services that may help producers adopt improved practices, organized producer groups, and encouraged producers and processors to establish pre-harvest contracts.

The training on good agricultural practices included canopy management through selectively pruning branches to improve sunlight penetration, disease and pest control, and nutrient management. For effective nutrient management, the project recommended leaf and soil testing. The program trained selected literate farmers from participating FBOs – Ketu North and Norvisi Mango Farmers associations – on collecting leaf and soil samples, recommending that they make use of testing that the Kwame Nkrumah University of Science and Technology, College of Agriculture offers at a cost ranging from GH¢ 100 to GH¢ 200 per test.

Ten farmers from the Ketu North and Norvisi mango farmers associations reported that they had noticed improved fruiting following pruning and that training in controlling pests and diseases was also useful. Without knowing how to control pests and diseases, previously they just cut down or abandoned fields with infested fields. However, they complained that the chemicals recommended during training were not readily available in nearby markets. Three farmers who had their soils tested reported that the results helped them apply appropriate chemical fertilizers, but the remaining members of the two FBOs did not have their soils tested, citing cost as the main reason for not doing so.

Visits to some of the 550 FBO members who received training on good agricultural practices in Brong Ahafo showed that they were following the recommended practices. The farmers noted that the training was useful because mango production is relatively new them to them. One farmer in Kintampo claimed to have increased his mango acreage from 8 to 14 acres following the training because he was able to increase yields from 1.2 to 3.0 mt per acre by putting into practice what he had learned in the training. The value chain officer of Kintampo North district also indicated that nearly 1,500 additional acres has been brought under mango in recent years – the total mango area in the district now stood at a little over 3,000 acres.

MOAP supported the development of services that could benefit smallholders. In Volta region, the project supported the establishment of a service centre, the Own Management Technology Centre, to offer labor services to its members. The service centre recruited pruning, weeding, and harvesting crews to offer farm maintenance and mapping services to Volta Value Chain Cooperative Union members at a fee. MOAP supplied the Technology Centre with the required equipment: pruning saws, secateurs, chain saws, pole pruners, and knapsack sprayers. However, the study team did not see any evidence of this centre working as expected.

In addition to establishing the service centre that would provide skilled labor services, the project also groomed a team of experts who would become available to the centre for providing technical services to members. The group, which was 17 strong in 2015, included experts in agronomy, group/organization development, business planning and proposal development, and GIS/mapping, among others. MOAP used them as consultants in many of its training program, with the expectation that they would be available to the service centre after the completion of project. There is little evidence that the service centre was able to

draw upon these experts or that it was demanded by its members after the winding up of the MOAP project.

In Brong-Ahafo, MOAP and the value chain committees recruited labor gangs to offer pruning, spraying and harvesting services to mango producers. The information that the study team received suggests that these enterprises never took off. Some farmers and the regional value chain officers noted that those who were trained were all producers. Consequently, they did not provide services to other mango farmers because they put all their attention into undertaking timely operations on their own trees.

MOAP also tried to spin off small businesses that could support the sector. After taking over a nursery that it inherited from an earlier program, MOAP trained MoAF staff and some lead farmers on the production and management of mango seedlings. It also provided polybags for the seedlings. Two lead farmers, who were trained by MOAP, were still producing and selling seedlings to other farmers: when the study team visited them, they had 8,470 mango rootstocks and 3,654 papaya seedlings available for sale to farmers.

In Brong-Ahafo, MOAP trained 20 nursery operators in the fundamentals of seedling production: soil mixing and bagging, seed selection, de-husking and treatment, disease detection and control, identification of varieties, pruning for scions, scion selection, treatment and grafting, shading, nursery sanitation, sterilization of tools, scouting for healthy and disease-free seedlings, tagging, nursery management and operation, and record keeping. It certified eight of them to produce seedlings for mango farmers. The study team learnt that at least one of them is still producing seedlings in Kintampo.

MOAP also helped many growers have their produce certified. Fifteen out of the 23 members of the Afadjato Valley Mango Producers Association had been helped by an earlier project to obtain certification, but MOAP extended this relationship by paying certification fees for 2014/2015. Six of the farmers renewed their certification in 2016. The GlobalGAP certified farmers sell their produce to BlueSkies and Kingdom Fruits.

Member of other FBOs, however, have had difficulties in finding market for their GlobalGAP certified fruits and have abandoned certification altogether. Norvisi Mango Farmers' Association in Ketu North district is one such FBO where four farmers with 66 acres of mango trees were certified in 2015, but have since abandoned certification because they could not find a market for their certified fruits.

In Brong-Ahafo, MOAP organized trainings in certification standards and internal auditing for some producers and agricultural extension agents. Two FBOs in Techiman and Kintampo were GlobalGAP group certified. Two farmers in Techiman opted for individual certification. MOAP paid the fees for certification for both farmers between 2009 and 2012. The farmers, however, have abandoned certification because they failed to get any premium in prices for their certified produce from local traders and processors.

The project also invested in organizing farmers. It organized seven district mango associations comprising 550 growers in districts such as in Kintampo North and South where mango producers were not organized. One such organization, Kintampo Mango Farmers Association, won the Best Regional Farmer Association on three occasions during the celebration of the National Farmers Day.

MOAP also encouraged committees to set up an association to collectively market mangoes. The Commercial Mango Growers' Association, comprising of 25 producers, emerged from these efforts in 2010. MOAP trained them in collective marketing and brought in consultants to assist the groups. In 2011, the association negotiated the sale of 197 tons of mango to fruit processing companies in Ghana – this was projected to reach 2,000 tons by 2017. The association sold mangoes worth GH¢ 102,000 in 2011, and earned commissions on sales of GH¢ 5,500. However, the association has since collapsed because some members who did not agree to the association earning a commission began side-selling the mangoes they produced. Some former members allege that mango processors who were buying from the association sowed seeds of discord among members and encouraged the members to sell directly to them to avoid paying a commission to the association.

As part of the efforts to link producers with buyers, MOAP invited Evelyn Farms, a mango buyer, for discussion with farmers. Evelyn Farms verbally agreed to buy 30 percent of the annual production of the Volta Value Chain Cooperative Union. However, producers in the cooperative union did not take up the offer because Evelyn Farms offered GH¢ 0.60 per kg, while local traders were buying at GH¢ 0.80 to GH¢ 1.00 per large fruit. Some of the major processors, including Bomart, Kingdom Fruits, HPW, and Blue Skies, do buy from members of the cooperative union, but individually, not as a group. They offer prices in the range of GH¢ 1.00/kg to GH¢ 1.40/kg for both conventional and GlobalGAP certified mangoes.

## 5.3 Citrus

Citrus, which is planted over a much larger area than any other horticultural crop in Ghana, was produced by 20,000 farmers in 2015 as estimated by the German development agency, GIZ, which has been active in the citrus industry in Ghana for several years. The crop also earns foreign exchange for the country from exports of fresh fruits to neighboring countries, such as Côte d'Ivoire, Burkina Faso, and Togo (Asare-Bediako et al. 2013). Citrus cultivated in the country includes sweet orange, tangerine, lemons, and lime (Adjapong 2014). The most commonly-grown rootstock is rough lemon and the most common scion is Valencia sweet orange (Dewdney and Timmer 2009).

Citrus production is scattered throughout Central, Eastern, Ashanti, and Brong Ahafo regions and parts of Volta region. However, production is concentrated in Central region with 69 percent of the total cultivated area. Citrus trees typically fruit twice a year – in a major season from August to November and in a minor season from April to June. According to smallholder citrus producers in Central region, citrus trees begin yielding 3 to 4 years after planting.

Citrus is cultivated in 15 districts in Central Region by 12,800 farmers cultivating on about 16,900 hectares, producing an estimated 158,800 mt. While Valencia sweet orange is the most common variety, other varieties include Asuansi (local variety), Late Valencia, Mediterranean Sweet, Tangerine, and Red Blood Orange.

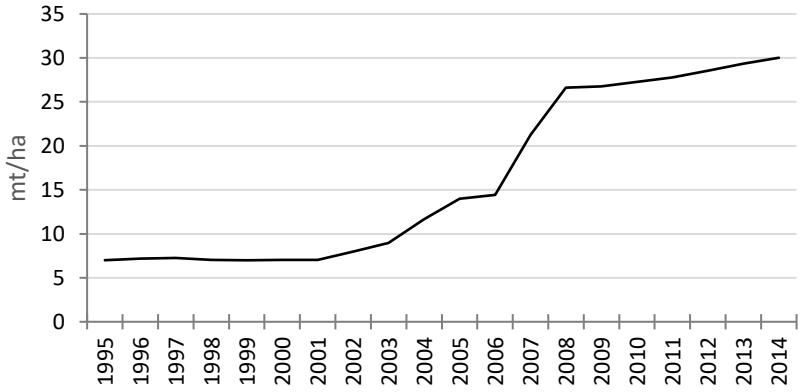
Government and donors programs have intervened to improve citrus production, focusing on training producers how to achieve optimal plant population; prune trees; maintain soil fertility; control pests and diseases, fruit flies in particular; handle fruit post-harvest; and market them. USAID, which has been involved in the citrus industry since 1996, has supported the industry through the supply of seedlings, training of producers, and marketing. In 2016, USAID's West Africa Trade and Investment Hub helped the major citrus processor,

Pinora, to enter the USA market. The Dutch-funded Toward Sustainable Clusters in Agribusiness through Learning in Entrepreneurship project, which started in June 2012, trained nearly 4,000 smallholder producers and worked with a large processor, Fruittiland, which has a daily extraction capacity of 1,000 mt, to obtain Fairtrade certification to export juice concentrate to the European market and conventional juice concentrate to the West Africa market. The Israeli Agency for International Development Cooperation, in partnership with GIZ and MoFA, organized in 2010 a series of workshops to transfer Israel citrus technologies to Ghana.

### *Performance*

Citrus production in Ghana has expanded significantly in the last two decades. Production increased from 225,000 mt from over 32,000 ha in 1995 to an estimated 737,000 mt from 24,500 ha in 2014, While the area under citrus declined by 7,600 ha, production almost tripled. Since 2005 citrus production has been growing at an average annual growth rate of 4.6 percent. Unlike other crops, citrus production is driven by productivity growth. The FAO estimates that citrus yields grew from 7 mt/ha to 30 mt/ha between 1995 and 2014 (Figure 5.5) (FAOSTAT 2017). However, the information collected in this study through interactions with actors in the citrus value chain do not support the dramatic increases in yields of citrus suggested by the MoFA and FAO data.

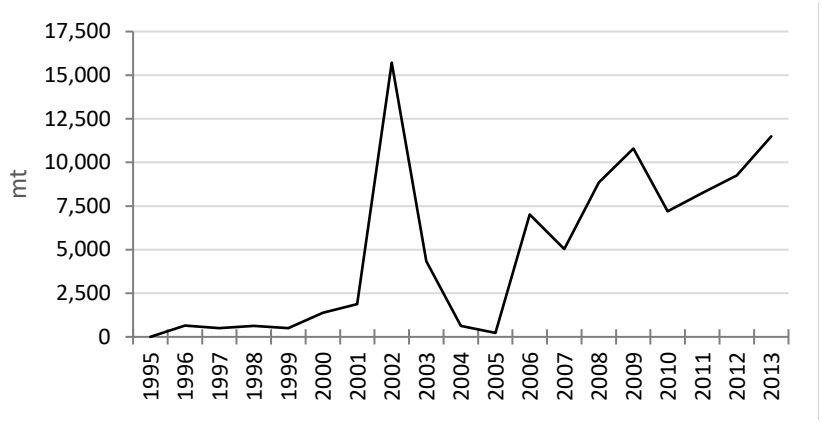
**Figure 5.5: Citrus yields in Ghana, 1995 to 2014**




Source: FAOSTAT 2017

Citrus fruits commonly are consumed locally. Sweet orange, lemon, and lime are exported fresh to neighboring countries, such as Cote d'Ivoire, Burkina Faso and Togo. As noted, a USAID project supported a processing firm to export citrus to the US under AGOA, the African Growth and Opportunity Act. According to FAOSTAT data, Ghana's citrus export represents just about one percent of the total citrus production. The most recent data available for both production and export are those of 2013. Total production in year 2013 was 709,500 mt, while total citrus exports were only 11,485 mt (Figure 5.6). Official export data are likely to miss informal exports to neighboring countries.

**Figure 5.6: Total citrus exports from Ghana, 1995 to 2013**




Source: FAOSTAT 2017.

### *Technology, yields, and profits*

A survey in 2014 by the Central region office of MoFA of citrus producers in three districts in Central region – Assin North Municipality, Assin South, and Abura-Asebu-Kwamankese – found that 79 percent of respondents still rely on 'sharp' cutlasses for weeding and pruning their citrus. Nearly 60 percent of respondents did not control fruit flies on their farms, and nearly all farmers did not apply any fertilizer, whether organic or inorganic, to their trees. They harvested the fruit by shaking the branches to collect them on the ground or used a forked stick to dislodge them. Producers typically heap the fruit either on bare ground or on palm fronds, leaving them exposed to natural forces until a buyer arrives.

Farmer reported low yields, with 90 percent reporting less than 5 mt per acre, which is less than 100 fruit per tree per season. Diseases and pests cause considerable damage: over 50 percent of the fruit can drop due to angular leaf disease, citrus black spot, and fruit flies (Brentu et al. 2013). Producers harvest fruits before they mature to avoid fruit fly infestation, but such fruit has unacceptably low levels of sugar for processing. Traditionally produced citrus fruits are not suitable for processing because of their low sugar content. Their brix levels could be as low as 6 percent, while desired levels for processing are at least 10 percent.

Good agricultural practices for citrus include proper site selection, appropriate plant population (110 trees per acre), the application of organic and inorganic fertilizers, regular pruning using motorized or mechanical pruning saws or secateurs, regular weed control, spraying of insecticides and fungicides, controlling fruit flies using pheromone traps or protein baits, practicing farm sanitation, including picking and burying dropped fruits, and harvesting using clippers and sacks to reduce cuts and bruises from dropping fruit to the ground. According to officials of MoFA and GIZ, producers can expect to double their yields by following these practices – from 100 fruits per tree to over 220.

While costs double from nearly GH¢ 750 per acre to GH¢ 1,500 per acre when recommended practices are adopted, yields also double. Under traditional practices without effective pest control, fruit flies damage about 40 percent of fruits if they are left on the trees for the ripening required to achieve the sugar levels demanded by processors. Producers, however, can harvest all the fruit before they are fully ripened for sale to consumers. Back of the envelope estimates suggest that, even if farmers adopt improved practices, they may not be able to generate profits by selling to consumers. However, if producers are able to receive

higher prices from processors, even if they produce with only traditional practices, citrus production could be profitable.

The study team learned of growers abandoning their orange groves, which gives some credence to the data that suggests a declining trend in the area under citrus in Ghana. According to the Assin Citrus Growers and Marketing Association, over 5,000 acres of citrus farms have been abandoned within Assin North and Assin South districts alone. While farmers were abandoning their orchards, many processors, such as Pinora and Fruittiland, reported not being able to source sufficient citrus for their processing needs.

### *Marketing*

**Domestic fresh market**: As with other fruit crops, traders buy oranges at the farm gate. Farmers sort the fruit into heaps and price them by 100 fruit units, a unit which varies in quantity by fruit size. Farmers in Central region report that large sized fruit sorted into 6 heaps of 24 fruits each – a total of 144 fruits – are treated as a 100 fruit unit. Medium sized fruit are sorted into 8 heaps of 22 fruits – 176 fruits in total. Traders brought a 100 fruit unit – 144 or 176 depending on fruit size – at GH¢ 7.00 in 2016. Traders may demand smaller fruit for free. The price of 100 fruit may fall to between GH¢ 3.00 and GH¢ 4.00 at the peak of the season. Both traders and producers stated that traders take more fruits than they pay for as compensation for the losses they incur during transit to markets. Producers complained that they are not able to sell all that they produce even under these obviously unfavorable terms. Farmers in Ajumako reported that about 50 percent of the fruit in the major season and up to 90 percent in the minor season are not harvested or, if harvested, left to rot because traders fail to collect the fruit or come late. Producers rely on traders to dispose of their harvest because they are able to sell only a small quantity of fresh fruit in nearby markets.

Retailers sell citrus fruit in smaller heaps of 5 or 10 or sell them individually peeled. Citrus is also sold by the bowl, basin, or bucket in which the fruit is displayed. In Accra, citrus in heaps or in containers are sold by retailers in the central markets for between GH¢ 2.00 and GH¢ 10.00, depending on the season. However, in producing areas, a heap of ten or more fruit is usually sold for GH¢ 1.00 or less (fieldwork 2016).

Processors typically buy citrus by weight. In 2016, farmers in Ajumako in Central region reported that Pinora purchased their fruits at GH¢ 288 per mt. The processors typically require fruits with a higher brix or sugar level of at least 10 percent. This means that the fruit should stay on the tree longer, requiring farmers to make extra investments to control fruit flies and to test their fruits prior to harvesting. This often is not done by smallholder citrus producers, so often their fruit is rejected by the processors.

**Export market**: Neighboring West African countries are the main export markets for fresh citrus. Sweet orange, lemon, and lime are the most exported types of fresh citrus. Traders from neighboring countries typically travel into Ghana to buy fruit directly from farmers. Ghanaian traders also will buy citrus from Ghanaian producers for sale in these neighboring markets. Citrus farmers in Central region report that traders from Cote d'Ivoire usually operate through agents who arrange the transaction for them by visiting citrus producing communities to inspect farms and choose which farmers' fruit to buy. These fresh exports are fraught with many difficulties. Farmers reported that traders have absconded with their fruit without payment, since the fruit is sometimes sold on credit due to lack of market.

### *Project interventions*

According to MoFA's 2013 Impact Assessment Report on the MOAP project, MOAP trained 2,000 members of the Citrus Growers and Marketing Association and about 1,900 members of the Central Regional Organic Citrus Farmers Association on improved practices of citrus cultivation. Some farmers interviewed for this study in Ajumako noted that they had attended these day-long trainings more than once.

The MoFA assessment revealed that, though over 90 percent of the respondents in the three districts where the assessment was carried out indicated that they had participated in trainings on good agricultural practices, less than 10 percent of them had adopted any of the recommended practices. Through interactions with 23 citrus producers at Denkyira, Essiam, and Kwasi Gyan no.2 in Ajumako/Enyan/Essiam district and five producers in Assin Fosu, the study team learned about the factors that influence adoption of recommended practices. The thoughts of these citrus producers on the adoption of recommended practices were as follows:

- **Removing weeds**: Farmers who had neglected or abandoned their fields reported that training to be useful to rejuvenate their fields. But they said they could not afford to purchase the motorized equipment that they were trained to use. They also noted that abandoned farms require manual clearing prior to using motorized equipment. Manual clearing may cost as much as GH¢ 200 per acre.

- **Controlling major pests and diseases**: The training received by citrus producers recommended collecting dropped fruit fly infested fruits in polythene bags and leaving the bags in the sun for a couple of days or burying them. Another recommendation was to place pheromone-based fruit fly traps in the orchards to trap the male fruit flies. Producers were expected to buy the traps through their FBO from a dealer in Accra, since no traders in the region supplied them. Some of the farmers felt that the eight traps they were recommended to set up in an acre with 110 citrus trees was a big expense for them –a box of five traps with 10 pheromones then sold at GH¢ 80, while a box of 20 traps with 50 pheromones sold at GH¢ 200. Because many producers stated that they could not afford to buy commercially available traps, the project taught them how to make traps using methyl eugenol as the attractant. They were taught to apply a mixture of methyl eugenol and insecticide to a piece of cotton or foam and place it in an empty plastic bottle with two small openings that allow the male fruit fly to enter. However, both the methyl eugenol and insecticide were not available locally, but needed to be sourced from Accra. Nonetheless, some success was achieved – the study team observed homemade traps hanging from trees when it visited the tree plots of about a dozen citrus producers.

- **Pruning**: The training recommended farmers who had previously removed only damaged, diseased, or dead branches to also prune overcrowded canopies to improve aeration and sunlight penetration. All 23 farmers interviewed indicated that they have already adopted or were inclined to do so, but complained of the high cost of the special pruners they were required to buy because citrus trees are hardwoods.

- **Harvesting and post-harvest handling practices**: Most producers harvested their fruit early before it was fully ripe to avoid fruit fly infestation, which could potentially damage more than 50 percent of the fruit on the trees. In addition to using fruit fly

traps, MOAP advised them to adopt harvesting practices that would reduce fruit damage: harvesting fruit using bags that could be lowered gently to the ground and spreading harvested fruit under shade so that they remain aerated and moist. The 23 producers from Ajumako district and the 5 from Assin Fosu who spoke with the study team reported that they adopted these recommendations. The trainers also advised them to check the sugar levels before harvesting fruit, but the farmers said that they did not have the refractometers needed, and they had requested Pinora Ltd. to send field officers to check the sugar levels in their fruit.

In addition to providing training on good production practices, MOAP trained more than 2,000 citrus farmers on better business practices through “farmer business schools”. The trainers gave them farm diaries and business planning books. About 30 farmers who met with the study team explained that they could not make use of the diaries and books because they were illiterate. The literate among them also thought it was too time consuming and tedious to maintain up-to-date records on their citrus production. A few, however, kept some records of when various farm operations were done, the cost of the operations, and the quantities of fruit harvested. Most of the trainees who interacted with the team said that, even though they do not maintain records, they make mental calculations that are required for good management. Three of them also noted that they do not have time to keep detailed records.

Twelve processors participated in a training in business development. The trainers used a manual that covered aspects of understanding markets, developing a supply chain for fruit processing, fruit drying and fruit juice production principles and practices, hygiene and control, and obtaining certification. Two small scale processors, FarmFresh Ltd and Keltrice Enterprise in Cape Coast and Agona Swedru, respectively, indicated that they had changed the way they handle fruit and their hygiene practices, as a result of which they have noticed that the quality and shelf life of their products has improved. Large-scale processors, such as Pinora and Fruittiland, also have received training in hazard analysis and critical control points. The representatives of both companies reported at the regional value chain committee meetings in 2016 that the training was useful to them.

Partnering with Fruittiland, the MOAP project established a service centre to offer timely pruning, weeding, and harvesting services to farmers. The project agreed to share the costs of establishing the centre equally. MOAP donated equipment to the service centre,[2] in addition to meeting one half of the core staff costs in the first year. Fruittiland was expected to provide land, offices, and furnishings, and to pay the utilities, working capital, and the remaining 50 percent of the staff costs in the first year.

The service centre had not yet started its operations when the study team visited the site. Also, Fruittiland, the processing company, had not processed any fruit in the area since 2015. It was expecting to recommence fruit processing in April 2017. The study team later learned that producers had not demanded the service center, so it is unclear what motivated its creation. Additionally, the study team learned that Fruittiland was proposing to lease-in abandoned citrus farms by paying farmers GH¢ 350 per acre per season.

[2] These include: two tractors, a desktop computer and accessories, a motor bike, 12 brush cutters, 8 motorized pruners, 5 manual pruners, 6 mist blowers, 6 knapsack sprayers, 6 office fans, 6 air conditioners, a projector, and a whiteboard. Boots, gloves, goggles, wheelbarrows, shovels, and overalls were also to be supplied.

Interactions through the MOAP value chain committees led to the beginnings of some value chain relationships. The study team does not have information on whether the relationships were sustained, however. Pinora, a processing firm, entered into a verbal agreement with the Citrus Growers and Marketing Association, an FBO that has 297 growers cultivating citrus on about 1,200 acres in 10 communities in Ajumako district, to buy their produce. Borthapreku, an organic citrus peel drying company, reported that it increased the number of producers from whom it procures from 4 to 22 by networking with producers at value chain committee meetings. The study team does not have information on whether the relationships were sustained after the project ended, however.

# 6. ANALYSIS

The theory of change employed by the two value chain projects – the Northern Rural Growth Project (NRGP), which ran from 2007 to 2016, and the Market Oriented Agricultural Project (MOAP), implemented from 2005 to 2016 – in making the interventions they did was presented earlier in section 3 of this report. Thereafter, evidence gathered on immediate outcomes of the projects was presented. Here we assess this evidence to understand the reasons behind the outcomes and to offer some guidance for making interventions to strengthen agricultural commodity value chains.

The analysis relates to understanding the outcomes of two broad sets of interventions. The first set are those implemented to facilitate interaction among actors in order to encourage them to innovate, including by entering into mutually beneficial relationships. The second set of interventions were to assist value chain actors in improving their operations, including helping them to offer new services – all of which can be characterized as private sector development. The second set of interventions, even when targeted at downstream actors in the value chain, also were expected to benefit smallholder producers upstream.

While both projects expected value chain actors to benefit from increased interactions between actors, they expected marginally different outcomes. NRGP anticipated that increased interactions would persuade formal financial institutions to lend more to producers; producers and buyers would enter into pre-harvest agreements that improved market access for producers; and producers would adopt improved farming practices to increase productivity and quality – thus earning higher incomes. Additionally, NRGP expected that producers would increasingly use cashless transactions in their business dealings with suppliers and traders with a bank as the intermediary. It was expected that this would, in turn, lead to more effective use of borrowed funds and improved loan repayment. MOAP, too, expected increased lending by banks and increased sales through pre-harvest agreements, but they also expected to use value chain committees to better understand the needs of value chain actors and as mechanisms to deliver the services demanded.

Both projects intervened to strengthen the operations of value chain actors, usually by building capacity; the bulk of the efforts of the projects went into improving producers' understanding of improved practices. MOAP also trained and advised small and large processors on improved business practices. Both piloted training of producers in partnership with downstream actors. Additionally, MOAP helped downstream actors and producer organizations to initiate commercial services that would facilitate and potentially encourage producers to adopt improved agricultural practices.

## 6.1 Limited innovation

Innovations in production or marketing – using new ideas, new technologies, or new ways of doing things – open opportunities for value chain actors to enter into mutually beneficial relationships. A value chain that is made more efficient through innovations benefits all by providing greater commodity volumes, better quality, lower costs, or less waste (Birachi et al. 2013). Actors in a value chain that remains zero-sum, in the sense that one actor can benefit from any changes only at the expense of the other, see few opportunities to craft mutually beneficial or win-win relations. Maize value chain participants in NRGP committees faced zero-sum situations because their interests conflicted in the absence of innovations to significantly change how the maize value chain functioned. For example, producers expected higher-than-market prices, while traders expected to buy maize in larger quantities or at below-market prices. Without larger volumes, improved quality, or reduced costs on the supply side or cost-reducing developments or increased demand on the demand side, neither party had anything to offer to the other party to encourage them to change their position. With significant productivity or quality improvements, producers might have been content selling larger quantities at prevailing prices, thus making pre-harvest agreements more likely.

The limited potential of technological change in commodity production to engender credit-led productivity growth did not go unnoticed by the NRGP implementation team. Following a visit to Sandema village, where farmers were using improved maize varieties, the consultants who trained the bank staff noted that the farmers were obtaining “remarkably better yields” than similar farmers in other communities. They emphasized that “the farmers that maximize yields and minimize unit costs of production are more profitable, less risky, and more credit worthy”. They also observed, in contrast, that the farmers that they interacted with in other communities did not have access to improved seeds or extension agents (Inspired International 2012).

Producers and buyers – mainly processors – in MOAP committees took steps to enter into pre-harvest agreements in cases where the producer had innovated to increase productivity or improve quality. Where producers had begun to produce certified products or improved quality, buyers sought relationships. However, it is not clear whether the relationships endured. Fruittiland, a processor, for example, supplied plastic mulch to pineapple producers who had begun to adopt improved practices. But producers and buyers in many instances failed to enter into agreements that were focused only on price, as producers invariably found that the prices buyers offered to be unacceptably low and, in many cases, less than what they could get in spot consumer markets.

Value chain development projects that emphasize marketing over production urge producers to form pre-harvest contracts. A pamphlet developed for maize cultivators by the USAID’s Agricultural Development and Value Chain Enhancement project, for example, suggests that they should not plant a crop before they know who they will be selling to. While traders and producers enter into “grain for inputs or cash” type agreements, contracts are rare. From a technical standpoint, contract farming arrangements are not suitable for grain, except in the case of seed, organic grain, or niche grain products for exports (Minot and Sawyer 2016).

## 6.2 Platforms and innovation

Value chain coordination and innovation platforms are likely to generate effective outcomes when they are anchored around the dissemination of technologies that have the potential to make the chain more efficient. The NRGP value chain committees aimed to scale up institutional innovations – new ways to process credit applications and recover credit and to foster relationships among producers, traders, and buyers. However, these innovations were of doubtful benefit without technologies that significantly improved production or post-production processes. The only marginally superior production technology that the committees disseminated, as argued, may even have prevented the scaling up of institutional innovations.

The projects did not set up the value chain committees to be innovation platforms in the sense of encouraging the participants to collectively examine their problems and opportunities and to seek out solutions. The study did not examine in detail what transpired in the committees, but available information suggests that NRGP committees sought predetermined outcomes: increased lending, cashless transactions, pre-harvest contracts, and more favorable agreements with services providers. MOAP, in contrast, may have organized value chain committees in a way that permitted them to be more innovative. They provided opportunities for participants to articulate their problems and needs, and the project worked to solve them. MOAP sought to explicitly address production and processing problems faced by value chain agents with technological solutions. The project invested in technology development as well. For example; in collaboration with the HPW fruit exporting firm, MOAP identified mango germplasm that could produce twice per year under the ecological conditions of northern Volta region.

## 6.3 Building on existing institutions

Another factor to consider in building new relationships among value chain actors is to see if similar relationships already exist. Many value chain actors have on-going relationships; they are not merely engaged in arm's-length exchanges. Market exchanges in Africa are usually personalized (Fafchamps 2004), which is supported by the evidence gathered by this study. Traders support production. Processors, too, work with selected group of producers to obtain their supplies. Pineapple exporters have and repeatedly use the same out-growers from season to season. Projects can build on social capital that already exists. USAID's Agricultural Development and Value Chain Enhancement project, for example, reached smallholders through aggregators, who were already working with the smallholders as out-growers.

Contract farming also is not new to Ghana. Schemes such as the maize production package of the Masara N'Arziki Farmers Association in northern Ghana have caught the attention of policy makers as effective instruments to promote technology adoption among smallholders. However, scaling them up has proven difficult. Farmers have been dropping out of the Masara N'Arziki scheme at usually high rates. A recent study suggests that, although producers can increase yields with the use of improved seeds and higher applications of fertilizers, profits are not changed significantly because of the implicit high rates of interest producers pay when they have to repay in grain the cost of the production package at predetermined prices (Lambrecht and Ragasa 2016).

Could the outcomes have been different if the value chain committees were guided differently? Did the committees adequately understand their role, and were the committees

helped to function in a way that would lead them to generate new ideas and practices? Platform members need to be guided because they may not naturally see the benefits of value chain actors sharing and cooperating, and they may need to be guided by a neutral facilitator, because trust building is a slow process and win-win benefits are not always apparent and are not immediate (Birachi et al. 2013; Mitchell, Keane, and Coles 2009; Bijman and Wollni 2009). Additionally, these committees also may need to be supported over extended periods because significant changes can be achieved only through a series of small changes that build on each other (Mayanja et al. 2012).

Perceptions of the purpose of committees that were held by the organizers of the value chain committees and many of the actors in the value chains concerned – that they were designed to address producer concerns rather than to serve as collective institutions for the value chain as a whole – could also have prevented them from being innovation platforms. An NRGP document states that: “The committees were expected to assist smallholder farmers (members of FBOs) by linking them with other actors.” Many producer groups also saw their participation in their value chain committee as no more than an opportunity to negotiate better terms for themselves with all other stakeholders in the value chain.

## 6.4 Private sector development

Private sector development interventions of the two projects involved training and advising individual producers and downstream enterprises to improve their operations. They also made efforts to help producer organizations and downstream actors to offer paid farm management services that the projects thought would be demanded by producers in order to enable them to adopt some of the production practices recommended under the projects.

Both projects directly assisted individual actors primarily through training and advice, with producers being the primary beneficiaries of the training. Unlike in traditional extension programs in which the focus is technology dissemination, producers were also trained to farm as a business rather than just to subsist. This study has not measured the extent to which producers adopted the technologies to which they were introduced. But some impressions emerge from interactions by the study team with selected group of producers. A significant portion of maize producers, perhaps as much as one-half, now apply fertilizers, primarily to maintain yields. But the use of improved maize varieties, which can yield significantly more, is limited. Farmers suggest that the risk of unfavorable weather conditions as one factors that discourages them from making significant investments in improved maize production technologies.

A much smaller portion of producers in fruit value chains adopted the technologies disseminated by MOAP – although they benefitted significantly. These producers seem to be constrained by two factors: some of the technologies require significant out of pocket expenses, and producers are concerned that they will be unable to sell their increased production or to obtain a price premium for the increased quality in their fruit. For example, producers who produced certified fruits discontinued doing so when they failed to attract a price margin for higher quality.

The impression that emerges from the information obtained through this study is as follows:

1) Technology supplied by NRGP was a limitation to developing the chain, and the technology disseminated was well known to producers.

2) MOAP, on the other hand, disseminated technologies that could significantly improve productivity and quality in the fruit value chains, but producers were constrained by not having sufficient resources to access the technologies and manage associated marketing risks.

MOAP's efforts to initiate commercial farm services to increase local access by farmers to production equipment that they do not usually own or to skills that farmers may not possess failed because farmers did not demand these services, according to available information. Looking more broadly at private agricultural service provision in Ghana may suggest some reasons for these failures. Private enterprises will emerge to offer the services demanded if it is technically viable to do so and a profit can be made. Supply of mechanization – plowing, harvesting, or maize shelling, for example – offers a good example. While the government has set up mechanization centers across Ghana, private tractor owners supply the bulk of the agricultural mechanization services in the country (Chapoto et al 2014). Why then is there a shortage of tractors in northern districts? It may have something to do with the viability of providing plowing only services in these districts. As the demand for tractors services is primarily for plowing – except for rice producers who also prefer to harvest rice mechanically – successful providers move from one agro-climatic zone to another to extend the season over which they provide services (Houssou, Diao and Kolavalli 2014).

## 6.5 What to do?

How, where, and when might it be appropriate to intervene in value chains, particularly to benefit smallholders? This question can be broken into a series of questions: How to select value chains to intervene in? Where in selected value chains are interventions needed and which interventions would be most beneficial? And, most important, how to intervene? The last question goes to the heart of development effectiveness. The lessons from this study do not comprehensively answer these questions, but available evidence from Ghana is organized below around these questions.

The projects examined in this study selected value chains that would benefit smallholders. NRGP states that it selected its target value chains based on their market potential, financial viability, pro-poor characteristics, women's preferences, and their capacity to meet local and international demand. The two primary concerns of NRGP in selecting the value chains were the potential for development and whether the poor could benefit from their development. MOAP sought to upgrade smallholders to participate in the more remunerative processing or export components of horticultural value chains. However, selectively investing in some value chains, as opposed to making horizontal investments that can benefit all value chains, runs the risk of commodity-specific failure and a misallocation of resources. The two projects avoided such risks by selecting dominant value chains.

Where to intervene in value chains? Where there might be coordination and market failures? A review of four value chains in Ghana – cocoa, rice, tomato and pineapple – suggested that interventions may be most required upstream in the production stage (Kolavalli 2019). Observations from the two projects examined here support this finding. In maize, for example, making significant improvements in the value chain lay in improving productivity and quality. While producers primarily look for higher prices, instances of unmet demand for larger quantities of higher quality maize are common in Ghana. In the fruit value chains examined, there was unmet demand from private processors and exporters. Their

investments were subject to public provision of physical and regulatory infrastructure. Access to credit and land rights might also be a constraint to investments, but raw material availability usually attracts private investments. And many of the downstream enterprises reach upstream to support production to ensure adequate supplies of raw material for their own operations.

But what aspect of production might need intervention? The supply of improved varieties and associated production packages appears to be one. The absence of improved maize varieties in the technology package offered by NRGP appears to have limited growth in the productivity of beneficiary producers. Supply of planting material and improved productivity technologies was also key to the fruit crops studied. The private sector often is capable of introducing new technologies – as some companies have introduced improved seeds in Ghana – but it needs to be facilitated by public research and regulatory capacity.

Quality is another issue that requires attention. The role quality played in giving smallholder access to niche markets was evident in the fruit value chains. Improving production practices, developing suitable infrastructure for post-harvest practices that maintain fruit quality, and offering incentives to producers are keys to achieving higher quality. In the value chains examined, quality has been improved through training and support for obtaining certification. And the premium from access to export markets has offered sufficient incentives for adoption in many cases. Under some situations – as the ban on Ghana's vegetable required – interventions may be required to introduce regulation, while also assisting the commodity value chain to self-regulate.

But how to intervene? It depends on what needs to be achieved. Bringing together actors in a coordination and innovation platform may be an obvious first step in developing value chains. This study offers some additional lessons.

- One must begin with clear objectives as to what is to be achieved through platforms. Merely bringing actors together may not lead to transformational changes, including increased level of trust among actors. And trust alone may be inadequate to lead to institutional innovations. Moreover, third party support over extended periods may be necessary.

- Facilitating contractual relationships between producers and buyers is often thought to be a convenient way to bring smallholders into remunerative value chains. But in doing so, it is necessary to consider whether such contracts already exist and understand why they may not be more prevalent. Recent research suggests that they may not be consistently beneficial to producers. Understanding how and why they fail is necessary to identify measures that a third party can take to scale them up.

- The prospect of a bigger cake gives participants incentives to work with each other to benefit from the change. However, platforms themselves may not seek out technologies unless they are guided to. There is need to think about how better technologies will come into the picture.

Many of the coordination problems – such as processers not having adequate supplies of acceptable raw material even as producers cannot sell what they produce – can be solved working with private companies or associations.

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# APPENDICES

## Appendix 1: District Value Chain Committees involved in study

### Appendix Table 1: District Value Chain Committee members interviewed, by type

| | District Value Chain Committee | Committee members interviewed, total | Farmer-based organi-zations | Input dealers | Traders or aggregators | Tractor or bullock service providers | Banks or other financial institutions | Nucleus farmers | Ministry of Food and Agriculture staff | Others |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Bawku West | 6 | 2 | 2 | 1 | - | 1 | - | 2 | DoC |
| 2 | Builsa North | 7 | 3 | 1 | 2 | - | 1 | - | 1 | DoC |
| 3 | Garu-Tempane | 8 | 4 | 2 | 2 | 1 | 1 | - | 1 | PAS |
| 4 | Kasena-Nankana West | 6 | 5 | 2 | 1 | 1 | 1 | 1 | 1 | NBSSI |
| 5 | Central Gonja | 6 | 2 | 1 | 6 | 2 | - | - | 1 | - |
| 6 | Chereponi | 6 | 2 | 2 | 2 | 1 | - | - | 1 | - |
| 7 | East Mamprusi | 5 | 3 | 1 | 1 | 1 | 1 | 1 | - | NBSSI |
| 8 | Kpandai | 7 | 2 | 1 | 1 | 2 | - | - | 1 | GPRTU |
| 9 | Kumbungu | 10 | 1 | 1 | 1 | 1 | - | - | 1 | - |
| 10 | Sawla-Tuna-Kalba | 12 | 3 | 2 | 4 | 1 | - | 3 | 2 | NBSSI |
| 11 | Yendi | 6 | 1 | 2 | 1 | 1 | 1 | - | 1 | - |
| 12 | Lawra | 21 | 3 | 1 | 1 | 1 | 1 | - | 4 | - |
| 13 | Sissala West | 8 | 2 | 1 | 1 | 1 | 1 | - | 1 | |
| 14 | Pru | 6 | 2 | 3 | 2 | 1 | 2 | - | - | NBSSI |
| 15 | Sene West | 12 | 3 | 1 | 1 | 1 | 2 | - | 1 | - |
| | **Total** | **126** | **38** | **23** | **27** | **15** | **12** | **5** | **18** | **8** |

Source: Fieldwork 2016-2017.
Note: DoC = Department of Cooperatives; GPRTU = Ghana Private Road Transport Union; NBSSI = National Board for Small Scale Industries; PAS = Presbyterian Agricultural Station, Garu.

## Appendix Table 2: Composition of District Value Chain Committees

| Region | District Value Chain Committee | Year estab-lished | DVCC members in total | Traders or aggrega-tors | Input dealers | Banks or other financial institutions | Tractor or bullock service providers | Ministry of Food and Agriculture staff | Others | Farmer-based organization represent-atives | *Farmer-based organi-zations in district* | *Membership of FBOs in district* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upper East | Bawku West | 2011 | 9 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | *93* | *1,347* |
| | Builsa North | 2011 | 17 | 3 | 2 | 1 | 2 | 1 | 2 | 6 | *36* | *348* |
| | Garu-Tempane | 2011 | 12 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | *84* | *1,161* |
| | Kasena-Nankana West | 2012 | 12 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | *59* | *1,081* |
| Northern Region | Central Gonja | 2013 | 19 | 3 | 2 | 3 | 2 | 3 | 1 | 5 | *68* | *1,487* |
| | Chereponi | 2013 | 15 | 2 | 2 | 1 | 1 | 3 | 1 | 5 | *56* | *961* |
| | East Mamprusi | 2011 | 17 | 2 | 4 | 1 | 3 | 1 | 3 | 3 | *64* | *1,169* |
| | Kpandai | 2012 | 15 | 3 | 2 | 1 | 3 | 1 | 2 | 3 | *50* | *1,164* |
| | Kumbungu | 2014 | 11 | 1 | 3 | 0 | 2 | 1 | 0 | 4 | *93* | *3,319* |
| | Sawla-Tuna-Kalba | 2012 | 21 | 2 | 4 | 0 | 7 | 1 | 4 | 7 | *55* | *929* |
| | Yendi | 2012 | 7 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | *91* | *1,708* |
| Upper West | Lawra | 2012 | 12 | 1 | 2 | 1 | 2 | 1 | 0 | 5 | *21* | *472* |
| | Sissala West | 2013 | 16 | 5 | 2 | 1 | 1 | 1 | 2 | 4 | *103* | *1,796* |
| Brong Ahafo | Pru | 2011 | 12 | 1 | 2 | 1 | 1 | 1 | 1 | 5 | *31* | *584* |
| | Sene West | 2011 | 10 | 2 | 1 | 0 | 1 | 1 | 0 | 5 | *36* | *543* |

Source: Authors compilation from fieldwork and NRGP documents.

.

## Appendix 2: Questionnaire used for survey of financial institutions associated with district value chain committees

**Survey of Financial Institutions**

The International Food Policy Research Institute (IFPRI), in response to a request from the Ministry of Food and Agriculture ( MoFA), is conducting a study on value chain development interventions employed in two MoFA projects: Market Oriented Agriculture Program (MOAP) and Northern Rural Growth Program (NRGP). We are examining the working of District Value Chain Committees (DVCC) as part of which we are interviewing the participants: producer groups, banks/financial institutions, service providers, and other stakeholders.

We are inviting you to participate in this survey because we have been informed that your bank participated in the activities of DVCCs and trainings organized by the NRGP. Your participation in this research study is voluntary. Any proprietary information that you may share with us would be kept confidential.

Do you consent to participate in this survey? Yes/No.

**1.** Name of Institution:_____ Location:_____
Interview Date: _____

**2.** Name of the respondent: _____ Mobile no: _____

**3.** Function/designation of the respondent in institution: _____

**4.** When did this institution/branch start its operations? _____

**5.** When did it start lending? _____

**6.** Participation in DVCC

1) When was this financial institution invited to join the DVCC? (Year): _____
2) Any role in the executive? 1 = Yes; 2 = No _____
3) If yes, what role? _____
4) Has the institution been attending the DVCC meetings: 1=regularly; 2=occasionally:____
5) When was the last time you attended a DVCC meeting? _____
6) Has the DVCC played any role in,
   (a) Screening of applicants for Agricultural loans? 1 = Yes; 2 = No _____
      a. If yes, explain how:

   (b) Recovery of Agricultural loans? 1 = Yes; 2 = No _____
      a. If yes, explain how:

7) What share of your total Agricultural lending portfolio comprises of loans given out to groups under DVCC? _____%
8) Did you ever participate in any **training** organized by NRGP? 1 = Yes; 2 = No _____
   (a) If yes, how many times? _____
   (b) Can you tell us some of the **topics/issues** covered in these trainings?

   (c) Have these trainings influenced how you **screen** Agricultural loan applications? 1 = Yes; 2 = No _____
      a. If yes, can you specifically mention how?

(d) Have these trainings influenced **how much you lend** and the **terms** of repayment of Agricultural loans? 1 = Yes; 2 = No _____

a. If yes, can you specifically mention how?

9) Did this financial institution approve any applications for **matching grants** under the NRGP? 1 = Yes; 2 = No _____

(a) What factors influenced your decision?

## 7. Composition of the overall lending portfolio:

| 7.1 Types of loans offered | 7.2 Do you offer? 1=yes; 2=no | 7.3 When did you start offering? (year) | 7.4 Share in your total lending portfolio (% | | | 7.5 Interest rate | | |
|---|---|---|---|---|---|---|---|---|
| | | | Now | 2011 | When started lending | Now | 2011 | When started lending |
| Non-Agricultural | | | | | | | | |
| Agricultural – production | | | | | | | | |
| Agricultural – trade | | | | | | | | |
| Other (specify) | | | | | | | | |

## 8. Agricultural Lending and Recovery

8.1 Agricultural loans in the past ten years (annual information for every fiscal year starting from 2016/17 and backwards)

| 1.Year | 2.Total amount loaned out | 3. Amount of agricultural lending | | | 4. Clientele for agricultural lending | | | 5. Interest Rate charged to: | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1.Groups | | 2.Individual farmers | | |
| | | a. Total | b. Lending for Agricultural production | c. Lending for Agricultural trade | a. No. of groups | b. Total no. of members | a. No. of farmers | a. Groups | b.Individual farmer |
| 2016/17 | | | | | | | | | |
| 2015/16 | | | | | | | | | |
| 2014/15 | | | | | | | | | |
| 2013/14 | | | | | | | | | |
| 2012/13 | | | | | | | | | |
| 2011/12 | | | | | | | | | |
| 2010/11 | | | | | | | | | |
| 2009/10 | | | | | | | | | |
| 2008/09 | | | | | | | | | |
| 2007/08 | | | | | | | | | |

8.2 Agricultural loan **recovery** in the past ten years (annual information for every fiscal year starting from 2016/17 and backwards)

| | Agricultural lending (overall) | | | | Group lending | | Lending to individual farmer | |
|---|---|---|---|---|---|---|---|---|
| | Production loans | | Trade loans | | Production loans | | Production loans | |
| 1.Year | a. % recov-ered | Reasons for non-recovery: 1. Yields were lower than expected 2. Yields were good but borrowers refused to pay 3. Crop failure (natural disaster) 4. Other (specify) | a. % recov-ered | Reasons for non-recovery 1. Goods did not sell as expected 2. The market was good but borrowers refused to pay 3. Other (specify) | a. % recov-ered | Reasons for non-recovery 1. Yields were lower than expected 2. Yields were good but borrowers refused to pay 3. Crop failure ((natural disaster) 4. Other (specify) | a. % recov ered | Reasons for non-recovery 1. Yields were lower than expected 2. Yields were good but borrowers refused to pay 3. Crop failure (natural disaster) 4. Other (specify) |
| 2016/17 | | | | | | | | |
| 2015/16 | | | | | | | | |
| 2014/15 | | | | | | | | |
| 2013/14 | | | | | | | | |
| 2012/13 | | | | | | | | |
| 2011/12 | | | | | | | | |
| 2010/11 | | | | | | | | |
| 2009/10 | | | | | | | | |
| 2008/09 | | | | | | | | |
| 2007/08 | | | | | | | | |

## 9. Lending Practices for Agricultural Loans

| | | | 9.1 Agricultural production loan | |
|---|---|---|---|---|
| | | | Group | Individual/farmer |
| Collateral | 1. Is collateral needed for borrowing? 1= yes; 2=no | | | |
| | 1.1 If yes, type of collaterals: 1= Farm or land; 2= non-farm or /non-land asset; 3= other (specify) | | | |
| Loan amount | 2.1 Average amount of loan by crop types | a. Crop 1 | | |
| | | b. Crop 2 | | |
| | | c. Crop 3 | | |
| | | d. Crop 4 | | |
| | | e. Crop 5 | | |
| Loan disbursal | 3.1 Mode of disbursal<br>a. Directly to individual (farmer) or member (for group lending)<br>b. Directly to group executive (for group lending)<br>c. To service provider on behalf of farmer<br>d. Other third-party payment (specify)<br>e. Any other (specify): _____ | | | |
| | 3.2 If any option other than # a. | a. Since when did you start this practice | | |
| | | b. Why? (list reasons) | | |
| | 3.3 Frequency of loan disbursal (1= one time ; 2= multiple installments; 3= other (specify)) | | | |
| | 3.4 If option# 2 | a. Since when did you start this practice | | |
| | | b. Why? (list reasons) | | |
| | | c. How many installments | | |

| | | | | |
|---|---|---|---|---|
| | | d. Specify months/ crop production activities corresponding installments | | |
| Service charges (%) | 1.1 One time loan | | | |
| | 4.2 Loan disbursed in multiple installments | | | |
| Loan repayment | 5.1 What is the duration for loan repayment (months) | | | |
| | 5.2 Do you reschedule loans in case of crop failure? 1=yes; 2=no | | | |
| | 5.3 Who repays on behalf of groups? 1= individual members; 2= group executives; 3= other (specify) | | | |
| Supervision | 6.1 Do you provide supervision for your Agricultural-production loan clients? (1 = Yes; 2 = No): | a. Prior to loan application | | |
| | | b. for crop monitoring: | | |
| | | c. Recovery | | |

**10. Information on Current Borrowing Groups**

We understand the significance of this information and assure you that we will maintain this information in strict confidence and limit its use to academic purpose only. You may use codes instead of client names in case you want to maintain anonymity of your client/s.

Given that, will you answer this question? Yes/No.

| Sl. No. | Group name or code | How introduced? 1= self; 2= third party (specify) | Crops supported | Average loan per acre | Year of first borrowing | No. of years of borrowing | Overall repay-ment | Reasons behind the bank's longstanding association with this group? 1=Good repayment record, 2=Strong recommendation, 3=Social network of group members (specify), 4= other (specify) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |

**11.** Did you **discontinue** lending to any agricultural production groups within the past one or two years? 1 = Yes; 2 = No.

If Yes, how many groups did you discontinue lending to? _____

What are the reasons for discontinuing lending to these groups? _____

1. Bad repayment record
2. Group (s) did not reapply
3. Change of bank's lending policy
4. Lack of collateral / guarantors
5. Termination of program/project that supported/introduced group

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