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Agricultural Financing and Credit Constraints

The Role of Middlemen in Marketing and Credit Outcomes in Ghana

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IGC PROJECT ON AGRICULTURAL FINANCING AND CREDIT CONSTRAINTS: THE ROLE OF MIDDLEMEN IN MARKETING AND CREDIT OUTCOMES IN GHANA

(FINALREPORT)

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1. Introduction

Agriculture is the main stay in many African countries and the majority are subsistence farmers with low income. Similarly, the poor in Ghana are mostly found in rural areas and agriculture forms the mainstay of these economic agents. Ghana has a population of about 24 million and like most developing countries in Africa, agriculture is the mainstay of the economy and about 70% of the population is rural. The land area is 23.8 million hectares of which 57% is agricultural land (MOFA, 2003). Agriculture employs a greater proportion of the labour force in Africa and contributes significantly to GDP in these countries. Rural agricultural workers form the poorest in Ghana according to the GLSS. In Ghana, the share of agriculture in GDP is about 40% and the sector employs about 55% of the working population. Besides, growth in agricultural output over the past five years has been the highest with the bulk coming from cocoa. Despite the contribution of agriculture to the national economy, the incidence of poverty is reported to be highest amongst food crop farmers, and amongst self-employed rural people working in off-farm activities such as trade. Rural agricultural workers form the poorest in Ghana according to the GLSS. Currently, agriculture in Ghana is still being practiced using the 'hoe and cutlass' technology with very minimal irrigation and processing of farm output. Majority of farmers operate barely subsistence farms or with very low incomes from their holdings. A number of factors have contributed to this poor state of affairs and had ensured that the agri-business sector has not been able to realize its full potential The factors affecting the agri-business sector includes poor market accessibility,, weak infrastructure (e.g, roads, storage facilities, etc), limited ability to influence government policy and inadequate credit.

In order to address the issue of poverty as envisaged in the Ghana Poverty Reduction Strategy paper and currently the Ghana Shared Growth and Development Agenda, it is necessary that the constraints to agriculture are addressed. One such constraint mostly mentioned and yet not adequately addressed is the lack of access to agricultural finance. The share of domestic money banks credit to agriculture has declined consistently from 1998 to 2008, except with a marginal increase in 2009 (ISSER, 2010). It has been argued by some researchers that providing rural farmers with credit will increase output and productivity. We however hold a complementary view; agriculture credit will succeed if profitability is improved. Agricultural profitability is not just determined by credit but also the efficiency of pricing and marketing. Thus increasing

the supply of loanable funds does not necessarily expand the production frontier and lead to higher earnings, and unless the risk is managed, loanable funds will disappear into bad debts.

One area that affects credit outcomes which has received little focus is the role of middlemen in the marketing and credit delivery process. It has been hypothesized that middlemen often provide supplier and buyers credit and this is often `mortgaged' against expected or future harvests whose prices are predetermined but fixed at a very low level. In addition, in view of the perishable nature of agricultural products, prices at the farm gate may be kept low by the monopoly power of middlemen or buyers. Little is known about the performance of the agricultural marketing system in Ghana. This study examines the spatial and cropwise distribution of margins between farm gate and market prices and also, relates this to characteristics of these markets. This will permit us to explore the extent to which middlemen affect agricultural financing, farm revenue and poverty in rural areas? The study provides a rich description of the state of the agricultural marketing system in Ghana. It also investigates the margins between farmgate and market prices for different crops, in different regions and ascertains the extent to which farmers use forward sales to obtain finance from marketers. The different terms under which these are done and the impact of these features of the marketing system on farmer profits is also investigated. The rest of the study is organized as follows: the section reviews the literature and agricultural financing and marketing in Ghana. This is followed by a section on the methodology while section four presents the findings. The final section provides the concluding remarks.

2. Agricultural Finance and Marketing

The financial system in Ghana falls into three main categories: formal, semi-formal and informal. Formal financial institutions are incorporated under the Companies Code 1963, which gives them legal identities as limited liability companies, and subsequently licensed by the Bank of Ghana (BoG) under either the Banking Law 1989 or Non-banking financial institution law 1993 to provide financial services under Bank of Ghana regulation. The commercial banking system which is dominated by a few major banks reaches only 5% of households (World Bank, 2004) and financial analysts estimate that about 60% of the money supply in Ghana is outside the commercial banking system. The role of the semi-formal and informal sector, comprising rural banks, savings and loans companies, and semi-formal and informal financial systems in financing agriculture cannot be underscored.

Over the years formal financial institutions have demonstrated a lack of interest in agriculture finance for four reasons according to IFPRI (2010). First, many agricultural households were located in remote parts of the country and were often widely dispersed that financial institutions found it challenging to provide cost-effective and affordable services. Second, big swaths of the agricultural population were subject to the same weather and climate risks, making it hard for providers of financial services to hedge risks or operate profitable insurance pools. Third, service providers, mainly urban-based, simply did not know enough about the business of agriculture to devise profitable financial products. Fourth, most small agricultural producers in developing countries had little education and little knowledge of how modern banking institutions work. As a result of these difficulties, some innovations are adopted in recent times, namely; Index-based insurance schemes, microfinance, community banking, using modern communication technology to enhance payment system and financial institutions try to bundle financial services with non-financial services as some of the innovations in agricultural financing (IFPRI, 2010).

Available literature indicates that Northern Ghana is the most 'under-banked' part of Ghana (IFAD, 2000)[1]. Several reasons account for this but the common explanation is that there are no formal financial institutions in over 60% of the Districts in the north. It is estimated that one rural bank office serves an average of 53 000 km^2. Except where semi-formal financial services such as NGO-operated special programmes have come in, farmers and agro-processors rely on other sources including susu collectors and middlemen. Also, whereas banking systems are being strengthened in Ghana through supervision, they have so far tended to focus on their best clients to improve portfolio performance, rather than to reach out to new, smaller clients. Banks continue to have difficulty with small transactions because of high costs, perceived risks, collateral-based methodologies, and strong incentives to lend to the public sector due to the high interest rates on government's financial instruments (IFAD, 2000).

By definition, informal financial transactions do not involve legal documentation and are based primarily on a personal or business relationship. This makes them easier and attractive to rural people. The informal financial system covers a range of activities including what is known as *Susu*. The World Bank (1997) identified five different types of institutions dealing in *Susu* in the country. These are *Susu* collectors, *Susu* associations, *Susu* clubs, *Susu* companies and

[1] Northern Ghana is defined to include Northern, Upper East and Upper West regions.

licensed financial institutions. Other forms of informal financial institutions are trade creditors, self help groups and personal loans from friends and relatives. *Susu* collectors are individuals who collect daily amounts from their clients and return the accumulated amount at the end of a particular period, usually one month, minus one (1) day's amount as a commission. The *Susu* collectors act as mobile-bankers for traders, business men, farmers and other professionals in the rural communities. Research has shown that *susu* collection is male dominated (World Bank, 1997; IFAD, 2000 and Ekumah and Essel, 2001). Until recently, the enormous potential of *Susu* collectors as an effective microfinance delivery mechanism had not been taken into consideration. Now, however, collaboration with such indigenous systems is considered an effective strategy for programmes that target women entrepreneurs in the informal sector.

A major player in agricultural finance within the informal sector is those engaged in moneylending business. While the Bank of Ghana serve as the lender of last resort to commercial banks, to the farmer or the rural business person, the moneylender becomes the lender of last resort. Money lending involves giving out small loans to small business owners with the aim of making some gains. It can also take the form of loans in kind (e.g., fertilizer, food stuff, cloth, etc). The experience of Ghana shows that money lending has been in practice for long and is done by people (middlemen) who are usually wealthier farmers or traders. Recently, professionals like building contractors, teachers, carpenters, masons, managers, etc have engaged themselves in lending money to people for returns. Market women or traders also lend money to people. Moneylenders use their own funds but sometimes they access credit from the banks. Money lending is built on trust because moneylenders know their borrowers. The objective for lending money varies from place to place and time to time. For example, in the rural areas of Ghana, moneys can be lent to people for weddings, funerals, urgent medical expenses, the purchase of extra food, purchase of farm inputs and for meeting travelling costs. Urban dwellers often borrow from moneylenders for purposes of paying school fees, medical expenses and capital to start small businesses. Like the formal financial institutions, an important factor that guides the lending process is the ability to repay. Socially, the moneylender is an asset to the village farming community and he is held in high regard. Owusu-Acheampong (1986) concludes that the moneylender is approachable and is ready to lend at a short notice.

Financing agriculture involves managing risk and Microfinance has been developed as a risk management tool only recently. Small farmers face market constraints in addition to financial

constraints in developing countries since wholesalers and retailers who serve as the key actors of agricultural markets have monopoly power when it comes to pricing. This situation occurs because wholesalers link up with producers in the primary markets and assemble agricultural commodities supplied by small, scattered producers. As traders, wholesalers also arrange movement of produce from primary rural markets to secondary urban markets and transmit price information reflecting consumer preferences of food type, quality and volume required to producers. The main role of retailers is to link wholesalers and consumers. Retailers also disperse produce assembled in wholesale markets to consumers in desired small volumes and transmit consumer preferences of food type, quality and volume to wholesalers who in turn pass them on to producers. Advances of goods are the most common form of credit (Aryeetey and Nyanteng, 2006). With this, rural suppliers deliver goods early in the morning to wholesalers or retailers in a large market and expect repayment by the end of day or within an acceptable short period of time.

Lutz (1994) documented that retail prices are stationery, implying that retailers are indeed passive decision makers following wholesale prices without taking local supply and demand conditions into account. Kuiper et al (2003) corroborated this in a study of the vertical price relationships between wholesalers and retailers on five local maize markets in Benin. The authors found that relations between wholesalers and retailers vary between market places. In contrast to common assumption in development studies, Kuiper et al (2003) argued that retailers play a crucial role in the price formation process. They do not allow wholesalers to behave as vertical price leaders in the sense of Stackelberg leadership, unless wholesalers are involved in market arbitrage. This is attributed to the fact that retailers in rural areas can choose to buy either from wholesalers or at the farm gate. Buying directly from farmers may provide retailers some freedom to set prices. However, the authors found that in two larger rural centres, wholesalers involved in arbitrage among urban markets did influence price formation. Finally, the authors concluded that local market conditions are decisive in the distribution of market power among retailers and wholesalers. The evidence in literature points to the fact that there is not a clear matter whether wholesalers or retailers or both have some market power and are able to influence price formation.

Cross country studies have also highlighted the important role played by informal financial institutions. The World Bank (1997) conducted a study into informal financial markets and

financial intermediation in Ghana, Malawi, Nigeria and Tanzania. Data were collected on informal financial institutions in the respective countries focusing on agents, portfolio characteristics, interest rates, risk management, transaction costs, delinquency, and linkages to other institutions. The findings were that informal financial agents were well-educated relative to real informal sector workers and were generally in their mid-40s. In overall terms, the findings showed that about 60% of the sampled population had attended secondary or other post-primary school. The results further showed that money lending covers a wide range of financial arrangements with interest rates varying from 0-100% a month. The study established that the most common source of informal finance (usually interest free) is from relatives and friends and that most of the commercial money lending in the sample countries is undertaken as a part-time activity, involving the use of surplus funds form other sources such as a trading business.

On informal methodologies, the study found that informal lenders succeed through information based on personal and social networks. They use bilateral, character-based relationships to achieve repayment rates without relying on formal collateral and project appraisals. Informal methods yield loan administration costs that are below those of banks operating much larger loans. Whereas banks reported operating costs on the order of 12% to 19% of amounts lent, informal moneylenders and associations are generally under 3%. Repayment rates were also found to be higher for informal lenders. For example, over 80% of informal agents in Ghana and Nigeria revealed no delinquent borrowers, according to the report whereas all sampled respondents expected almost 100% repayment within three months of the due date. Thus, the study concluded that informal agents bear lower relative costs and losses on their small loans than banks do on larger ones. This is contrary to the perception that small loans are costly and risky. The findings observed very little intermediation in terms of mobilizing funds from savers and transmitting them to borrowers in other groups. The study concluded that a financial gap remains for small businesses, which generally need larger loans at lower rates that informal agents can provide.

Robinson and Kolavalli (2010) have studied the marketing of tomatoes in Ghana by exploring the linkage between farmers, traders and retailers of tomatoes in Ghana. The key intermediaries are the tomato traders (the market queens) and the “lead boys” the latter an increasing important role in linking traders to farmers. The market Queens have control over the larger

markets located near to key consumption areas restricting who can bring tomatoes to the market and how many trucks can bring tomatoes to the market on any one day. Only smaller markets located around the key growing areas are unrestricted and farmers can often take their own produce to these markets and sell. Farmers see themselves and consumers as least powerful in determining whose tomatoes are collected and taken to the market and thereby influencing prices at the farm gate and urban markets. The tomato value chain according to the paper is characterised by a 'two-level' system in which traders are the direct link between rural farm producers and the urban consumption. Farmers are distanced from market signals. Most wait for the market queens to come to their fields and if these traders do not come, farmers leave the tomatoes to rot in the field in the absence of a local market.

Acknowledging the importance of market access and its effects on rural incomes and the many failures in rural markets in developing countries, Markelova et al (2009) assess collective action to address the inefficiencies, coordination problems or barriers to market access. The study draws on case studies and other literature to examine the conceptual issues and empirical evidence on the role of collective action institutions in improving market access for the rural poor. Applying insights from studies of collective action in natural resource management, the paper examines what conditions facilitate effective producer organizations for smallholders' market access, with special attention to the characteristics of user groups, institutional arrangements, types of products (staples, perishables and other commodities), markets (local, domestic and international), and external environment. The case-studies in this study show that collective action can bring advantages for smallholder marketing. Acting collectively for market access can help correct some of the market imperfections, such as high transaction costs and missing credit markets, and fill in coordination gaps. Farmers are more able to obtain necessary information, reach quality standards and operate on a larger scale when they pool financial and labour resources, enabling them to sell to new domestic or international markets, which are otherwise out of reach for smallholder producers.

The paper states that some degree of outside assistance, both financial and in capacity building is often required for producer groups to form and operate successfully, but this can introduce problems with sustainability versus dependency of the organizations. While NGOs may be well-suited for the role of catalyst of collective action for marketing, it falls to the public and private sectors to ensure that there are incentives for farmers to organize through policies and

programmes that allow them to access stable and competitive markets. Collective action according to the paper can play a critical role for smallholders not only to get a better price for their products, but also to adapt to the changing global supply chains. But a healthy dose of realism is needed when considering the applicability and effectiveness of collective marketing. If the incentives and enabling conditions for farmer groups to form and operate successfully are missing, collective marketing will not be profitable or sustainable.

Forward contracts can be seen in diverse ways including the relationship between traders and landowners. For instance, Smith et al. (1999) in examining the interlocked transactions between traders and landowners (farmers) in the cotton and wheat markets in Sindh that facilitate the provision of credit by traders concluded that the case examined provides an example where traders lend to landowners in a segment of the credit market that approximates competitive behaviour, without surplus extraction by traders. Key conditions resulting in this favourable outcome are the existence of both competition for market share and information sharing on borrowers between traders. The study found that interlocking contracts are beneficial to both traders and landowners, combining effective recovery of input loans with competitive prices for both inputs and borrowers' seed cotton output. Despite the high transaction costs and risks inherent in agricultural lending in Sindh, the combination of interlocking, screening mechanisms and information sharing on potential defaulters provide a mechanism by which capital, sourced by traders and ginners from wider national money markets (where the opportunity cost of capital may typically be lower than that prevailing in local rural markets) is channelled to landowners via the crop marketing chain. Whether this outcome is also beneficial for other rural groups who may borrow from landowners, in particular sharecropping tenants, is independent of market relations between landowners and traders and is not determined here. Benefits associated with interlocking include secured crop supplies, especially cotton, but also wheat and other crops, reducing search costs and potentially achieving some economies of scale. There is also an increase in the volume and market share of their fertilizer and pesticide sales (particularly for those with input agencies), and also reduction in monitoring and enforcement costs associated with loan recovery, and the level of default.

Conventional views of bilateral trade agreements are based on rational decision-making models that stress how personalized modes of exchange are mutually beneficial responses to problems

of risk and uncertainty. In most of the literature the analyses are of public markets where exchange partners freely choose to maintain long-term relationships and Russell (1987) argued that much of this literature is unsatisfactory in rural contexts when land and credit transactions are interlinked with marketing functions. The study therefore examines the extensive bilateral trade agreements between wholesalers, middlemen, and producers in the highland vegetable trade in northern Luzon.

Unequal access to the means of exchange maintains the pervasiveness of these marketing agreements while social relations contribute to the dependency of producers on local middlemen. Personalized trade relations enhance the external control of production and distribution networks, in contrast to the more competitive way they operate in public marketplaces. The personal power of middlemen is enhanced not only by farmers' dependency on loans for production and reproduction, but also by the advantaged position of middlemen in the webs of extractive relationships that control marketing outlets. As Gudeman (1978b: 139) notes, loan contracts under these conditions are not true loans; they are inputs by external firms in the form of wage advances and working capital investments. Many peasants merely subcontract their labour to middlemen, who themselves are dependent on external sources that ultimately control distribution.

From the above, the informal financial sector plays a dominant role in financing agricultural markets in developing countries including Ghana. Secondly, agricultural credit through forward contract exists but evidence on the extent to which they influence farmgate prices is mixed. This issue forms the focus of the next section.

3. Methodology

The aim of this research is to provide a rich description of the state of the agricultural marketing system in Ghana. Most of the data required for this project exist in recent and on-going surveys. The study used the GLSS5 and the GLSS5 Each of these surveys has data available on farmgate prices, and some information on market prices, and additional information is included in these surveys on the terms of market transactions, the use of agricultural finance, and post-harvest loses of crops. Additional data was obtained from the Ghana Statistical Service on market prices for crops around the country. Moreover, most of

these data are geocoded, so we can use ArcInfo to produce maps to provide a spatial dimension to this analysis.

The final goal of the project will be a series of simple diagnostic accounting exercises: first, what is the gap between the farmgate and the market price for different crops in different parts of the country. Second, how does this gap relate to the market structure available for those crops in those regions, as revealed by the type of transactions reported by farmers (e.g., forward sales with credit, spot sales in the market, sales to traders at the farm). The conceptual simplicity of the output should not obscure the importance of the questions for policy, nor the substantive economic analysis that is required along the path to the final product. We had to deal with difficult questions of unobserved variation in product quality; tedious problems of incommensurable units; and important issues of the timing of sales and price measurements. Nevertheless, the recent data generated by the series of ISSER and GSS surveys provides a very rich base of information for this analysis.

3.2 The model

Gross margin of a firm is obtained by deducting the variable costs from the income or sales revenue and dividing by the income (Nix, 1998). It is calculated as a firm's total sales revenue minus its cost of goods sold, divided by the total sales revenue, expressed as a percentage. The gross margin represents the percent of total sales revenue that a middleman retains after incurring the direct costs associated with making available the goods and services to consumers. They reveal how much a firm/middleman earns taking into consideration the costs that it incurs for producing or making available its products and/or services. Mathematically, a gross margin is defined as:

$$Gross\ margin = \frac{Total\ Revenue - Variable\ costs}{Total\ Revenue} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Equation 1 above is in terms of the total quantity sold of the product in question. On a per unit basis, gross margin is defined as;

$$Gross\ margin = \frac{Selling\ Price - Average\ cost}{Selling\ Price} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

It shows how much of a mark-up a firm is achieving between the cost of what it sells and the selling price.

Taking the farmgate price as the variable costs of the middlemen, Equation 2 above could be written as;

$$Gross\ margin = \frac{Market\ Price - Farmgate\ price}{Market\ Price} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

The farm-gate price is calculated as the revenue from sales divided by the quantity sold by the farmer (the data from MiDA data, 2008 and GLSS5).

$$Farmgate\ Price = \frac{Sales\ Revenue}{Quantity\ sold} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4$$

Market prices are the average market price of the products in 2008 (to correspond with the year of the survey data) obtained from the Ghana Statistical Service.

The calculation of the gross margins is extended to representing the spatial gross margin of the regions by calculating it for each of the regions. It can be verified conceptually by considering that the market prices and the farm-gate prices vary spatially, whereas farm-gate prices may also vary by the channel of distribution. The study therefore finds the distribution of the gross margins by the geographical location and by the value chain.

Regression model

In order to investigate what factors determining the gross margin of the crops under study, this study has developed a simple model. Suppose that there is just one farming area where crops are produced, and one market area where crops are consumed. Let $d_{cm}(p_{cm})$ be the demand for crop c in the market when the price is p_{cm}. We will make use of the standard inverse demand curve $p_{cm}(d_{cm}) \equiv d_{cm}^{-1}(p_{cm})$. Let $s_{cf}(p_{cf})$ be the supply of crop c by farmers when they are

paid p_{cf} (and thus the inverse supply curve is $p_{cf}(s_{cf}) \equiv s_{cf}^{-1}(p_{cf})$). Let t_c be the per-unit cost of transporting the crop from the farm to the market.

In a competitive equilibrium, arbitrage ensures that traders earn zero economic profits, so if trader i buys x_{ci} units of crop c from the farmers and sells it to consumers in the market, her net profits are;

$$x_{ci}(p_{cm} - p_{cf} - t_c) = 0 . \quad \text{...} (5)$$

Thus the familiar arbitrage condition must hold:

$$p_{cm} = p_{cf} + t_c \quad \text{...} (6)$$

and the gap between the farm-gate and market prices depends only on transaction costs t. If a farming area is more distant from the market, or more difficult to reach, we expect this gap to be larger. If a crop is more difficult to transport, again we expect this gap to be larger.

But not all trading systems are perfectly competitive. Consider the opposite extreme in which a single trader (or single cartel of traders) controls the movement of crops from the farm to the market. In this case, that trader chooses x_c to maximize profits, which are

$$p_{cm}(x_c) \cdot x_c - t_c \cdot x_c - p_{cf}(x_c) \cdot x_c \quad \text{..........................} (7)$$

This implies that

$$p_{cm} - p_{cf} = t_c + x_c \left[\frac{\partial p_{cf}}{\partial x_c} - \frac{\partial p_{cm}}{\partial x_c} \right], \text{ or } \quad \text{................} (8)$$

$$p_{cm} - p_{cf} = t_c + \frac{p_{cf}}{\varepsilon_c^s} - \frac{p_{cm}}{\varepsilon_c^d}, \quad \text{.......................... ....} (9)$$

where ε_c^s and ε_c^d are the elasticities of supply and demand for crop c.

In the case of monopoly, therefore, the price gap between the market and the farm gate will depend not only on the transaction costs, but also on the market structure. For markets and crops in which either (or both) supply or demand is highly inelastic, the price gap will be particularly large.

This suggests the following regression. Let k index the various EAs in the datasets we have available. Construct p_{kcm} as the market price for crop c relevant for EA k, and p_{kcf} as the average farm-gate price for crop c in EA k. Let d_{kc} be the distance to market for crop c in EA k, and X_{kc} be a vector of characteristics of EA k and crop c. The characteristics of the EA includes the locality (rural/urban), average farm size in the EA, availability of irrigation in the community, pest control practices, storage facilities, extension services and access to improved seeds. EA characteristics also include use of modern technology such as use of tractors, combine harvesters, and threshing machines.

A variable measuring the educational characteristics of the farmers measured in terms of years of schooling is also included among the explanatory variables.

The empirical regression model is specified as

$$p_{kcm} - p_{kcf} = \alpha_c + \beta d_{kc} + X_{kc}\delta + \varepsilon_{kc} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (10)$$

4. Descriptive Statistics

4.1 Middlemen and marketing outcomes

While credit from formal and informal institutions is generally limited and comes with challenges to small-scale farmers, there are other avenues through which these credits are offered to farmers. Credit from formal credit institutions apart from being limited and mostly non-existent comes with demand for huge collaterals and other stringent requirements. Considering the risks involved in agricultural production, most banks and non-bank financial institutions are less willing to extend credit to smallholder farmers. Informal sources of credit on the other hand are expensive because of the high rate of interest charged on such credits. Given the constraints that exist with the main sources of credit, other avenues available to farmers may be through middlemen in the marketing of their produce.

Middlemen in the supply chain offer some forms of credit to farmers, for example through pre-harvest contracts. In this form of financing, the producers and the middlemen (wholesalers and

retailers) go into an agreement in which the later pays in advance before the produce is harvested and at an agreed price. The credit could be in the form of cash or kind. Cash provided is used to finance the production process by purchasing inputs and also serves as income for the farmer's domestic use. Aside cash, middlemen offer the farmers inputs and this form of arrangement provides a huge relief from the frustrations that exist in the other forms of obtaining credit. This arrangement however, is not highly practised among smallholder farmers in the MiDA selected districts in Ghana. Table 1 below shows the main marketing channels of farmers.

Table 1: Distribution of marketing channels in 2008

main outlet	Frequency	Percent	Cumulative
Pre harvest contractor	146	1.52	1.52
Farm gate buyer	2,939	30.56	32.08
Market trader	5,548	57.7	89.78
Consumer	789	8.21	97.98
State trading organisation	24	0.25	98.23
Cooperative	5	0.05	98.28
Exporter	15	0.16	98.44
other	150	1.56	100

Source: GLSS5+

While pre-harvest contracts could be an alternative source of funding for smallholder farmers, they seldom make use of this marketing channel and less than two percent of the sample engaged in it. Most farm produce are sold through the market trader who buys with cash or at times on credit from the farmers. However, the market traders (often referred to as market queens) constitute a very important link between rural farmers and urban consumers. They usually form cartels to regulate the price of the produce in the urban markets while bidding down the price at the farm gate. Apart from the market traders, producers also have their wares mostly purchased by those who go directly to the farm to buy the products for their own use. Similarly, the farmers also make use of the local markets within the community to dispose of their wares.

In the absence of pre-harvest contracts, middlemen provide farmers with resources by offering them higher prices for their produce translating into higher incomes. By offering them higher

farmgate prices, farmers are guaranteed higher incomes from which they can afford to save and purchase inputs for the next season. Table 2 below, shows the average farmgate price offered by the various marketing channels.

Table 2: Average farmgate prices offered by the different marketing channels (2008)

	All channels	pre harvest	farm gate	market trader	consumer	state corp.	cooperative	exporter
Maize	**311.52**	419.17	271.49	332.48	267.31	372.98		367.12
	(348.83)	(285.67)	(233.22)	(389.77)	(298.92)	(110.71)		(388.31)
Cassava	**204.42**	164.73	172.86	241.07	147.97	162.85		
	(361.63)	(141.80)	(190.60)	(400.80)	(557.53)	(36.14)		
Groundnut	**237.29**	251.82	204.60	263.29	239.45			
	(321.47)	(117.36)	(241.75)	(374.38)	(286.38)			
Millet	**262.92**		329.76	247.57	204.30			
	(270.61)		(221.46)	(286.62)	(111.45)			
Pepper	**1416.77**	1261.10	1380.65	1453.14	1094.87			695.65
	(1654.31)	(694.42)	(1691.31)	(1540.60)	(992.50)			(245.95)
Rice	**695.65**		259.04	193.49	277.04	548.94	187.01	204.61
	(245.95)		(326.22)	(200.85)	(379.80)	(1517.01)	(136.72)	(64.74)
Yam	**166.62**	264.80	192.02	160.32	120.76			127.53
	(564.12)	(255.13)	(839.99)	(404.38)	(176.13)			(73.32)

*Source: Generated from MiDA data (GLSS5+, 2008)
*Standard deviations in the parentheses

From Table 2 above, pre-harvest contractors often offered farmers higher average farm-gate prices than the average price offered by all marketing channels (in 2008) contrary to the popular perception that such marketing arrangements are characterised by low farm-gate prices. The pre-harvest agreed prices for farm produce were generally higher than the prices offered after harvest thereby providing guaranteed incomes for the farmers. However, only few smallholder farmers engage in this form of marketing channel, perhaps because only few buyers exist with this form of arrangement (see Table 3). For maize, pre-harvest contractors offer higher average prices to farmers than all the other channels, while the state purchasing corporations, and market traders also offer higher farm-gate prices. In the cassava and pepper markets, it was also evident that market traders offer higher than the average farm-gate price. All the other middlemen offer lower than average prices although farm-gate buyers offer higher average prices than the others. Farm-gate buyers favour millet farmers than the other categories of middlemen. Though cooperatives are known marketing channel for effectively guaranteeing

stable prices and access to market (under certain conditions), this medium is barely used by Ghanaian smallholder farmers. From Table 1 above, only about 0.05 percent of respondents sell through this channel. This is because, most of the known farmer cooperatives including the publicly owned cooperatives have been dysfunctional.

Table 3: Distribution of marketing channels in 2005/06

Main outlet	Frequency	Percentage	Cumulative
pre-harvest contractor	67	1.69	1.69
farm gate buyer	300	7.57	9.26
market trader	3,381	85.29	94.55
Consumer	173	4.36	98.92
state trading organisation	10	0.25	99.17
Cooperative	2	0.05	99.22
Other	31	0.78	100
Total	3,964	100	

*Source: Generated from Ghana Living Standard Survey data (GLSS5, 2005/06)

Table 4: Percentage distribution of the market structure of the various crops

	pre harvest	farm gate	market trader	consumer	state corp.	cooperative	exporter	Other
Maize	1.2	23.42	63.2	10.14	0.06	Na	0.13	1.85
Cassava	3.06	34.04	51.32	10.95	0.1	Na	Na	0.52
Groundnut	0.59	38.13	54.49	4.05	0.06	0.06	0.06	2.56
Millet		18.8	71.79	8.55	Na	Na	Na	0.85
Rice	0.17	45.67	43.08	3.81	3.29	0.52	0.35	3.11
Yam	0.76	31.26	57.94	8.01	Na	Na	0.64	1.4

*Source: Generated from MiDA data (GLSS5+, 2008), Na = not available

Analysis of the GLSS5 data on Maize, Beans, Sorghum and Rice also makes interesting findings to support popular perception that pre-harvest contracts by middlemen provide lower farmgate prices to farmers (**Table 5**). Selling directly to consumers provide higher prices followed by sales to a market trader and at the farm-gate.

Table 5: Average farm-gate prices offered by the different marketing channel (2005/2006)

	All channels	pre harvest	farm gate	market trader	consumer	state corp.
Maize	754.34	626.76	744.45	758.91	794.03	1671.97
	(1655.33)	(1441.27)	(1241.97)	(1735.24)	(1284.11)	(3856.62)
Beans	1222.50	454.45	1247.67	1262.69	454.89	
	(2045.00)	(156.21)	(1701.98)	(2107.90)	(286.38)	Na
Groundnut	1761.95	1864.97	599.57	1847.50	772.93	Na
	(13304.07)	(3782.63)	(927.51)	(13835.81)	(1228.71)	Na
Millet	1263.87	1632.10	1010.15	1277.55	Na	Na
	(2908.47)	(2391.87)	(2403.25)	(2958.06)	Na	Na
Sorghum	971.00	270.79	1791.32	900.61	Na	Na
	(1420.20)	(81.17)	(2203.99)	(1308.29)	Na	Na
Rice	926.72	273.11	504.79	910.62	2341.29	Na
	(2174.49)	(152.98)	(507.22)	(2163.40)	(3347.65)	Na

*Source: Generated from Ghana Living Standard Survey data (GLSS5, 2005/06), Na = not available
*Standard deviations in the parentheses

Middlemen in different markets enjoy different rates of gross market margins. **Table 6** below presents the different gross market margins of the different categories of middlemen and for different commodities. For five food crops, namely, maize, cassava, groundnut, and millet, middlemen in the Northern region enjoy higher gross margin of 0.65 on the average than in the other regions, with the highest gross margin in the yam market. Those in the Ashanti and Central regions also enjoy relatively high gross margins in these products.

Table 6: Market margins in the various regions, 2008

	Region					
	Central	Accra	Volta	Eastern	Ashanti	Northern
Maize	0.548	0.514	0.51	0.504	0.499	0.706
Cassava	0.431	0.612	0.585	0.486	0.529	0.799
Groundnut	0.602		0.614	0.688	0.693	0.796
Millet	Na	Na	Na	0.243		0.533

Rice	Na	0.728	0.604	0.784	0.659	0.752
Yam	0.664	0.511	0.845	0.738	0.789	0.806

*Source: Generated from MiDA data (GLSS5+, 2008), Na = not available

Local rice traders enjoy very high gross margins generally with the highest gross margin in the Eastern region and the lowest gross margin in the Volta region.

In the Northern region where higher gross margin exists for most of the crops, it has been observed that the markets are characterised by the combinations of farm gate buyers and market traders. On the other hand, the Eastern region where the gross margins are the least is dominated by market traders.

Table 7: Leading marketing channels for various crops across the regions

	Region					
Crop	**Central**	**Accra**	**Volta**	**Eastern**	**Ashanti**	**Northern**
Maize	Market trader 74.07%	Farmgate buyer 55.10%	Market trader 63.69%	Market trader 64.79%	Market trader 67.28%	Market trader 50.42%
Cassava	Market trader 54.00%	Farmgate buyer 55.10%	trader/farmgate 48.87% / 34.51%	Market trader 58.84%	Market trader 46.56%	Farmgate buyer 56.82%
Groundnut	Local market 50.00%	Na	Market trader 70.19%	Market trader 61.83%	Market trader 65.22%	trader/farmgate 51.62% / 41.84%
Millet	Na	Na	Na	Farmgate buyer 66.67%	Na	Market trader 72.49%
Rice	Na	Farmgate/state 48.84% / 41.86	farmgate/trader 42.86% / 34.29%	Market trader 75.00%	Market trader 67.57%	farmgate/trader 47.36% / 44.71%
Yam	Market trader 84.07%	Na	trader/local mkt 42.42% / 32.32%	Market trader 64.57%	Market trader 61.18%	trader/farmgate 51.68% /40.94%
Bean	Na	Market trader	Market trader	Market trader	Market trader	trader/farmgate

		50.00%	61.43%	75.00%	86.67%	58.90% /33.85%
Market structure	Market trader 65.07%	Farmgate buyer 48.40%	Market trader 58.00%	Market trader 63.61%	Market trader 64.70%	trader/farmgate 52.73% /39.43%

*Source: Generated from MiDA data (GLSS5+, 2008), Na = not available

Table 7 above presents the percentages of each of the marketing channels for the various crops. Market traders play the dominant marketing role for most of commodities in the Ghanaian market. They are the main player in the supply chain for almost all products in the agriculture sector. Except for the market of rice where they are the second marketing channel used to dispose of local rice produced in the country with farmgate buyers being the main marketing channel.

4.2 Findings

In the descriptive **Table 8** below, the crops under study were cultivated on an average farm size of 3.5 acres and five percent of farms are located in communities where irrigation is practised. About 87 percent of the farms are located in rural areas and about 45 percent of them engaged in some form of pest control. About 86 percent of the farmers use modern techniques on their farms and 83 percent of them had access to extension services. About 21 percent of the farmers used improved seeds and made use of one storage facility/service or the other. On the average, these farmers have about five years of schooling. Most (39%) of theses farms were located in the Northern region followed by Eastern region with 25 percent. Greater Accra region has the lowest number of farms.

Table 8: Descriptive of regression Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Irrigation	7154	0.05158	0.221192	0	1
Average Farm size (Acres)	7274	3.468979	4.016264	0.438	128.9116
Years of schooling	7263	4.648768	5.2489	0	16
Rural	7320	0.86612	0.340546	0	1
modern tech	6019	0.86011	0.346902	0	1
Pest control	6019	0.445257	0.497035	0	1
Storage	6019	0.014454	0.119364	0	1
Extension	7078	0.837949	0.368524	0	1
Improved seed (%)	7320	20.83008	33.3336	0	100
Central region	7320	0.04194	0.200466	0	1
Greater Accra	7320	0.022541	0.148445	0	1
Volta	7320	0.135656	0.342446	0	1
Eastern	7320	0.252869	0.434686	0	1
Ashanti	7320	0.160929	0.367491	0	1
Northern region	7320	0.386066	0.486879	0	1

The descriptive are without controlling for other variables in determining the gross margins for the various crops. After taking into account all the variables in an OLS regression the results are presented in **Table 9** below.

At the market place, it is expected that the higher (lower) the quantity of the crops supplied by the farmers the lower (higher) the farm-gate prices offered them leading to higher gross margins, all things being equal. This phenomenon has been evidenced in our results. The quantity sold of the crop is a statistically significant determinant of the gross margin of most crops, Cassava, cocoyam, groundnut, millet and rice, all of them at one percent significant levels.

Besides, variables that have the tendency to increase the supply of crops have seen high gross margins between farm-gate prices and the market prices. Farmers who make use of high technology in the farming process are able to receive relatively high farm-gate prices for their crops, especially for crops such as maize, groundnut and cocoyam. In communities where there are large scale productions, as proxied by the average farm size, gross margins are higher for most crops except yam and maize. The results are all statistically significant at one percent.

Because of large scale production, supply to the market is relatively high hence farmers are offered relatively low farm-gate prices.

Pest control on the farm is associated with high relative farm-gate prices for especially rice, millet, cocoyam and cassava. These results are highly statistically significant. Pest control is likely to increase the quality of the produce of farmers. These produce are offered relatively high farm-gate prices unlike produce from farms where there is no pest control. Use of improved seeds is also very important in determining the gross margin for most of the crops under study. In the case of yam, rice, millet and groundnut, the use of improved seeds are associated with lower gross margins. The higher the percentage of farmers who use improved seeds the lower the gross margin in that locality. Just as it is in the case of pest control, the use of improved seeds may be associated with higher quality of the produce. This therefore brings about relatively high farm-gate prices to farmers who make use of improved seeds. On the other hand, use of improved seeds is associated with higher gross margins for cocoyam and cassava. This pattern could be explained as, the improved seeds being associated with increased supply of the produce in the community. Thus, the higher the percentage of the farmers using improved seeds in that community, the higher quantity supplied increases thereby putting a downward pressure on the farm-gate prices.

Table 9: Estimation results for determinants of Gross Margin

	Cassava	Cocoyam	Groundnut	Maize	Millet	Okro	Rice	Yam
Quantity sold	0.000002 ***	0.00001 ***	0.00002 ***	0.0000008	0.00003 ***	0.00004	0.00001 ***	-0.00000003
	(0.0000005)	(0.000002)	(0.000002)	(0.0000006)	(0.00001)	(0.00004)	(0.000002)	(0.00000005)
Distance	-0.000005	0.00030	-0.00030	0.00008	0.00160 ***	-0.00753 ***	-0.00052	-0.00003
	(0.00006)	(0.001)	(0.0002)	(0.00009)	(0.0006)	(0.002)	(0.0004)	(0.00007)
Irrigated comm.	-0.00072	-0.079 ***	-0.002	-0.020 ***	0.062 **	-0.129	-0.074 ***	0.008
	(0.006)	(0.027)	(0.015)	(0.008)	(0.028)	(0.081)	(0.014)	(0.020)
Avg Farm size	0.00094 ***	0.010 ***	-0.003 *	0.000	0.008 ***	0.064 ***	0.012 ***	-0.0002
	(0.0003)	(0.003)	(0.002)	(0.0006)	(0.002)	(0.017)	(0.003)	(0.001)
Rural	-0.021 ***	-0.018	0.071 ***	-0.018 ***	0.044 ***	-0.293 ***	-0.005	-0.010
	(0.004)	(0.015)	(0.008)	(0.006)	(0.012)	(0.090)	(0.011)	(0.010)
Years_sch	-0.001	0.004	0.004 *	0.0005	-0.004	0.023	-0.010 ***	0.001
	(0.0007)	(0.003)	(0.002)	(0.001)	(0.005)	(0.016)	(0.003)	(0.002)
(Years_sch) squared	0.00007	-0.00012	-0.00029	0.00004	0.00024	-0.00072	0.00065 **	-0.00006
	(0.00005)	(0.0002)	(0.0002)	(0.00009)	(0.0004)	(0.001)	(0.0003)	(0.0002)
tech	0.001	-0.110 ***	-0.050 **	-0.018 ***		0.108	0.142 ***	0.018
	(0.003)	(0.014)	(0.024)	(0.006)		(0.086)	(0.040)	(0.011)
pestctrl	-0.012 ***	-0.048 ***	-0.005	-0.008	-0.040 **	0.288 ***	-0.019 *	-0.006
	(0.003)	(0.016)	(0.007)	(0.005)	(0.019)	(0.063)	(0.010)	(0.009)
strg	0.016		-0.128 ***	-0.050 ***		-0.336	0.033	0.012
	(0.012)		(0.032)	(0.014)		(0.357)	(0.067)	(0.023)
ext	-0.004	-0.007	0.008	-0.001	0.042 *	0.061	0.025 **	-0.003
	(0.003)	(0.025)	(0.008)	(0.006)	(0.022)	(0.067)	(0.011)	(0.010)
% improved seed	0.0001 *	0.0006 ***	-0.0004 ***	0.00005	-0.0022 ***	-0.0018	-0.0020 ***	-0.0010 ***
	(0.00006)	(0.0002)	(0.00008)	(0.00006)	(0.0004)	(0.004)	(0.0002)	(0.0002)
Central	-0.120 ***	0.140	-0.105	0.133 ***		-0.259 *		0.105
	(0.007)	(0.087)	(0.076)	(0.018)		(0.139)		(0.077)
Volta	-0.068 ***	-0.174 **	-0.351 ***	0.045 ***		-0.363 ***	-0.128 ***	0.143 *
	(0.005)	(0.081)	(0.020)	(0.017)		(0.073)	(0.027)	(0.075)
Eastern	-0.073 ***	-0.283 ***	-0.233 ***	0.082 ***	-0.323 ***	-0.438 ***	-0.076	-0.035
	-0.005	-0.078	-0.020	-0.017	-0.089	-0.101	-0.050	-0.075
Ashanti	-0.081 ***	-0.293 ***		0.029 *		-0.073	0.117 ***	0.109
	(0.006)	(0.079)		(0.017)		(0.266)	(0.038)	(0.075)
Northern	0.020 ***		-0.078 ***	0.153 ***	-0.298 ***	-0.475 ***	-0.067 ***	0.033
	(0.007)		(0.016)	(0.017)	(0.071)	(0.067)	(0.022)	(0.075)
Constant term	0.159 ***	0.522 ***	0.674 ***	0.146 ***	0.402 ***	0.474 ***	0.418 ***	0.250 ***
	(0.008)	(0.084)	(0.028)	(0.020)	(0.073)	(0.167)	(0.049)	(0.077)
R-squared	0.4942	0.4992	0.3314	0.2768	0.3655	0.6128	0.431	0.3912
Root MSE	0.03001	0.07611	0.10477	0.07827	0.06948	0.24424	0.08945	0.07413

Standard errors in parentheses
Level of Significance = (***) 1% , (**) 5% and (*) 10%

Existence of irrigation in the community to guarantee all year round production is statistically significant in determining the gross margin, especially for rice, maize, cocoyam and millet. Generally, irrigation farming in the community reduces the gross margin except in the case of

millet. Thus, farmers are offered high prices relative to the market prices in communities where irrigation is present than in communities where irrigation farming does not exist. This is probably related to lean seasons when the crops are scarce. Those farmers who produce the crops in such seasons are able to get high farm-gate prices for them.

Storage facility in the community, and also available to the farmer, reduces the gross margins for maize and groundnut. Farmers who have storage facility are able to hold unto their produce when the prices being offered them are low. As a result, they are able to get relatively high farm-gate prices for their produce. This is particularly the case for maize and groundnut; and it is statistically significant at one percent in both cases.

Distance to market seems not to be an important determinant of gross margins for most of the crops, except in the cases of okro and millet. Moreover, the effects are different for even the two crops. While the distance to market has a positive effect on gross margin for millet, it has an opposite effect on okro. This means, the distance between the farm and the market decreases the farm-gate price offered to farmers of millet. Traders factor in the cost of transporting the produce to the market place to bargain for lower farm-gate prices.

Generally, the Volta, Eastern and Northern regions are associated with lower gross margins. In these regions, crops such as rice, okro, millet, groundnut, cocoyam and cassava have lower gross margins. Farmers of these crops in the three regions are offered relatively higher farm-gate prices. Maize farmers, on the other hand, have always been offered lower farm-gate prices in all the regions under study (See GIS Maps[2] Below). This means that a particular attention needs to be given to maize farmers. There are huge differences in the prices that are offered to maize farmers and market prices of maize. This has significant effects on the income levels of maize farmers and therefore poverty levels in maize growing communities. A similar result is

[2] The maps produced represent the average farm gate prices for maize, cassava, yam and rice and their corresponding gross margins. Using GIS software (ArcGIS 9.3), the average farm gate prices for the selected commodities and their corresponding gross margins for each of the applicable MIDA districts were computed. On the basis of the computed outputs, the districts layer was symbolized by quantities based on the values of the respective farm gate prices and corresponding gross margin for each commodity. The outputs were then divided into 5 class ranges based on equal intervals between the defined ranges. The results were finally visualized in graduated colours, a cartographic method that uses colour to show values of defined quantities. The lighter shaded districts represent those with lower farm gate prices or gross margins whereas the reverse is true for the darker shaded areas. A legend is indicated for interpreting each map in addition to the labeling of the districts for easy identification.

found for rice farmers in the Ashanti region, yam farmers in the Volta region and cassava farmers in the Northern region. There is the need for policy to address these trends.

There are mixed results for the rural dummy. While some crops (millet and groundnut) experience higher gross margins in the rural areas, others (okro, maize and cassava) have experienced lower margins. For millet and groundnut, farmers are offered relatively lower farm-gate prices in rural areas than in urban communities whilst for okro, maize and cassava, farmers are offered relatively higher farm-gate prices in rural areas.

Figure 1: Farm Gate Prices for Cassava

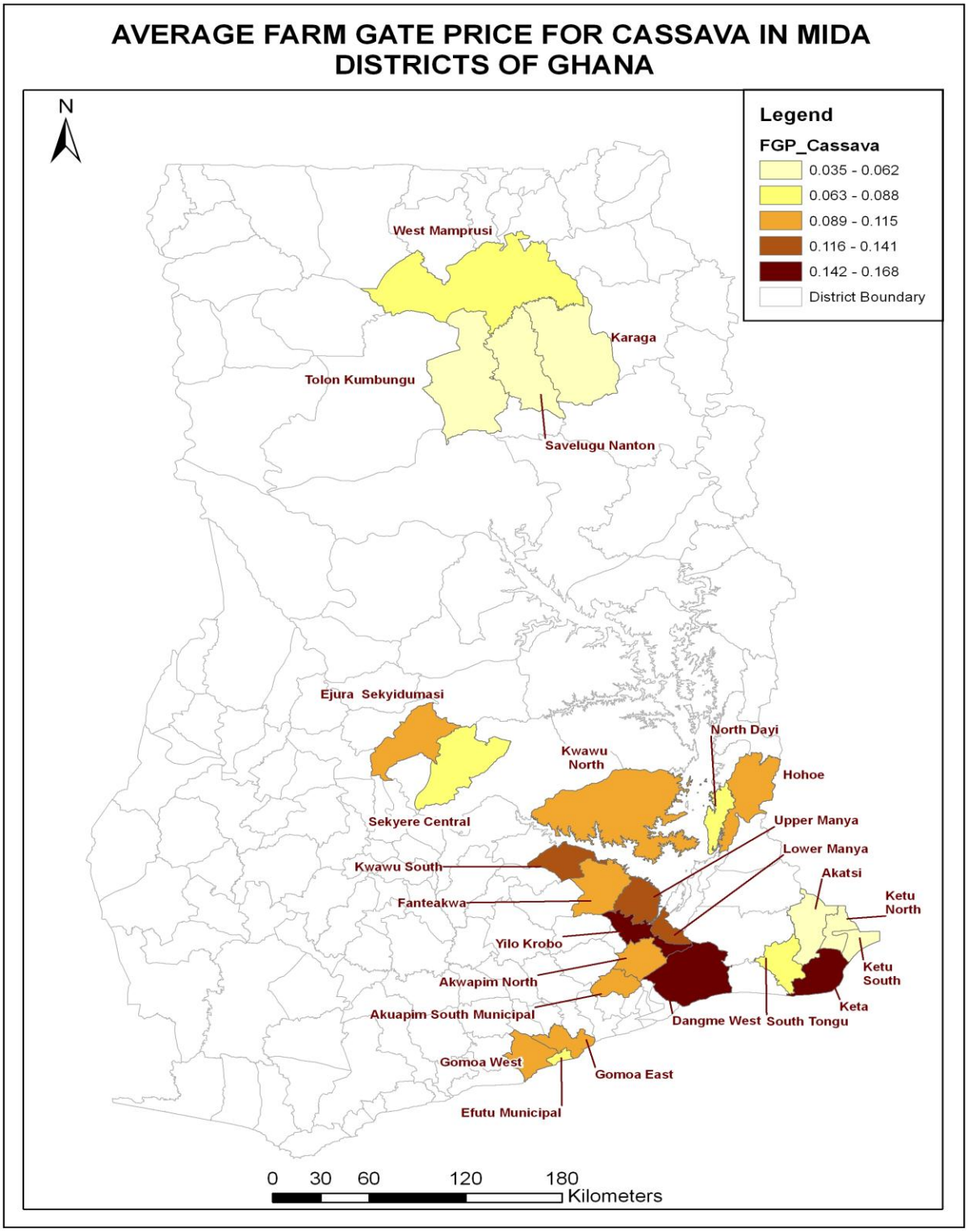


Figure 2: Farm Gate Prices for Rice

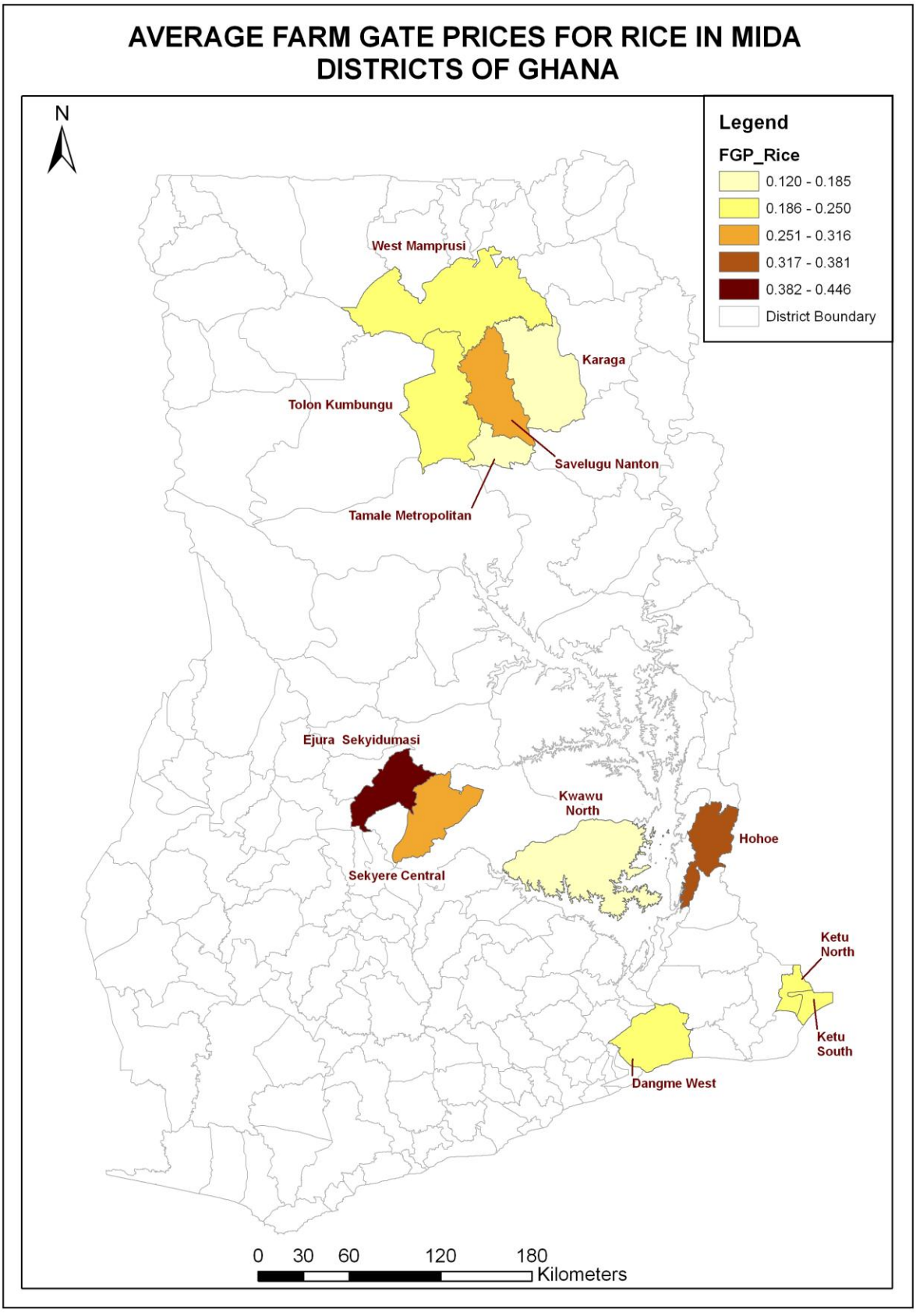


Figure 3: Gross Margin for Rice

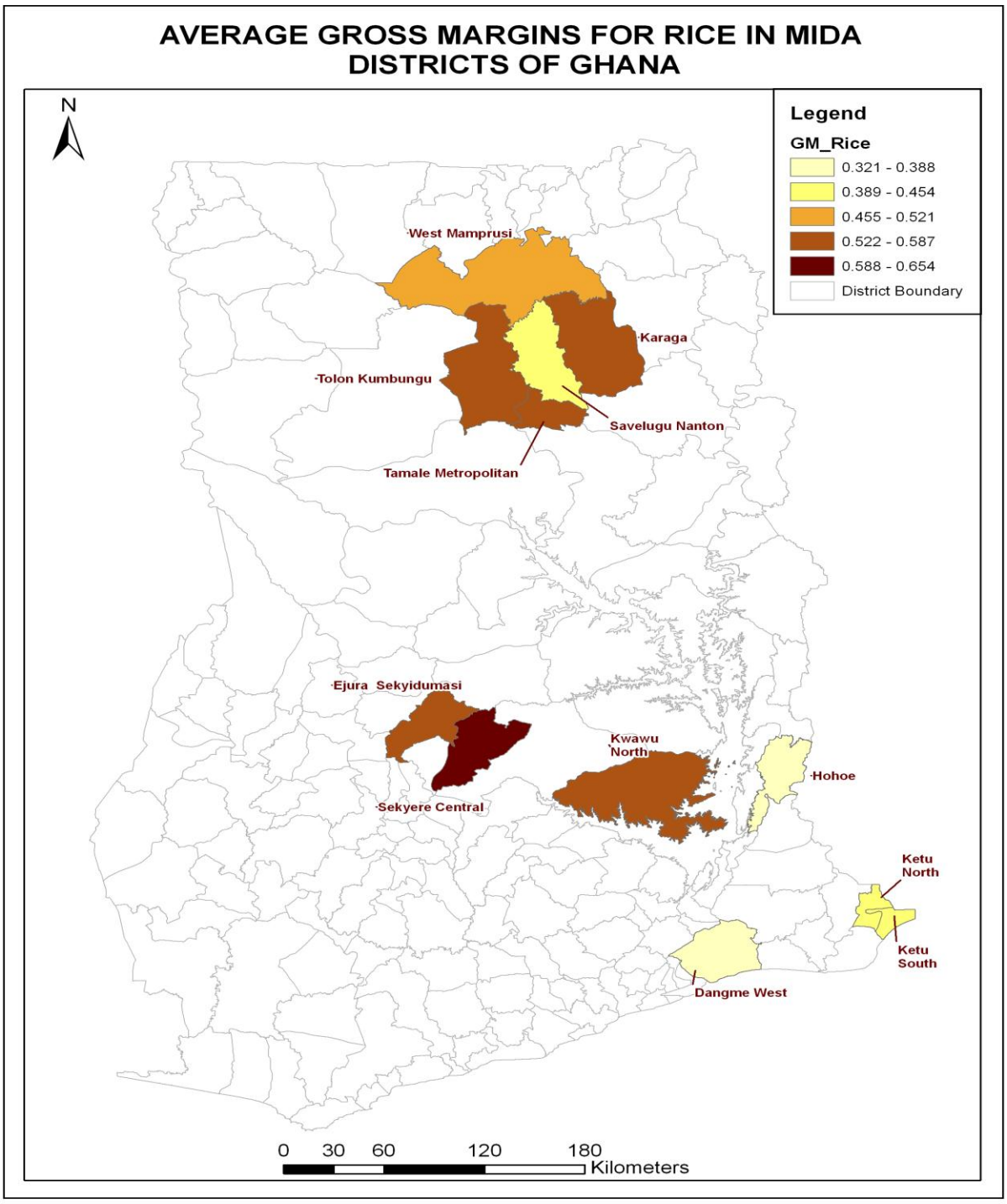
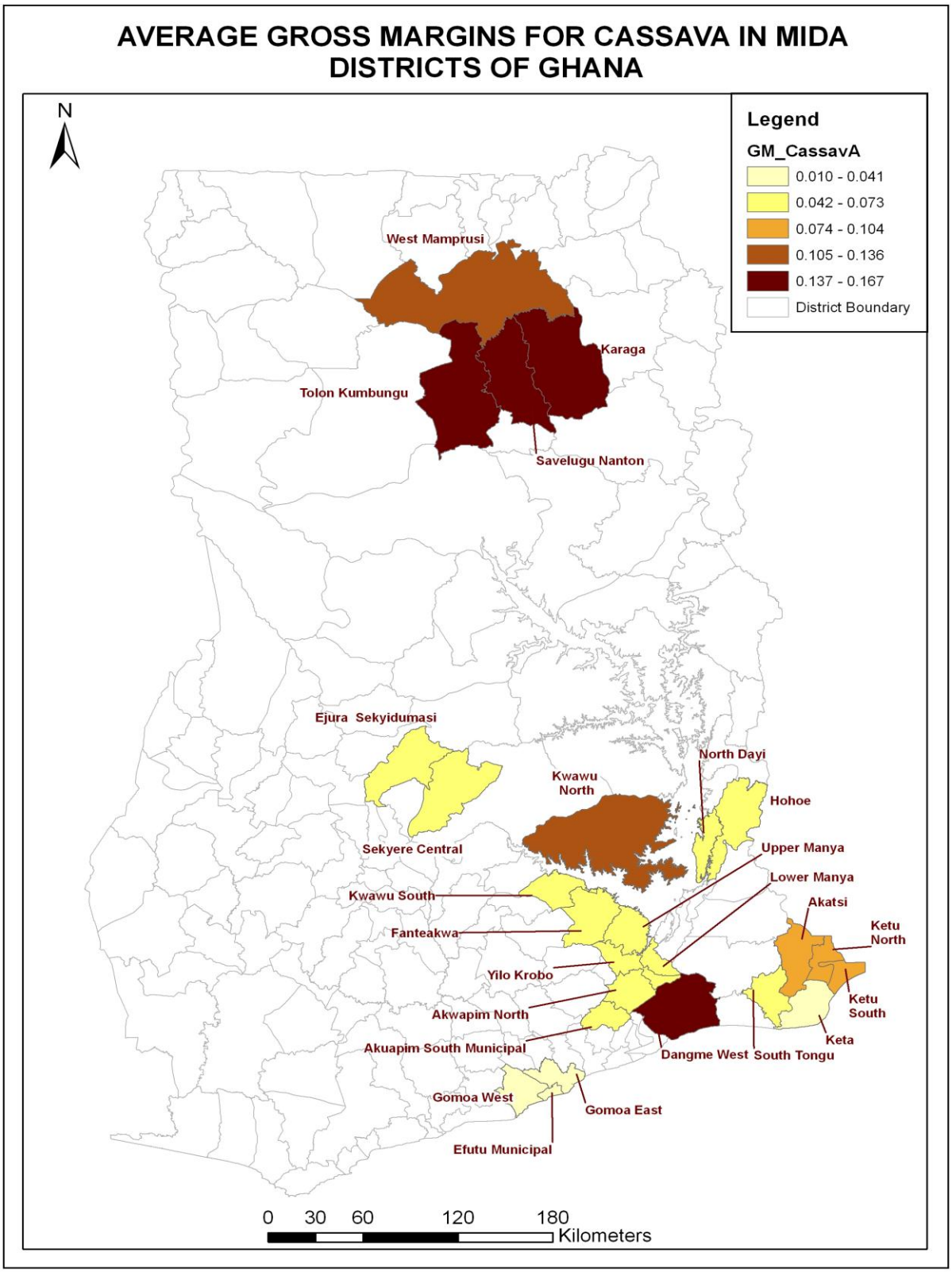


Figure 4: Gross Margin for Cassava



5. Conclusion

The study analysed the spatial and cropwise distribution of margins and relates this to the characteristics of the various markets in order to assess the extent to which middlemen affect agricultural financing, farm revenue and poverty in rural areas. It also investigates the margins between farmgate and market prices for different crops in different regions and ascertains the extent to which farmers use forward sales to obtain finance from marketers. The study made the following findings: first, the MiDA GLSS5+ data results show that pre-harvest contractors often offered farmers higher average farm-gate prices than the average price offered by all marketing channels (in 2008) contrary to the popular perception that such marketing arrangements are characterised by low farm-gate prices. However, analysis of the GLSS5 data from Ghana Statistical Service (2005/6) shows contrary results. Results from crops such as Maize, Sorghum and Rice support popular perception that pre-harvest contracts provide lower farmgate prices to farmers by middlemen. Selling directly to consumers provide higher prices followed by sales to a market trader and at the farmgate. In terms of regional variations in gross margins, the study found that Middlemen in different markets enjoy different rates of gross market margins for different commodities. For five crops , namely maize, cassava, groundnut, beans and millet, middlemen in the Northern region enjoy higher gross margin of 0.65 on the average than in the other regions, with the highest gross margin found in the groundnut market. Those in the Ashanti and Central regions also enjoy relatively high gross margins in these products.

In conclusion, forward sales exist in agricultural markets in Ghana and this is evidenced in the variations in the prices offered by middlemen to farmers. Pre-harvest contracts leads to lower prices offered to farmers compared to when sold directly to consumers or using other forms of marketing channels which in turn has significant implications for poverty. It is believed that the `retreat' of the state in providing credit, marketing and other forms of support to farmers has to a large extent contributed to this phenomena. Thus the study suggests that the state should use its regulatory powers to ensure that the agricultural sector does not suffer unduly from its privatization and liberalization policies. Farmers should also be educated on other forms or sources of credit and marketing channels. They can also form cooperatives to enhance their bargaining power and improve their chances of obtaining credit from formal institutions.

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