Institute of Social Studies

GRADUATE SCHOOL OF DEVELOPMENT STUDIES

The Impact of Liberalization Measures on Production, Marketing and Imports of Maize and Rice in West Africa. A Comparative Study of Ghana and Mali

A RESEARCH PAPER PRESENTED BY

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(Ghana)

In partial fulfillment of the requirements for obtaining the degree of

MASTER OF ARTS IN DEVELOPMENT STUDIES
SPECIALIZATION: AGRICULTURAL AND RURAL DEVELOPMENT

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THE HAGUE, DECEMBER 2003

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DEDICATION

To my mother for bearing with my long silence.

ACKNOWLEDGEMENT

To God is the Glory for this work, my health and very being. My profound gratitude is due Dr. Bridget O'Laughlin, my supervisor, for meticulously guiding me through this research paper with such support and understanding. My thanks goes also to my second reader, Dr. Kristin Komives and ARD Programme Convenor, Dr Haroon Akram-Lodhi for their searching questions during this process that helped and shaped my thought for this paper. To the ARD and PND Staff Groups and in particular Antonella Sorrentino the Programme Administrator and the entire staff of ISS,. Finally, my sincere thanks and gratitude is to the Dutch Government for funding my studies here at the ISS and to Moses Tia for sending to me data from Ghana.

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Chapter One

1.0 Introduction

Food crop agriculture in Ghana and Mali have received varying attention under the IMF/World Bank sponsored Structural Adjustment Programme (SAP) and the liberalization measures have particularly redefined the role of parastatal organisations and thus affected the activities of smallholder producers and marketers of cereal crops. The food crop sub-sector in both countries stagnated or even experienced negative growth prior to the reforms. Although food crop agriculture in Ghana has had relatively less state intrusion compared to Mali, in the period between 1984-1990 the sub-sector grew at 2.1%, well below the target of 4.5% for food self-sufficiency (Sijm, 1993) and in two years during this period it experienced a negative growth rate, against 3% per annum population increase (Hutchful, 2002:71; ISSR, 1992:82 1997:93). On the other hand food production and marketing in Mali until the 1980s has been effectively state administered (Yade et al., 1999; Sijm, 1997). The involvements of the state in agriculture through parastatal organizations and interventionist policies in both countries have been blamed for unsatisfactory performance of the food crop production prompting the implementation of the SAPs in both countries in the early 1980s (Alderman, 1994).

The liberalization of agricultural input and output markets coupled with the withdrawal of input subsidies, in Ghana and Mali, directly impacted, in different ways cereal crop production and marketing. One purpose of the policies was to stimulate production and competitiveness in the agricultural sector and in particular for small-scale food production (Asuming-Brempong, 1994:43; 1998:218; Dembele and Staatz, 1999). To realize these it was necessary to reverse the overvalued exchange rate in Ghana and remove other disincentives such as subsidies on inputs to allow a market-friendly operation of small-scale cereals production and marketing to optimise resource allocation in that sector. Also export duties on non-traditional commodities including, rice and maize were removed and export licensing abolished in Ghana (Leechor, 1996).

In Mali the reforms liberalized the cereal market, in particular rice under a multidonor-financed cereals restructuring programme known as *Programme de Restructuration du Marche Cerealier* (PRMC) (Dembele and Staatz, 1999). This

initiative abolished by 1987 the fixing of producer and consumer prices managed by the state grain-marketing agency, the Office Malien des Produit Agricoles (OPAM) and then in 1994 the overvalued CFA Franc was devalued alongside the other francophone members (Diarra et al., 1999) and abolished the monopolies of the Office du Nger (ON) to organise the production of rice in Mali.

1.1 Problem Statement

The effect of these reforms on Ghana's food crop agriculture remains as unsettled as indeed the prescriptive relevance of the SAP itself to the problem of under development. While the IMF/World Bank and other proponents of SAP in the 1990s touted Ghana as success story critics claim the contrary that the reforms have worsened in real terms smallholder food crop production. On other hand the Malian case appear to enjoy unanimous acclamation as having improved in real terms domestic production of smallholder cereals production (Alderman, 1994; Seini, 2002; Hutchful, 2002; Faucher and Schneider, 1985).

It is against the contrast in the two case studies that this paper investigates why liberalization measures introduced in the early 1980s appear to have triggered positive response from smallholder production in Mali but had a contrary or less successful effect on Ghana's cereal production. This issue is important given that domestic food needs, especially in Ghana, continue to be substantially supplemented by both commercial and food aid imports (Aggrey-Fynn et al., 2003:4; Asuming-Brempong and Asafu-Adjei, 2000:7-8), and the increasing concern for Africa to improve its food security and reduce dependence on imported cereals.

1.2 Background

Ghana is one of the earliest implementers of the IMF/World Bank sponsored SAPs and has been judged by "customary criteria" as successful front-runner in adjustment (Leechor, 1996) and portrayed as adjustment's star pupil although cautiously (Alderman, 1994). On the contrary critics question the blanket "success" conclusions when clearly the use of aggregate macroeconomic indicators alone is not adequate, in particular given that the food crop production grew at only 2.1%, far off the 4.5% per annum target, coupled with the population growth rate of 3% per annum and indeed

between the period 1984-1990 food production experienced negative growth rate in two years (Hutchful, 2002:71; ISSER, 1992:82; 1997:93).

With the expected results of improved food production been disappointing, this paper examines the Ghanaian experience, focussing not on export crop production, but on food production, in particular two cereals that are produced locally but also imported: rice and maize. These cereals constitute a sizeable portion of national diet and often imported to bridge the gap between domestic production and consumption (Asuming-Brempong and Asafu-Adjei, 200:7-8; Pearce, 1992).

1.3 Research Question

In the context of the differences that evolved in the two case studies, the main question the paper seeks to answer is: *Why was the supply response to the liberalization measures by smallholder cereal producers more positive in Mali, than it was in Ghana?* The possible explanations include differences in the existing agricultural production and marketing structures and institutions in Ghana and Mali, as was the implementation process.

Therefore answers to the following *sub-questions* are pertinent to unravelling why the liberalization measures yielded different outcomes in Ghana and Mali:

- How was the production and marketing of cereals organized in Ghana and Mali prior to the reforms, with respect to inputs and credits, the role and contribution of parastatal and private organizations.
- How were the various components of the measures, such as the liberalization of input and product markets, prices and imports implemented
- How was devaluation implemented and what were the responses from smallholder producers and food traders to the exchange rates changes in Ghana and Mali?

1.4 Methodology and organization of paper

The analysis makes extensive use of secondary literature to describe the pre-and-post SAP existing agrarian structure, the processes and infrastructure changes on production and marketing of these cereals in Ghana and Mali. A combination of

secondary literature and FAO statistical data on area harvested, production and yield; inputs and subsidies, and imports data of maize and rice are used to discuss the implementation process and the resulting outcomes.

The paper is organized into five chapters. After the introduction, chapter two looks at the theoretical framework, setting out the perspectives on SAPs and trade liberalization in particular and their impact on domestic production of rice and maize in Ghana and Mali. In chapter three smallholder production and marketing of cereals in Ghana and Mali is described in the respective contexts of pre-and-post liberalization state policies on inputs and credit, produce and prices as well a discussion of the process of implementation of the measures in the two countries.

The fourth chapter addresses the impact of the policies on rice and maize production and marketing in Mali and Ghana by exploring smallholder producers and marketers response to the policy changes. Here macro level data on area cultivated, input use and yield as well as imports of maize and rice in the case studies are examined vis-à-vis the policy measures of liberalization that directly relate to the agricultural sector. Finally chapter five summarizes the paper and concludes on the main findings.

1.5 Limitations

The principal limitation is the lack of comparable data on (i) pre-and post agrarian arrangement and structures for both case studies (ii) the implementation of the measures and (iii) the responses to the process in both cereals, for the case studies. Also the obvious differences with respect to demographic and socio-economic factors affect overall demand for cereals in the two countries. For instance Ghana has relatively higher urban population than Mali and therefore inherently has higher inelastic demand for rice than the Mali. Another problem is the absence of micro-level data to offer more useful insight to smallholder producer and trader activities, hence the over reliance of the paper on macro-level and therefore inferential conclusions.

The paper is decidedly non-technical, an approach that limits its analytical adequacy with respect to the impact of the changes in exchange rate and devaluations on smallholder farmer and trader responses. A discussion for this purpose would require using econometric models such as regression analysis, employing the ARCH

Approach to ascertain price level and variability and their implications on production (Shively, 1996) and cointegration tests that could examined inter-market influences on prices and for that matter production of these crops and indeed the influence of other traded and non traded commodities (Abdulai, 2000).

The paper also appreciates that many factors beyond the liberalisation measures discussed here, such as weather and household dynamics to mention but a few, affect price and production decisions of individuals and groups in the production and marketing of cereals, and equally important most of these factors are not mutually exclusive in their effect. A related limitation is the fact that many other factors may negate the supply response of cereals production in the case-countries, including institutional issues such as property rights, other capitals such as human resource quality and provision (research and extension) and general factors such as political stability.

Another limitation, and in fact a general problem of assessing the impact of trade liberalisation, is how to examine the extent to which trade liberalisation measures have been implemented and what other policies may have contributed to the outcome of such reforms. The latter issue complicates impact assessment since such other policies may reinforce or contradict the effects of trade liberalisation measures (Dijkstra, 1997:10).

The indicators considered in the paper may equally not be satisfactory enough in assessing the impact of the reforms on the production of rice and maize. This is because the use of changes in output levels or growth may be a signal of increase in "allocative efficiency while at the same time it may reflect a lack of dynamic efficiency", respectively referring to efficient reallocation of resources or simply severe stagnation as a result of decline in output. The above factors are some of the limitations to the paper as it answers the contrasting outcomes of the liberalisation measures in the two case studies.

Chapter Two

2.0 Theoretical Framework: Assessing the Effects of SAPs on Agriculture

2.1 Perspectives on why SAP

Structural Adjustment is generally understood as the process whereby economic policies and relevant institutions are reformed with the view to achieving economic growth, through improved resource allocations, increasing economic efficiency and enhancing the resilience of an economy to both domestic and external shocks. The policies of adjustment encompass both short-term stabilization and longer-term adjustment measures in which the former are primarily designed to reduce short-term imbalances between aggregate supply and demand, manifested in balance of payment and budget deficit problems (Duncan and Howell, 1991:5; Stewart, 1994:99). Structural Adjustment Programmes (SAPs) thus seek to enable the 'price mechanism' to determine the allocation and use of resources in the economy by de-emphasizing state interventionism or controls in the economy through market friendly policy instruments. The promotion of free-market environment is often justified by the dismal economic experiences of most African countries in the past three or so decades as aptly expressed below:

> Africa's agricultural export performance deteriorated substantially from 1970-84. The pattern of decline ... and partial recovery in the late 1980s ... follows closely the high levels of distortions in the agricultural sector. These distortions were the direct result of both direct government controls on producer prices for Africa's export crops and the indirect effects of exchange rate policies (Jaeger, 1992:xi).

The measures often prescribed by SAP to address these distortions include privatisation and liberalization, devaluation and the pursuance of fiscal prudence to restore the fiscal balance of the economy and enhance its exports competitiveness and contraction of its imports, through a realistic and flexible exchange rate regime. Privatisation involves the transfer of public assets to the private sector, encouraging the private sector to provide the funds lost as a result of state withdrawal from the economy or the creation of space for private sector participation through the provision of an 'enabling environment'. The objectives for these measures often include reducing the burden (of subsidies on inefficient parastatals) on national budgets, the generation of greater efficiency in resource allocation to stimulate competitiveness as well as attract foreign direct investment and importantly for the agricultural sector

allowing small to medium scale enterprises and farmers access to credits (Mkandawire, 1994:192-193; Faini; 1994:335; Helleiner, 1994:18-19).

To address the overvaluation of the currency, exchange rate reforms have been an integral part of SAP in both countries, seeking to restore a more competitive exchange rate regime through currency devaluation and a free foreign exchange market. When these are well carried out it is argued, local production gains competitive advantage over its international counterparts and this enhances more growth (CDR, 1995). However this analysis is queried on grounds that the direct impact of devaluation on agricultural production is a function of increased boarder prices being passed on to producers, a condition often attainable with the better organized export sector but difficult to achieve in the domestic market. This is coupled with the problem of cheap imports and food aid that depress domestic prices. Another constraint to improving farmers' income through devaluation is the unavoidable issue of increased inputs prices, which erodes any possible gains especially to peasant producers (Sarris and Shams, 1991; de Haen et al., 1992:198; CDR, 1995:33).

These theoretical stances are challenged on grounds that the "price mechanism in a 'perfect world' would deliver an optimum allocation of resources, but would not do so in an 'imperfect world'" as national economies are (Colclough, 1985:27). Similarly the emphasis of SAPs on short-term stabilization measures is criticized as not addressing the deep-rooted structural weaknesses in African agriculture (Thorbecke and Kone, 1994:19; Kofi, 1994). Hence the conclusion that, for a viable SAP, "[a] superstructure of agrarian development strategy 'with an institutional development face' must be in place" to build the needed capacity in Africa (Kofi, 1994:54). SAPs also overlook the external causes of the African crisis that warranted the introduction of these Programmes in the first place and that these exogenous constraints still persist in the form of unfair terms of trade and subsidies in developed countries. Therefore critics of SAPs argue that the measures worsen the vulnerability of less developed countries to the asymmetries of world trade.

Analysing the neo-classical production function upon which the SAP's trade policies and subsidies are founded Geier (1995) similarly agues the inappropriateness of the policies, especially relating to peasant production. The argument is that the

assumption that relative increases in food crop prices leads, ceteris paribus, to increased food production is flawed. This is because peasant production, as in West Africa is dictated not primarily by income, but by consumption and that peasants will decide not necessarily to maximize profit but more generally utility (Geier, 1995:58). This view is echoed in the statement that peasants in the uncertainty of rainfed African agriculture would seek to minimize risks rather than profits (Ellis, 1993). These perspectives inform the conclusion that in the African context a policy that seeks to increase food production, even for the market, cannot be confined to the food market or agricultural sector but should proceed in tandem to address the socio-economic and structural bottlenecks, both domestic and international to enable smallholder producers and traders function physically and institutionally (Geier, 1995:61).

The policies of SAP are also theoretically contradictory to long-term developmental objectives in a number of ways. These contractions include, first a conflict between cuts in government expenditure and the need to sustain or expand public infrastructure and second the demand-restraint policies, such as credit cutbacks and deflationary monetary policies are unfavourable for domestic and foreign private investment. Thirdly the almost non-discriminatory nature of import liberalization conflicts the developmental imperative of diversifying production. There is therefore the argument that the "[sudden] and sharp reductions in protection rates are responsible for the observed de-industrialization process" (Thorbecke and Kone, 1995:49) in Africa and this point is akin to the conflict between policies that are pro-expansion of traditional primary exports and the need to diversify towards non-traditional ones. This contradiction is said to partly account for the deterioration of terms of trade. And not the least there is also the charge that SAPs are incomplete, in that they correct macro-economic distortions but lack the complementary measures that will energize agricultural supply response satisfactorily and these measures include modification of credit markets and foreign investment, inline with local capability and peculiarities.

There are also empirical setbacks to SAPs. The experience reveals so far that the IMF policies of stabilization are anti-poor because the higher taxes and interest rates they prescribe squeeze out the private sector and this is obstacle to long-run growth. Again the elimination of subsidies on food, education and health decreased real income and

led to such measures to mitigate the effects, a case in point was Ghana's Programme of Action to Mitigate the Social Cost of Adjustment (PAMSCAD) in 1986 (Degefe, 1994:53; Hutchful, 2002). In addition to these problems the deterioration of terms of trade is as culpable as the decline in exports, a problem attributed to external bottlenecks as outlined earlier. For example in the 1990s sub-Saharan African (SSA) exports valued 34% less than they did in the 1980s and even then the impact of interest rates and terms of trade shocks on GDP was 30% more than it did a decade ealier in the 1970s. Between 1970 and 1990 the terms of trade on minerals and agriculture exports also fell by 50 and 30 percentage points respectively. The effect of these combined precipitated the decline of African economies and which SAPs still do not actively address (Degefe, 1994).

The "crowding out" of private sector argument often levelled against state involvement in the economy is contested also as ignoring or disregarding the fact that economic growth is a function of the level of capital stock (including physical infrastructure) and this prerequisite, is mostly state provided in SSA. Therefore state expenditure cutbacks negatively affect new projects, the maintenance of old ones and essential recurrent expenditure on social services such as education, health and transport and research and extension

These problems have reflected in the supply response of agriculture to SAP, which have proved unsatisfactory. The elimination of subsidies and price controls raised cost of production while the unbridled liberalization of imports did not allow rise in output or prices due to depressing effects of such imports. The theoretical and empirical limitations of SAPs notwithstanding, a common position is that in the absence of adjustment the foreign finance and capital inflows would not have come to salvage, desperate as they were these economies (Thorbecke and Kone, 1994:38). Proponents even present more positive stories of SAP.

A World Bank report entitled Adjustment in Africa: Reforms, Results and the Road Ahead concluded that the biggest improvement of the reforms have been in the macroeconomic sphere and in agriculture in agreement with Loxley's 1988 analysis on Ghana's performance which concluded that based on the targets set out at the beginning of the Programme, the outcome has been a remarkable success (Loxley,

1988). However in another study and based on the same objectives outlined in the document: Ghana Agricultural Policy-Action Plans and Strategies1984-1986, Kofi (1994) arrived at the contrary conclusion that very few of the objectives have been met. He identifies that " the capital intensive strategy of agricultural development may be technically efficient but not price-efficient. It seems that the emphasis on modern production methods at the expense of the traditional or peasant systems of production was inappropriate"(ibid: 11).

2.2 Trade Liberalization

Trade liberalization as an instrument to rationalize the price incentive system and improve the competitiveness of local producers is therefore said to be inadequate (Leechor, 1996:165) and in the light of the alternative views raised above, non-price factors are as relevant in most developing countries (Chhibber, 1988:45). However given that there is strong association between macro-policy (in particular exchange rate policy) and aggregate export growth and, agricultural being the largest export sector in Sub-Saharan Africa, a common ground is that neo-liberal policies of SAP need not be dismissed but they should consider non-price constraints such as the inadequate rural infrastructure and the low and declining fertilizer use in these countries (Thorbecke and Kone, 1995:45).

2.3 Trade Liberalisation measures and the agricultural sector in Ghana

The impact of trade liberalization on agriculture especially on food crop agriculture thus remains a contested issue in Ghana. A 1990 report by the Ministry of Agriculture, Ghana (1990:2) paints a rosy picture of the process when it claimed that "the adoption of market-friendly policies is affecting the incentives to engage in various agricultural activities and as a result agricultural growth is on the rise". However, while there has been some progress such as the reversal of the 1.2% decline of the sector between 1970 and 1980 to a 2% growth per annum between 1985 and 1994 with respect to the SAP's objective of 4% growth rate (World Bank, 1993:7-11) the ministry's conclusion is an over statement. This is because between 1990 and 1995 average agricultural growth remained at 2%, below the target and even against a high population growth rate of 3% per annum (Gibbon et al., 1993; ISSER, 1995:71; Awanyo, 2001:2).

This poor rate of growth of the agricultural sector is attributed to the lop-sided policy of the SAP with respect to its over emphasis on industrial and export crops to the detriment of food crop agriculture (Kofi, 1994), and a World Bank divisional chief eventually concedes that in the case of Ghana for long time agriculture was synonymous to cocoa production and that "this was a blind spot" (see Armstrong, 1999:80).

2.4 Trade Liberalisation measures and the agricultural sector in Mali

In contrast, many assessment of Mali indicate a general improvement in cereal production and marketing following the reforms (Sijm, 1997:203; Diarra et al., 1999). The objectives of Mali's liberalization programme were largely the promotion of cereal food production through the elimination of operating deficits of the state owned agencies in production and marketing of cereals (Becker and Camara, 1992:249). The impact of these on prices of coarse grains as production increased after the droughts was dismal despite the unprecedented buying of 93,000 tonnes by the state to support prices. However the situation in the rice sub-sector was widely successful. In addition the devaluation of the CFA caused prices of imported rice rise by 50% prompting a corresponding rise in the price of locally produced rice by 23% within two weeks. This changesshifted demand for rice away from imported rice to the local rice which became cheaper and according to the SIM, farmers in the ON received between 67 and 82 percent of the increased prices in the market (Diarra et al., 1999:15-16).

Chapter Three

3.0 The Organisation of Smallholder Cereal Production and Marketing before liberalisation and the process of liberalisation.

This section discusses the role of organisational and regulatory policies in shaping the production and marketing of food agriculture in the two countries. In this regards government through the contribution of parastatal institutions versus independent actors in the production and marketing of rice and maize in the two cases is examined.

In Ghana the state has involved in the food crop sub-sector until 1990 under different guises and names pursued the same goal of influencing agricultural production through pricing and marketing policies. In Mali however the state until 1987 actively and effectively directed agricultural production through the operations of the parastatal organisations.

3.1 Public and Independent Cereal Producers and Traders in Ghana

Subsistent farmers with negligible involvement of commercial enterprises have generally dominated food crop agriculture in Ghana. Apart from the immediate post independence period where state experimental farms were attempted it has generally not effectively involved in food production and where it did, it has been to limited to the provision of irrigation services at few places including at Vea and Tono irrigation projects in the upper Regions and along the Accra plains, most of which have proved to non-profitable. Therefore the role of the state in food crop agriculture is arguably only in "marketing" through the agency of the GFDC since 1971.

Since the 1970s the Task Force, the Food Distribution Corporation and Grains Marketing Board have been merged under the Ghana Food Distribution Corporation (GFDC). In the 1970-1980 decades the GFDC functioned as parastatal organisation in cereal marketing and distribution, concentrating on maize and rice without involving in actual production until the SAP of 1983 that marked the beginning of the end of GFDC as marketing agent in 1990.

Table 3.1 Selected Policy Measures of the Reforms Directly Related to Food Agriculture in Phases

Measures /Phases	Ghana			Mali		
	1983-86	1986-92	1992-2000	1981-86	1987-92	1992-94
Pricing Reforms	-Currency devaluation -Removal of price controls -Reducing agricultural inputs subsidies -Increases producer prices of cocoa	-Market oriented Foreign exchange auction -Guaranteed minimum price for maize and rice increased	-Guaranteed minimum price for staples abolished -Agric input subsidies removed	-Measures to end fixing prices -Agric input subsidies reduced	-Agric input subsidies removed	Cereals price support abolished
Monetary Policy Reforms	-Tariffs and duties rationalised	-Abolish Required lending to agric	-Procurement of agric input privatised	-Parastatals made illegal		CFA Devalued
Structural Policy Reforms	-Import controls removed -To increase cocoa production	- SOEs Divested[+] -Increasing cereals output -Program to invest in public sector		-Private cereal trading legalise	PRMC - continues	PRMC – restructuring monopolies completed

Available data indicate that the GFDC had insignificant influence on the activities of smallholder producers and marketers. They had the freedom to sell to the GFDC or not and indeed resort to this only in times of difficulty. The GFDC therefore as seen in the quantities it actually purchased (Table 3.2) was an insignificant player in the cereal market. It bought less than 8% of the total domestic production of maize and rice and was not even punctual at this (Seini, 2002) thus failing the price support scheme intended to promote. This contrasts with the Malian case where the OPAM bought over 30% of domestic production of rice through the Office du Niger. (See Table 3.4).

Table 3.2 Ghana: Official purchases of Maize and Rice by GFDC, 1982- 1989

	Official purchases in tonnes		As % of total production	
	Maize	Paddy	Maize	Paddy
1982	5000	---	1.9	---
1983	7500	---	5.4	---
1984	18,500	471	3.2	1.7
1985	17,619	3,744	4.5	4.7
1986	13,601	1,970	2.4	2.8
1987	11,864	1,600	2.0	2.0
1988	17,236	4,900	2.3	5.8
1989	5,205	3,184	0.7	4.8

Source: Sijm (1997)

The insignificant level of purchases by the GFDC conveys the failure of the guaranteed minimum price scheme and therefore any impact of the GFDC on smallholder producers. Even though other actors such as the Grains Warehousing Company and public sector poultry and feed mill establishments and market women retailers were under the GFDC, they unofficially dominated the cereal market. The market women in particular operated in networks private wholesaling and retailing of rice and maize and the networks are built and maintained on trust and ethnic ties (Abdulai, 2000:335).

The large wholesalers among these networks have spatial arrangement that allow them to obtain supplies directly from farmers or through resident assemblers, who then sell these to long distance traders in urban markets. In the case of maize, which is traded in unprocessed form, traders often perform exchange and facilitating functions (Alderman and Shively, 1995; Abdulai, 2000).

Abdulai (2000) characterises the small scale and large-scale traders in cereal trading respectively as 'limited marketing firms" and "price-and distribution oriented firms". The wholesalers either take delivery of goods to sell for profits or engage in the chain as commission agents for the assemblers, who buy from rural markets, houses and farmers to sell in urban and market centres.

3.1.2 Fertilizer and input use in Ghana

Through the Ghana National Procurement Agency (GNPA) the state until 1984 was responsible for importing fertilizer in to the country. This task has since been assigned to the Crown Agents (CA) following the privatisation of the fertilizer market. Prior to

1984 agro-inputs were transported to regional and district depots, where they were sold to farmers at prices determined by the Ministry of Agriculture (MoA) hence the effectiveness of the subsidies that the state provided since 1968. These prices were kept uniform through out the country with minimal impact on prices at remote places (Jebuni and Seini, 1992). Since the policy changes that started in 1983 the fertilizer market has become brisk with multiple players from the private sector, especially after 1990. They include key dealers such as Chemico Ltd, Dizengoff, Wienco Ghana Ltd, AGRIMAT Ghana Ltd and OBEK Agro Services. However, while the increase participation of the private sector in the input market may be welcome it is instructive to indicate that most of these private companies target only big fertilizer users such as the large irrigation projects, tobacco producers and the Oil Palm Plantations at Bonsu and Twifo, to the detriment of small scale farmers at remote places who have problems of ready access to fertilizers.

The distribution of fertilizer in Ghana is now broadly a two-way channel, flowing directly to farmers, and indirectly through private dealers such as Primax, Jasmedi Group, Paradi Farms the and Agricultural Development Bank (ADB) or through small-scale rural retailers who number up to 800 and scatter around the maize belt of Techiman, Wenchi, Kintampo and, Afrancho, Akumadan and Offinso, all in the Brong-Ahafo and Ashanti regions of Ghana and few up north at Tamale and Bawku The intermediaries take delivery of their allocation directly from warehouses in Tema for further distribution through the rural retailers in the districts capitals and farming communities(www.afamin.net/ghana).

3.1.3 Agricultural Credit in Ghana

The source of credit for smallholder farmers in Ghana has been the rural financial system comprising the informal and formal financial market. Informal credit however remains the main source and includes non-institutional credits provided by family relations, friends, private moneylenders and traditional rotational savings and credit associations known as "susu". The informal financial system has the advantage of flexibility despite its infamous exorbitant interest rates, hence the establishment of some 120 rural banks and 300 credit unions by the government since the early 1990s (Sijm, 1997; Jebuni and Seini, 1992).

In collaboration with the Ministry of Food and Agriculture (MoFA) a number of NGOs such as World Vision, the Adventist Development and Relief Agency (ADRA) and Techno Serve have been active in providing credit to peasant farmers. For instance Techno Serve working with the Agricultural Development Bank (ADB) and the Department of Cooperatives introduced in 1989 small farmer inventory credit scheme. This helps farmers to store their produce after harvest with the cooperatives in return for a loan 75 to 80 % of the current value of the stored produce. This loan is either later repaid in cash plus storage and administrative expenses and the stored produce retrieved or the cooperative sells the produce, upon the farmers authorisation, when the prices are better and the proceeds paid to the farmer less storage and administrative costs. The outcome has shown that farmers make up to 70% profit more than the price they would otherwise receive at the time of harvest. Other NGOs such as the Sasakawa Global 2000 have however folded up apparently due to loan default by farmers (Sijm, 1997).

The formal sector has rarely advanced credits to smallholder farmers and in general negligible percentage to the agricultural sector. According to Sijm (1997) even though interest rates on credits from the commercial and secondary banks were heavily subsidized between 1977 and 1989 smallholder farmers did not benefit from this, as most credits were advanced to large scale farmers and parastatal agro-industry. He states that during this period the majority, 60-90 percent of smallholder farmers did not receive any formal credit and the remaining smallholders accessed only credits from the informal or non-institutional sources, prompting the government to directly intervene by requiring commercial banks a mandatory minimum lending quota to agriculture. This intervention was phased out between 1987 and 1990 under the SAP financial sector reforms (Baffoe, 2002).

The fundamental reason for unwillingness of the formal financial institutions to provide credits to smallholder farmers is the low rate of loan repayment, which is explained by the weather dependent, risks adverse nature of the sector (Jebuni and Seini, 1992:18). Loans and advances from commercial banks to the agricultural sector are therefore on constant decline (Table 3.3).

Table 3.3 Loans and Advances to the Agric sector by Commercial and Secondary Banks (%)

Year	Commercial Banks	Secondary Banks
1988	16.6	13.2
1989	15.5	13.4
1990	15.8	16.1
1991	13.6	13.0
1992	11.1	8.7
1993	9.6	7.5
1994	6.6	9.3
1995	5.2	12.7
1996	2.4	17.3
1997	3.2	20.2
1998	2.2	22.2
1999	1.6	23.2
2000	1.0	11.0
2001*	1.0	8.6

Source: Ghana Statistical Service, Quarterly Digest of Statistics.
*Figures up to March 2001

In Table 3.3 loans and advances from bth commercial have been declining since 1988 and since the 1990s the percentage of loans from commercial sources to the agricultural sector has fallen to single digits

3.1.4 Devaluation in Ghana

Ghana' effort at correcting the disincentives in the agricultural sector required significant exchange rate adjustment, hence it carried out a series of devaluation of the cedi, starting with drastic 90% devaluation of the cedi in April 1983. Subsequently a series of devaluations depreciated the cedi to 90 cedis to the dollar in 1986 from a pre-reform parity of 2.75 cedis to the dollar in 1983, then to about 950 cedis to the dollar in mid 1994 (Sijm, 1997). A gradual and continuous devaluation of the currency reduced the inflation from 57% for the period of 1972-83 to 26% between 1983-93.In the period 1993-2000 inflation fluctuated around 32% and has remained double digit (Baffoe, 2002).

The generally depreciative trend of the cedi is said to have had favourable consequences on exports as they became cheaper. They however increased the prices of imports and worsen inflation in the domestic economy (ibid). Except for the traditional export crop, cocoa, non-traditional exports of Ghana grew marginally and to improve the situation to a 20% export earning retaining incentive for the import of input was offered by the government. The marginal success of this inducement probably explains why this facility was increased to 35% in 1987 and then to 100% in 1992. With respect to the smallholder agricultural sector devaluation increased the

cost of credit, probably explaining the failure of farmers to access credits from the formal sources.

The changes in exchange rate also resulted in the rise of prices of petroleum products and this affected the carting of agricultural inputs and products and so reduced profit margins of smallholder producers and traders (Sarris and Shams, 1991).

3.2 Public and Independent Cereal Production and Marketing in Mali

Mali until 1981 adopted an anti-market approach to agricultural production. The state suppressed private enterprises, promoted state led cooperatives and compelled farmers to sell their produce at low official prices to the ON. The parastatal Office du Niger (ON) was in charge of irrigated rice production, processing and marketing and controlled over 85% of the total domestic production (Cisse, 1998:14). Other parastatal monopolies were the *Societe de Credit Agricole et d'Equipement Rural* (SCAER) for agricultural credit and input distribution and the *Office des Produits Agricole du Mali* (OPAM) was responsible for domestic agricultural output marketing. Under the Cereal Market Restructuring Program (PRMC) an epitome of liberalization and privatisation in Mali, cereal production and marketing has been drastically transformed especially since 1987 when the statuses of the parastatals were abolished (Dembele and Staatz, 1999).

3.2.1 Rice Production in the The Office du Niger (ON)

The ON is the largest rice producing area in Mali and is dominated by small- scale farming in which plots in the range of 4.7 to 8 hectares is allotted in arrangement that allowed state control of both the input and product markets. The land is zoned into three categories and graduated according to the quality of water and irrigation services provided by the Office du Niger. These are the RETAIL, ARPON and the non-restored area, in order quality and level of services provided.

In the RETAIL project area there is full water control and regular irrigation services and maintenance of the irrigation network. This is the best quality zone and production is intensive, involving transplanting and heavy use of agrochemicals. The next area of cultivation is the known as the ARPON and it is second to the RETAIL in terms of quality and attention received. Irrigation services are provided but the area is

not well levelled and therefore prone to irregular flooding. Production in the ARPON is thus less intensive and limited amount of agrochemicals such as fertilizers are applied here. The third land-use zone is non-restored and relies exclusively on gravity irrigation and the irrigation network is not regularly maintained. It is therefore the least in quality and farmers have access to fewer inputs compared to their counterparts on the above two areas (Diarra, 1999).

The charges for services provided by the ON to farmers on these three areas thus vary. The extent of state involvement as discussed above is discernible is further illustrated by the percentage of paddy that the state purchased (Table 3.4). According to Sijm (1997) the proportion of paddy bought by the state ranged between 23.8 percent in 1970 and 45.5 percent in 1973. Even after the restructuring of OPAM state purchases are still around quarter of total production. This shows a significant influence on food crop agriculture by the state and contrasts sharply with the GFDC in Ghana that buys less than 10 percent.

Table 3.4 Mali: Official Purchases of Paddy ('000 of tonnes) 1970-86

Year	Quantity	As % of total production
1974/75	84	33.6
1975/76	100	45.9
1976/77	107	45.1
1977/78	66	33.2
1978/79	51	20.2
1979/80	52	31.6
1980/81	32	19.9
1981/82	43	24.3
1982/83	38	29.6
1983/84	32	25.9
1984/85	42	40.0
1985/86	35	18.7

Source: Sijm (1997)

The state production and marketing of rice has been curtailed since the start of the reforms in 1981. Credence to this assertion is the sharp rise in peasant farmer associations at the village levels from less than 10 in the mid 1970s to about 1200 in the 1980s. Also by 1986 some 140 donor support was extended to these village associations in the ON and the growing role of private smallholder farmers and traders is evidenced by the fact that in the 1990s some 2,700 village associations have been officially approved by the state (Sijm 1997).

3.2.2 Agricultural input, Credit and Subsidies in Mali

Agricultural credit and input distribution was monopolised by SCAER, a parastatal organisation that provided farm supplies and credits to farmers through the agency of the Rural Development Operations (ODRs). In 1981 this monopoly was replaced by the Agricultural Development Bank (BNDA) to provide credit directly to farmers through group liability guarantee arrangement in the village associations or indirectly through the ODRs or the National Direction of Cooperatives (DNACOOP) Since the process of liberalisation begun a number of forces now interplay on the input and credit sector. These forces include the removal of subsidies, liberalisation of the input and output market and the devaluation of the CFA Franc (Cisse, 1998:14-15).

Subsidies on fertilizer have considerably been reduced since 1981 when the process of liberalisation started. The prices of fertilizer in the mid 1970 were more than 50% less than their actual cost due to state subsidies on agricultural inputs. These subsidies were substantially reduced in the 1980s to between 15 and 25 percent and were eventually abolished in 1987. In Table 3.5 below the current and relative prices of fertilizer between 1980 and 1990 reveal the evolution of subsidies over this period.

Table 3.5 Mali: Fertilizer Prices in Current and Relative Terms, 1980-90

	A	B	C	D
Year	Urea	Ammonium Phosphate		Price ratio
	CFA/kg	CFA/kg	Urea/Maize	Urea/Paddy
1980	60	70	1.9	2.0
1981	65	70	2.3	1.7
1982	103	108	2.2	2.1
1983	103	108	2.1	1.9
1984	103	108	2.1	1.7
1985	103	120	1.9	1.7
1986	105	194	2.5	1.5
1987	134	194	--	1.9
1988	145	194	--	2.1
1989	145	194	--	2.1
1990	145	194	--	2.2

Source: Sijm (1997)

In columns A and B are current prices of Urea in CFA/kg and columns C and D, the relative official prices of fertilizer/cereal. In 1981 a legislative instrument abolished the fixing of prices of agro inputs by decree thus allowing since then, the market to determine price. In Table 3.5 above the unit price of Urea increased right through the decade. In relative terms, with respective to cereal prices, the price of Urea decreased up to the mid 1980s, indicates the point when subsidies on inputs were completely

removed. This is evident in the relative price of Urea with respect to Paddy where price ratios have increased from 1.9 in nineteen eighty-six to 2.2 in nineteen nineties.

According to Cisse (1998) after the devaluation of the CFA Franc by fifty percent in January 1994 prices of inputs rocketed by about 71% causing the use of fertilizer to fall by 11%. The effect of the increase in fertilizer prices also hurt smallholder farmers, indebted the village associations and hence affected their access to formal sector credits (ibid).

3.3 The Macro Context: Foreign Exchange Rate and Imports in Ghana and Mali

The exchange rate reforms in Ghana were gradually implemented towards a market driven system. In the first phase of the reforms (1983-86) a set of devaluation were undertaken leading to depreciation of the currency from 2.7 to 90 cedis to the Dollar and in 1988 private foreign exchange bureaux were permitted and inter-bank market system replaced the 1987 auction system. According to Baffoe (2002) the devaluation did not cause contraction in total output because of government fiscal prudence but most importantly, donor support with foreign exchange that helped the importation of industrial producer goods.

The foreign exchange regime in Mali was different in the sense that since June1984and indeed since independence in the 1960s. Mali has been one of the seven-member West Africa Monetary Union (UMOA). Characterised by the common currency system and under a common central bank and policies, the seven countries in the francophone were integrated with a fixed exchange rate of 50:1 between the CFA Franc and the French Franc until 1994 it was devalued by 50 percent to the French Franc (Sijm, 1997:450-453; Yade, 1999).

The devaluation had impact more on its coarse grains than on imports on rice per se. It is important to note that before and after the reforms only Mali among the seven-member francophone group had near 80% self-sufficiency in domestic cereal needs and maintains higher export market with the neighbouring countries. Mali recorded substantial increase in exports of coarse grains (millet and sorghum), from annual average of 7,468 metric tonnes in the decade before 1992/93 to 30,000 metric tonnes by 1998/99, registering 300% rise (Dembele and Staatz, 1999; Yade et al., 1999).

3.3.1 Liberalization of Agricultural Market in Ghana

Marketing boards in Ghana for practical purposes imply the Cocoa Marketing Board (COCOBOD) since the GFDC has rarely if ever, realized its objectives and more importantly the focus of the SAP until 1986 almost precluded food agriculture as priority. The GFDC while it was officially in charge of marketing of agricultural products as indicated earlier was ineffective. Therefore it can be said that privatisation of marketing boards in Ghana practically does not refer to food crop agriculture but refers to the cocoa sub-sector.

Food agriculture received effective attention only after 1990 when the Ghana Medium Term Agricultural Development Programme (GMTADP) was launched. Under the programme the Agricultural Sector Adjustment Programme (ASAP) (1991-2000) pursued reducing the role of the GFDC through sale, lease or commercialisation of its processes, properties and infrastructure. The GFDC stopped buying grains to support the guaranteed minimum price scheme (Baffoe, 2002).

The *removal of price controls* started in the first phase (19983-86) was not completed until 1990. In the adjustment phase (1986-92) pricing policy in food crop agriculture involved the raising of guaranteed minimum price for maize and rice (Baffoe, 2002), which however remained ineffective because over 90% of cereals were marketed outside the control of the GFDC; hence the subsequent abolition of the GMP policy in early 1990s was a matter of natural course (Sijm, 1993:131).

Quantitative *trade restrictions* were also only removed in June 1987, when import licensing for rice by private traders was abolished. The importation of maize into Ghana is still however being controlled by the Ministry of Trade through the Ghana National Procurement Agency (GNPA), wholly state owned enterprise even though in practice Ghana hardly imports maize (Sijm, 1993:9).

Subsidies on inputs and fertilizer have been in place since 1968. These included the absence of tariffs on fertilizer imports and prices of fertilizers that were well below the import prices, besides the implicit subsidy of overvaluation of the cedi before the SAP in 1983. Under the ERP since 1983 a number of policy changes, including a

series of devaluations that re-established a market determined exchange rate that increased prices of fertilizers to their actual costs between 1985 and 1989 (see Table 3.6).

Table 3.6 Ghana: Fertilizer Imports, Prices and Subsidies, 1980-90

Year	Total Imports(tonnes)	Compound(Cedis/mt)	Subsidy (%)
1980	60,460	300	65
1981	0	600	45
1982	46,500	600	45
1983	0	1,060	45
1984	48,350	9,000	NA
1985	29,999	9,000	60
1986	20,100	16,000	56
1987	38,070	28,400	42
1988	43,415	46,000	30
1989	47,460	71,000	15
1990	43,350	84,000	0
1991	0	--	0
1992	29,400	--	0
1993	20,160	--	0
1994	24,060	--	0
1995	28,140	--	0
1996	19,840	--	0
1997	56,163	--	0
1998	42,315	--	0
1999	21,993	--	0

Source: Jebuni and Seini (1992)
MoFA, SRID 2000

In addition to these policies, the removal of subsidies on fertilizer was pursued under the liberalization process. As shown in Table 3.6 subsidies on fertilizer were 60% of their cost in 1985 and gradually reduced to zero by 1990, and this reduction of subsidies is seen in the continuous increase in price of compound fertilizer from a low of 600 cedis/mt in 1982 to 84,000 cedis/mt in 1990. It can also be seen that since 1990 the quantity of fertilizer imported to Ghana has fallen to levels far below the 48,000 tonnes of 1984, suggesting a declining trend in fertilizer use since the withdrawal of subsidies in 1990.

3.3.2 Liberalization of the Cereal Market in Mali

The liberalization of food crop agriculture in Mali revolved around the restructuring of the cereal market. The process started in 1981 with a legislative instrument that abolished the monopoly of the marketing agency *Office des Produits Agricole du Mali (OPAM)*, established in 1964 as a monopoly for purchasing, processing, sale, import

and export of all food grains. Until then, it bought cereals directly from village level producers and indirectly through the ODRs at fixed prices. These produce were then sold again official or state determined prices to employees of public institutions, urban consumer cooperatives and to deficit rural areas. The OPAM operated at loss hence its eventual abolition in 1987 under the *Programme* de *Marche Cerealier* (PRMC).

The PRMC was charged with restructuring the cereal market and freeing it up for profitable and active private sector participation. To this end, private cereal trading was made legal in 1981 (Sijm, 1997:425-427). The process of restructuring the market progressed slowly with all the of other public institutions, OPAM, ON and ODRs by 1993 when the process was completed. The fixing of official prices for cereals was abolished and OPAM has since 1987 assumed new roles of managing the National Security Stock (SNS) (Jayne et al., 1996:8; Sijm, 1997:429). However until 1992 the ON still maintained an official price support for paddy (Diarra et al., 1999;8).

3.4 Conclusion

While similarities exist in the two cases the differences in the organisation of the food crop sector out weigh. Both countries have small-scale actors as majority in the production and marketing of cereals. However in Ghana the organization of production is nearly exclusively left to the private participant while in Mali an elaborate state provided infrastructure in the form of irrigation services, official credit provisioning as well as processing and marketing of rice and maize exist and the sole prerogative of state designated parastatals.

The GFDC in Ghana in practice bought not more than eight percent of total domestic annual production, contrasting the case in Mali where over thirty percent of total annual production was bought by OPAM. Also in Mali private producers in state allocated plots made mandatory sales to OPAM through the Office du Niger as oppose the situation in Ghana where farmers had the option of selling to whom they pleased and in fact only sold to the GFDC as a last resort. The GFDC failed to achieve its objective of guaranteed minimum price while in Mali the state succeeded

in fixing producer and consumer price until the late 1980s when the PRMC abolished such monopolies.

The availability of subsidies on inputs until the reforms liberalized the input market is another similarity in the two cases. In Ghana from the immediate post independent period to the close of the 1970-decade witnessed growing levels of fertilizer use as result of favourable policy in the form of fixed exchange rate and availability of subsidies on inputs. However policy reforms from the early 1980s led to exchange rate flexibility, devaluations and the phasing out of the subsidies. The result of these changes is that fertilizer use has declined to levels below those of the 1970s and this is reflected in the volume of fertilizer imports, which have dwindled considerably. In Mali the combined effect of phasing out agricultural input subsidies and the devaluation of 1994 led to 11% decrease in the use of fertilizer in particular for those in the third category in the ON.

Despite the similarities as outlined in the two case studies Ghana smallholder farmers in Ghana are not privileged to the elaborate, extensive and more efficient infrastructure in Mali left after the reforms. This allows farmers ready access to inputs even though the fertilizer market is now privatised. On the other hand despite the enhanced level of privatisation of the fertilizer market in Ghana, with different channels of distribution, remote areas especially in the northern half of the country have sporadic and indeed untimely access to inputs. This is because of the over concentration of fertilizer dealers and distributors to the maize belts of Ashanti and Brong-Ahafo regions where large commercial farmers and plantations such as the oil palm and tobacco plantations provide lucrative markets. The above differences therefore explain the relative success of cereals production and marketing in Mali than Ghana after the liberalisation measures.

Chapter Four

4.0 Smallholder Producer and marketer Response in Ghana and Mali

The response of smallholder food crop farmers and traders to the liberalization measures is examined in this section through an analysis of changes in producer price, input use, yields, production and imports of rice and maize in the two countries.

4.1.1 Producer prices

Ghana's price intervention policy in food crop agriculture has never been effective as the focussed was always on generating revenue through fixing producer prices of cocoa. The pricing and marketing of food crops which started later in late 1960s under the GFDC had the objective of achieving food self-sufficiency particularly in maize and rice through the Guaranteed Minimum Price (GMP) scheme and as indicated earlier it performed inefficiently. Since 1990 the producer price scheme for maize and rice has been abolished.

Prior to the reforms the producer prices of food crops were raised each year although these have proved to be nominal in effect (Appendix 1 Figure1). In real terms the price trend fluctuated and indeed deteriorated steadily between 1984 and 1990 (see Appendix 1 Figure 2). The volatile nature of producer price of cereals indicates the weather dependent character of food agriculture in Ghana, and the " surplus or residual character of food markets", where only negligible proportion of food is sold and bought, even by farmers especially in deficit years (Sijm, 1997:324). On the other hand real prices of cereals generally deteriorated after the reforms in 1983 as seen in Appendix 1 Figure 2. The graph of maize real prices fluctuated between 1984and 1989 then became at around 75 cedis/unit through out the 1990s. The real prices of rice have particularly unstable and continue to fall.

4.1.2 Trend in Fertilizer use in Ghana

In the past three decades the use of fertilizer in Ghana shows a fluctuating trend. From a modest level of about 4.5 thousand tonnes, the figure rose rapidly in the 1970s to about 31 thousand tonnes by 1977 and then decreased rather sharply to 13 thousand tonnes in 1980. Since 1981 the use of fertilizer has not recovered to the 1977 and 1981 levels (Bumb et al., n.d), due to decline in fertilizer use, which has dropped in

that decade to negative 7.6%. Table 4.1 reveals a decreasing trend in the use of fertilizer in Ghana in the 1980-90 decade.

Table 4.1 Ghana: Annual Growths in Fertilizer Use (%)

Year	Nitrogen	Phosphate	Potash	Total
1960-1970	8.8	22.0	-3.6	8.8
1970-1980	20.4	16.5	22.2	20.0
1980-1990	-3.9	-8.7	-13.9	-7.6

Source: Bumb et al.

The general growth of fertilizer use through the 1960-1970 to 1970-1980 is attributed partly to favourable pricing policy and government efforts to promote the use of improved techniques of production, hence the high levels of subsidies. However in the 1980s the changes in pricing and distribution policy and in particular the move from a fixed to flexible exchange rate policy led to a drastic decrease in the use of fertilizer (Table 4.1) as price rose to record levels (Table 3.6). There is clearly an inverse relationship between level of fertilizer subsidies and prices borne by farmers. So while subsidies were reduced pushing prices up, fertilize use declined in response and is borne by the continuous fall in the volume of fertilizer imported in the country (Table 3.6). Since 1990 the complete withdrawal of subsidies on fertilizer coupled with the deteriorating exchange rate, has seen negative trend in fertilizer use (Table 4.1).

4.3 Response of Smallholder Cereal Producers to Changes in Fertilizer Prices in Ghana

Macroeconomic policy changes on devaluation and exchange rates to restore producer price incentives in the agricultural sector increased imports prices and hence domestic input prices. In particular the withdrawal of agricultural input subsidies impacted negatively on the level of input use as prices rose. In Table 3.6 above fertilizer prices increased substantially, between 1985 and 1989 due to the changes on exchange rates the devaluations and the phasing out of subsidies starting in 1983. The drastic rise in prices thereafter contrasts sharply with the pre-adjustment period when prices were virtually constant (Jebuni and Seini, 1992:3) leading to decline in input use hence yields.

The earliest available data, 1970-79, show increased levels in fertilizer use, and this is reflected in quantities of fertilizer imported. The cushioning effect of subsidies on agricultural inputs as seen in Table 4.2 below, below explains the high levels of fertilizer use, when subsidies on inputs are also high. There are therefore direct relationships between subsidies and fertilizer use or imports.

Table 4.2 Ghana: Fertilizer Imports (tonnes) Costs (cedis) Prices Sold (cedis) and Subsidies (%), 1970-79

	Compound				Ammonium Sulphate		
Year	Imports	Costs	Sold	Subsidies	Costs	Sold	Subsidies
1970	8,250	110.6	56	49	81.4	40	51
1971	8,626	122.3	56	54	85.6	40	54
1972	12,307	163.9	56	66	110.7	40	64
1973	16,931	183.2	56	69	155.2	40	74
1974	12,470	353.7	56	84	293.1	40	86
1975	22,241	408.6	56	86	275.6	40	85
1976	43,983	297.5	56	81	227.5	40	82
1977	26,550	306.0	130	58	296.0	100	66
1978	39,360	--	--	--	--	--	--
1979	58,650	--	--	--	--	--	--

Source: Jebuni and Seini, 1992

The volume of fertilizer imported increased continuously over the 1970s when state policy encouraged the use of improved technologies including fertilizers, through inducement in the form of subsidies. However in the wake of the de-subsidisation policy since 1983 the level of fertilizer imports has declined and not recovered to the levels in the late 1970s and this is a proxy indicator of the level of fertilizer use. For instance in 1980 fertilizer imports totalled 60,460 tonnes and by 1999 this dropped to 21,993 tonnes (Table 3.6). The total volume of fertilizer imported to Ghana swung around 40,000 tonnes as the level of subsidies fell gradually from 60% in 1985 to 0% in 1990.

The impact of subsidies on the levels of fertilizer use is examined in relation to productivity of maize below. In Table 4.3 the production of maize, area harvested and yield is shown alongside for the purpose of comparison.

Table 4.3 Ghana: Maize Production, Area Harvested and Yield

	Production	Area Harvested	Yield
Period	Million Tonnes	'000 Hectares	Tonnes/Hectare
1966-1970	0.37	309	1.21
1971-1975	0.43	394	1.08
1976-1980	0.31	307	1.02
1981-1985	0.44	490	0.87
1986-1990	0.64	518	1.22
1991-1995	0.92	634	1.45
1996-2000	1.01	681	1.49

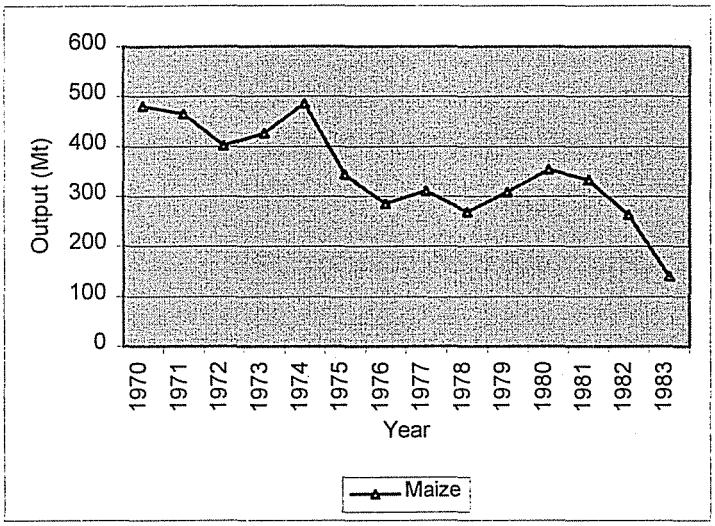
Source: FAO Database

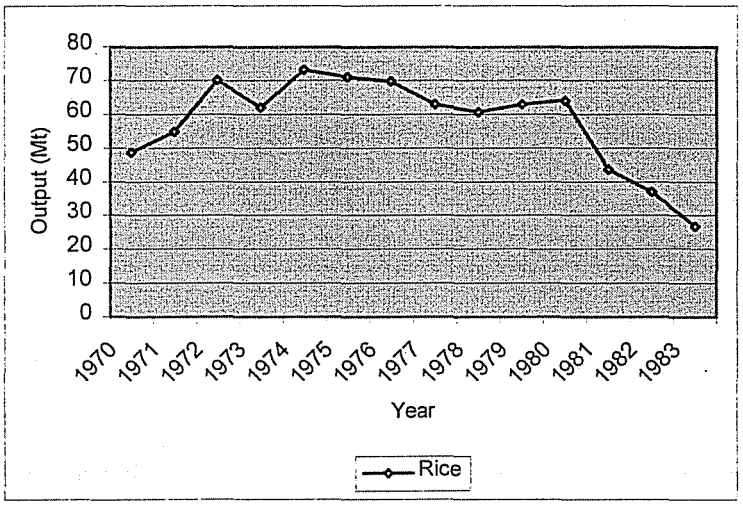
The strong increase in maize production between 1981-1985 is due to expansion in acreage rather than yield improvement (Seini, 2002:23, Aggrey-Fynn et al., 2003:6). This is because granted that subsidy levels and fertilizer use are directly related, it means in this period fertilizer use declined because from 1983 subsidies were being removed and therefore fertilizer use as reflected in the volume of fertilizer imports, which show decline. The implication is that an increase in output level is logically due to acreage expansion rather than due to yield improvement. This is empirically examined as follows.

If the yield for 1983 is taken as the average (0.98mt/ha), yields declined from an average of 1.2 mt/ha in 1966-70 to 0.9 mt/ha in the 1981-85 period (Table 4.3 above). The declines in output in the late nineteen seventies (Figure 4.1 a & b) were due to the general deterioration of the economy following the oil crisis of the 1970s and the attendant debt burden besides successive internal policy mismanagement since the mid 1960s. However the decrease in maize yield between the 1976-80 and 1981-85 periods could be attributed to the impact of the liberalisation policy on agricultural input use. During this period yield declined from 1.02 to 0.87 tonne per hectare, as against an increase in acreage from 307 to 490 hectares and thus supports the argument that the increase in production from 0.31 to 0.44 million tonnes over this same period is indeed as a result of extensification, distress measure of land expansion to cope with declining yield levels.

In general Table 4.3 shows this same relationship of increasing production levels corresponding to expansion in area harvested, while yields fail to show a clear pattern over the three decades. To appreciate the impact of on production per capita, Figure 4.1 a & b give the trend of output in the period just preceding the start of the reforms. As indicated this general falling trend in the 1970s is a result of mal-administration coupled with the exogenous factors of debt and the oil crisis.

Figure 4.1 a & b Ghana: Output of Maize and Rice ('000 Metric tonnes), 1970-83





Source: Adopted and Computed from Baffoe, 2002

The general worsening of the economy decline in output of food crops, as seen in the case of maize in Figures 4.1 a, falling right through from the oil crisis of 1973 to the early 1980s prompting the introduction of the SAP in Ghana in April 1983. The fall in output of maize and rice was 71% and 63% respectively, the 1974-1983 period. Maize output declined from 485.7 thousand metric tonnes in 1974 to an all time low of 140.8 thousand metric tonnes in 1983 as did the output of rice which reduced to almost the same depth at 26.9 thousand metric tonnes in 1983 from 73.2 thousand metric tonnes in 1974. Again using the average (0.98) of the early years of the SAP (1981-85), the averages in Table 4.3 shows that 40 percent of total production over the 1981-85 to 1996-2000 period is accounted for by increases in acreage but not yield and this is confirmed by the fact that yield levels of these cereals are way off their maximum potential. For instance the average yield per hectare of maize between 1990-94 was only 27% of the 5.0 mt/ha maximum yield potential.

In Table 4.4 the output of maize for 1992, two years after the total withdrawal of subsidies, was negative and year on year change was in fact –21.6% as yield per hectare declined by 20%. There was however 7% change in rice output, and a significant 31% improvement in yield, this statistics are relative to the fact that area cultivated of rice decreased by 15% in that year.

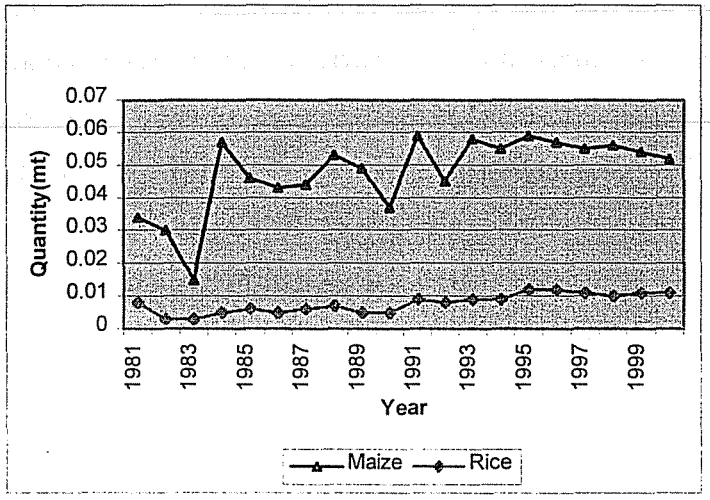
Table 4.4 Ghana: Output, Area Harvested and Yield of Maize and Rice

Year	Output ('000 mt)		Harvested Area ('0000 Ha)		Yield (mt/Ha)	
	Maize	Rice	Maize	Rice	Maize	Rice
1988	600	52	540	52	1.10	2.10
1989	715	72	567	72	1.30	0.90
1990	553	49	467	49	1.20	1.70
1991	932	123	610	95	1.50	1.30
1992	731	132	607	80	1.20	1.70
1993	961	157	635	164	1.50	2.00
1994	940	162	629	184	1.50	2.00
1995	1034	221	669	213	1.60	2.20
1996	1008	216	665	229	1.50	2.10
1997	1021	197	663	223	1.50	1.81
1998	1015	281	697	130	1.46	2.16
1999	1014	210	697	105	1.46	1.99
2000	1013	249	695	115	1.46	2.17

Source: The state of the Ghanaian Economy.
Various issues.

The sudden rise in maize output in 1995 (Table 4.3) can also be accounted for by increases in area cultivated rather than due to *real gains* in output that results from yield improvement that have rather remained virtually stable around 1.5mt/ha through out the 1990s. The lack of improvement in yield is made clearer in Figure 4.2 below where production per capita of these cereals shows that at best response to the liberalization measures remains ambivalent.

Figure 4.2 Ghana: Production per capita 1981-2000



Source: Computed from FAO Database, 2001

The evolution of production per capita of the two cereals from 1981 to 2000 and indicates sharp drop in maize production per capita from 0.03 metric tonnes to 0.015 in the drought years of 1982-83. The final total removal of agricultural input subsidies, including those on fertilizer in 1990 explains the drop in maize production per capita from 0.049 to 0.037 mt/capita in 1992, although production recovered to stable levels from the mid 1990s. This stable rise is therefore accounted for by expansion in acreage (Seini, 2002; ISSER, 1995:84-85) and thus only nominal rather than real gain in rice production. The fluctuating but generally rising import volume of the cereals especially over the 1989-94 period in Figure 4.3 supports this assertion, since food imports can serve as indicator of the level of food balance. It has to be noted that Ghana does not export either crop and therefore the singular importance of food imports, commercial or aid as indicator of the gap between domestic production and consumption.

Analysing Figure 4.2 reveals we notice maize production per capita increased sharply after 1983 and the significance of this needs to be put in perspective. In 1984, Ghana had just emerged from its worst drought in decades (1982-83 season) and amidst this relief was the 1981 "revolution" under the populist Provisional National Defence Council (PNDC) that galvanized extra labour hands from the over one million deportees from Nigeria. Together these provided a record boost to agricultural productivity in several decades and thus accounting for the high output. This phenomenal increase in agricultural output could not however, be sustained as prices collapsed under severe lack of post harvest infrastructure and processing facilities during which smallholder farmer motivation vaporised.

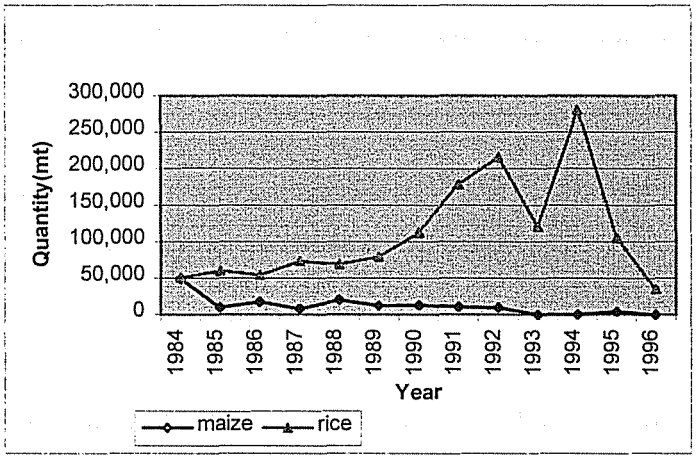
Consequently, maize production per capita in the period between 1984 and 1992 fluctuated widely between 0.057 and 0.045 metric tonnes, as a result of the policy changes and lack of adequate post harvest processing and warehousing facilities. The evidence in Figure 4.2 shows that production per capita of both maize and rice stagnated right through 1994-2000 and according to Aggrey-Fynn et al. (2003) cereal production has been declining since the year 2000 and it may not be far fetched to speculate that in the absence recent data on yield the available past trend suggest that

the declines in production since the year 2000 are due yield deterioration. In the light of the above, the importation of selected food crops to Ghana is examined next.

4.3.1 Imports of rice in Ghana

The discussion of Ghana's international trade in cereals is concentrated on rice for a number of reasons including the insignificance of maize trade and the sheer lack of consistent data on that. International trade on rice is thus more developed than that of maize and has remained so even after the liberalization of the market (Alderman and Shively, 1996:526; Abdulai, 2000:505). The importation of rice and maize between 1983 and 1997 is shown in Figure 4.3 below.

Figure 4.3 Ghana: Selected Food Imports, 1984-96



Source: Computed from FAO Database, 2001

While maize imports in Figure 4.3 is relatively low and remains flat for the two decades since liberalization measures were adopted in 1983, rice imports has been on the ascendancy in particular between 1983 and 1992. This reflects possible food deficit since this period (1983-92) coincides with the period that saw fluctuating and general decline of production per capita of maize and no improvement in per capita output of rice (Figure 4.2). The generally rising volume of rice imports in Figure 4.3 especially up to 1994 buttresses the discussion in section 4.1 that though both output and yield of these cereals recovered from the macro economic deterioration of the mid 1960 and 1970s, there has not been real growth since 1990 when subsidies were totally withdrawn.

The sudden drop in the volume of rice imports in 1995 could be attributed to a number of reasons, including the appreciable improvement in yield of other food crops such as yam, plantain and cocoyam (Table 4.5) thus explaining the rise in the *food production per capita index.* For this reason the FAO concluded in 1999 that Ghana's cereals needs were more than compensated from tuber crops and that its overall food situation was satisfactory (Asuming-Brempong and Asafu-Adjei, 2000:13). The per capita food index is shown in Appendix 2 Figure 1 and the relative output increase of the other food crops in Figures 4 to 6.

Table 4.5 Ghana: Yield Per Hectare and Potential Yield of Major Staples (Mt/Ha)

Crop	Average Yield	Potential Yield	% of Potential
Cassava	10.44	28.0	37.3
Plantain	7.20	10.0	72.0
Yam	10.70	14.0	76.4
Cocoyam	6.36	8.0	79.5
Maize	1.38	5.0	27.6
Rice	1.64	3.0	54.7
Sorghum	0.90	2.5	36.0
Millet	0.72	2.0	36.0

Source: Seini, 2002
Ministry of Agriculture (1991), Agriculture in Ghana: Facts and Figures, PPMED, Accra

The yield profile (Table 4.5) and outputs (Appendix 1) of these tuber crops is accounted for by the relative success of improved new varieties and generally their non-reliance on chemical fertilizers and therefore relatively immune to the impact of the policy changes regarding chemical inputs. A further deterioration of the cedi following the spending spree during the2000 general elections, possibly sustained the decline in imports as the inflation made domestic cost of imports to continually rise.

4.2.1 Response to Cereals Market Reform in Mali

The response of Mali's smallholder producers and traders to the liberalization of the food crop sub-sector contrasts sharply with the Ghanaian experience where the private sector was rarely if ever under effective state control. The long-standing heavy state investment and meddling in the food economy of Mali and the subsequent transformation the reforms brought caused drastic changes in the production and in particular trading of cereal crops.

The end of OPAM's monopoly in cereals trade in the mid 1980s was enthusiastically welcome by the private sector as exemplified by the entry of many small scale private traders who with their colleagues moved from trading clandestinely through personal networks with other traders and agents of the state, to the open in the free market environment. They have been described as "core" traders, due to their predominance of the cereal market and extent of dispersion. The core group now actively and openly transact business with the "peripheral" traders, who are urban-based and managerially more sophisticated wholesalers (Dembele and Staatz, 1999:10-11). The increased opportunities from the removal of constraints on movement and market restrictions boosted the confidence of these small scale private traders to invest in warehousing or vehicles where the transport network was good, a development which contrasts sharply with the pre-reform period where only those in the periphery and well connected to the official marketing system could invest in storage and trucking facilities.

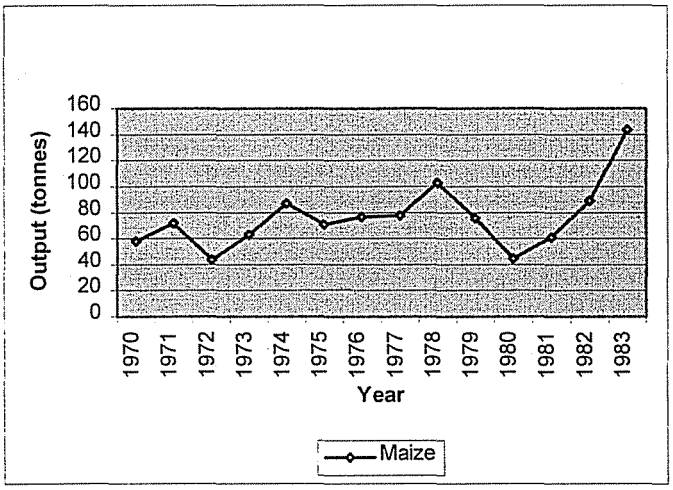
4.2.2 Cereals Market reforms, Producer Prices Response of Producers

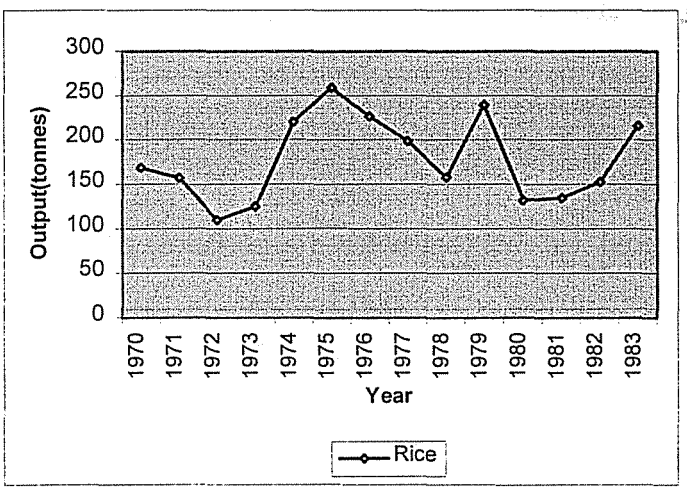
The market reforms in Mali's cereal sub-sector provided a platform that facilitated dissemination of information and reinforced market infrastructure, as investors increased expenditure on haulage trucks and warehousing; and in addition the devaluation boosted integration of the rice market. The combined effect has been the increase in production incentives through better prices to farmers and traders alike (Dembele and Staatz, 1999:20).

Nominal retail prices increased between 1981-85 due to poor rainfall but prices dropped in 1986 and fluctuated in a general upward trend through 1986-1993. In the past two decades producer prices have similarly shown this pattern of instability and in percentage terms have been more volatile than the retail prices. In real terms however a different price pattern evolved, with coarse grains suffering price deterioration by about 20% and rice prices falling also by approximately one-third in Bamako for example over the period of 1981/82 and 1997/98. It is reported that real producer prices for rice moved upwards between 1981-1992 due the tariff protection enjoyed by the rice sub-sector until recently and thereafter rose steadily and therefore in general producer prices in real terms portrayed fluctuating pattern (ibid: 13).

The response of maize production between 1980 and 1997 (see Figure 4.5) is significantly higher compared to the immediate past era of state interventionism in food agriculture in Mali especially from mid the 1970s, as seen in Figure 4.4 below.

Figure 4.4 a & b Mali: Output of Maize and Rice, 1970-83





Source: FAO Database, 2001

Figures 4.4 a & b are provided to show that the increase production per capita of these cereals in Figure 4.5 reflects improvement in yield after the 1980-1997 reforms. Prior to the drought of 1972-74, Mali produced sufficiently its domestic cereals needs, including rice and maize. It became a net importer of food and received substantial food aid from the 1970s to the mid 1980s, with the exception of the 1976/77 cropping season. Notwithstanding the high state investment in the food crop agricultural sub-sector, at the Office du Niger in the late 1970s and early 1980s, cereal production saw marginal improvement between 1970s and 1980s. For example until the effective

restructuring of the rice sub-sector from 1987 domestic production had been only 55% the total Malian rice consumption (Diarra et al., 1999:4).

With the reforms maize production increased by 12.5% per annum between 1980-97 raising the share of maize in total grain production in Mali from 6% in 1980 to 16% in 1997 (Table 4.6) and rice production grew at 9% per annum over the period. Following the reforms rice production tripled from 214, 000 to 688, 000 metric tonnes between 1985 and 1998 and raised Mali's self-sufficiency in rice from 50% to about 80% by the close of the 1990s (Diarra et al., 1999).

Table 4.6 Annual Growth rate and Share of Total Grain Production in Mali

Cereal	Annual Growth Rate (%)	Share of Total production (%)	
	1980-97	**in 1980**	**in 1997**
Millet & Sorghum	2.7	80	56
Maize	12.5	6	16
Rice	9.0	14	27
Total	4.7	100	100

Source: Dembele and Staatz, 1999

It has to be noted though, that shortly after OPAM scale back defending official prices in 1986, maize prices collapsed and production dropped briefly as farmers shifted to traditional intercropping (Dembele, 1999). The levels of maize production however recovered and indeed increased after the devaluation of the CFA Franc in 1994, when both domestic and export demand for maize shot up in response to the depreciation of the currency. Below is a profile of rice and maize production between 1984-2000.

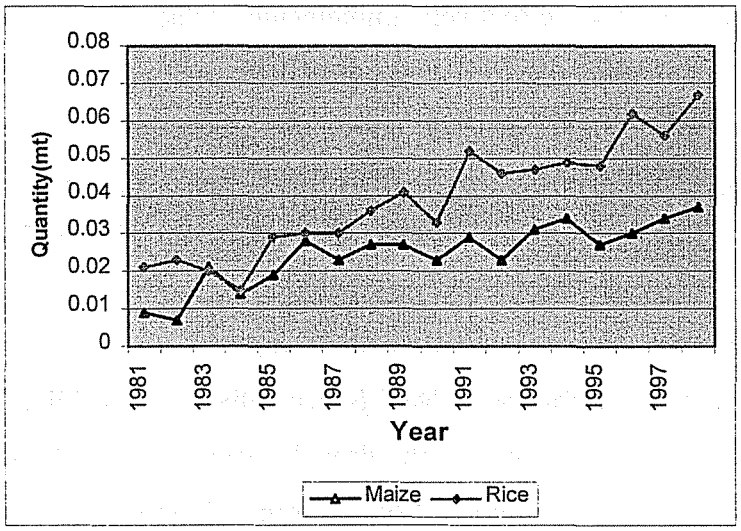
Table 4.7 Mali: Production, Harvested Area and Yield of Maize and Rice, 1984-2000

Year	Production ('000 Mt)		Harvested Area ('000Ha)		Yield ('000Hg/Ha)	
	Maize	**Rice**	**Maize**	**Rice**	**Maize**	**Rice**
1984	101	109	89	165	11.3	6.6
1985	140	214	109	185	12.8	11.5
1986	213	225	128	190	16.5	11.8
1987	178	237	118	163	15.1	14.5
1988	215	288	143	231	15.0	12.4
1989	225	338	175	231	12.9	14.6
1990	197	282	170	197	11.5	14.3
1991	257	454	186	263	13.8	17.2
1992	193	410	192	233	10.0	17.5
1993	283	428	257	246	11.0	17.3
1994	322	469	284	284	11.3	16.5
1995	264	462	205	303	12.8	15.2
1996	294	627	186	328	15.8	19.1
1997	341	589	202	330	16.8	17.8
1998	387	718	230	330	16.8	21.7
1999	437	809	260	350	16.8	23.1
2000	438	809	260	350	16.8	23.1

Source: computed from FAO Database, 2001

In Table 4.7 production of both maize and rice slightly fluctuated between 1984 and 1987, which show the effect of the reluctance at implementing the reforms in the early years. The 1987 unequivocal restructuring of the institutions ushered in general stable period of growth in production for both crops between 1988 and 2000. The rate of growth of these crops over the period is respectively 50 and 70 percentage point, while harvested area for both crops increased at relatively lower rate. The increases are therefore due to improvement in yield, in particular rice (Table 4.7), doubling from 11.5 Hg/Ha in 1985 to 23.1 Hg/Ha in 2000 and this reflected in Figure 4.5 below, a generally increasing trend in production per capita.

Figure 4.5 Mali: Production per capita, 19981-2000



Source: Computed from FAO Database, 2001

The production per capita of both rice and maize in Mali contrasts the picture that evolved in Ghana. The liberalization measures in Mali led generally to a sustained increase in production per capita of both cereals (Figure 4.5) and this probably explains the declining import trend of both crops as shown in (Figure 4.6).

In Figure 4.5 the evolution of rice production per capita shows positive gradient over the period 1987-1999, as does the graph for production per capita of maize, which maintained a fairly positive trend, over 1992-98 periods. This improvement is

reflected in Figure 4.6 where the importation of both rice and maize between 1987-1997 decreased considerably.

Table 4.8 Mali: Percentage Change in Harvested Area and Yields

	Harvested Area ('000 Ha)			Yields (Tonne/Ha)		
	1990-93	1994-96	percent	1990-93	1994-96	Percent
Rice	195	300	54%	2	1.7	-15%
Maize	201	234	16%	1.16	1.34	16%

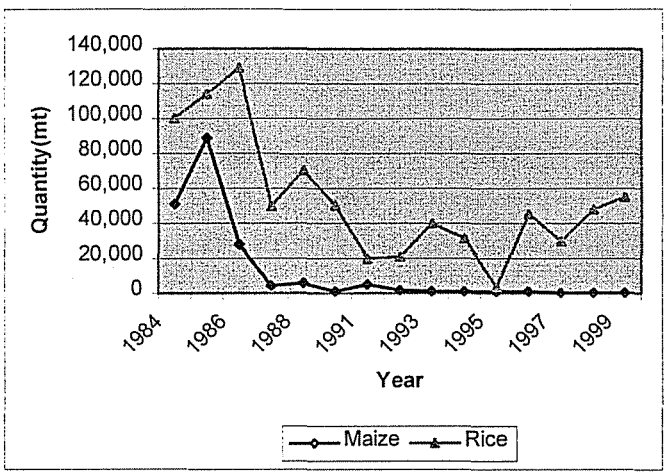
Adopted from Yade et al. (1999)

The graphic contrast in both production per capita and annual imports of these cereals can be explained in terms of farmers' response to the policy changes. The response of maize farmers to the policy changes was more enthusiastic than those of rice (Table 4.8), for instance acreage and yields for maize increased by 16%. Even though the production per capita of both crops fluctuated they however maintained generally, a positive gradient especially after 1986 onwards when the reforms of the ON and OPAM were eventually effectively implemented (Yade et al., 1999). In particular after the devaluation of the CFA Franc production per capita of rice increased from 0.048 mt in 1995 to 0.067 in 1998; and maize production per capita increased from 0.027mt to 0.037mt over the period. This improvement in production per capita can be seen in the fluctuating declining volume of imports as seen in Figure 4.6 below.

4.2.3 Imports and domestic cereal production in Mali

The evolution of food imports to Mali is generally on the decline since it recovered from the cereal food shortages of the drought years of early 1980s. From the mid 1980s the volume of rice imports dropped from a high of 129,100 metric tonnes in 1986 to 55, 300 metric tonnes in 1999 and maize imports remains fairly stable below 10,000mt (Figure 4.6). This suggests an increase in level of food balance as a result of the increases in domestic production and yield levels of maize (Table 4.5).

Figure 4.6 Mali: Imports of selected cereal imports



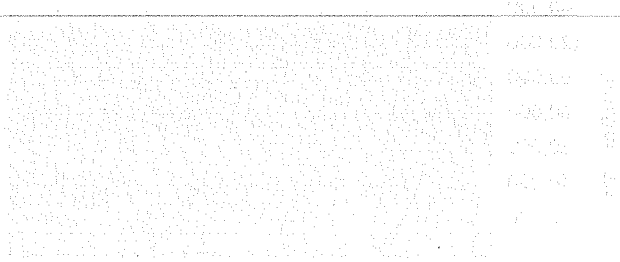
Source: Computed from FAO Database, 2001

4.3 Conclusion

The impact of liberalization on Mali contrasts sharply with Ghana's experience, as did the contexts the measures were implemented. Mali had better production and marketing infrastructure than Ghana and absorbed more efficiently the labour force, even though under state run input and product markets. The numerous new smallholder entrants to the cereal market suggest a growing profitability in that sector and their investment in vehicles and warehousing (Diarra, 1999:8). Also the production of in Mali increased significantly since 1987, pushing downwards the need for food import.

On the other hand the measures had more adverse effects on yields through decrease use of fertilizers as their prices rose. The declining production per capita of both cereals thus leads to increasing volume of rice imports

Additional measures are thus needed in Ghana to stimulate smallholder farmers and traders in the private sector who although, have never been effectively under state control did not have the luxury of an enabling production and market environment to make such activities profitable. In addition, Ghana's food crop agriculture unlike the Malian case did not even before the reforms receive policy priority and until late 1980s. As consequence Ghana food farmers were thus more vulnerable to the austerities of the liberalisation measures.



Chapter Five

5.0 Summary and Conclusions

The paper compared at the macro-level the processes of liberalisation measures and the impact on rice and maize production and marketing in Ghana and Mali. Smallholders are the majority in the production and marketing of cereals including, rice and maize in Ghana and Mali and have thus been critical contributors to GDP and revenue and indeed majority of the labour force is employed in subsistent agriculture. The sector has thus enjoyed in the past four decades varying degrees of subsidies on fertilizer and other ago-inputs.

5.1 Pre-liberalisation Cereal Crops Production and Marketing Arrangement in Ghana

In Ghana these subsidies strongly defined the use of fertilizer in the past three decades, with the pattern reflecting the extent to which the prices are subsidized. The 1960s and 1970s saw high doses of fertilizer, as they were the most subsidy friendly periods, and then followed by an era of fluctuating levels of fertilizer use. Since the early 1980s the trend has been downward with the gradual withdrawal of subsidies and consequently to a zero subsidy regime beginning from 1990 under the price liberalisation policy of the SAP.

Ghana has had a relatively freer production and marketing food crop agricultural sector, with the exception of state farms scheme briefly experimented in the immediate post independent period between the late 1950s and early 1960s. The production and marketing infrastructure put in place have changed over the decades even though they have pursued the same objective of achieving food self-sufficiency through a Guaranteed Minimum Price (GMP) scheme under the Ghana Food Distribution Corporation (GFDC), a parastatal organisation.

As the name suggests the preoccupation of GFDC was the buying and distribution of domestic produced cereals, notably rice and maize during harvest and lean season respectively in order to defend the GMP. The GFDC was however not successful in the GMP scheme as it could purchase only about 8% of total domestic production of rice and maize due to lack of funds and ineficiecy. Eventually in 1990 the GFDC lost its monopoly under the SAP reforms that divested it in addition to other State Owned Enterprises (SOEs)

In the past two decades increase in cereals output have therefore been due to expansion in acreage rather than improvement in yield, a situation that could partly be explained by the removal of subsidies on agricultural inputs. The provision of credits to subsistent agriculture has on the contrary been generally left to the informal sector and even before the end of the "minimum quota lending requirement to the agriculture" by the banks the informal sector had been the largest credit provider to food crop production in Ghana. To improve the acute inadequacy of agricultural credit government supported the creation of rural banks and cooperatives and encouraged the involvement of NGOs in credit provision. Notwithstanding these attempts loans and advances from secondary banks to agriculture have continued to decline to an all time low of 8.6% in 2001.

In a nutshell the peculiarities of Ghana in terms of inadequate food crop agricultural infrastructure coupled with the negative impacts of the policy changes regarding agricultural subsidies, and the attendant debilitating effect on smallholder producers explain the deterioration in production per capita of rice and maize, hence the increased rice imports to meet domestic consumption needs.

5.2 Pre-liberalisation Cereal Crops Production and Marketing Arrangement in Mali

In sharp contrast with the rather less organized production and marketing arrangement discussed about Ghana, the Malian situation was well organized and effective in terms of the responsibilities of the ON, OPAM, and SCAER. These parastatals respectively were in charge of organizing the production, marketing and distribution of produce and input distribution. The SCAER played relatively a minor role of handling the distribution of agricultural inputs. It distributed these through the administrative structures of the ON or through the ORDs. The ON organized rice producers in near subsistent arrangements, with individuals assigned to plots not more than eight hectares. It provided irrigation services and maintained the channels, and upon harvest the ON handled exclusively the milling and trashing of the produce.

The OPAM came in at this stage to buy the processed rice from the farmers through the ON. It also handled this purchasing monopoly in the strictest sense because

private trading in cereals was illegal until 1981, when a legislative instrument allowed private sector participation. The sum effect of of these parastatal organisations is that they successfully controlled smallholder farmers and traders who therefore had little room for manoeuvre and thus produced and traded less than optimum capacity. In the wake the reforms the private sector therefore increased its activities, especially the trading of cereals and also increased its investment in physical infrastructures such as warehouses or transport facilities.

5.3 Response and Outcomes in Ghana and Mali

The relatively much organized and availability of production and marketing infrastructure allowed smallholder farmers and traders in Mali to benefit from the reforms, in terms of improvement in yield and capacity of organisation, than their Ghanaian counterparts who faced a less conducive agrarian structures. Productivity of cereals has not improved, relative to non-cereal food crops that do not depend on inorganic fertilizers. With falling yield of the cereals due to lack of ready access to inputs by remote and smallholder farmer and increased costs of fertilizers after the devaluations and removal of the subsidies, food imports have to Ghana have increased compared to Mali. Also farmers expanded acreage to compensate for the dwindling yield in the absence subsidy supported input market.

In the light the different experiences in two case studies, one observation is that the significance of the liberalisation measures will depend on existing agrarian structures, production and marketing arrangements and public institutions in a country implementing them. Therefore cognisance of this fact a consideration should be given whether or not these measures are exactly implemented as prescribed. There is therefore no single recipe or blueprint for improving food productivity in Africa or elsewhere. It is imperative in certain situations such as in the case of Ghana for the state to maintain a degree of support for smallholder producers who may not be

capable enough to straight away face the rigour of a profit driven market that do not respond to needs but ability to pay.

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Appendices

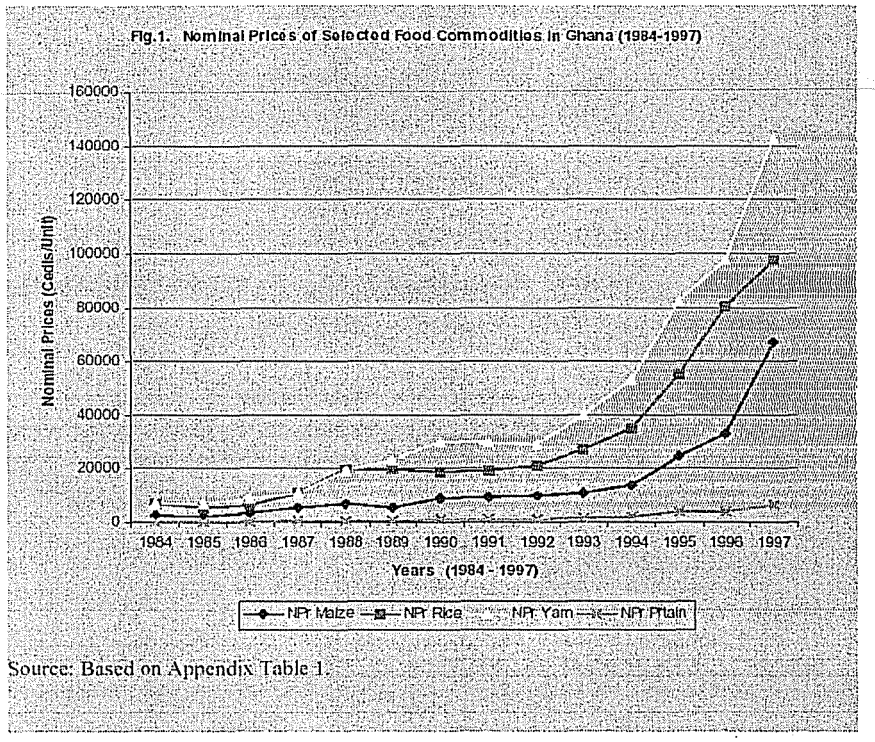
Appendix 1

Table 1 Nominal Annual Average Wholesale Prices (cedis) for Selected Food Crops, 1984-97

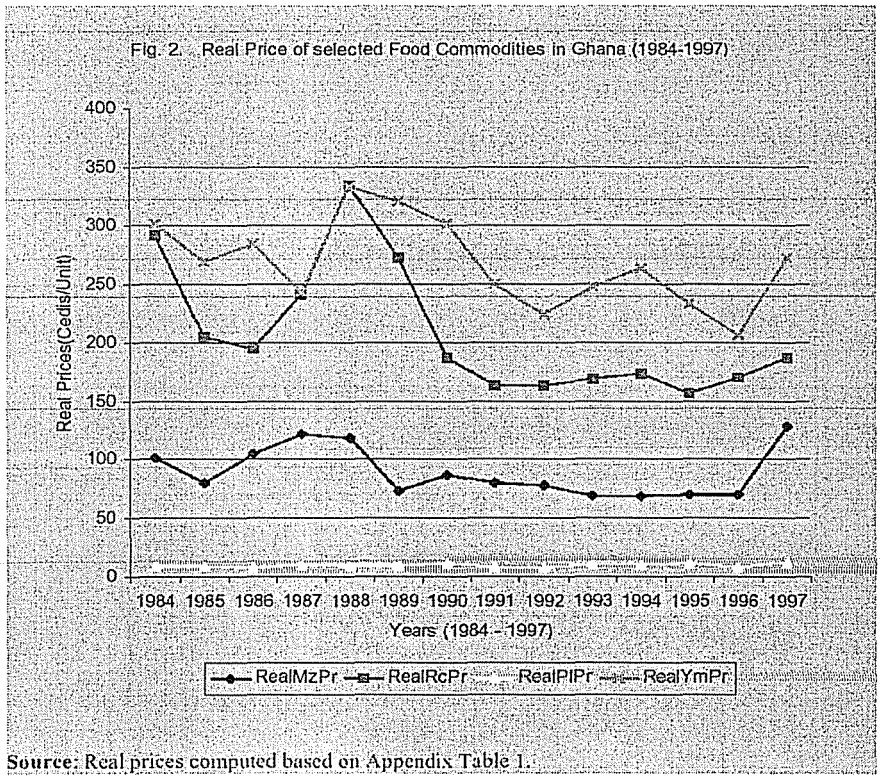
Year	Maize	Rice	Plantain	Yam	CPI 1990 = 100
1984	2338	6710	209	6960	23
1985	2038	5207	216	6813	25
1986	3311	6174	239	9012	32
1987	5387	10631	435	10769	44
1988	6859	19452	517	19387	58
1989	5300	19802	696	23365	73
1990	8633	18662	1109	30102	100
1991	9434	19277	887	29469	118
1992	10048	21179	1069	29070	130
1993	11072	27300	1610	40098	162
1994	13863	35163	1940	53210	203
1995	24708	55157	4160	82219	363
1996	32814	80270	3693	97487	474
1997	66736	97497	6538	142086	523

Source: Asuming-Brempong and Asafu-Adjei, 2000

PPMED, Ministry of Food and Agriculture.



Source: Based on Appendix Table 1.



Source: Real prices computed based on Appendix Table 1.

Appendix 2

Figure 1: Index of Food Production Per Capita 1983 - 2000 (1989-91 = 100)

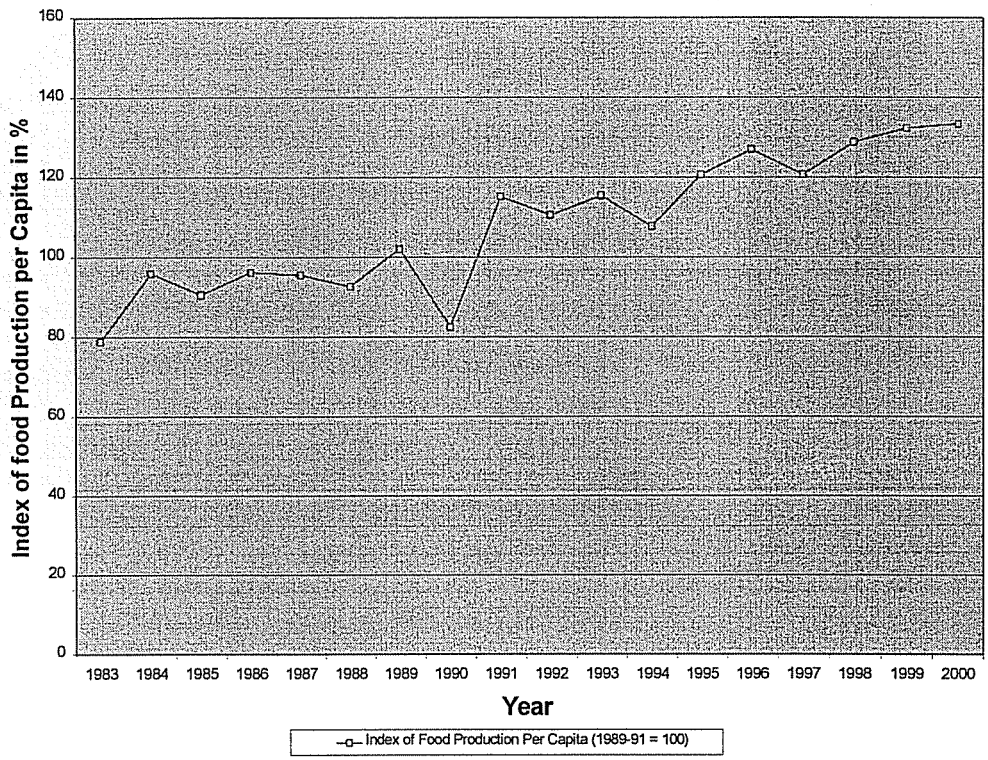


Figure 2: Maize Output 1983-2000

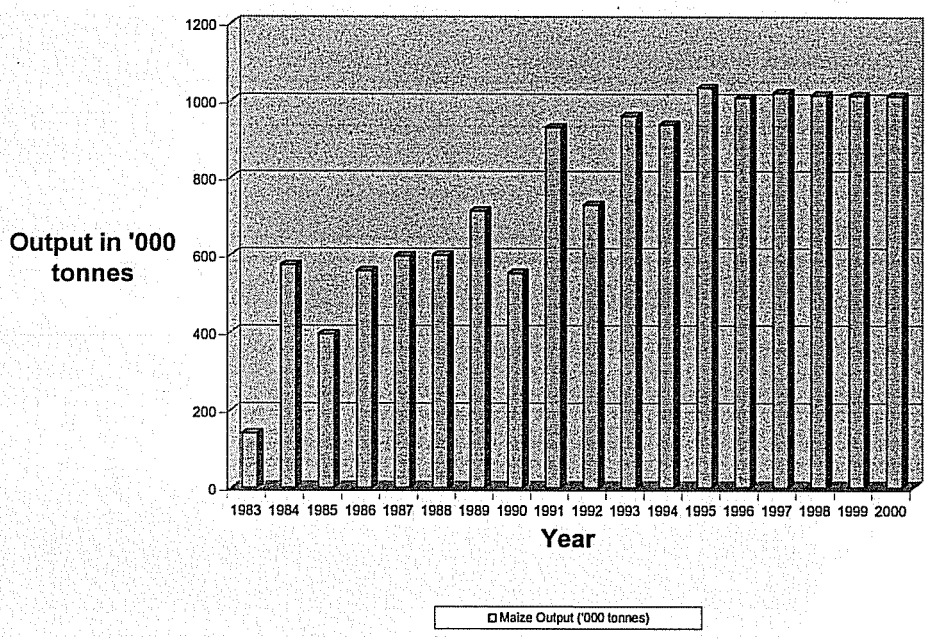


Figure 3: Rice Output 1983-2000

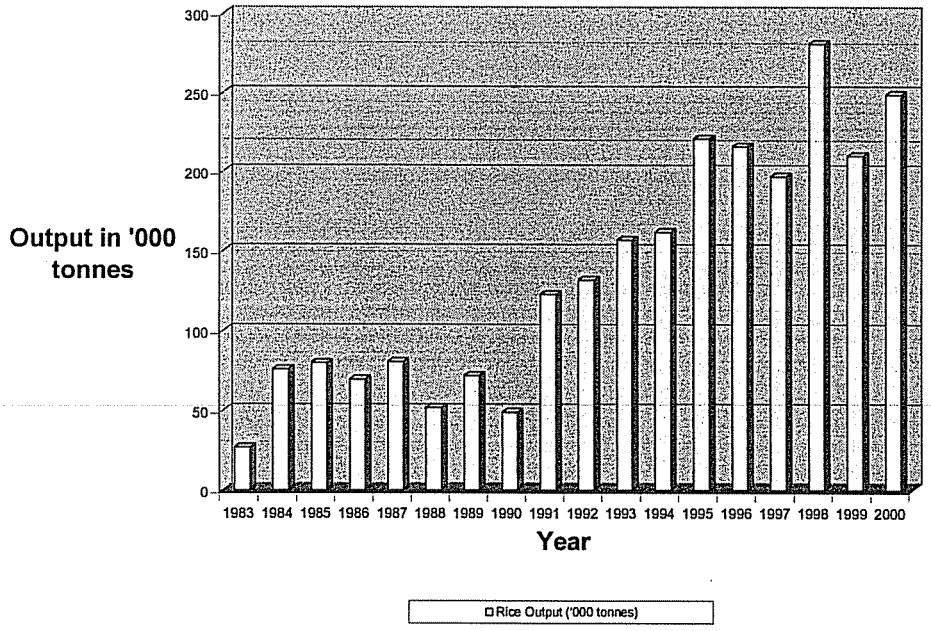


Figure 4: Plantain Output 1983 -2000

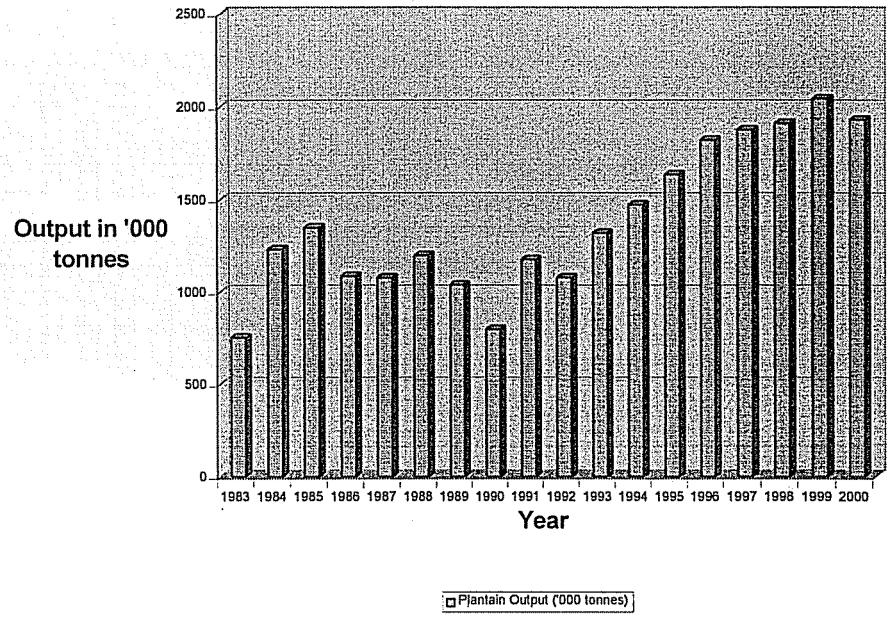


Figure 5: Cassava Output 1983 - 2000

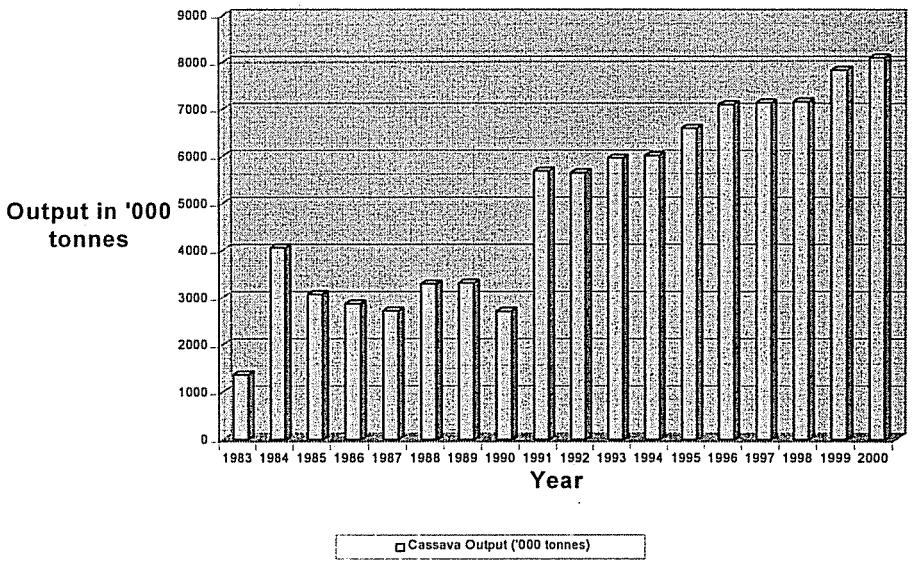


Figure 6: Yam Output 1983 - 2000