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# Developing Technological Capabilities in Agro-Industry: Ghana's experience with fresh pineapple exports in comparative perspective

Lindsay Whitfield

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## ACRONYMS

| | |
|---|---|
| GEPC | Ghana Export Promotion Council |
| HAG | Horticulture Association of Ghana |
| MCA | Millennium Challenge Account |
| SPEG | Sea-Freighting Pineapple Exporters of Ghana |
| USAID | United States Agency for International Development |
| | |
| EureGAP | Euro-Retailer Produce Working Group Good Agricultural Practice |
| GlobalGAP | Global Good Agricultural Practice |

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## ABSTRACT

The time is ripe for an evidence-based discussion of what is 'private sector development' in Africa and how it occurs. This discussion requires analyses on how actual existing industries are created, expanded and remain competitive, and the role of industrial policy. This paper contributes to the discussion by examining the emergence and trajectory of a new agro-industry in Ghana: the pineapple export industry. It explores how this new agro-industry emerged as well as how it responded to changes in international competition. It explains the limited expansion of the industry and its declining international competitiveness by looking at how Ghanaian exporters developed technological capabilities initially and the incentives and disincentives to building those capabilities. The industry has its origins in Ghanaian professionals, civil servants and import businessmen who sought new economic opportunities in the 1980s and 1990s. The paper argues that at the heart of the industry's crisis was an inability to further develop technological capabilities. Both firm level and national level factors determine technological capability development. Thus, the crisis had systemic features that have broader implications for understanding the obstacles to developing new agro-industries in Ghana as well as other African countries. It also argues that small farmers can have a place in high-value agricultural export industries, but they must be linked into supply chains in ways that increase their capabilities. Where relevant, it compares Ghana's experience with that of the Ivory Coast and Costa Rica, its main competitors.

## I. INTRODUCTION

The economic policy agenda which promoted a minimal state and trade openness as the key to economic development, and which promoted deregulation, liberalization and privatization necessary to unleash private sector productive forces in developing countries is discredited. The economic record of the past few decades does not support this theory (cf. Hausmann & Rodrik 2003). Former proponents of the agenda acknowledge that the 'supply side' response of the private sector, especially in African countries, has not been what was expected in reaction to these reforms. A consensus is emerging on the need for industrial policy, even though the details on what industrial policy should include are still debated (cf Lin & Chang 2009).[1] In order to move the debate forward, we need more analyses of the emergence of new industries in less-developed countries and in the contemporary global economic context. Industrial policy is not just relevant for manufacturing, but also for non-traditional agriculture and services (Rodrik 2007). Agro-industries are particularly important, as they are often a first step in the industrialization process.[2] Furthermore, the time is ripe for an evidence-based discussion of what is 'private sector development' (to use international development jargon) and how it occurs.

Existing evidence on the experiences of building industries in developing countries underscores three general points. Successful industries are *made*: they are actively constructed through the conscious effort of a myriad of actors. Although the emergence of industries may be partly unintended, their advancement is usually not, and it requires more than individual entrepreneurs alone. Industries also need to be constantly *remade*, in order to remain profitable. Lastly, this making and remaking of particular industries is partly country specific, so the way an industry emerged in one country cannot be replicated exactly in another country. Thus, we need analyses of the making and remaking of industries which provide an evolutionary perspective that documents how and why specific industries emerged and evolved. An evolutionary approach is important for understanding the extent to which industry formation and trajectory are shaped by existing conditions and the extent to which they can be shaped by conscious effort.

This working paper aims to contribute to the debate by examining the emergence and trajectory of a new agro-industry in Ghana: the pineapple export industry. Whole pineapple exports as a percentage of total exports from Ghana are negligible, and they are not a significant percentage of non-traditional exports.[3] Nonetheless, this case is interesting because it involves the creation of a new agro-industry and a new group of productive entrepreneurs in a country where large-scale capitalist farming and new agro-export industries are not very widespread.

Ghana began exporting pineapples to Europe in small quantities in the mid-1980s.[4] Pineapple exports increased from 650 tons in 1984 to reach just over 70,000 tons by 2004. The Ivory Coast almost monopolized the supply of fresh pineapples to the European market in the 1980s. Ghana carved out

[1] Industrial policy refers to government interventions that stimulate specific economic activities.

[2] Industrialization is understood here to refer to the process where a country moves into production of new goods and services and its economic structure changes.

[3] Ghana's traditional exports include cocoa, gold and timber, which continued to account for the majority of the country's total export revenue in the late 2000s.

[4] The rest of the paper refers to 'pineapple' as shorthand for fresh whole pineapples.

a niche in the European market as a primary supplier of top-quality pineapples shipped by air, and in the second half of the 1990s entered the sea-freight market.[5] However, from 2005 Ghana's pineapple export industry went into crisis, total exports decreased and the industry was restructured. Just before the crisis, pineapple production for export was split between approximately 12 large farms (300-700 ha), about 40 medium farms (20-150 ha) and possibly as many as 10,000 smallholders (0.2-10 ha) (NRI 2010). The crisis led to the exit of smallholder producers from production for export and to the collapse of many medium and large producer-exporters.[6] In 2009, total exports began to rebound, but production had become concentrated among a handful of very large farms.

This paper explores how this new agro-industry in Ghana emerged as well as how it responded to changes in international competition and why it responded the way it did. In doing so, it aims to show why it did not retain and expand its position in the European market in the face of international challenges in the 2000s.

Global value chain analysis is the dominant approach used in the growing literature on horticulture value chains and production in African countries . This approach focuses on who is governing or driving the chain, how power is distributed and exercised vertically within the chain, and the implications for African producers and exporters. A major argument in the global value chain literature is that changes in African horticulture commodity chains are driven by changes in European retailing (cf Dolan & Humphrey 2000, 2004). The process of retail concentration produced new competitive strategies that emphasize quality, consistency, variety, packaging, reliability of supply, price, processing and product combinations. These strategies produced new performance standards and led to greater control of supermarkets within the chain. The tendency towards concentration of production in large-scale farms and the exclusion of smallholder producers from horticulture export value chains observed across African countries is explained by the higher requirements from European retailers in the 1990s. These requirements included higher organizational capabilities (consistent supply, quality control), post-harvest facilities (for high product quality and packaging), flexibility and reliability of transport logistics, higher volumes, and innovation in products. On top of this, the 2000s witnessed the emergence of new private standards for imported fresh fruits and vegetable.

The dramatic evolution of the international pineapple market in the 2000s and the changes in Ghana's industry structure and market position cannot be explained by these factors alone. Ghanaian exporters felt the pressure from European retailers to deliver higher volumes, better quality product and consistent supply, but this pressure did not drive the changes in the international pineapple market described above. The pressure of new private standards, especially EureGAP and then GlobalGAP, hit the Ghanaian industry after 2005 and thus compounded the crisis but did not initiate it.

Rather, the changes in the international market stemmed from product and process innovations driven by Del Monte, a transna-

[5] Ghana's main markets in Europe are Italy, Belgium, France, the Netherlands, Germany and Switzerland. Ghana's exports to Switzerland, a significant importer of Ghanaian pineapples, are not captured in the European Union import data presented in Figures 2 and 3.

[6] The term 'producer-exporter' is used in this paper to denote firms that produce pineapples on their own farms and control the export of this produce. They may buy fruits from other farmers. The distinction is made in contrast to farmers who produce but do not export directly, and to exporters who do not have farms and buy all of the fruits they export.

tional corporation with operations in Costa Rica, which Ghanaian exporters struggled to copy. European retailers had to accept the supply and quality of pineapple from West African countries until Del Monte offered a new product to the European market, the MD2 pineapple. The MD2 pineapple represented more than a new variety; it set new industry standards. Del Monte customized this pineapple as a 'shipping pineapple', in the sense that its form and sugar content allowed it to be shipped from Costa Rica to Europe. Due to Del Monte's ability to control the whole supply chain (including shipping) and an elaborated marketing campaign, MD2 succeeded in penetrating the market.

These changes and their implications for Ghana and the Ivory Coast have been examined from a global value chain perspective (Fold & Gough 2008; Vagneron et al. 2009). From this perspective, innovations and standards permeate the whole value chain and determine who participates in the market and under what conditions. Transnational fruit companies remain powerful actors of the chain, not just in marketing but also in production, because of their ability to innovate. Del Monte was able to innovate on several fronts: varietal, logistical, new quality standards, and product differentiation.

Examining these changes only from a global value chain perspective provides only half of the picture. It neglects important horizontal dimensions of the Ghanaian industry and tends to be too deterministic, overlooking many possible ways in which African producers, exporters, and governments could respond to changes in the chain and international markets. The strength of multinational corporations and the invention of a new pineapple variety did not necessarily mean that Ghanaian producer-exporters were doomed. Long-time observers of the Ghanaian pineapple export industry argued that the situation could be turned to Ghana's advantage (Accord Associates 2001). Central America was raising the quality image and price profile of pineapples. If Ghana could match the consistent quality of the Costa Rican product, it could benefit from the market improvement. The decline in demand for Ghana's variety was due more to the quality of the sea-freighted pineapples upon delivery, than to the variety per se. It was argued that Smooth Cayenne could compete with MD2, if the Ghanaian industry improved its performance and adopted a coherent marketing strategy that all exporters worked together to implement. This did not happen.

Producers and exporters of non-traditional fruits and vegetables must innovate continuously in order to retain their market share and maintain unit values. Thus, African horticulture export firms must be proactive in market and product differentiation, which require greater skill in production, post-harvest care and logistics, greater capital investment, and greater innovation capabilities (Dolan & Humphrey 2004). However, such upgrading does not occur automatically in response to buyer demands or market signals. Global Value Chain analysis helps to understand what forms of upgrading are required in particular value chains, but it does not illuminate how and why such upgrading takes place, outside of examples where lead firms in the chain upgrade their suppliers. The framework is weak in its discussion of the influence of national institutional context on the decision of firms to export and on their ability to maintain competitiveness in the chain (Selwyn 2008). Following Selwyn (2008), this working paper focuses on the circumstances in which upgrading can come about: which actors, relationships and actions facilitate them, and what kind of an

environment is conducive to the existence and cooperation of such actors. This paper draws on the technological capabilities approach in order to understand how and why upgrading does (or does not) occur.

This paper explains why Ghanaian exporters did not respond sufficiently quickly or adeptly to international market demands or changes initiated by competitors. It does so by looking at how Ghanaian exporters initially developed technological capabilities and at the incentives and disincentives to building on them. It argues that at the heart of the industry's crisis was an inability to further develop technological capabilities. The determinants of technological capability development are both firm level and national level. Thus, the crisis had systemic features which have broader implications for understanding the obstacles to developing new agro-industries in Ghana as well as other African countries.

The paper is based on fieldwork carried out in Ghana between January 2009 and May 2010. The methodology involved open-ended semi-structured interviews with relevant industry actors, combined with unpublished reports and documents about the industry. Interviews were conducted with pineapple producer-exporters, relevant trade association staff, relevant government bureaucrats, international and national consultants for the industry, staff from donor agencies and private agencies implementing donor projects in horticulture. The focus of interviews with exporters was to extract their history and experience as exporters, and thus in-depth interviews with fifteen exporters were more appropriate than a large survey. These exporters were selected based on the period when they invested as well as the need to capture a spectrum of experiences: firms still exporting, including the largest ones as well as those struggling; those no longer exporting; and those which were key to developments in the industry. Investment in pineapple exports can be described in terms of four waves: pioneering (early to mid-1980s), take off (late 1980s-early 1990s), demonstration effect (mid to late 1990s), and foreign direct investment (2000s). Four pioneer firms, four take-off firms, five demonstration effect firms, and one foreign investment firm were interviewed, as well as Farmapine, the exporting company formed from smallholder cooperatives. Interviews were conducted with the owners of the firms in all but two cases, and in most cases additional firm staff were interviewed, such as general managers.

The remainder of the paper is structured as follows. The technological capabilities approach to explaining industry emergence and competitiveness is discussed in section two. Section three explains the emergence of the pineapple export industry in Ghana. Sections four and five look at challenges arising in the 1990s and 2000s, respectively. They focus on the source of the challenges, Ghana's response, factors explaining that response and the implications for the industry. The particularity of an industry's trajectory becomes much clearer if contrasted with other cases. Thus, the paper makes comparisons with the pineapple export industry in the Ivory Coast and Costa Rica where relevant.

## II. DEVELOPING TECHNOLOGICAL CAPABILITIES

Creating new industries that are internationally competitive requires a process of developing new technological capabilities. Developing countries find it difficult to compete in global markets, including in agro-industries where they may already produce the raw ma-

terial, despite their low wages and large pools of unemployed labour due to low productivity levels. Competitiveness depends on the productivity of labour and the effectiveness of converting inputs into outputs. Productivity in developing countries may be low due to infrastructure constraints, but more importantly, it may be low due to the low technological capabilities of firms (Amsden 2001; Khan 2009). Furthermore, retaining competitive industries requires continuously building technological capabilities. Market conditions and tastes are changing, technologies improving, new competitors appearing, and relative costs of inputs, labour and infrastructure shifting. Success will generally depend on constant investment in capability acquisition (Lall 1996).

This capabilities approach to understanding economic development is defined by three main arguments. First, technology is understood as encompassing 'embodied' and 'tacit' elements. 'Embodied' elements are the physical equipment, codified knowledge and other external inputs, and 'tacit' elements are the skills, technical knowledge and organizational coherence required to make technologies function in a firm. Second, the tacit elements of technology cannot be simply transferred to a firm; they have to be learnt, and that learning process requires conscious effort on the part of firms. Third, the environment in which firms operate affect their decisions and ability to invest in developing new technological capabilities.

The capabilities approach, which draws inspiration from evolutionary economics (cf. Nelson & Winter 1982), has generated a large body of literature. The summary presented in this section is not a full literature review, but rather draws selectively from key early works (Pack & Westphal 1986; Dahlman et al. 1987; Lall 1992, 1996). It first outlines what technological capabilities are, and then the factors that affect their development.

Technological capabilities are the skills—technical, managerial and institutional—that allow productive enterprises to utilize equipment and technical information efficiently (Lall 1996: 28). They are firm-specific: a form of institutional knowledge that is made of the combined skills of its members accumulated over time. They are the capabilities required to acquire, assimilate, use, adapt, change or create technology. They can be categorized in terms of production, investment and innovation capabilities, but these types of capabilities interact and are inseparable (Dahlman et al. 1987).[7] Production capabilities refer to operating productive facilities and are reflected in productive efficiency and the ability to adapt operations to changing market circumstances. Investment capabilities refer to establishing new productive facilities and expand existing ones, and are reflected in project costs and the ability to tailor project designs to suit the circumstances of the investment. Lastly, innovation capabilities refer to creating new technology and are reflected in the ability to improve technology, or to develop new products and services that better meet specific needs.

## How technological capabilities are developed

Capability building is an investment; an investment that has to be conscious and purposive (Lall 1996). Acquiring capabilities requires 'learning-by-doing' as well as 'technological effort' on the part of firms. In addition to formal education and scientific, codified knowledge, firms need a mix of or-

[7] For a more elaborate breakdown of the components of technological capabilities, see Lall (1992:167).

ganizational and operational capabilities and skills that can only be developed through actual experience. Experience is needed also to know what is wanted and what is possible in the way of products and processes. Acquiring this experience is not automatic, but rather a slow process of learning-by-doing and discovering what works in the local context through experimentation. Learning-by-doing is necessary, but not sufficient. Acquiring technological capabilities also requires conscious effort on the part of firms to monitor what is being done, to try new things, to keep track of developments throughout the world, to accumulate added skills and to increase the ability to respond to new pressures and opportunities (Dahlman et al. 1987).

The development of technological capabilities in enterprises follows an evolutionary but individual path (Lall 1996). It is evolutionary in that investments in knowledge and skill creation are cumulative, and it is individual in that some firms will invest more in technological capabilities than others. The extent to which individual firms invest depends on the functioning of factor and information markets, but more importantly on the realization by the entrepreneur that technological capabilities investments are needed and can be profitable.

Developing technological capabilities is the outcome of firm-specific factors as well as factors common to a given country. Firms do not act in isolation. They operate in a network of formal and informal relationships with suppliers, customers, competitors, consultants, and technology, research and educational organization. Firms draw upon factor markets (finance, infrastructure, skills, technology, suppliers), organizations and other firms for skills, assistance and information. The national environment directly influences the technological effort of firms.[8] Lall (1996: 36-49) disaggregates the effects of the national environment into five determinants of technological capabilities development:

1) incentive structure facing firms: macroeconomic environment and policies (the rate and stability of growth, interest rates, price changes, exchange rates, fiscal and monetary policies, availability of foreign exchange), trade regime, domestic competition policies;
2) availability of the right quantity and quality of skills: formal education and training;
3) availability of technological information and support services: encouragement of technological activity in general (overcoming risk aversion and the 'learning to learn' barrier), development of special research skills, setting of industrial standards and the promotion of quality awareness, undertaking contract research, testing or information search for firms that lack the facilities or skills, undertaking or coordination of basic (pre-commercial) research activities;
4) finance for developing technological capabilities in industry: fiscal or other incentives for technological activity by a firm or group of firms, or other forms of support, regulations on foreign technology or foreign direct investment, and targeting specific technology for research by the public sector solely or in collaboration with private organizations;
5) the technology policies of the government.

[8] Dahlman et al. 1987 refer to this as the economic environment. Lall (1992) describes it in terms of national technological capabilities, but in a later work (Lall 1996) simply refers to it as the determinants of technological development.

The interaction of these factors affects the willingness and ability of firms to develop capabilities. All of the five national level factors are shaped by government policies and actions. For example with the availability of technological information and services, the provision of these services can be seen as an infrastructure service, provided by the state or as a cooperative activity by the enterprise. In the case of the latter, the government may have to help introduce cooperative solutions with financial or other assistance (Lall 1996). Evidence from Asian and Latin American countries shows that the state plays an important role in stimulating and facilitating inter-firm coordination (cf. Doner & Schneider 2000; Schneider 2004).

It is argued that government interventions to shape incentive structures, human resources, technological effort of firms and institutional factors are imperative. Developing technological capabilities can be risky for firms. It requires investments and new ways of doing things, and the benefits to be gained are uncertain due to the tacitness of technology. Technological effort may involve a period of financial loss, because while firms are gaining new capabilities they may be unable to compete successfully. Lastly, the markets for finance for technological development, for the creation of new skills and for the generation and diffusion of technological information are very imperfect in developing countries. Thus, there are strong disincentives to invest in technological effort, creating what Khan (2009) calls a learning trap. Lall (1996: 28) identifies the same problem when he says: 'Left to their own devices, individual enterprises may find capability development very difficult, slow and expensive to undertake, and so may end up with poor abilities to operate efficiently or upgrade their technologies'.

This learning trap can be overcome through a variety of different schemes, but they have often included a role for the state. Such schemes have been referred to generally as 'rents for learning' (Khan 2000a) and 'learning by monitoring' (Sabel 1994). One of the keys to these schemes is that the state provides support to firms in return for firms improving performance against international standards. The state does not have to have superior market knowledge to implement such a scheme, but rather instigates firms to acquire the knowledge by giving them incentives. States do, however, have to be able to enforce such schemes (Khan 2000b).

## Relevance of the capabilities approach for agro-industry

The technological capabilities approach has been applied mostly to the development of manufacturing industries, but it is also applicable to agro-industries. A study on Chile in the 1990s shows how the Chilean state and agro-industry firms collectively redefined institutions and practices to meet increasing competitive pressures (Perez-Aleman 1997, 2000). The successful performance of Chilean agro-industries, which included small-scale suppliers of raw material, stemmed from the ability to build local technical capacity, reorganize production, procure quality raw material and adopt, adapt and diffuse new knowledge across the production chain. The state and private institutions assisted the reorganization of firms to build their capacity to continuously improve performance. The Chilean firms had to discard old technology and organizational knowledge and build new skills to develop agro-exports.

The definition of agro-industry should not be limited to agricultural raw materials that are processed into different products. Fresh

produce exported to European markets is not a commodity which requires further processing before end use. It is a product ready for consumption and requires an industrial process from production to marketing which is different from that which characterizes, for example, pineapple traditionally grown and sold on the local market in Ghana. It requires a technical development process of learning, among other things, how to meet quality, how to work with suppliers to help them build their capacities to meet requirements, and how to keep up with technological and market changes. Thus, horticulture exports can be thought of as an agro-industry.

In sum, developing technological capabilities requires learning-by-doing and efforts on the part of firms, which take place within an institutional context structured by national level factors. This institutional context creates the incentives for, and facilitates the process of, firm level and industry level technological effort. This conceptual approach to understanding the performance of agro-industries has methodological implications. It necessitates that we look at the evolutionary trajectories, structures and intra-industry relations of particular industries as well as affects of the general business environment, industry-state relations, and the affects of government policies and interventions.

## III. THE RISE OF GHANA'S PINEAPPLE EXPORT INDUSTRY

Ghana's contemporary pineapple export industry emerged in the early 1980s as the result of a handful of entrepreneurs identifying and exploiting a comparative advantage.[9]

[9] A comparative advantage is a firm's already existing ability to produce a good or service at a lower cost than its competitors.

Air freight costs to Europe were cheaper for Ghana than for the Ivory Coast, the main exporter of pineapple to Europe. Thus, Ghanaian exporters could break into the market based on a cost advantage. Ghana's pineapple export industry ran into a crisis because individual firms, and thus the industry as whole, did not develop their technological capabilities. As a result, they failed to turn their initial comparative advantage into customized competitiveness (cf Reardon & Flores 2006). The general business environment and institutional foundation of Ghana's industry did not facilitate technological capability development, nor was there a pro-active strategy for the industry supported by industry actors collectively and the government and providing the necessary industry-wide goods and incentives.

This section describes the emergence of the pineapple export industry in Ghana. It first explains the historical foundations on which it was built, and then outlines how a group of entrepreneurs capitalized on a comparative advantage. The rest of the section examines who these entrepreneurs were, why they went into pineapple production and export, how they developed the necessary technological capabilities, and the extent to which they had support from each other and from the state. The remaining sections of the paper explore the limited extent to which the Ghanaian industry was able to translate this comparative advantage into a competitive one.

### Limited experience with commercial pineapple production

The first shipment of whole fresh pineapple exports by air occurred in 1984. This was not the first instance of commercial pineapple production or exports. The history of earlier commercial production and export is impor-

tant because it laid the foundation (albeit limited) on which the contemporary industry was built. It also indicates the limited nature of firm and national level technological capabilities in commercial horticulture production. Ghana's historical experience contrasts with that of the Ivory Coast, where an elaborate institutional architecture, state support, and expansive cultivation of pineapple was built around processed pineapple exports during the colonial period which was later adjusted to support fresh pineapple exports from the 1960s onwards.[10] Thus, Ivorian firms and farmers already had accumulated some technological capabilities prior to the rise of international fresh produce markets, although they had to expand and adapt these capabilities.

Commercial production of pineapple in Ghana dates back to the 1930s when a small group of farmers tried to export the crop to England, but importers considered the indigenous Ghanaian variety unmarketable because the colour was unattractive (P Obeng 1992).[11] Pineapple production expanded again around World War II, but declined at the end of the war when service personnel left. A botanical garden established in the town of Aburi in the late 19th century by German missionaries introduced a new variety of pineapple, Smooth Cayenne, which was adopted by peasant farmers in the surrounding area. However, as the cocoa industry expanded, farmers stopped growing pineapple.

In the mid-1960s, the first independent government under Kwame Nkrumah opened a state-owned cannery near the town of Nsawam to produce pineapple chunks and juice for local and export markets. A state-owned plantation was established, but the factory also used local farmers as outgrowers, so farmers started growing pineapple again. These developments, combined with good soil conditions, gave rise to the pineapple belt between the towns of Aburi and Nsawam, which are situated within a radius of 40 kilometres from Accra, the capital city.

The Nsawam cannery was part of President Nkrumah's strategy of state-led industrialization which he initiated in 1963, and differs from the experience of the Ivory Coast where pineapple canneries were established during the colonial period (Willems 2006). While supported by the state, the Ivorian canneries were privately owned and managed by French cooperatives where French plantations produced half the required pineapple and the rest was outsourced from individual African producers. After independence, the Ivorian government supported the industry through policies that promoted African producers in the cooperatives as well as through access to credit and research in collaboration with French research institutions.

Ghana witnessed immense political instability after the overthrow of Nkrumah's government in 1966. There is no record on the success of the cannery afterwards. One can speculate – based on the Ivory Coast's experience – that the cannery was never that successful, given that factory owners in the Ivory Coast complained in the 1960s that the production of preserved pineapples was not profitable anymore (Willems 2006: 108), and the Ivory Coast probably had lower production costs than Ghana, given the infrastructure developed by the French to support the industry in the colonial period.

Nor is there much evidence about commercial pineapple production. One source

[10] There is very limited material on the earlier periods of pineapple production in Ghana. This section draws on unpublished theses and oral history collected in interviews by the author. There is relatively more on the Ivory Coast, see Willems (2006) and Vagneron et al. (2009).

[11] There is no information about what type of farmers they were, and whether they were Ghanaian or British.

notes that the Acheampong military government (1972-79) supported pineapple production in the early 1970s, in an attempt to increase pineapple yield for the cannery and export through projects that offered agro-inputs, mechanization and extension services (IS Obeng 1994). Apparently pineapple production levels increased to 34,000 tons of pineapple by 1974, the highest level in Ghana's history at that time. However, it is not clear whether this production went to the local market, cannery or export. Pineapple production decreased after 1974 and plummeted by 1979 to only 3,900 tons, as a result of the deteriorating macroeconomic environment.

Ironically, it was around 1979-1980, in the midst of Ghana's most severe economic crisis with negative growth rates, that the seeds of the contemporary pineapple export industry were sown. Given that the economy was in free fall and political instability was at its height, what conditions facilitated the rise of this new industry? The beginning of pineapple exports in Ghana was partly accidental and partly based on astute observation of an unexploited comparative advantage by a small group of Ghanaians. The nature of this advantage is briefly described, before turning to who invested and why and how they developed the necessary initial capabilities.

## Exploiting a comparative advantage in the 1980s

Ghanaian exporters piggybacked on the European market for fresh pineapples built by Ivorian exporters. By the early 1970s, the Ivory Coast had diversified into fresh pineapple exports. The Ivorian pineapple processing industry was facing tough competition from Southeast Asian countries. At the same time, technological improvements in refrigeration processes for sea transportation facilitated the import of fresh tropical fruits in Europe and reduced dependence on preserved tropical fruits (Fold & Gough 2008). Thus, Ivorian pineapple producers started to cultivate for fresh export due to the rising demand (Willems 2006). As the closest supplier to Europe, the Ivory Coast was able to capture the European market and expand its exports. In 1986, Ivorian pineapples accounted for 95 percent of European imports.

Ghana had similar agro-climatic conditions as the Ivory Coast and was a similar distance from Europe, but it did not have an experienced group of commercial pineapple producers and exporters, nor the infrastructure or the institutions for export, marketing and logistics that the Ivory Coast had. It did have one advantage over the Ivory Coast: cheaper freight costs. Sea transport was the main means used by Ivorian exporters to transport pineapples to Europe. However, two companies (one French-owned and one state-owned) had a monopoly on sea transport, so freight costs were high (Willems 2006). Sea transport was not fully liberalized until 1996, which led to substantial reductions in transport costs. But before then, Ghanaian exporters were able to compete with Ivorian exporters because they had access to cheap airfreight. Transport accounted for the bulk of production cost, so Ghana's cheap airfreight could compete with Ivory Coast's expensive sea freight, and at the same time produce a better quality product because air-freighted fruit were picked ripe.

Ghana's first exports in 1984 were sent on passenger airlines because there were no cargo airlines then. When the space of passenger airlines was exhausted, the pioneer exporters found space at cheap rates on empty cargo aircraft from Nigeria looking for business on the trip back to Europe. Finally, the airport cargo handling services at Accra airport were liberalized in the second half of

the 1980s. New cargo airlines arrived, resulting in increased freight capacity and a variety of destinations. Two of the pioneer exporters chartered their own cargo planes. By controlling the logistics, the cost of transport was cheap for them, and they offered extra space to smaller exporters.

During the late 1980s and early 1990s, Ghana carved out a niche in the European market, controlling about 60 percent of the market in air-freighted pineapples to Europe (Dixie & Sergeant 1998). Air-freighted Smooth Cayenne pineapple from Ghana was considered a top quality product in the 1980s and received a premium over sea-freighted fruit.

## Who invested, why and how did they develop the necessary productive capabilities?

The producers of pineapple exports in the 1980s were different from earlier periods where state-owned plantations or peasant farmers dominated production. The Ghanaians who invested in pineapple farms for export came from a variety of backgrounds but were largely Accra-based professionals, public sector employees or owners of import businesses.[12] These investors constituted a new group of capitalist farmers in a country where large-scale capitalist farming was very limited (see Whitfield 2010). Ghana did not have a long history of successful plantation agriculture as in the Ivory Coast.

The handful of Ghanaians who pioneered pineapple exports did so either to earn foreign exchange for their primary business which relied on imports, or were professionals looking for a new way to make money given the economic crisis. With the severe macroeconomic imbalances and the economic controls put in place to deal with them in the late 1970s and early 1980s, it was difficult for businesses to acquire foreign exchange and import licenses.[13] Apparently the government encouraged import businesses to engage in exports to earn foreign exchange in order to get an import license. Several of the pioneers began exporting agricultural products in order to generate foreign exchange and access import licenses.

Why they invested in pineapple and not another export crop can only be answered speculatively. The Ivory Coast had made a name for pineapples in the European market, and many of the pioneers mentioned that friends or business contacts in Europe advised them that pineapple was a good market. Pineapple also has a relatively short gestation period of about 18 months. Other horticulture crops were tried, but pineapple was the most successful. Lastly, the pineapple belt is located very close to Accra. Its location meant it was convenient for farm owners to get their pineapples to the airport quickly using relatively good infrastructure, and it was easy for them to operate a farm but still live in Accra or travel back and forth easily. In the 1980s and 1990s, the pineapple belt was extended, but still remained within a 60 kilometre radius from the capital.

The apparent success of the pioneers led to a second wave of investments (the take-off wave), with their commercial farms beginning to export in the late 1980s and early 1990s. These investors also came from diverse occupational backgrounds (e.g. accountants, import businessmen), but were generally also urban, petty bourgeoisie. Many had seen first hand the profits to be made in pineapple exports.

[12] 'Ghanaian' includes Lebanese who have been living in Ghana for generations.

[13] Restrictions on the retention of foreign exchange were gradually removed, starting in the late 1980s and completed by 1992.

These early investors were not agriculturalists and had no prior experience in capitalist farming and export. They had to learn through experimentation how to grow pineapple and market it, but at that time pineapple could be produced with very simple technology, and the Smooth Cayenne variety produced good yields even when the best agricultural practices were not used. This learning was facilitated by the effort of one pioneer who went to the horticultural training institute in the Ivory Coast and brought back production techniques to Ghana. Most of the second wave of investors learned from the pioneers. The post-handling infrastructure required for air freighting was very basic. Pineapples were packed in the fields, loaded into trucks and sent directly to the airport.

These investors were not a capital-rich group and were able to enter pineapple export because the start-up costs were relatively small. They could begin pineapple production with a small investment, using capital accumulated from their salaried jobs or from other businesses, and then gradually expand by reinvesting profits. Some investors had access to credit through banks, but most relied on informal means to get capital (i.e. friends or family). Land was available in the pineapple belt and could be accessed, although on a piecemeal basis and not without some problems.[14] Individual companies controlled their own export marketing. Their owners relied on family, friends and business contacts in Europe to help them secure European buyers and to advise on marketing.

[14] Due to land tenure system, land was very fragmented and documentation of land ownership did not exist. As a result, land was acquired in small pieces from many different owners who expressed willingness to sell land, and land litigation often arose because multiple actors claimed ownership of the land and demanded compensation.

## Limited government support and inter-firm cooperation

In the late 1980s, these investors received a critical but one-off rent from the Ministry of Trade and Industry under the Provisional National Defence Council military-bureaucratic government. The Minister wanted to expand exports and encourage export diversification away from cocoa, and the nascent pineapple industry seemed a good candidate for support. At that time, there were at least 16 small and medium-sized pineapple producer-exporters. The Minister financed and organized access to planting material from the Ivory Coast for these producer-exporters, which was needed in order to expand their production quickly. He also organized a concessionary credit facility and import licenses for the eight biggest producers, which financed basic packhouses, irrigation facilities, farm equipment and agrochemicals. The only condition for receiving this one-off rent was for beneficiaries to produce business plans for expanding their production.

This support was not continued after the Minister left the government at the end of 1988. The programme was his personal initiative; it did not have political support of the ruling Provisional National Defence Council, and the financing for it had been raised through informal means. The Ghana Export Promotion Council, a government institution under the Ministry of Trade and Industry, continued to provide some support to the nascent pineapple export industry. It helped producer-exporters to find buyers. Through some small donor-funded projects in the early 1990s, it arranged study tours for pineapple exporters to visit other exporting countries and tours to importing countries to discuss the requirements of different importers, and seconded an international consultant to provide technical assistance on production.

Producer-exporters who benefited from this one-off rent referred to it as crucial to the expansion of the industry in the 1980s, because it came at a critical time when the industry was stagnating due to economic constraints and to unproductive competition. The two largest producers were in a rivalry that undermined the growth of the industry as the two leaders intentionally tried to keep the smaller producers from growing. There were networks among different groups within the industry through which information was exchanged but there was little industry-wide collective action and coordination around quality control or export marketing arrangements, for example. There was a Horticulture Association of Ghana, which arranged cargo flights, procured inputs and negotiated with the government over foreign exchange regulations and import licenses.

In contrast to Ghana's experience, the fresh pineapple industry in the Ivory Coast acquired its leading position through state support and centralized organization of the industry. It was built in a historical context of a centralized government control system during the colonial period, which led to a centralized approach by trade associations after independence (Willems 2006). The Ivorian state supported trade associations to coordinate all activities and operations in a vertically integrated supply chain, first in processed and then in fresh pineapple, giving it a position of power and control over individual industry actors. The Ivorian state also supported the industry through mobilizing international finance for research and investment, through its land and immigration policies, and through encouraging diversification of agricultural exports. The trade association established in 1991 to govern fresh banana and pineapple exports played a key role in coordinating the industry. It organized sea transport, harbour activities, quality inspections, handled administration at European ports, had a representative in France to protect interests of the Ivorian exporters, conducted studies on European markets and maintained close contact with European importers.

In sum, the technological capabilities required for Ghanaians to export pineapples to the European market were relatively simple and easy to acquire. Although they still required investment and effort on the part of Ghanaian entrepreneurs, the investment was small enough and the returns large enough to encourage risk taking, especially in the economic environment of the 1980s where there were few economic opportunities. Information on production was acquired from the Ivory Coast and shared among firms through informal networks. Information on export markets was acquired through informal networks (friends, business contacts, diaspora), and later through the Ghana Export Promotion Council.

The industry may never have taken off without the financial and technical support through a one-off subsidy from the Minister of Trade and Industry and without the incentive for limited inter-firm coordination required to receive the assistance (in the context of a rivalry between the two largest producer-exporters at the time).

## IV. CHALLENGES IN THE 1990s

In the early 1990s, Ghana's comparative advantage based on cheap air freight charges to Europe was being eroded by rising fuel prices, exhaustion of available air craft cargo space and the increasing cost competitiveness of sea-freighted exports from Central America as well as the Ivory Coast. As mentioned already, the Ivorian exporters significantly reduced their sea freight costs starting in 1994.

The increasing competition from Central America came particularly from Del Monte and Dole, transnational corporations with operations there.

These transnational corporations offered a homogenous product of high quality through their highly organized production, planning and export systems, and use of information communication technologies (Willems 2006). Their pineapples were also traded under a well-known brand name, and they employed promotion campaigns aimed at consumers and retailers. They benefited from lower production costs due to vertically integrated production, good infrastructure, and from owning their own sea transport. As a result, these transnational corporations cut into the Ivory Coast's market share, reducing it to just over 50 percent by the mid-1990s. Ivorian exporters could not offer the same level of quality, homogeneity of product, and marketing efforts, nor could Ghanaian exporters who were less organized than the Ivorians and produced smaller export volumes.

However, Ivorian and Ghanaian Smooth Cayenne pineapples still had several important advantages over the Central American pineapples (Willems 2006). Central American countries exported the Champaka variety which was less desirable on European markets due to its greenish colour and less sweet taste. And West African countries still had lower transport costs because they were closer to Europe. Champaka pineapples flooded the European market, which led to a drop in prices, but Smooth Cayenne was still the most demanded.

Until the second half of the 1990s, the characteristics of transnational corporations (being well organized and having full control over the supply chain) did not provide a competitive advantage in the European markets (Willems 2006). This situation changed in 1996 when Del Monte launched a new hybrid variety called MD2 which had the right colour, a sweeter taste, was better suited to sea transport, and had a longer shelf life. The launch of MD2 occurred at the same time as issues of food safety and branding became important for European retailers.

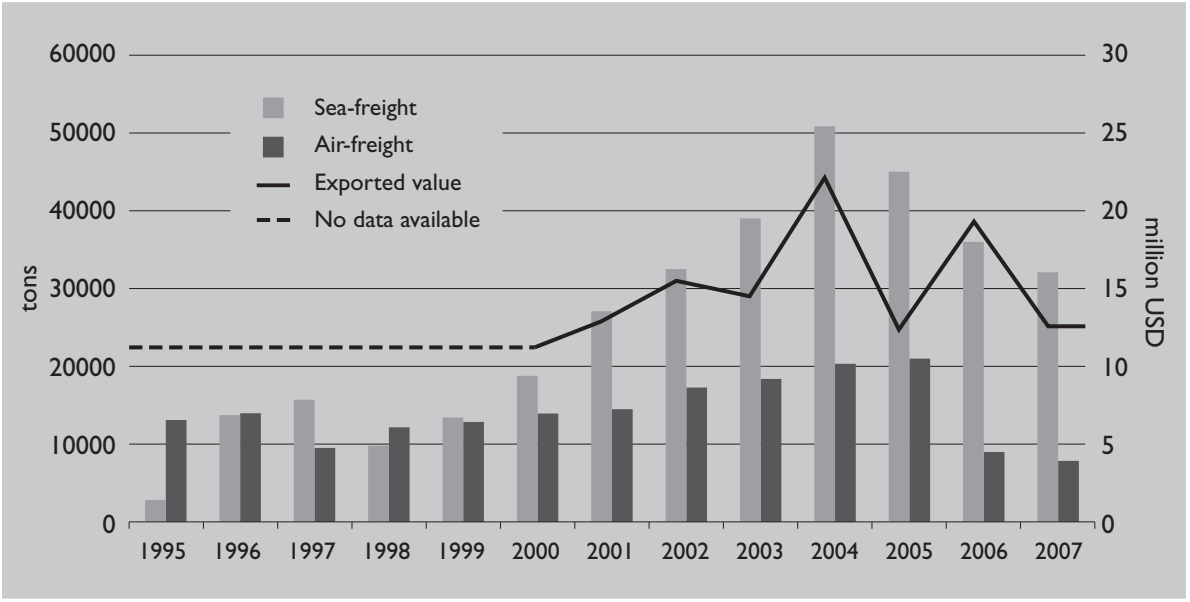
## Ghana's response to these challenges and its implications

The 1990s saw several changes in the landscape of Ghana's industry: a third wave of investment in commercial farms; increase in smallholder farmers in the pineapple belt producing pineapple to sell to exporters, and the rise of pure exporters (exporters without their own farms) who bought fruits from smallholders and small, non-resident commercial farmers. There were between 50 and 70 companies exporting pineapples at any one time, and about 40 percent of exports came from smallholder production (Dixie & Sergeant 1998).

When Ghana had the comparative advantage in air-freighted pineapples, there was not enough pressure to collaborate. When that advantage began to be eroded by the mid-1990s and competitor countries offered new challenges, it could have provided the motivation to come together. However, it did the opposite: it made Ghanaian exporters more competitive with each other.

The exception to this general trend of increasing individualism in the industry was the formation of the Sea-freighting Pineapple Exporters of Ghana association (SPEG) in 1994 which spearheaded the shift to sea-freighting, beginning in 1995. This initiative was led by just a handful of producer-exporters who realized the importance of sea-freighting to saving the international competitiveness of Ghana's industry and creating the potential

Figure 1. Ghanaian whole pineapple exports in tons, 1995-2007, and in US mil, 2000-2007




*Source:* Ouma, Boeckler & Lindner (2010).

*Note:* Volumes of export are based on SPEG 2008 data and value on GEPC 2008 data. The volumes reported by GEPC and SPEG do not match for the years 2000 through 2007.

for expanding exports. Shifting to sea-freighting required collaboration and organization among producer-exporters in a way that they had not done before. It probably would not have happened if actors external to the industry had not pushed the agenda and given resources to support it.

A private consultancy company hired as an implementing agency for a USAID project provided a feasibility study showing the cost advantage of shipping by sea and the volume that was needed to make it possible. This report was crucial in convincing four companies to take the risk.[15] SPEG was set up to arrange sea freight space on a refrigerated vessel owned by *Compagnie Fruitière* which was travelling from Cameroon to the Ivory Coast and then to Europe. The consultancy company facilitated this contact and provided financial and logistical support for the operations of SPEG, until it could generate its own funds to support a secretariat. The vessel agreed to stop in Accra for an agreed minimum volume of pineapple per visit. SPEG negotiated this minimum volume and freight costs. Initially, the founding SPEG members found it difficult to produce the minimum volume and had to pay for unused freight space—a cost shared among members. Eventually, the companies were able to expand their volume.

With evidence of success, other producer-exporters slowly began to join SPEG. All firms exporting pineapples by sea have to be members of SPEG, as this organization arranges and controls the sea-freighting logistics. Just before the collapse of the Smooth Cayenne market in 2005, there were

[15] Of these companies, one was owned by an African-American who had moved to Ghana upon retiring; one was owned by a British national, one was owned by shareholders but managed by a Swiss-German, and one was owned by a Ghanaian. Thus, only one of the Ghanaian early investors was willing to take the risk and collaborate. Notably, only two of these companies survived into the 2000s and only one exists today.

about 50 SPEG members, including pure exporters.

The move to sea freighting allowed the Ghanaian industry to expand its export volumes (see Figure 1). The Ivory Coast supplied the majority of the European market, but in the mid-1990s it began to focus on French import companies leaving Ghana the opportunity to fill the demand for pineapples in North Western Europe (Dixie & Sergeant 1998). Production increased for large and medium-scale producer-exporters as well as among smallholder producers (Technoserv 2004). Ghana's exports grew, but they grew slowly and remained far below the export levels of it competitors, as Table 1 indicates.

The inconsistent quality of Ghanaian pineapples was a small problem with air freighting, but it became a big problem with sea freighting (Dixie & Sergeant 1998). The shift to sea freight required that producers and exporters improved their practices and equipment in order to ensure good quality and longer shelf life. Pineapples were packed in the fields, with the hot sun and manual handling leading to deterioration in quality. They were sorted inside trucks due to lack of equipment to lift pallets. The trucks went straight to the port and were not cooled until they were in the refrigerated vessel. European importers demanded more fruit than individual Ghanaian exporters could supply, so they often rushed fruit to ripen and picked fruit too early, decreasing the quality of the fruit.

Thus, considerable scope for improvement existed in production to deliver better qual-

Table 1. Exports of pineapple, 1990-2007, selected countries. Tonnes.

| | Costa Rica | Philip-pines | Ecuador | Côte d'Ivoire | Panama | Hondu-ras | Guate-mala | Brazil | Mexico | Ghana |
|---|---|---|---|---|---|---|---|---|---|---|
| *1990* | 95,880 | 146,323 | 1,342 | 135,313 | 0 | 37,700 | 175 | 7,606 | 8,683 | 9,440 |
| *1991* | 100,286 | 167,520 | 1,554 | 121,440 | 0 | 48,744 | 83 | 15,212 | 9,817 | 10,675 |
| *1992* | 93,491 | 151,946 | 1,586 | 126,748 | 0 | 49,073 | 60 | 16,304 | 9,768 | 9,754 |
| *1993* | 97,061 | 154,333 | 2,299 | 125,949 | 0 | 54,339 | 66 | 35,948 | 8,184 | 13,157 |
| *1994* | 160,526 | 161,512 | 3,997 | 134,070 | 0 | 42,915 | 140 | 22,623 | 6,558 | 14,954 |
| *1995* | 177,604 | 163,524 | 5,686 | 135,940 | 0 | 44,228 | 196 | 10,239 | 8,438 | 15,764 |
| *1996* | 179,451 | 143,994 | 9,746 | 170,406 | 1,194 | 30,636 | 699 | 11,542 | 10,198 | 26,750 |
| *1997* | 250,100 | 144,802 | 8,825 | 175,064 | 494 | 22,949 | 492 | 12,956 | 18,337 | 25,402 |
| *1998* | 271,272 | 117,436 | 6,374 | 149,356 | 533 | 43,100 | 1,074 | 13,003 | 19,827 | 21,300 |
| *1999* | 304,418 | 127,682 | 12,000 | 201,787 | 98 | 43,500 | 2,404 | 15,815 | 19,612 | 21,849 |
| *2000* | 322,453 | 135,484 | 10,155 | 187,836 | 290 | 22,804 | 2,317 | 16,063 | 24,409 | 26,173 |
| *2001* | 386,922 | 154,412 | 16,237 | 195,236 | 670 | 40,000 | 5,957 | 14,457 | 34,694 | 19,703 |
| *2002* | 504,076 | 178,657 | 33,315 | 173,829 | 456 | 26,216 | 6,889 | 8,660 | 24,563 | 46,391 |
| *2003* | 559,426 | 194,684 | 49,211 | 173,518 | 4,759 | 34,745 | 6,644 | 12,096 | 20,839 | 45,421 |
| *2004* | 693,107 | 204,087 | 68,421 | 158,736 | 13,180 | 50,540 | 16,231 | 23,375 | 33,530 | 56,094 |
| *2005* | 905,090 | 215,070 | 79,737 | 132,077 | 27,969 | 54,930 | 40,359 | 19,630 | 33,075 | 52,574 |
| *2006* | 1,194,179 | 231,882 | 95,046 | 115,604 | 21,461 | 60,136 | 26,839 | 22,678 | 25,588 | 44,054 |
| *2007* | 1,353,027 | 270,054 | 99,581 | 96,558 | 61,210 | 52,965 | 47,460 | 36,764 | 32,256 | 29,512 |

*Source:* Faostat

ity and higher yields, in post-harvest handling to deliver a better presented and consistent product, and in more professional financial management and marketing (Dixie & Sergeant 1998). Ghana's quality and yields were more inconsistent than production in Central America and the Ivory Coast. Standardized production practices, key to achieving homogenous, good quality fruits, were not achieved among producer-exporters, much less among smallholders, and quality was checked only at individual exporters' packing stations. Post-harvest handling on the farm and transport of the fruit needed improving through investments in post-harvest infrastructure, especially cold storage; training staff; and closer collaboration with smallholder producers. The facilities at the main sea port were not organized for perishable exports; there was no packing shed and no cold stores.

The shift to sea freight was *not* accompanied by these changes, however, and the industry did not achieve the required standards in production and post-harvest handing.[16] A major source of complaints from European importers in the 1990s was the internal browning in fruits upon arrival in Europe. As a result, Ghana's exports fetched declining prices and a declining reputation (Accord Associates 2001). Ghanaian exporters also did not achieve the volumes of exports and standards of management needed to widen their profit margins and increase their leverage in the market. By the early 2000s, Ghana had 55 registered pineapple exporters (consisting of many medium-sized producer-exporters and a large number of pure exporters), but only 10 of them exported over 1,000 tons (Voisard & Jaeger 2003). Such small volumes of individual Ghanaian exporters compared to their competitors meant that they had little negotiating leverage over price. In 2001, the two biggest exporters in the Ivory Coast exported 130,000 tons combined, while the whole Ghana industry exported around 30,000 tons. Ghanaian exporters also generally lacked selling agents in Europe to perform quality inspection. Thus, European wholesalers could cheat Ghanaian exporters by claiming bad fruit, and thus not paying for them, without the exporters being able to prove otherwise (IS Obeng 1994; Fold & Gough 2008; interviews).

[16] Only one producer-exporter built a packhouse with cooling facilities in 1995, which was a huge innovation at that time. He relied extensively on a network of outgrowers whom he supported with finance and training, rather than a nucleus farm, and was trying to get uniformity in outgrower fruit by creating storage so that fruits could be harvested when ready and not against shipment consignment dates. He was one of the four producer-exporters who led the shift to sea freighting. No one else followed his lead until 2004. One reason given was that SPEG was using a refrigerated vessel with hatches, where all of Ghana's pineapples were loaded in the same hatch. Thus, his pre-cooled pineapples were loaded next to other producer-exporters' pineapples that had come straight from the field, diminishing the effect of pre-cooling. Creating a continuous cold chain required using refrigerated containers, which no producer-exporter attempted until Bomarts sent the first pre-cooled shipment in a refrigerated container in September 2004. At that time, the other larger producer-exporters were just building modern packhouses but without cooling facilities. Notably, today Bomarts is the largest exporter among the Ghanaian owned exporting companies (see Table 2).

## Why this response?

Why was it so difficult for industry actors to collaborate to shift to sea-freighting, and why was the shift not accompanied by changes in production and post-harvest handling needed to achieve the required quality for sea freight? One argument is that the lack of access to adequate working capital was more the source of sub-standard performance than the lack of technical know-how (IS Obeng 1994). Most farmers relied solely on their profits for working capital, which resulted in limited investments in the farm and slow growth in export volumes. It is true that outside the

cocoa sector, most agricultural producers lacked access to credit, except through small and short-lived donor-funded projects, and that long-term financing instruments were totally absent. The World Bank noted that implementation of its agricultural projects in the 1990s was affected by the high cost of credit and the lack of long-term credit needed for major capital investments (World Bank 2000).

Lack of access to finance for agribusiness was a serious constraint. However, interviews with producer-exporters indicated that profit margins were high for air-freighted pineapple in the first half of the 1990s, and that a lot of money was made which could have been invested in new production, post-handling and export practices. They cite other reasons why it was not. One reason was that producer-exporters saw themselves as only competing with the Ivory Coast, and they claimed to be using the same technology as the Ivorians ('doing things the same way'). To an extent, this was true.[17] In the 1990s, the Ivorian exporting organizations did not have a continuous cold chain from farm gate to market door. The Ivorian industry also depended on smallholder producers for almost 50 percent of its total exports, and the production and post-harvest handling practices of the smallholders were often inadequate, resulting in poor quality and non-homogenous fruit (of different size, colour and maturity). Bad roads led to internal and external bruising. Quality checks were made at packing stations. Packed fruit was transported to the ports in trucks that often broke down.

Thus, the Ivory Coast did not provide an immediate model to follow, but its industry was in the process of changing. Its medium and large-scale producers, traders and export association realized in the early 1990s that they needed to improve the quality of their product in order to be successful in the increasingly competitive international pineapple market (Willems 2006). But it took a long time for the Ivorian industry to implement these changes, with some only coming to fruition in the late 1990s and early 2000s. For example, quality assurance mechanisms were gradually created during the 1990s, such that by 2000, 100 percent of fruit to be exported was thoroughly checked (including internal condition) at the port by an internationally recognized independent body paid by the trade association and its quality label attached to exported fruit. Containerized shipping was not introduced until 2000, which allowed the possibility of continuous cold chain from farm gate to market.

Another explanation is that the decentralized and unorganized structure of the Ghanaian industry and the nature of relations within the supply chain did not encourage learning but rather deterred investments in new technology and innovating with new practices. The small-sized operations of producer-exporters in the early 1990s led them to depend on smallholder farmers to increase their volumes. In trying to meet the volumes requested by their buyers, quality was not the top priority. Producer-exporters increasingly relied on smallholder production, but did not provide adequate support to smallholders in the production process to ensure good quality nor did they put in place formalized quality assurance mechanisms. Producer-exporters told smallholders when to harvest, and often rushed harvesting to meet deadlines. They often carried out harvesting themselves, judging in the fields of smallholders what was export quality fruit.

[17] See Willems (2006), which is the only description of the Ivorian industry available.

Arrangements between smallholders and producer-exporters became increasingly non-committal as competition among exporters for smallholder fruits intensified. Even where a producer-exporter had a verbal commitment with a smallholder to buy his fruits and perhaps assisted him by providing inputs on credit, the smallholder might sell the fruits to another producer-exporter or pure exporter who offered a better farm gate price (sometimes because that price did not account for the deduction of the credit, and thus the smallholder was effectively dodging the repayment of the loan). It is generally agreed that such side-selling was rife, and that producer-exporters intentionally 'stole' smallholder fruit from other producer-exporters.

The lack of formal contractual relations between smallholders and exporters served the interest of both parties. Exporters also saw it in their interest not to have formal relations because it gave them flexibility. Producer-exporters were seeking to create a backup supply in case they needed it, and did not want to have to buy all the smallholders' fruits.[18] Smallholders tried to sell for the highest price. This behaviour exacerbated existing mistrust among producer-exporters. Such a situation further deterred producer-exporters from supporting smallholders financially and technically to improve their production practices.

The uncertainty and competition created by this industry structure not only led to inconsistent quality of exports. It also created disincentives for producer-exporters to invest in improved practices and equipment and expand their own farms, when almost 50 percent of their supply was smallholder fruit. Lastly, some of the largest producer-exporters at the time did not shift to sea-freighting until the late 1990s or early 2000s, because they still had viable air freight markets, so they saw even less need to invest in new practices and technology.

The industry structure and relations as they formed in the 1990s were not the only disincentive to investing in building technological capabilities. The nature of the entrepreneurs was also important. The early investors, who became the key industry actors in the 1990s, are described by some industry observers as 'cowboys' practicing a form of 'bootstrap entrepreneurship'. They zapped up opportunities, but they were individualistic in their approach and short term in their outlook. This outlook was crucial to the emergence of the industry, but not conducive to its further development. Industry-wide initiatives or strategy, and the collaboration needed for it, did not matter to them. Business was good for them individually. And they did not have previous business experience which would impress the importance of inter-firm coordination. Finally, the expectations and standards of business success in Ghana were very low; pineapple exporters saw themselves as doing well by Ghanaian standards, which led to complacency.

A large portion of pineapple exporters sought mainly to make quick money in hard currency. Thus, they were not looking to reinvest as full-time commercial farmers and exporters. Often investors mixed businesses, using pineapple exports to support their import trading business. If the import business was more important, then the pineapple one suffered. As a result, there was a large turnover

[18] Some of the larger producer-exporters had a small group of outgrowers whom they worked with more closely. These outgrowers included nearby peasant farmers growing pineapple in addition to other crops, but they also included aspiring commercial farmers who might also have worked as field staff or managers on the producer-exporter's farm. These outgrowers benefited from a closer relationship to the producer-exporters, learning from the producer-exporter's farm and sometimes receiving financial assistance.

in exporters. One producer-exporter noted that the Horticulture Association of Ghana had about 60 members, but only 20 were really active and about 40-50 percent had only been operating a few years.

With the creation of SPEG, producer-exporters abandoned the Horticultural Association of Ghana to the smaller producers who did not directly export, weakening that organization further. Furthermore, the increased competition between producer-exporters exacerbated the existing distrust amongst them and lack of transparency in the running of HAG and then SPEG.

## Lack of political support for the industry

In addition to these disincentives and obstacles to firms investing in building their capabilities, and to the inter-firm collaboration that would facilitate it, there were no incentives or imperatives to do so coming from the government. In fact, the government largely neglected the industry in the 1990s. There was no support among the ruling political elite for developing the industry. The Horticulture Development Unit in the Ministry of Food and Agriculture was created in the early 1990s as the result of a World Bank project. This Unit was never adequately financed by the government and became dependent on donor projects to continue its activities. The World Bank funded most agricultural projects in the 1990s, including one project that had a component on pineapple exports (World Bank 2001). This component funded technical assistance on production for smallholder producers and producer-exporters through international consultants placed in the Horticulture Unit, participation in international trade fairs, and rehabilitation of roads in pineapple-growing areas.

The United States aid agency provided some assistance to pineapple exporters as part of much larger programmes in the 1990s aimed at supporting the private sector. The facilitation of establishing SPEG was the only really important contribution to the industry. Other aspects included providing some special financing mechanisms routed through banks and providing technical assistance to smallholder producers as well as helping them to form cooperatives.

A 1998 consultancy report for the World Bank to evaluate Ghana's horticulture export industry argued that the industry needed targeted support to address the following issues: delivery of foreign exchange loans to producer-exporters, perhaps with a matching grant scheme where the business would be provided with technical advice; develop a research and development programme which could develop crop production and post harvest techniques which would ultimately be wholly funded by the industry itself; develop a training programme for the industry so as to build up the expertise and management skills of the industry, including apprenticeship schemes; infrastructural activities such as cold storage and roads; and to encourage expansion of the sea freight sector so that Ghana can charter its own services.

Such a targeted programme to develop the industry was not forthcoming. The proposal was not picked up by the World Bank due to a shift in the balance of interests within the Bank regarding agriculture away from individual projects towards agricultural sector support (and specifically institutional reforms within ministries of agriculture). On the Ghana side, the government did not push for it. There was a change in ruling party in 2001, but the new government also did not prioritize the pineapple export industry. Instead, what occurred over the next decade

was a motley assortment of uncoordinated and incoherent donor-funded (and -driven) projects and programmes implemented by different government and private agencies.

Furthermore, there was little support among donors or within the Horticulture Development Unit to develop the industry by building the technological capabilities of producer-exporters. Instead, the focus was largely on smallholder production as a means of poverty reduction. For example, the World Bank decided to employ funds from its project which were still unused in 1998 to bring together five smallholder pineapple cooperatives, with two small producer-exporters, to form an export company.[19] The World Bank drew on a farmer-ownership model which had been piloted in other African countries. Farmapine, as it was called, began exporting in 2000. However, it faced major problems. Just when Farmapine started, the air market crashed and the two exporters whose expertise was bought out by Farmapine had no experience exporting by sea. The company did not have enough start-up working capital, of which too much was spent on the salaried technocrats hired to run it. While Farmapine became the second largest exporter in the first half of the 2000s, it faced problems exporting good quality pineapples by sea and its response was no better than the other exporters.

Remaining competitive requires constant investment in capabilities acquisition (Lall 1996). Market conditions and tastes are changing, technologies improving, new competitors appearing, and relative costs of inputs, labour and infrastructure shifting. In general, Ghanaian producer-exporters did not continue to invest in developing their capabilities. For example, producing higher-quality products necessitated standardizing production practices across the industry, finding new ways to organize relations between exporters and small producers, and creating institutions to monitor and enforce quality standards. Few Ghanaian exporters realized that technological capabilities investments were needed and that they would be profitable. The observation by Lall (1996: 32) that 'the learning process itself has to be learnt in developing countries' is very apt for this case.

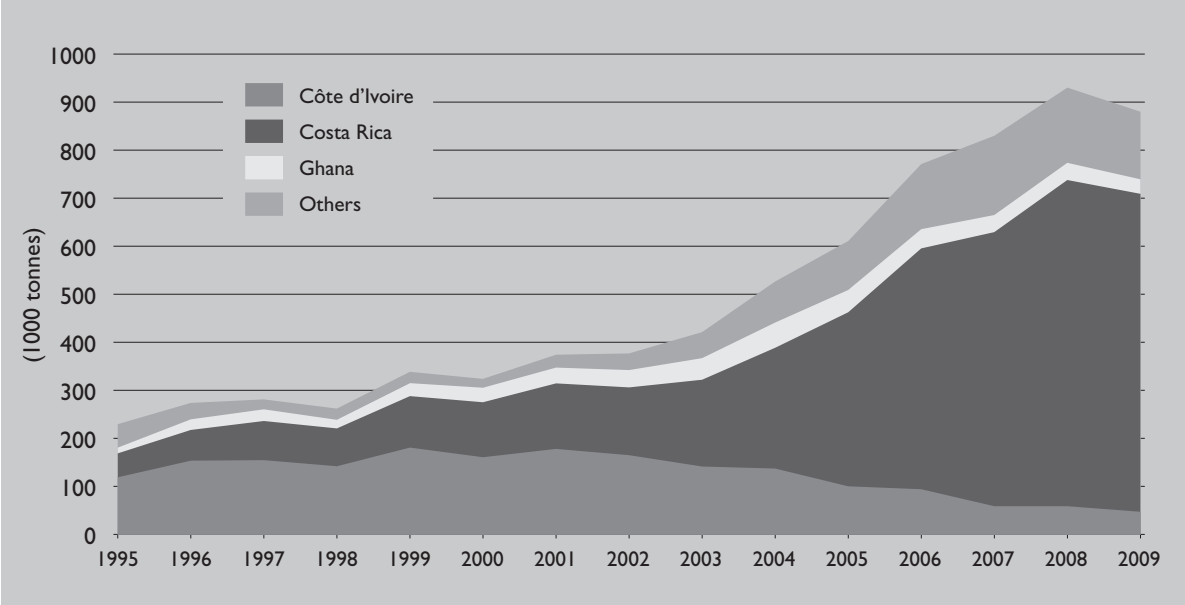
The efforts of individual firms improved their chance of survival, but individual firms could not deliver the needed industry-wide collective goods and were deterred from some investments due to collective action problems where one firm's investment could be undermined by the actions of other firms. Ghanaian exporters generally were unable collectively to solve problems and build capabilities. Selwyn (2008) shows in the case of the grape export industry in Brazil how important collective action among firms was for the ability of small and medium-scale producers to upgrade. In that case, trade associations did not just support members but also forced them to adapt to new circumstances as a means of maintaining competitiveness. A private marketing board responsible for export arrangements was also created to control quality and increase volumes.

## V. CRISIS IN THE 2000s

Foreign consultants' reports on the Ghanaian industry warned as early as 1998 that Central American pineapples produced by multinationals at low costs and with significant marketing muscle would create intense competition for Ghana. Already in 1999, European demand for Smooth Cayenne began to

[19] Each cooperative had 164 smallholders, with an average of 1.9 acres of pineapple cultivated per farmer.

Figure 2. EU imports of pineapple from Ghana, Ivory Coast & Costa Rica, 1995-2009




*Source:* Eurostat, commodity code 080430.

Imports refer to all extra-EU imports. EU is the EU-15 group for the period 1995-1998, EU-27 group from 1999 onwards. The category 'Others' refers to total imports from all other countries than Côte d'Ivoire, Costa Rica and Ghana.

decline as demand for the perceived superior MD2 increased. Del Monte had raised the standards of market service and produced pineapples with a better price/quality ratio. Ghana had low quality, low export volumes and high relative costs. More generally, the poor quality image of West African pineapple remained. By the end of 2005, the European market made a definitive shift to the MD2 variety and demand for Smooth Cayenne evaporated. Costa Rica quickly took over the European market (see Figure 2).

The Ivory Coast's exports began to decline around 2000, but Ghana increased its exports in the first half of the 2000s, reaching 10-11 percent of the European market. Its market share plummeted in 2005, for reasons discussed below. Between 2003 and 2007, European imports from the established pineapple exporters (in Ivory Coast and Ghana) fell by 55 percent. However, Ghana's total exports did not fall so drastically, because in 2003 *Compagnie Fruitière* (a multinational corporation) established a subsidiary in Ghana called Golden Exotics in a decision to move its production from the Ivory Coast, and started exporting MD2 pineapple in 2004. Nonetheless, by 2010 Ghana supplied only 3 percent of pineapples imported to Europe (Loeillet & Paqui 2010).

This section summarizes the causes behind the dramatic rise of Costa Rica and the MD2 takeover of the market, before examining the Ghanaian industry's response. We can only speculate about the Ivory Coast's decline. Ivorian Smooth Cayenne also faced quality problems in the 2000s (Paqui 2007). Its quality problems partly resulted from the industry's inability to improve the practices of smallholder producers, because the changes made in the 1990s were limited in scope, as well as the degeneration in the quality of planting material that had been used since the 1940s (Willems 2006). It was

also due to the political crisis in the Ivory Coast, which erupted into civil war in late 2002.

## The rise of Costa Rica and the MD2 takeover of the market

Costa Rica's rise in the pineapple export market is primarily the story of Del Monte, and the story of Del Monte is largely one of innovation and creating barriers to entry. Del Monte created a new variety that set higher quality standards and met export market needs: better appearance, sweeter and lower acidity, high resistance to parasites and internal rot, ability to survive cold storage for up to two weeks which was crucial for sea freighting, and longer shelf life (NRI 2010).[20] These characteristics addressed European importer concerns about Smooth Cayenne. Paqui (2007) argues that part of Del Monte's success with the MD2 variety was that it hit a stagnant market. Smooth Cayenne was the only variety, so by aggressively marketing a new product, Del Monte expanded demand. When Del Monte turned its focus to the European market aggressively in the early 2000s, European importers embraced MD2.[21] The switchover was gradual initially, but by mid-2005 importers were looking only for MD2 pineapple.

Del Monte waged a vigorous war to prevent the spread of MD2 planting material to other growers; one that it lost, although not before solidifying its giant market share. The corporation did not have a patent on the MD2 cultivar as most people thought and as it claimed.[22] In 2003, Del Monte finally abandoned its claims over exclusive rights to MD2 after interminable court hearings. However, its first-mover advantage, its tight control of the entire chain from production to transport, and its marketing under a well-known brand name supported by intensive advertising enabled it to remain the top supplier of MD2 even after other companies began producing it.

When it was clear that MD2 was not patented, other multinational companies expanded production with MD2, or their own 'sweet' cultivars, in Costa Rica and other Latin American countries (Vagneron et al. 2009). There was also a proliferation of pineapple plantations managed by independent small, medium and large-scale producers in Costa Rica and elsewhere, some of whom contract their production to the multinationals (NRI 2010). Other Costa Rican companies started selling large volumes of MD2 to the European market, pushing down the price. MD2 exports from other Latin American countries increased, with entirely new players entering the scene, such as Honduras and Ecuador (see Figure 3). When the price of MD2 pineapples fell due to increased supplies, European importers lost interest in Smooth Cayenne.

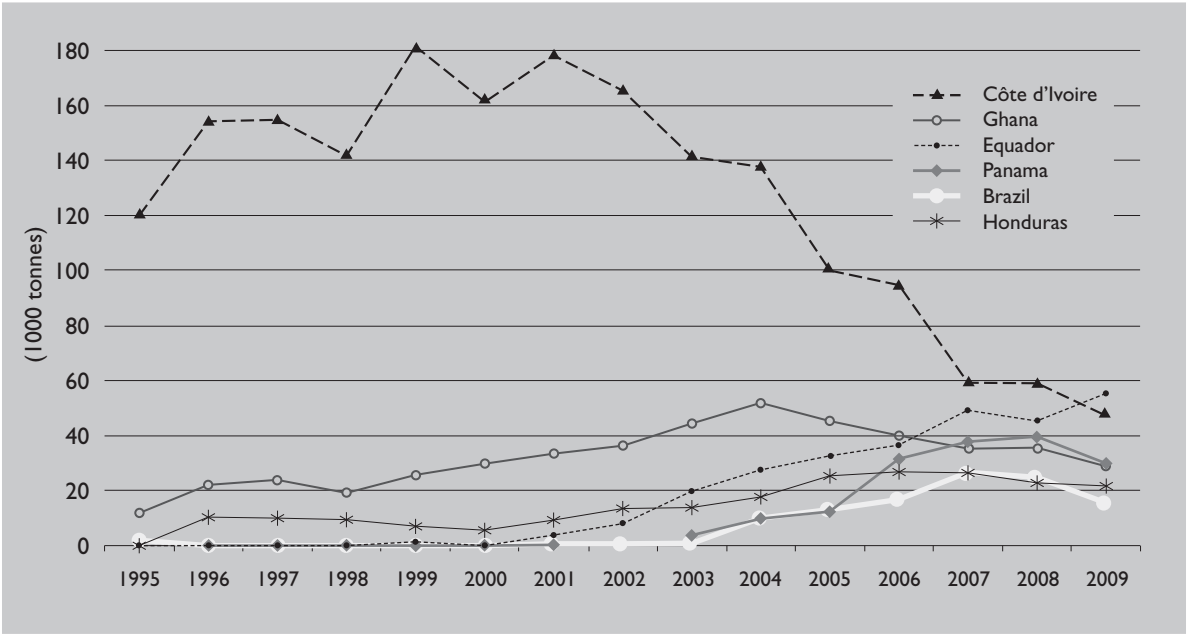
In addition to innovations led by Del Monte, the rise of Costa Rica as a pineapple exporter is attributed to the general business environment produced by national trade and agricultural policies and regional trade agreements (Vagneron et al. 2009; NRI 2010). These poli-

[20] For the story of how the MD2 variety was created, see Vagneron et al. (2009).

[21] The 11 September 2001 attacks in the United States and new US regulations on bioterrorism forced Costa Rica to find new markets for the new MD2 variety in Western Europe (NRI 2010).

[22] See Chronica Horticulturae 2003, vol.43, no.4, 'Pineapple Wars' by Jules Janick, and Chronica Horticulturae 2004, vol.44, no.2, 'Pineapple Wars Redux' by Ian Greig. Del Monte, Dole and Maui Land, which engaged collectively in the research that produced the MD2 hybrid, were fighting with each other over ownership of the MD2 cultivar through various law suits. Del Monte was unable to get a patent on MD2 because the cultivar had already been grown and marketed by Maui Land.

Figure 3. Top countries exporting to the EU, excluding Costa Rica, 1995-2009




*Source:* Eurostat, commodity code 080430.

EU is the EU-15 group for the period 1995-1998, EU-27 group from 1999 onwards.

cies included tax credits, export promotion incentives (including export subsidies), easy access to land, trade preference programmes with the US, government investment in agricultural research and development, as well as technical and financial assistance to farmers.

The general business environment in which Ghanaian producers and exporters operate is starkly less conducive to agri-business. They face higher production costs due to the high cost of credit or inability to access credit altogether (due to high interest rates and/or high collateral demands), poor infrastructure (roads, electricity, water), problems with land acquisition and security of rights, and a lack of skilled labour in agri-business and horticulture in particular.[23] For example, many farms were situated in rural areas that lacked electricity, so the farms operated with generators. As late as 2010, some farms were still waiting for electricity.

## The Ghanaian industry's response to MD2

Most pineapple producers did not start to cultivate MD2 pineapple until after the collapse of the Smooth Cayenne market in 2005. The largest producer-exporters in the 2000s (which mostly included the early Ghanaian investors who had survived and turned into full-time commercial farmers) acquired MD2 planting material through individual efforts or sharing among informal networks. One producer-exporter started a tissue culture lab in 2002 to produce MD2 planting materials. Notably, other producer-exporters distrusted the quality of such planting materials produced in Ghana and instead acquired them from MD2-producing countries like Costa Rica and Honduras. Still, only

[23] Many of the large producer-exporters got their farm managers from the Ivory Coast.

a few Ghanaian exporters had significant quantities of MD2 pineapples to export by 2005, meaning that almost all exporters lost a lot of money when in mid-2005, within a matter of months, European importers only wanted MD2 pineapples.

Although the first step to producing MD2 pineapples was accessing the planting material, this proved to be the easiest. Learning how to grow the MD2 variety profitably in Ghana's conditions was much more difficult and expensive than anticipated. SPEG and individual producer-exporters brought in consultants from Costa Rica to teach them, but the climate and soil is different compared to Ghana and even differs across the pineapple belt within Ghana. Learning to grow MD2 involved a large degree of trial and error. Even Golden Exotics struggled and was on the same learning curve with the rest of the producer-exporters, despite its better access to resources.

Producer-exporters lost much of their working capital figuring out that the agronomy of MD2 is different from the traditional variety. With Smooth Cayenne, Ghanaian producers could get decent yields even if agronomic practices were not the best. With MD2, production practices had to be precise to produce a profitable yield. MD2 also required different land preparation techniques, more fertilizer, more irrigation, more careful post-harvest handling which meant mechanization, and a continuous cold storage chain. All of this meant massive investments in new production equipment and state of the art packhouses with cold storage facilities. Without doing all of these things, the yields would be low and sizes of the fruit small, and thus financial losses occurred as costs exceeded returns. But if all these things were done correctly, the yield of MD2 was much higher than the Smooth Cayenne variety. MD2 is arguably an industrial crop developed for production on large-scale plantations and most suitable for high levels of mechanization (NRI 2010).

Thus, switching to MD2 required multi-million dollar investments. Producer-exporters who risked making the switch initially drew on company savings, but that was not enough. Unfortunately, accessing the necessary finance became a big problem and probably slowed down the learning process. In addition to the general inclination among national banks to favour short-term loans to finance trading and to shun long-term finance for agri-business, two factors compounded the difficulty of accessing loans. First, the large number of foreclosures of pineapple farms and their huge debts increased the banks' risk adverseness to lending for pineapple export. Second, the macroeconomic environment in Ghana began to deteriorate leading to higher commercial interest rates, around 30 percent, in the late 2000s. Producer-exporters could not get the amount of money they needed at the time they needed it, and had to take loans with unfavourable conditions (short-term, high-interest rate). This situation was somewhat ameliorated by a donor project (US-funded Millennium Challenge Account, or MCA) to support horticulture export, but this donor project was very slow in making credit available.

Producer-exporters who were able to finance cooling facilities and new equipment on their own, did so. Others had to wait until 2009 to receive post-harvest equipment financed by the MCA project and bought by SPEG. The MCA project was also supposed to help producer-exporters access loans for production (working capital) from national banks by shouldering 50 percent of the default risk, but this process was very slow. The banks were not eager to participate and the big ones declined to do so. Furthermore, the

Table 2. SPEG members' sea-freight performance, 2003-2008 (tonnes)[24]

| | *2003* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* |
|---|---|---|---|---|---|---|---|
| Golden Exotics | 328 | 938 | 3,100 | 8,048 | 11,911 | 8,553 | 8,606 |
| Bomarts | | 530 | 2,851 | 1,618 | 2,770 | 4,664 | 3,862 |
| Milani | 3,555 | 4,503 | 3,728 | 2,999 | 2,969 | 2,277 | 3,144 |
| Gold Coast Fruits | | | | 228 | 1,044 | 781 | 1,964 |
| Prudent | 3,303 | 3,820 | 1,984 | 2,200 | 2,414 | 1,671 | 1,229 |
| Georgefields | 2,340 | 2,889 | 2,225 | 1,589 | 1,027 | 1,207 | 1,563 |
| Koranco | 1,153 | 1,502 | 2,083 | 2,246 | 1,995 | 828 | 1,720 |
| Jei River | 6,557 | 6,431 | 6,634 | 6,471 | 1,635 | 1,720 | 1,366 |
| Chartered | 1,289 | 2,260 | 1,381 | 654 | 303 | 424 | 267 |
| Greenspan | 725 | 454 | 0 | 68 | 165 | 0 | 82 |
| Unifruit | 1,066 | 1,406 | 1,296 | 1,008 | 533 | 0 | 184 |
| Horizon | 1,018 | 1,171 | 633 | 167 | 113 | 164 | 58 |
| Farmapine | 4,958 | 4,766 | 4,235 | 1,161 | 27 | 0 | 0 |
| Silwood | 1,200 | 1,661 | 699 | 432 | 254 | 271 | 0 |
| Phoenix | 1,165 | 875 | 569 | 76 | 0 | 0 | 0 |
| Others | 3,965 | 5,287 | 2,324 | 2,028 | 1,236 | 504 | 799 |
| *Total* | *32,623* | *38,494* | 33,999 | *30,992* | *28,396* | *23,064* | *24,844* |

*Source:* Based on data supplied by SPEG.

US agency in charge of the MCA insisted on applying the commercial interest rate, which many producer-exporters were unwilling to take. As a result, producer-exporters who could access finance through their existing bank relations did not participate in the programme, and only those who were desperate took it.

The producer-exporters who made the switch to MD2 and survived had significantly reduced export volumes and operated at a loss for several years while they learned to produce MD2 profitably, which did not happen until 2009. Table 2 indicates the surviving SPEG members. However, in 2009, there were only seven serious exporters, and two of them accounted for over half of exports. Table 2 indicates which firms survived, as well as examples of firms that collapsed. Ghanaian nationals own all the firms listed in Table 2 except Milani, Golden Exotics and Gold Coast Fruits.[25] Golden Exotics and Gold Coast Fruits constitute the fourth wave of investment in the industry in the 2000s. Gold Coast Fruits was set up in 2005 as a German-Ghanaian joint venture, and Golden Exotics, as already mentioned, is the subsidiary of the multinational com-

[24] This table indicates total sea-freighted pineapple exports provided by SPEG. Air-freighted exports were significant until 2008. See Table 1 for total exports.

[25] Milani was started in 1998 by a Swiss national who was just buying fruits to export and then decided to establish his own farm so he could control production.

pany *Compagnie Fruitière*. Among the top exporters, Koranco is the only pioneer investor that survived, and Prudent, Georgefields, Bomarts are from the second and third wave of investors.[26]

Some producer-exporters listed in Table 2 are still in the process of making the switch to MD2. For example, Greenspan, a second wave investor, collapsed in 2005. The owner has only been able to revive it through support provided by a USAID project that facilitated access to bank finance and a Danida project which facilitated access to Danish importers. Chartered, which was a third wave investor, moved its operations in 2006 to a new farm on a larger piece of contiguous land and had to start over from scratch. The new farm is not located in the popular pineapple farming area or close to a main road. The owner had to construct a road to the farm, put in electricity, provide water, clear the land, and build a new packhouse, among other things. To take another example, Unifruit joined a German investor who set up a fresh cut fruit export company which started exporting in 2007, so the owner is selling largely to that company but plans to expand production and export MD2 as well.

Notably, Farmapine failed to make the switch to MD2 in 2005 and collapsed a few years later. It had started to acquire MD2 planting material in 2003, but it was not enough, and when the Smooth Cayenne market collapsed, it did not have a consistent supply of MD2 available. Then it could not get the financing to support the shift. It was already in debt (loan taken through the World Bank and Ministry of Finance had not been paid off), and banks, donors and the government refused to lend it more money. Horizon and Silwood are examples of companies that have not made the MD2 switch successfully and are unlikely to survive. Phoenix is an example of a company that collapsed immediately after the switch.

Out of the 54 pineapple exporters registered with HAG and SPEG in 2004, only 11 were actively exporting in 2008 (NRI 2010). In 2004, the capacity of SPEG and HAG pineapple producer-exporters ranged from 250 metric tons per week to 1 metric ton per week. 60 percent of these exporters were quite small, with a capacity of less than 25 metric tons per week. Only 50 percent of pineapple exporters were GlobalGAP certified, predominantly those in SPEG and only those with capacities greater than 15 metric tons per week. With few exceptions, only firms exporting 60 metric tons per week survived. All of the survivors had GlobalGAP certification. The small pineapple exporters in the Horticulture Association of Ghana lacked the necessary resources to cope with the change to MD2 production. 90 percent of HAG members had export capacity of less than 40 metric tons per week and had no modern packing facilities and very little on farm mechanization. Thus, shifting to MD2 required even more investments for these small producer-exporters than for the larger ones. They did not have the resources to meet GlobalGAP requirements, much less those for MD2 production. Survivors among smaller firms export to niche markets like Fairtrade or organic. Some of the large producer-exporters quit pineapple but shifted to producing other horticulture products, such as papaya. The pure exporters exited the business, except for exporters targeting the organic market who buy fruits from smallholders supported by donor-government projects.

[26] The large producer-exporters provide jobs on the farms and in packhouses to surrounding rural villages and small towns. They employ about 200-300 people, including packhouse and casual labour. The largest ones employ 400-500 people, and Golden Exotics employs much more.

The surviving producer-exporters abandoned smallholders and focused on their own farms. Smallholders did not have the capital and knowledge to make the switch, and the surviving exporters were not in a position to help them. Furthermore, it was increasingly realized that MD2 has economies of scale, requiring a minimum acreage to cover overhead costs in order for it to be profitable. As of mid-2010, very few smallholders or small farmers were producing MD2 pineapples, and those who were sold mostly to a firm exporting fresh cut fruit products. The small farmers selling MD2 to producer-exporters were very few and typically outgrowers for those producer-exporters' outgrowers during the Smooth Cayenne period.

As a result of the European market switch to MD2 and Ghana's response, production for export became concentrated among a small group of large producer-exporters who increased their farm size significantly in the last few years. Total exports declined between 2005 and 2008, but started to rise in 2009. There was little new investment in the industry, as the barriers to entry increased substantially. Starting with small operations and investments, as the first waves of investors did in the 1980s and early 1990s, is no longer possible. Current export volumes are still very low compared to competitors.

The crisis in the industry caused the trade association to fall apart rather than catalyzed inter-firm cooperation. While HAG and then SPEG were never strong institutions, they became largely defunct after the switch to MD2. SPEG membership decreased significantly, and the remaining members struggled individually to survive, so the association was deprived of financial resources. Moreover, SPEG was no longer needed to arrange the logistics of sea transport. In the mid-2000s, the export shed at the main sea port was renovated under a World Bank-government project supporting horticulture exports. Management of this shed was given to a company which is a joint venture between SPEG and Golden Exotics, but Golden Exotics has the management contract and SPEG was reduced to an oversight role.

## The limited impact of donor and government support[27]

Previous initiatives aimed at supporting horticulture exports were driven by groups of individuals first within the Ghana Export Promotion Council (Ministry of Trade and Industry) in the late 1980s and early 1990s, and later moved to the Horticulture Development Unit (Ministry of Food and Agriculture). But these initiatives never had strong political backing, authority and access to resources. As a result, the Horticulture Development Unit became dependent on donor project funding. This dependence had several consequences. Although horticulture production and export became a popular area for donor support in the 2000s, this gave the ruling political elite further reason not to put government money there. Second, it meant that donor agencies significantly influenced the priorities, design and implementation of projects, particularly in the absence of political support backing bureaucrats' positions in project negotiations. Third, given the large number of initiatives dispersed over multiple donor agencies, support to the industry was fragmented and uncoordinated. As a result, the impact of donor projects on the pineapple export industry has been small, piecemeal, often unsustainable and sometimes negative.[28] Donor projects

[27] This section is based on material presented in Whitfield (2010a).

[28] Several of these projects are ongoing, so these remarks are not conclusive but based on the observation of trends so far.

tended to address the same sorts of issues (such as technical practices and meeting international 'good agricultural standards'), but neglected major constraints facing the industry, partly because donors cannot address these constraints through donor projects. Donor project funding also was too slow, bureaucratic and rigid to meet the demands of supporting the pineapple export industry.

Furthermore, donors and the Ghanaian government (under different ruling parties) focused largely on supporting smallholder production. Either they thought that larger producer-exporters did not need assistance, or that the government should not provide such assistance because it should focus on poverty reduction. Additionally, there was a common imperative among politicians and donor agencies for projects with immediate, visible benefits and a broad impact, especially on a large number of smallholder farmers, rather than a focused project targeting a specific industry and the constraints it faces as an industry. Donor agencies want to be able to report on the large poverty reduction impact their projects have, and politicians think the more people they affect the more votes they can get.

We can provide a few concrete examples of these general statements. For example, donor-government projects that tried to help smallholders and small producers in HAG move into MD2 production failed. A World Bank project subsidized the cost of MD2 planting material for smallholder producers. However, it neglected to provide a source of funding and the smallholders did not have the working capital with which to cultivate it. Many small farmers had lost money during 2005 because exporters who bought their crop could not sell it (see Fold & Gough 2008). The MCA project promised in 2006 that it would provide credit, but its implementation was delayed several years (only some credit was made available by the end of 2009). As a result, the planting material largely went to waste. Those small farmers that had started to cultivate the MD2 under the assumption that credit would be coming lost their investment when the credit did not come.

The MCA project was supposed to support the horticulture export industry. However, it took several years for the government proposal to become a programme, with final negotiations in 2006. And in the course of negotiations with the US and in implementing the programme, the focus on horticulture export was diluted, and the emphasis shifted to promoting smallholder agriculture production through farmer-based organizations. While the initiative is providing support to pineapple producer-exporters (mentioned above), it has taken a long time to materialize. The whole of 2007 was spent setting up a new Ghanaian agency to implement it, and implementation beginning in 2008 involved endless negotiations between what the US funding agency wants, what the Ghanaian implementing agency wants, and what the producer-exporters want.

A large focus of donor-government projects was on GlobalGAP certification for smallholder producers of horticulture crops, due to the high cost of establishing and maintaining this certification for smallholders. However, in many cases, this certification is unsustainable in the absence of a donor to pay for it, because smallholders are not linked to exporters in effective ways. Other donor-government projects focused on research into new varieties and pest problems, certifying nurseries (which are largely used by smallholders), building roads in production areas, building public packhouses for small producers to use collectively, creating

demonstration centres of best agricultural practices (aimed at smallholders), and other forms of training smallholders in business and agricultural practices.

Since the early 1990s, the government has done almost nothing outside of donor-negotiated projects to support the pineapple export industry, or horticulture export more broadly. The only recent example was USD 2 million allocated in the 2006 budget to SPEG to support the introduction of the MD2 variety. The bulk of the money went towards setting up a tissue culture laboratory, in collaboration with a government agency, to produce planting material, and the rest was given as a loan to Farmapine so it could purchase planting materials. Although some of the large producer-exporters had taken the initiative to get their own materials, others did not have access to planting materials and the Bomarts tissue culture laboratory was not enough. However, this government response was too little too late. Furthermore, SPEG was wrong in its calculation about the need for planting material. As it turned out, the MD2 variety reproduces more new planting material than the old variety. All the nurseries and laboratories became redundant within a short period, and the price of planting materials dropped. The issue was no longer access to planting materials, but rather access to production financing and learning how to produce MD2.

Pineapple producer-exporters had little substantial influence over the design of these initiatives, partly because there was no strong industry lobby. SPEG as an organization did not put forth a strong, unified position in relation to proposed government-donor initiatives. In addition, foreign and local consultants were entrusted with authority to design projects and strategies for the industry. These consultants consulted industry actors to assess their needs and effectively acted as intermediaries between government and donor actors on the one hand and industry actors on the other. Thus, there were no strong links between the trade associations and bureaucrats (who implemented the projects) or with the political elite (who decided on strategic objectives).

Technocrats in the Horticulture Development Unit, who were the government actors interested in the industry, did not possess a shared heuristic understanding of the industry with the producer-exporters. These middle-level bureaucrats were focused on smallholder production and only recently came to see the need to support larger producer-exporters. In any case, they were relatively powerless. They do not have the authority to devise policies and get them implemented with the requisite political backing and budgeted resources. Donors and consultants paid by donors largely devised the projects and strategies aimed to support the sector. Donors, politicians, and top-level bureaucrats negotiated the final form of donor-funded projects, often with little input from the technocrats. Technocrats in the Unit have influence over which aspects of the projects are implemented. They could exert more influence over project content and designing sector strategies, but do not see it as desirable and feasible to do so. They spend all their time on implementation and meeting donor reporting demands, and do not see why they should spend over-time working on a strategy or project design when consultants are being paid lots of money to do that.

Thus, there was no one driving a strategic vision for the industry. The various groups of actors (state, politicians, industry, donors) had interests that did not converge in a way that supported the development of technological capabilities among the producer-export-

ers. In fact, there was very little coordinated action in general among the various groups or within them. The bureaucracy was fragmented, with ministries duplicating efforts. Donor support was fragmented, with donors duplicating efforts. Industry actors could not speak with one strong voice. And politicians did not see the industry as strategic to their political agenda.

In sum, it took a major crisis in the industry before producer-exporters sought to make investments in and efforts to devise new production, post-handling and transport practices as well as better financial management. In general, the new product, MD2 pineapple, required these capabilities. Producer-exporters were not trying to increase their ability to respond to new pressures and opportunities, and monitoring the horizon for new developments in the industry. But rather they were struggling to catch up with basic practices in horticulture export, such as continuous cold chains, in order not to become extinct. If Smooth Cayenne production had been given the same investments and effort as MD2 production now receives, it probably could have stayed competitive. This argument is supported by the fact that European demand for Smooth Cayenne has resurfaced in recent years as buyers acknowledge it has some advantages over MD2 (Loeillet & Paqui 2010).

The ways in which firms developed technological capabilities as well as the national environment and government policies have implications for the industry structure. In this case, producer-exporters largely had to sink or swim on their own. The development of firms' capabilities remained based on individual firm effort and informal networks among firms. There was little to no innovations in intra-industry institutional practices, formal organization, and collective goods provision. Government-donor projects targeting the industry were ad hoc, uncoordinated and insufficient, and the national economic environment was not conducive to providing the finance and technical support required by less capable firms. This situation led to a concentration of production among the largest and most capable firms who were willing and able to build the necessary capabilities. Smallholder production collapsed because the previous institutional relations were no longer viable and there was no attempt to alter the institutional relations to fit the new conditions. There was no attempt partly because producer-exporters were struggling themselves, and partly because donor-government sought to support smallholders largely in isolation of the industry's needs as a whole rather than find institutional innovations suitable for the new dynamics of the pineapple export market.

As Selywn (2010) argues, there are always alternative paths. In response to the MD2 challenge, government and donors tried (unsuccessfully) to save smallholder production in its previous form. Another path proposed by consultants is that multinational firms invest in the Ghanaian industry, bringing capital and technological capabilities, and that Ghanaian producer-exporters learn from them, probably in a contract-farming arrangement. Increasing concentration among a few large firms was not inevitable; nor is it inevitable that Ghanaian producer-exporters become 'outgrowers' for the big multinational tropical produce firms. There are alternatives. For example, the government (and donors) could have provided financial support to producer-exporters, conditioned on the beneficiaries improving their performance and on them assisting a group of smallholders to become their outgrowers. The group of smallholders included in the industry would be smaller than previously, but they would have increased capabilities.

## VI. CONCLUSIONS

The general trend in the international pineapple market is declining profits. The increase in global supply combined with increased international competition caused a drop in the price of MD2 and a decrease in its profitability. In order to remain profitable, Ghanaian producer-exporters will have to increase productivity and achieve the right economies of scale.[29] A new strategy for the pineapple export industry is needed, but even then it is unlikely that pineapple will drive growth in Ghana's nascent horticulture export sector. The future of the sector seems to lie in developing competitive advantages in other horticulture exports. The pineapple export industry laid a foundation on which there have been other investments in processed products for export (such as fresh cut, juiced, and dried) as well as investments in producing other tropical fruits and Asian vegetables for export. However, production and export of these other products remain on a small scale, and supply chains are unorganized and occur largely in an institutional vacuum.

There are many lessons to learn from this experience, for Ghana as well as for African countries generally. Developing technological capabilities in new agro-industries and remaining competitive in changing markets does not happen spontaneously through the interplay of markets. The pineapple case shows that competitive horticulture export industries cannot be made from the efforts of individual entrepreneurs alone. It also shows that the technology characterizing the industry does not have to be complex for countries like Ghana to run into problems with technological capabilities. Making an industry requires constantly building technological capabilities, a process which is determined by both firm level and national level factors.

Pineapple producer-exporter firms in Ghana were slow to build their technological capabilities because they started almost from scratch. These firms were not formed with existing expert agronomic or managerial personnel form other productive sectors in Ghana or from horticulture export industries in other countries, except for the Ivory Coast. The weak previous experience and expertise of the investors and their staff had implications for their level of technological effort: for their realization of the need keep abreast with the latest production practices and technology globally, to monitor their performance against international standards, and to constantly seek ways to improve.[30] The first step was learning to learn, which probably only happened after the crisis in the industry.

The technological capabilities literature tells us that a supporting technological infrastructure and incentives for firms to invest in technological capabilities development is essential. This is even more important in many African countries where export agriculture, agro-processing and manufacturing capabilities are still very low, the productive capitalist class is small and has limited experience, and the national economic environment results in higher production and transaction costs. In this context, African entrepreneurs will need more support and incentives to invest in and learn new production practices and technology. The inexperienced entrepreneurs that pioneered and expanded the pineapple export industry in Ghana were able to spot op-

[29] One producer-exporter estimated that a minimum of 10,000 tons of exports per year is required to support overhead costs, so most producer-exporters have a long way to go to achieve this minimum.

[30] For the importance of previous experience with horticulture export for the development of the grape export industry in Brazil, see Selwyn (2010).

portunities and take advantage of them, but they were not willing or able to develop them further.

Furthermore, collective action problems are serious among entrepreneurs with no previous experience with the benefits of collective action in productive industries. In this situation, inter-firm collaboration requires external pressure or incentives to come about; it does not naturally emerge. The government can provide incentives for companies to collaborate through the provision of benefits distributed by trade associations. The provision of such benefits, however, must be linked to performance benchmarks based on international standards. Third parties are needed to support research and development and dissemination and information sharing across firms, whether this is government or a private organization. Dahlman et al. (1987) refer to local specialized technical agents who act as repositories of diverse technological capabilities and whose objective is to promote and carry out diffusion of technological capabilities.

Smallholder producers can have a role in agro-export industries, but they need to be networked into national supply chains in ways which increase their productive capabilities. There are different ways in which this can be done. For example, in Chile, the government supported tomato processors to build the capabilities of the small producers from whom they sourced raw material (Perez-Aleman 2000). In African cases, however, this may mean supporting fewer smallholders with larger operations rather than thousands of smallholders with one-acre farms.

The national economic environment is also an important determinant of industries' success by directly and indirectly influencing firms' behaviour. The rise of Costa Rica as a pineapple exporter is attributed not only to innovation by a multinational but also to the general business environment produced by national trade and agricultural policies and regional trade agreements (Vagneron et al. 2009; NRI 2010). These policies included tax credits, export promotion incentives (including export subsidies), easy access to land, trade preference programmes with the US, government investment in agricultural research and development as well as technical and financial assistance to farmers. The general business environment in which Ghanaian producer-exporters operated was starkly less conducive to agri-business. They faced higher production costs due to the high cost of credit or inability to access credit altogether (due to high interest rates and/or high collateral demands), poor infrastructure (roads, electricity, water), problems with land acquisition and security of rights, and a lack of skilled labour in agri-business and horticulture in particular. For example, many farms were in rural areas which lacked electricity, so the farms operated with generators. As late as 2010, some farms were still waiting for electricity.

The comparison of the pineapple export industry in Ghana with that of the Ivory Coast reinforces these points. The Ivory Coast had better technological and physical infrastructure and state support than Ghana, and thus its industry produced high export volumes. However, the Ivory Coast's industry was also unable to adjust quickly enough to changes in the market. This can be explained by its inability to adjust institutions quickly enough to meet new circumstances. The first example is its inability to change how smallholders were linked into the supply chain in a way that developed the capabilities of smallholder producers. Second, although the Ivory Coast had more collective action and coordination among exporters than Ghana, relationships and institutions involving ties

to French companies were rigid and affected attempts to change marketing arrangements. Of course, the comparison with the Ivory Coast can only be partial, due to the civil war in the 2000s.

African countries in general are characterized by massive deficiencies in the general business environment: lack of infrastructure, access to finance, skilled labour. However, African governments cannot provide broad-based support to all economic activities in an industry-neutral way due to the specificity and complexity of the requisite publicly provided inputs; solutions have to fit the specifics of the context (Hausmann & Rodrik 2006). Thus, governments must make choices; they must target support and tailor it to specific industries, both in terms of affecting the economic environment as well as encouraging technological capabilities development.

Strategic state engagement targeting specific industries, and its success, has certain requirements. Such requisites include technocrats which shared a heuristic understanding of the industry with industry actors and which had strong political support; convergence of interests among state officials, politicians and industry actors, and open channels of communication among them; and the ability of the technocrats to monitor industry performance, provide incentives and enforce penalties (cf. Brautigam 2005; Perez-Aleman 2000; Maxfield & Schneider 1997; Doner 1991). These requisites were not present in the Ghana case. In Ghana, the various groups of actors (state, politicians, industry, donors) had interests that did not converge in a way that supported the development of technological capabilities among the producer-exporters.

Underlying these requisites is a fundamentally political element. While we know how the state can engage to build technological capabilities, why they choose to do so and do so successfully is less understood. This underlying politics of developing capabilities deserves further research through studying cases of particular industries where governments, especially African governments, have engaged successfully in building capabilities.

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