GHANA CONSTRAINTS ANALYSIS

(PARTNERSHIP FOR GROWTH)

FINAL REPORT

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Prepared by
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Acronyms and Abbreviations

AfDB	African Development Bank
AICD	Africa Infrastructure Country Diagnostic
CPIA	Country Policy and Institutional Assessment
CWSA	Community Water and Sanitation Agency
ECG	Electricity Company of Ghana
FDI	Foreign Direct Investment
GDHS	Ghana Demographic Health Survey
GDP	Gross Domestic Product
GDS	Gross Domestic Savings
GIPC	Ghana Investment Promotion Centre
GLSS	Ghana Living Standards Survey
GNI	Gross National Income
GoG	Government of Ghana
GRC	Ghana Railway Company
GSGDA	Ghana Shared Growth and Development Agenda
GSS	Ghana Statistical Service
GWCL	Ghana Water Company Limited
IFPRI	International Food Policy Research Institute
IRR	Internal Rate of Return
JMP	Joint Monitoring Programme (WHO/UNICEF)
LMIC	Lower Middle Income Country
MDGs	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
NDPC	National Development Planning Commission
NGO	Non-Governmental Organisation
RSDP	Road Sector Development Plan
TFP	Total factor productivity
TRIP	Transport Infrastructure Programme
UMIC	Upper Middle Income Country
UNICEF	United Nations Children's Fund
VLTA	Volta Lake Transport Authority
VRA	Volta River Authority
WHO	World Health Organisation
WSMP	Water and Sanitation Monitoring Platform

Executive Summary

Ghana has made noteworthy progress in promoting development on both the political and economic fronts. Although the economy has grown at a reasonable rate over the last decade, continuing at this pace will not deliver the "Asian Miracle-type" pace of transformation that Ghana seeks, even with the discovery and production of oil. Indeed even the current economic growth situation remains precarious. Growth and structural change have been mainly driven by public investment (financed from aid), whereas private investment (particularly the efficiency-seeking type) has been slow to respond. The fiscal and debt situations remain worrisome, with internal budgetary slippages and continued pressure for increases in recurrent spending. There is no doubt that sustaining Ghana's growth and development will require increasing the level of private investment. How can Ghana achieve this? What constraints are most binding for private sector growth in Ghana?

In this study we investigate what the most binding constraints are to private sector investments and growth in Ghana. We employ a growth diagnostic approach à la Hausmann, Rodrik, and Velasco (HRV) (2005). We build on a previous growth diagnostic for Ghana published in 2010 by Iza Lejárraga of the African Development Bank (Lejárraga, 2010). The AfDB study concluded that neither credit nor infrastructure poses a binding constraint to growth in Ghana. Rather, it identified Ghana's high labour redundancy costs as the most pressing constraint to private investment and the growth of non-traditional exports.

Building on the lessons of past reform efforts, constraints analysis refrains from encouraging developing country governments to undertake a wide range of policy reforms simultaneously, recognizing their limited administrative and political capacity to do so. Rather, the emphasis is on identifying and prioritizing what needs to be done *now*. Constraints analysis (growth diagnostics) seeks to isolate the most pressing constraints to growth, and then concentrate efforts on alleviating those. Growth diagnostics seeks to analyse and ascertain, for a particular country at a particular point in time, those factors that are the most "binding constraints" faster and sustained economic growth. It starts with the premise that those constraints affect growth by preventing private investment and entrepreneurship from reaching the levels they would attain in the absence of those constraints. The challenge therefore using this approach, is to identify the factor(s) that provide the largest positive effect on private investments.

This study first discusses Ghana's current economic situation and subsequently provides an analysis of why private investment is low. It reaches different conclusions than the AfDB study. The main findings of this study are summarised below.

The rate and composition of Ghana's growth is improving. Ghana's growth, after the economic collapse in the 1980s, has been relatively good – averaging about 3 percent in real per capita terms and with less volatility. However, most of this growth has been due to factor accumulation, with limited improvement in efficiency: over the entire period 1970-2005, growth in the labour force accounted for roughly two-thirds of Ghana's overall growth, with growing capital stocks adding another third. Indeed, the evidence points to a decline in total factor productivity (TFP) – a measure of the efficiency at which labour and capital are being used to produce goods and services – over this period. This situation seems to be changing: total factor productivity has begun to play more of a positive role in Ghana's growth since the early 2000's, rivalling the contributions of growth in labour and capital inputs.

Private investment in Ghana remains low. Although Ghana's investment rate is relatively low compared with its (rebased) income level, its domestic savings is even lower. This suggests that it has been financing its investments using foreign savings. A notable feature of investment in Ghana is that it is dominated by public, as opposed to private investment. This study argues that the low savings in Ghana can be partly explained by the nation's high and persistent fiscal deficits. Not only does the high deficit make the country more vulnerable to external shocks, but also it crowds out the private sector. The fiscal situation, an outcome of "inherent momentum in public spending," perpetuates the savings-investment gap by keeping the interest spread very high. This in turn keeps borrowing by private agents for investment purposes at a low level.

Credit is a binding constraint for private investment in Ghana. The study notes that credit to the private sector in Ghana is low compared with other countries. Evidence from firm surveys cites credit as a major constraint, while the limited credit that is provided to the private sector is largely short term in nature. In addition, domestic savings remain very low and the cost of borrowing very high. On this basis, we conclude that lack of access to credit is a binding constraint to growth in Ghana.

Power is a binding constraint to firm growth in Ghana. The evidence shows that the supply of power has not kept pace with the demand. This is evident from the declining electricity production per capita. Meanwhile, high transmission and distribution losses cause the effective supply to economic agents to fall significantly short of the production capacity that exists. Just as important, the available power supply is highly unreliable, with frequent and prolonged outages disrupting production, damaging equipment, and forcing firms to rely on generators to provide standby power. We argue that insufficient and unreliable power is causing losses of at least 5.6 percent of GDP. In addition, firms point to power as being the most important constraint to their growth. This study therefore argues that unmet demand for reliable power is a binding constraint to growth in Ghana.

Insecure property (land use) rights emerge as a third binding economic constraint to growth. The evidence reviewed does not indicate that the severity of the problems is as severe as the constraints evident in the financial markets and the power sector. Nevertheless, insecure land tenure appears to meet at least three of the four tests of a binding constraint. First, the shadow price of land tenure appears to be quite high, particularly if one views the extraordinarily high (30-300 percent per year) returns to capital prevailing among farmers as a measure of this shadow price. The cost of deteriorating land fertility provides another measure of that shadow cost. Second, agents are observed taking steps to circumvent the constraint, including paying twice for the same plot of land and engaging in lengthy and expensive court cases to resolve tenure disputes. Third, the prevalence of self-finance among farmers can reasonably be interpreted as an example of the pattern of economic activity one would expect to see in a world with weak property rights.

Urban water systems also appear to pose a severe, if not binding economic constraint. Again, the evidence is not as strong as with credit or power. The urban population share is about 51 percent and urbanization growth rates remain elevated at 3.7 percent per year. Current urban water supplies meet only about half of the demand. There are very large losses in the water delivery system (about 50 percent). We observe some signs of economic stress. Consumers are willing to pay 2 to 11 times the household water price, which can be viewed as a type of shadow price. There appear to be many efforts to circumvent the shortages by illegally tapping supplies in urban areas, perhaps accounting for a large part of the losses. Because demand for water – a multi-purpose necessity – is

highly inelastic, it may not be realistic to see alternative work-around patterns by businesses and consumers as with other types of constraints.

Road transport appears to pose a severe, if not binding constraint on economic growth. Here also the evidence is not as strong as with credit, land and power. Ghana's poor showing on rural access to roads suggests a major opportunity to improve access to agricultural input and product markets for rural communities. This can in-turn improve agriculture productivity and help extend the benefits of growth to a larger share of the population. In terms of the four tests, we find that road infrastructure meets two with a possible third being met when one considers rural roads. There is therefore a strong case to be made for rural roads being an important constraint to growth of the agricultural sector in Ghana.

Other factors, such as geography, human capital, roads and other non-power infrastructure, taxes, corruption, and macroeconomic risk were examined and were not found to be binding constraints. For example, with human capital, several concerns have been raised about the constraints posed by the lack of adequate skilled manpower. Further, data from the latest enterprise survey shows that very few firms have managers with a university degree. However, we show that the returns to education in Ghana remain relatively low. We conclude that human capital is not a binding constraint in Ghana. The results are summarised in the table below.

	Constraints Analysis Indicators	Conclusion	Remarks
1.	Is Private Investment in Ghana Too Low?	Yes	Clear evidence
2.	Is the Cost of Finance Too High	Yes; local finance	Credit is a Binding Constraint
3.	Is low Social Capital a reason for low returns to Investment in Ghana?	There is evidence that Infrastructure development is a problem	Power is to be the binding constraint. Transport is also found to be an important but not binding constraint
4.	Is Low Appropriability the Reason for Low Returns to Capital in Ghana?	There is evidence of severe micro risks	Land tenure problems is a binding constraint

1. Introduction

Ghana has made important political and economic strides in recent years. The country has held two democratic elections in the past decade, each followed by a peaceful transition of political power. It has made continuing economic reforms and experienced positive and accelerating economic growth over the past few decades, placing it on track to cut the prevalence of extreme poverty in half by 2015 relative to the level experienced in 1990. Its recent overall record in the areas of political and economic governance has been strong and improving. As such, Ghana has become an important country for regional stability in West Africa. For these and other reasons, Ghana has been selected as one of four countries to join in the new Partnership for Growth (PFG) with the United States Government.

While Ghana's economy has grown steadily over the past few decades, there is room for improvement. For example, Ghana's growth in the 2000s fell short of that achieved by East Asian countries in past decades. Similarly, Ghana's recent growth has fallen far short of the rate needed to reach the Government's ambitious goal of raising the nation's per capita GDP to $3,000 by 2020, from $1,098 in 2009.[1] Faster growth would allow Ghana to reduce poverty at an even faster rate. Meanwhile, Ghana's export sector still remains relatively concentrated in a few key commodities that have benefitted from rising commodity prices in recent years, but it remains vulnerable to a future downturn in its terms of trade. Although inflation has been on a downward trend, Ghana has been unable to tame inflation to single digits over the past decade, while the government's chronic budget deficits have spilled over into private credit markets.

This study attempts to identify the most important economic constraints in the Ghana economy as part of the PFG process. The goal is to inform policymakers where they should concentrate their efforts to increase investment and address economic policy issues.[2] It will do so by conducting an economic constraints analysis, also known as a growth diagnostic study. Building on the lessons of past reform efforts, constraints analysis refrains from encouraging developing country governments

[1] The $3,000 goal is from Government of Ghana 2010, page 2. GDP per capita in 2009 is calculated from the rebased aggregate GDP statistics (Ghana Statistical Service 2010), population estimates from World Bank 2011, and market exchange rates from International Monetary Fund (2011b). The implied growth in per capita GDP is 9.6 percent per year 2009-2020.

[2] The PFG process requires that a constraints analysis be conducted for each pilot country to inform future efforts by US and host-country government agencies to alleviate the identified constraints. The PFG envisages that after this study is completed, multiple US government agencies will work in a cooperative and coordinated fashion with Ghanaian counterparts to address the key economic constraints identified in this study.

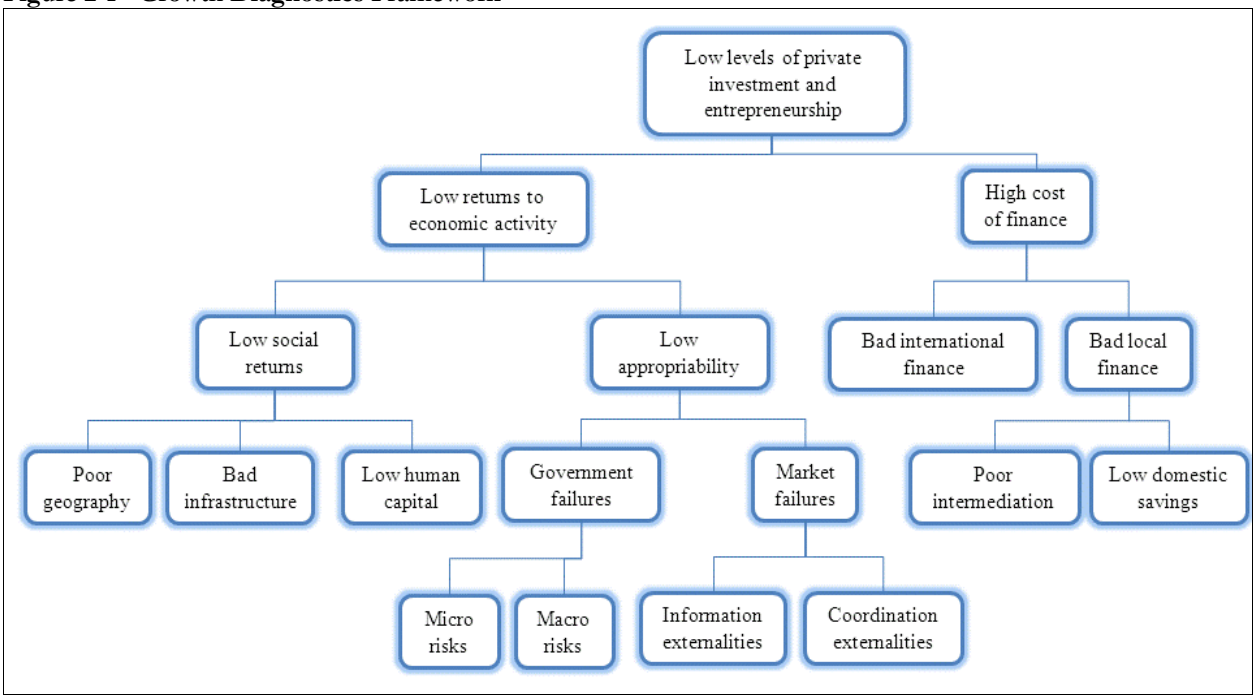
to undertake a wide range of policy reforms simultaneously, recognizing their limited administrative and political capacity to do so. Rather, the emphasis is on identifying and prioritizing what needs to be done *now*. Constraints analysis (growth diagnostics) seeks to isolate the most pressing constraints to growth, and then concentrate efforts on alleviating those. It is hoped that Ghana will be able to reach higher growth rates similar to other countries that have followed this approach, such as China, Vietnam, and India.

This study is organized as follows. Section II briefly reviews the constraints analysis methodology. Section III reviews recent growth and total factor productivity trends in Ghana. Section IV briefly reviews the evidence that private investment in Ghana is too low. Section V focuses on the credit side of the constraints analysis, i.e., whether limited access to credit is constraining investment and growth. Section VI focuses on economic returns, i.e., whether problems related to low social returns (geography, human capital, and infrastructure) or low appropriability (market or policy failures) have hindered investment opportunities. Section VII summarizes the main findings.

2. Methodology

The constraints analysis used in this study is based on the growth diagnostic approach originally developed by Hausmann, Rodrik, and Velasco (2005) and since elaborated by others, including the United States Millennium Challenge Corporation (MCC). **Growth diagnostics seeks to identify, for a particular country at a particular point in time, the principal barriers – the "binding constraints" – to that country achieving and sustaining faster economic growth**. It starts with the premise that those constraints affect growth by preventing private investment and entrepreneurship from reaching the levels they would attain in the absence of those constraints. The approach relies on a decision tree (Figure 2.1) to guide a systematic process aimed at identifying one (or at most a few) binding constraint(s) to growth. Meanwhile, the approach identifies other conditions as *not* constituting binding constraints to growth, however much those conditions fall short of the ideal.

Figure 2-1 Growth Diagnostics Framework



Source: Based on Hausmann, Rodrik, and Velasco (2005)

To apply growth diagnostics in practice, the analyst should always start at the top of the decision tree and work down -- pausing at each "decision node," examining the evidence for clues as to whether the binding constraint lies on the right or left branch below that node, proceeding to the next decision node, and repeating the process. In particular, the first decision node requires choosing one of two proximate reasons for inadequate private investment and entrepreneurship:

either because the **cost of financing investment is too high**, *or* because the **available private returns to investment and entrepreneurial effort are too low**. If the evidence points to costly finance as the proximate cause of low investment, the analysis proceeds down the right-hand side of the tree, seeking to identify why finance is so costly. Conversely, if the evidence suggests that private returns are too low, the left-hand side of the tree comes into play – are private returns too low because the social returns to investment are too low, or because market or government failures prevent investors from reaping an adequate share of the rewards of their efforts? And so on, to the bottom of the tree.

At each decision node, four tests are applied to distinguish between a binding constraint to growth and one that is not binding (Hausmann, Klinger, and Rodrigo 2008):

- First, if a constraint is binding, the "shadow price" associated with that constraint should be high. For example, if limited access to finance is a binding constraint on growth, interest rates should be particularly high compared with those in other countries.
- Second, a particular constraint is more likely to be binding if relaxing that constraint results in observably faster growth.
- Third, private agents should be making efforts to circumvent a binding constraint to growth: if low access to reliable electrical power is a binding constraint to growth, private firms should be observed investing in electrical generators.
- Fourth and finally, the firms that survive in the face of a binding constraint to overall growth should consist disproportionately of those that do not depend on that constraint. For example, in an economy where finance is particularly costly, there will be relatively few firms operating in industries that rely heavily on external finance.

Although in principle the "either/or" questions posed by growth diagnostics should allow the analysis to proceed down one side of the tree while ignoring the other, in practice the quality of the data do not lend themselves to this degree of certainty. As a result, analysts typically examine the evidence at *each* node of the decision tree, whether or not it lies on the "right" branch identified at the decision node above. Because of the many data limitations encountered in this course of this study, the analytic effort summarized here follows this practice.

Rather than undertaking a constraints analysis from the ground up, this study builds on a recent growth diagnostic for Ghana by Iza Lejárraga of the African Development Bank (Lejárraga, 2010). For concision, this study refers to Lejárraga's analysis as the "AfDB study." On the basis of the evidence examined, the AfDB study concluded that neither credit nor infrastructure poses a binding constraint to growth in Ghana. Rather, it identified Ghana's high labour redundancy costs as the most pressing constraint to private investment and the growth of non-traditional exports. This study reaches quite different conclusions.

Finally, constraints analyses typically rely on comparisons between conditions in the country of interest and those in relevant comparator countries – including a set of countries at a roughly similar level of development as well as other countries that have already achieved a level of development to which the country aspires. (Note that the AfDB study chose comparator countries based on Ghana's economic situation at independence, not the most recent years (Lejárraga, 2010)).

In this study, the first set of countries – those with "similar GNI (Gross National Income) per capita" – comprises Bangladesh, Benin, Kenya, Senegal, and Tanzania. A second set – the "near-term goal comparators" – include Cape Verde, Mongolia, Morocco, Sri Lanka, and Vietnam. Finally, Ghana's "long-term goal comparators" include Botswana, Ecuador, Korea, Malaysia, and Thailand – all of which enjoy a much higher standard of living than does Ghana today.

Readers should note that, notwithstanding the reference to "similar GNI per capita" above, the comparator groups in this study were chosen on the basis of their per capita income in terms of *purchasing power parity* in 2009. Converted at market exchange rates,[3] 2009 Ghana's GNI per capita ($1,190) was more than double that of Bangladesh ($580) and Tanzania ($500), more than 50 percent higher than that of Kenya ($760) and Benin ($750), and modestly higher than that of Senegal ($1,140) and of Vietnam ($1,000), the latter possibly mis-assigned to the "near-term goal comparator" group. These comparisons suggest that Ghanaian policymakers should be seeking to emulate the performance of the higher comparator groups, and should certainly avoid any sense of complacency based on comparisons with much poorer countries.

[3] Or more precisely, "Atlas rates" – 3-year moving averages of market exchange rates, computed by the World Bank to reduce the impact of year-to-year fluctuations in market rates.

3. An Overview of Post-Independence Economic Trends

3.1. Ghana's Performance over the Last 50 Years

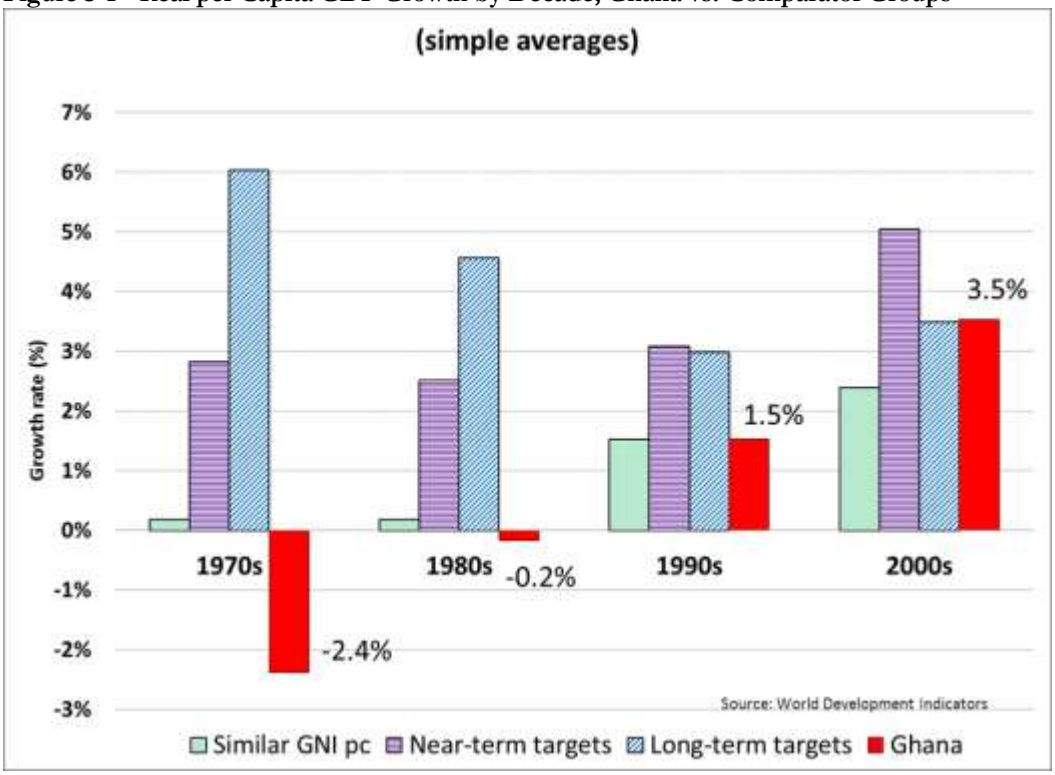
Growth Trends. Ghana's emergence as one of sub-Saharan Africa's leading economic success stories represents a dramatic turnaround from previous decades. As documented in detail by others, Ghana suffered serious economic instability and decline from the mid-1960s through the early 1980s, with state control followed by a prolonged period of "muddling through" characterized by import substitution, a restrictive foreign exchange regime, quantitative restrictions on imports, price controls, and a major role for the state in production (Aryeetey and Fosu, 2008). The deterioration was reversed in 1983 by the adoption of a package of economic reforms, supported by the World Bank and the International Monetary Fund. Major components included liberalization of exchange rate policy, privatization, and reforms in fiscal, monetary, and trade policies. Since then, Ghana has continued to pursue a gradual trend toward economic liberalization, as reflected in its high rating (7th out of 77 low-income countries) in the World Bank's Country Policy and Institutional Assessment (CPIA) for 2009 (World Bank, 2009a).

Figure 3.1 suggests both the economic damage inflicted by Ghana's pre-reform policies, as well as the benefits of its subsequent reforms. On the first count, per capita incomes in Ghana declined by nearly a quarter over the decade of the 1970s, even as the countries chosen as its long-term comparators (Botswana, Ecuador, Korea, Malaysia, and Thailand) raised their own per capita incomes by 80 percent on average. Ghana's per capita growth remained slightly negative when averaged across the 1980s, though this average disguises a dramatic swing from steep decline in 1980-84 to positive growth thereafter. Nevertheless, the net result was that over the 1980s, Ghana continued to fall further behind all groups of comparator countries.

The payoff to economic reform began to emerge more clearly in the 1990s, when Ghana's per capita growth finally moved into positive territory, roughly equalling that of its low-income comparators (Bangladesh, Benin, Kenya, Senegal, and Tanzania). Ghana's growth further accelerated in the 2000s, exceeding that of the low-income comparators and roughly equalling that of its long-term comparators, while still falling short of the average rate of per capita growth among the near-term comparators (Cape Verde, Mongolia, Morocco, Sri Lanka, and Vietnam). Per capita growth of 3.5 percent per year in the 2000s placed Ghana near the top end of what Pritchett calls the

"modest growth" range, and just short of the 4 percent threshold of his "rapid (converging) growth" range (Pritchett, 2009).

Figure 3-1 Real per Capita GDP Growth by Decade, Ghana vs. Comparator Groups



Source: World Bank (2011).

These growth comparisons rely on data available before the November 2010 release of new, much higher GDP data for Ghana for the period 2006-2010, with 2006 GDP now reported to be 60.3 percent higher than previous estimated (Ghana Statistical Service, 2010). The new GDP data suggest that Ghana's growth prior to 2006 might have been substantially faster than previously recognized, and that Ghana has actually been experiencing "rapid (converging) growth" for some time.[4] If so, that would tend to place greater weight on the need to sustain that pace of growth over coming decades and somewhat reduce the urgency of achieving a further acceleration of growth.

Factor accumulation versus productivity growth. The growth accounting matrix shown in Table 3.1, copied from World Bank (2007a), provides further insight into the nature of Ghana's recent growth. As seen in the second column, over the entire period 1970-2005 growth in the labour force

[4] Pending the release of updated GDP estimates for years before 2006, this point necessarily remains somewhat speculative. However, if we assume for illustrative purposes that GDP was correctly measured in 1990, and that the additional 60.3 percent GDP in 2006 arose through a constant additional growth rate over the intervening years, this would imply average per capita growth of 4.5 percent per year in the 1990s and 5.0 percent per year in the 2000s.

accounted for roughly two-thirds of Ghana's overall growth, with growing capital stocks adding another third. Meanwhile, total factor productivity (TFP) – a measure of the efficiency at which labour and capital are being used to produce goods and services – declined over this period, another reflection of the damage inflicted by policy distortions in the early decades. The third and fourth columns show that by the 1990s, capital accumulation gradually emerged as the primary engine of growth, offsetting the slower growth of the labour force. TFP remained roughly unchanged over the decade. Finally, the right-hand column suggests that rising productivity finally began to play an important positive role in Ghana's growth in the early 2000s, rivalling the contributions of growth in labour and capital inputs. Preliminary calculations carried out for this analysis suggest that TFP growth continued to accelerate in the later 2000s, rising 2.8 percent per year over the 2006-2009 period.

Table 3-1 Sources of Growth in Ghana, 1970 - 2005

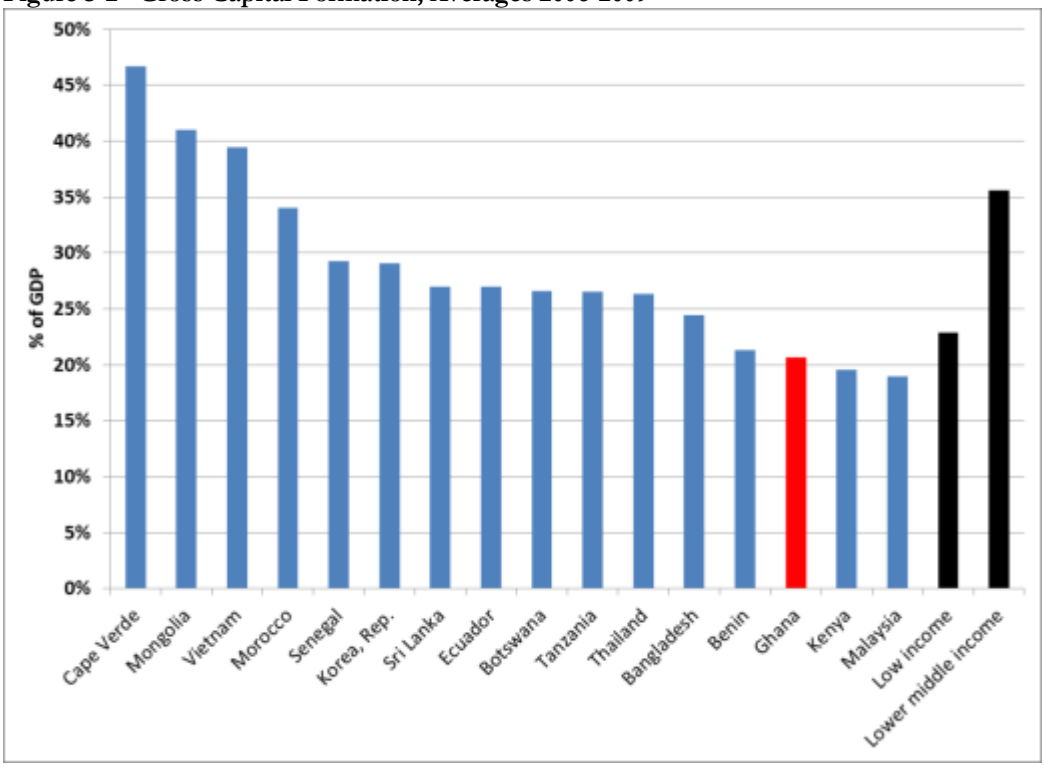
	1970-2005	1991-1995	1996-2000	2001-2005
	Growth Accounting for the Aggregate Economy			
Real GDP	2.7	4.0	4.2	5.2
Fixed capital formation	2.1	4.3	5.9	3.9
Labour Force	2.7	2.8	2.3	2.5
School Years of Labour Force	0.8	0.8	0.9	1.0
Total factor productivity	-0.26	0.05	-0.07	1.6
	Contribution to Growth			
Fixed capital formation	31.6	43.7	56.2	29.8
Labour Force	61.3	42.6	32.8	28.5
School Years of Labour Force	16.9	12.4	12.7	11.1
Total factor productivity	-9.9	1.3	-1.6	30.6
Total	100	100	100	100

Source: Ghana Country Economic Memorandum, World Bank 2007
Notes: Assumes α=0.4; depreciation=0.04

Macroeconomic challenges to sustaining growth. One of the key findings of the 2008 report of the Commission on Growth and Development (the "Spence Commission report") is that countries that achieve and sustain rapid growth typically invest 25 percent or more of national income, financed primarily out of domestic savings rather than through reliance on foreign borrowing or other forms of foreign savings like foreign aid (Commission on Growth and Development, 2008). In that regard, Ghana's recent experience raises some concerns about the sustainability of its growth. Figure 3.2 shows that at 20.7 percent of GDP, Ghana's average rate of investment in 2006-2009

(including both public and private) fell significantly short of the Spence Commission's 25 percent threshold.[5] Likewise, Ghana's investment rate was exceeded not only by almost all of its comparators, but also by the average among low-income countries.

Figure 3-2 Gross Capital Formation, Averages 2006-2009

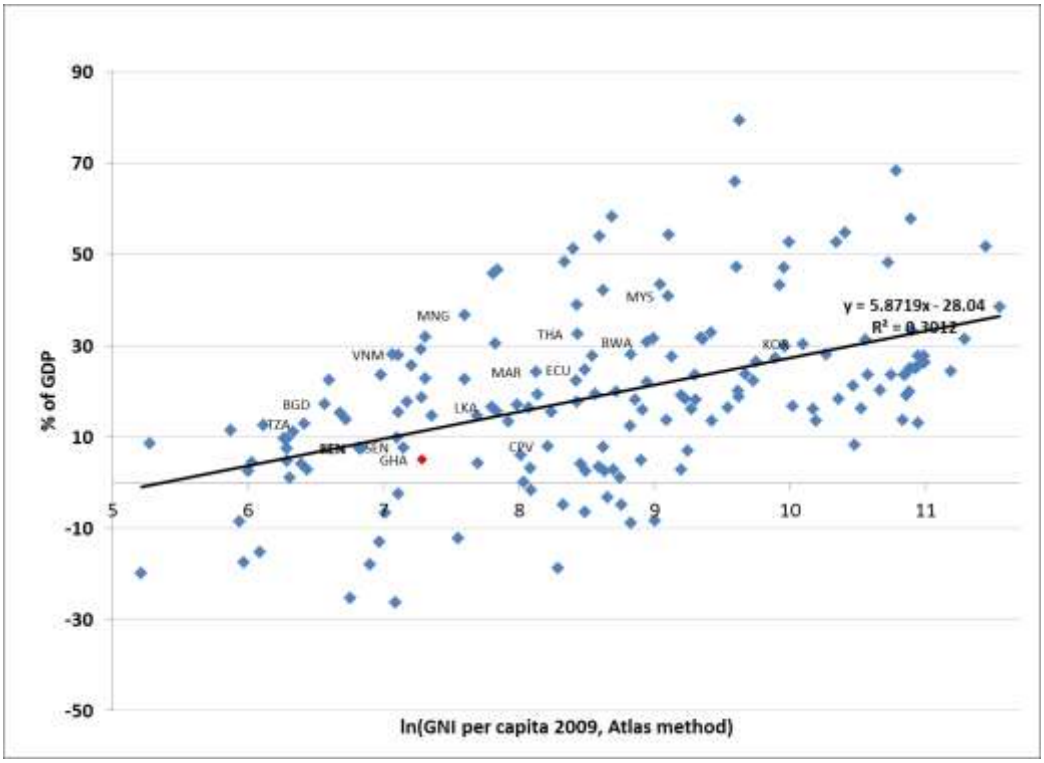


Source: World Bank (2011)

Meanwhile, Ghana's rate of gross domestic savings (GDS) is quite low. Averaging a mere 5.2 percent of GDP in 2006-9, Ghana's GDS fell well below a regression line that plots GDS against per capita income for a large sample of countries (Figure 3.3). In contrast, most of Ghana's comparator countries lie well above the regression line – especially its near- and long-term comparators.

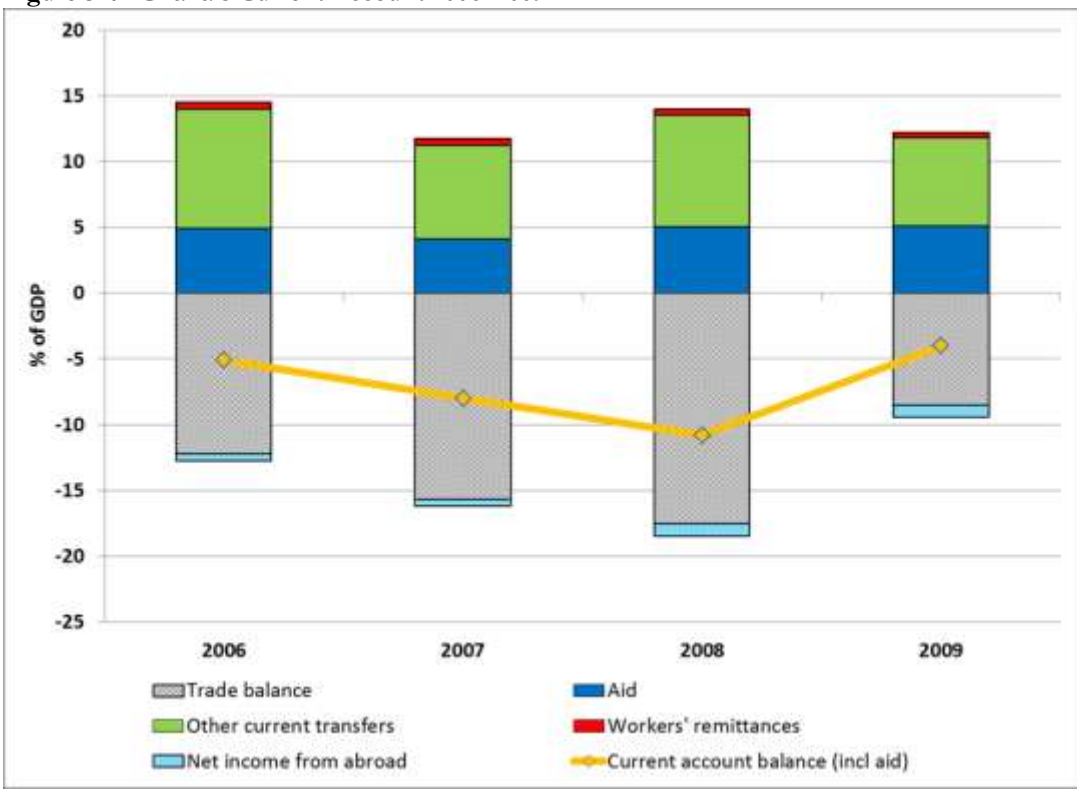
Figure 3-3 Gross Domestic Savings as a Share of GDP, Averages 2006-2009

[5] Here and elsewhere in this section, most comparisons expressed as a percentage of GDP rely on data from 2006-2009. This choice is necessitated by the fact that the available data for years before 2006 (notably in the World Development Indicators) have not yet been adjusted for the rebased GDP estimates, resulting in sharp discontinuities for many data series between 2005 and 2006.



Source: World Bank (2011)

Figure 3-4 Ghana's Current Account 2006–2009

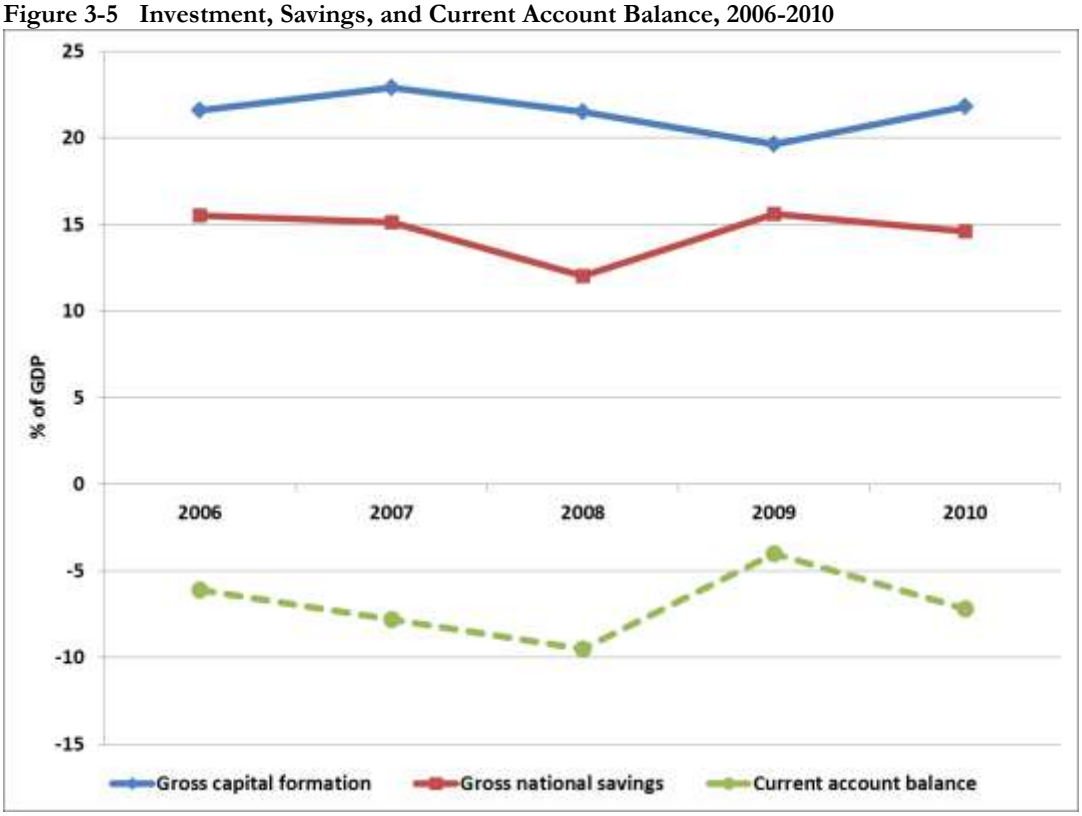


Sources: International Monetary Fund (2011d), World Bank 2011.

As seen in Figure 3.4, the large gap between Ghana's modest investment rate and its low domestic savings rate is filled by foreign savings – especially foreign aid (blue bars) and other current

transfers (green bars) along with substantial levels of net foreign borrowing (gold line). Remittances play a relatively minor role. Figure 3.5 provides a more aggregated picture of the same trends.

Figure 3-5 Investment, Savings, and Current Account Balance, 2006-2010



Source: International Monetary Fund (2011d)

Ghana's saving-investment gap is mirrored in – and to a large extent, caused by – a corresponding gap in public finances. As shown in Figure 3.6, public spending in Ghana routinely and substantially exceeds public revenues – including foreign aid grants – resulting in sizeable budget deficits. On a cash basis, those deficits averaged 5.1 percent of GDP in 2006-2009, a share of national income exceeded – among Ghana's comparator countries –only by Sri Lanka, which was embroiled in a civil war at the time (Figure 3.7). All the other comparator countries ran lower deficits than Ghana, or else ran budget surpluses. Indeed, Figure 3.7 understates the severity of Ghana's budget deficits by capturing only cash expenditures; meanwhile, Ghana accumulated substantial additional arrears in each of these years, pushing the deficit on a commitment basis to 12.5 percent of GDP in 2008.

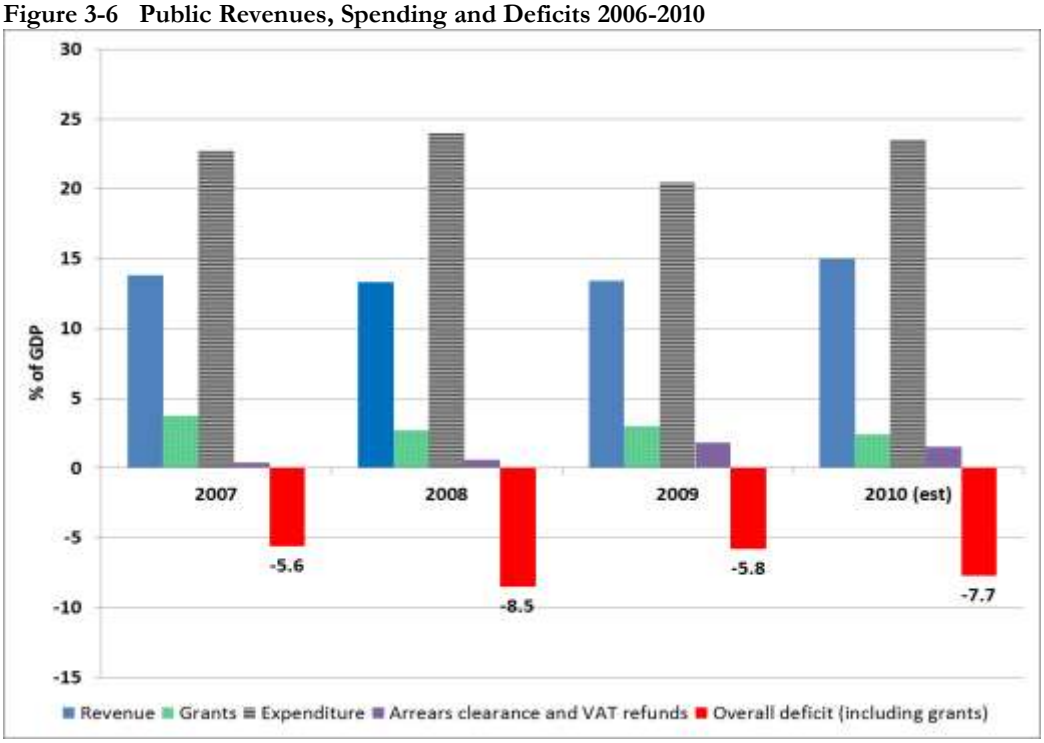
These large and persistent budget deficits affect private investment in several ways. First, those deficits represent dissaving by the public sector, which absorbs a substantial share of private domestic savings that would otherwise be available to finance investment, forcing investment at the margin to rely on the net foreign borrowing embodied in the current account deficit. By doing so, they expose Ghana's economy to fluctuations in international capital markets to a greater extent than otherwise. Second, a large share of the deficit is financed through the sale of bonds to domestic banks, leading to high real interest rates on domestic lending to private firms – the "crowding out" effect highlighted in Section V below. Third, an additional portion of the deficit is financed through expansion of the money supply, spurring high and highly variable inflation (Figure 3.8). In turn, high and unpredictable inflation exacerbates the risk of accumulating monetary assets denominated in cedis, thus reducing the incentives for domestic saving as well as lending. The impact on savers is seen clearly in the substantially negative real deposit rates documented in Section V. Similarly, uncertainty regarding future inflation helps account for at least part of the extraordinarily large spread between borrowing and lending rates seen in Ghana, as well as to predominance of short-term lending.

Calculations based on the old GDP series suggested that that Ghana's "tax effort" – taxes actually collected by a country as a share of (estimated) potential given that country's characteristics – was especially high among developing countries (International Monetary Fund, 2011a.) Revised calculations based on the new GDP series put this issue in a different light. As shown in Figure 3.9, Ghana's tax collections as a share of GDP are lower than most of its comparators, though slightly higher than the average among low- and lower-middle income countries as a group. Nevertheless, even after adjustment the cross-country data support the conclusion that Ghana's deficits are not mainly a result of insufficient taxation, but rather of what the AfDB growth diagnostic termed "buoyant government spending (p. 49)." Beyond noting the macroeconomic impacts of the sheer volume of spending, observers have raised at least two persistent concerns regarding its quality:

- first, that an especially large and growing share of Ghana's budget is spent on the wages and pensions of public employees, thus limiting funds available for other uses including building and maintaining infrastructure (International Monetary Fund, 2011d); and
- second, that Ghana's budgetary and procurement practices pay insufficient attention to maximizing "value-for-money" in using public funds (World Bank 2007a).

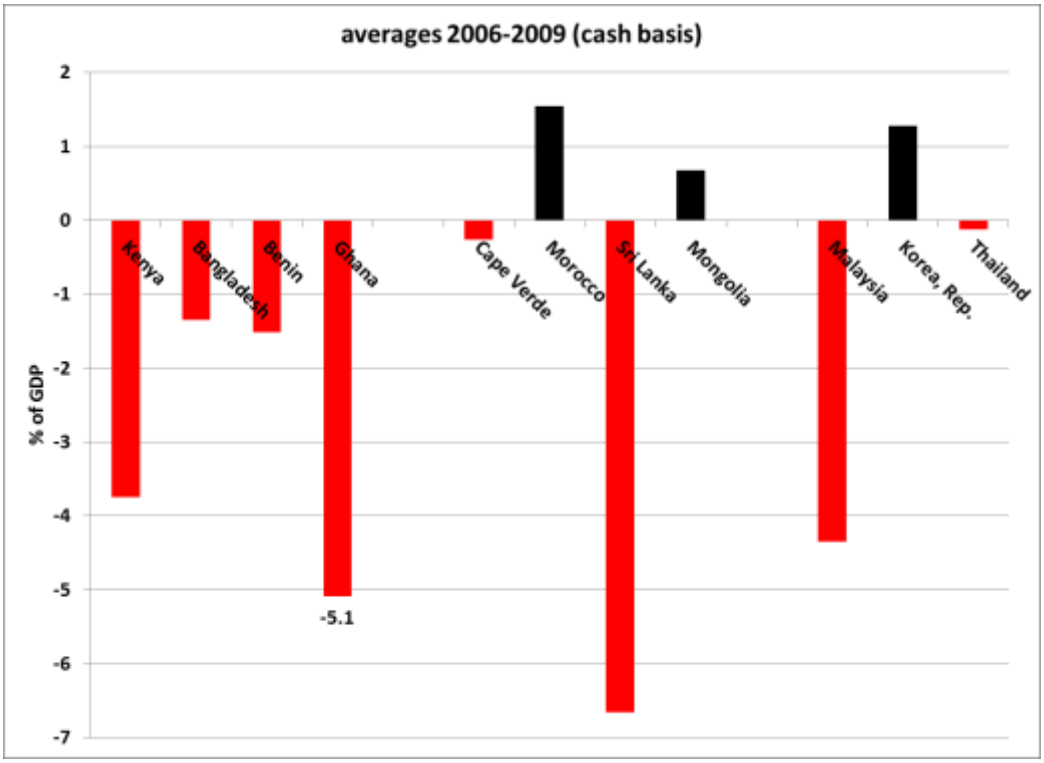
Making progress in both these areas presents challenges—political challenges to restrain the public wage bill, long-term challenges of building administrative capacity to improve the effectiveness of non-wage public spending. Addressing these challenges effectively is likely to be essential to allow Ghana to place its macroeconomic balances on a sustainable footing that makes greater room for private investment, while simultaneously freeing up resources to fund essential public infrastructure.

Figure 3-6 Public Revenues, Spending and Deficits 2006-2010



Source: International Monetary Fund (2011)

Figure 3-7 Budget Surplus/Deficit for Ghana and Comparators

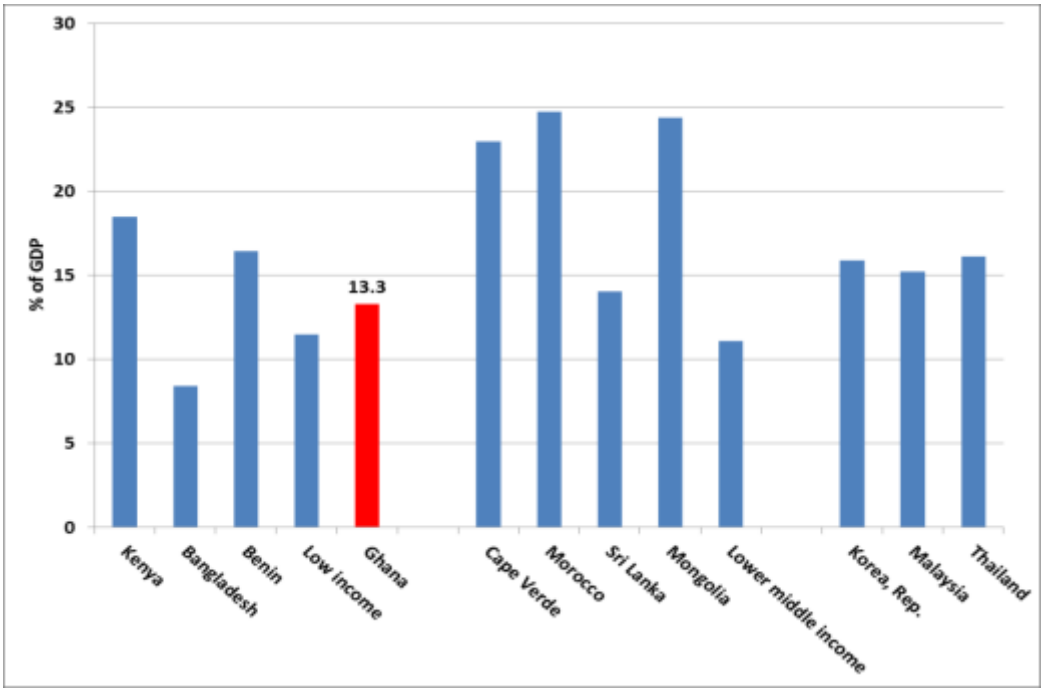


Source: World Bank (2011)

Figure 3-8 Inflation in Ghana, 1990-2010 (Consumer Price Index)

Source: World Bank (2011)

Figure 3-9 Taxes as a Percentage of GDP (Average 2006-2009)

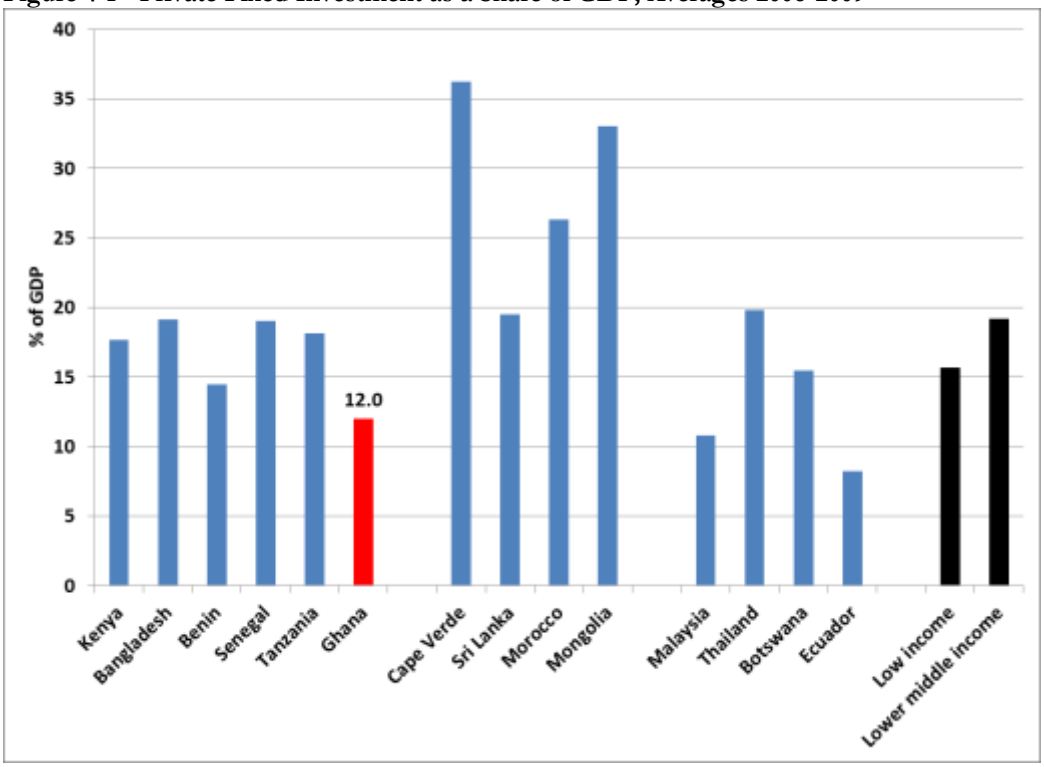


Source: World Bank (2011).

4. Is Private Investment in Ghana Too Low?

The preceding section showed that Ghana's overall rate of investment is quite low: lower than most of the comparator countries used in this study, and even lower than the average among low-income countries. However, that is only part of the story. The data summarized in Figure 4.1 show that Ghana's rate of *private* investment is conspicuously low, relative to most of its comparators, to lower-middle income countries as a group, and even to low-income countries. The African Development Bank (AfDB) growth diagnostic cites evidence that Ghana has an exceptionally large share of total investment in the form of *public* investment, and a correspondingly small share in the form of *private* investment, at least relative to that study's (different) set of comparators (Lejárraga, 2010, pp. 11-13). The Ghana PFG team could not find the data needed to replicate this result. What is clear is that Ghana's low rate of total investment interacts with its relatively low share of private investment in total investment to produce the low rate of private investment seen in Figure 4.1. Given the evidence that sustained rapid economic growth and economic transformation depends on high levels of private investment, this evidence suggests that Ghana indeed faces a problem in this area.

Figure 4-1 Private Fixed Investment as a Share of GDP, Averages 2006-2009



Source: World Bank 2011.

Moreover, the AfDB study provides evidence – not contested here – that Ghana's private sector faces a number of structural problems, which further limit its ability to contribute to rapid and sustained growth. These include:

- an especially high prevalence of very small firms alongside a small number of very large (mainly state-owned) and an unusually small share of small-to-medium firms;[6]
- an unusually small number of firms that export at all, and an even smaller number that export directly, thus limiting access to the elastic market demand and opportunities to boost productivity that participation in global markets offers;
- the small share and slow growth of the manufacturing sector, and more generally the slow pace of structural transformation from an economy heavily reliant on agriculture to one dominated by industry and services;[7] and
- limited diversification of the export mix, leaving the economy vulnerable to fluctuations in world prices of Ghana's "big three" exports: gold, cocoa, and timber.

6 The "missing middle" of small and medium enterprises (SMEs) in Ghana was a prominent theme among private investors interviewed in the course of the PFG process. They saw this as problematic in that they could not identify local firms sufficiently large to make it worth bearing the upfront costs of forming a partnership with the local firm.

7 This last point has been partially answered by the release of the new GDP figures in late 2010; the new data showed the service sector accounting for a much larger share of output than previously estimated (51 percent, up from 36 percent), along with a large drop in the share of industry (18 percent, down from 28 percent) and a smaller decline in agriculture (30 percent, down from 36 percent).

5. Is the Cost of Finance Too High?

Many firm-level studies on Ghana find that credit is a constraint to firm growth. In Barthel, Matthias, and Osei (2011) for instance, over 20 percent of the foreign firms interviewed mentioned credit as a constraint to increasing their investments. The 2007 World Bank Enterprise survey also show that about two-thirds of firms in the sample see credit as a constraint (Table 5.1). These findings in themselves do not necessarily mean that credit is a binding constraint in Ghana.

Table 5-1 Perception of Access to Credit as a Constraint, by Size of Firm (2006)

Access to finance	small (5-19)	medium (20-99)	100 or more	Overall
No obstacle	13.78	19.57	25.00	15.59
Minor obstacle	5.14	8.70	6.25	5.87
Moderate obstacle	11.62	10.87	15.63	11.74
Major obstacle	30.81	33.70	25.00	30.97
Very severe obstacle	38.65	27.17	28.13	35.83
Total	100.00	100.00	100.00	100.00

Source: World Bank (2007b)

5.1. International Finance

Proceeding down the decision tree, we first examine Ghana's international finance. A quick review and comparison of the data shows that international finance does not seem to be a problem in Ghana. Ghana's level of foreign direct investment (FDI) is fairly healthy and has been increasing in recent years, reaching about 6 to 7 percent in 2008 and 2009 (World Bank, 2011). In many years over the past two decades, the level of FDI in Ghana as a percent of GDP has exceeded the average levels of its current peers and medium term comparators (Figure. 5.1).

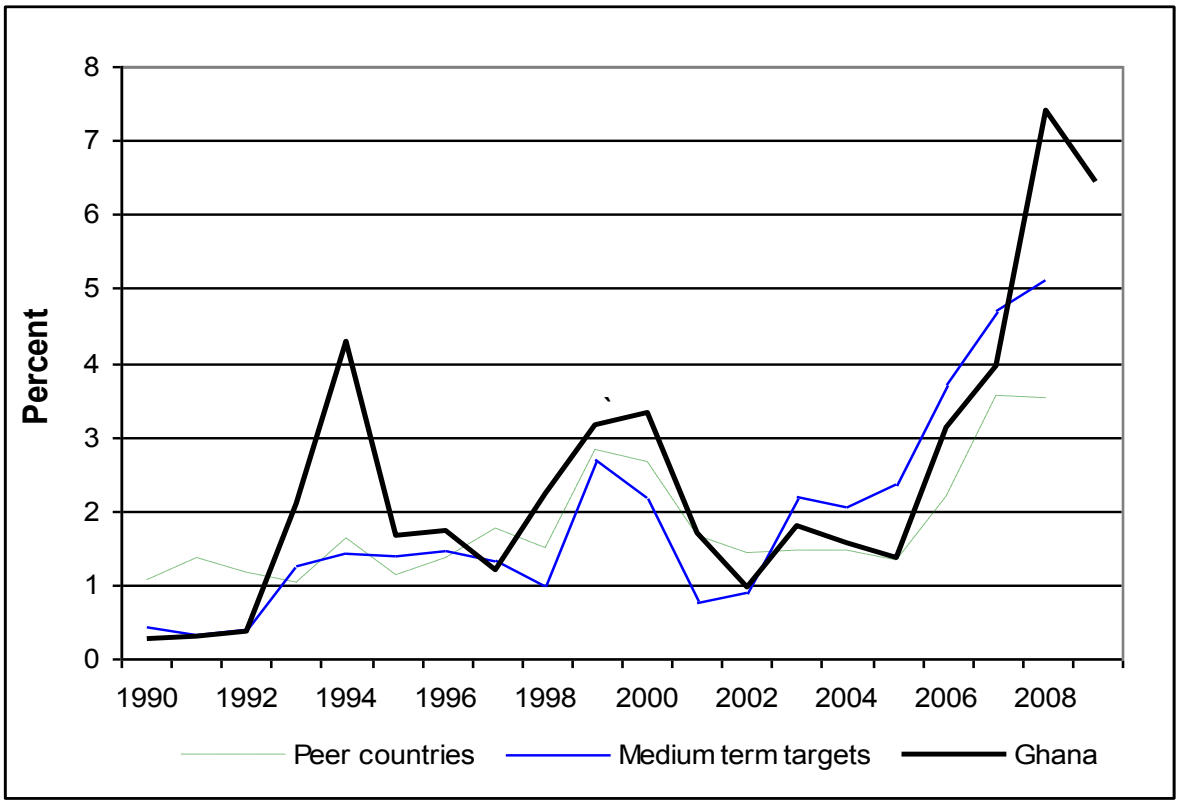
Ghana also has substantially increased its access to international finance over time in the form of net current account transfers from abroad, primarily from official development assistance. Ghana's ratio of net current transfers rose as a share of GDP steadily from 3 percent in 1990 to 19 percent in 2005 (World Bank, 2011).[8] Moreover, Ghana has been able to tap into international financial markets. In 2007, the Government of Ghana issued a $750 million sovereign bond that it used primarily for infrastructure projects, primarily in the energy sector, and is presently in the process of issuing a similar bond this year, according to numerous press accounts. However, S&P, one of the

[8] Data after 2006 are not comparable because of the national income account rebasing issue discussed earlier.

major credit rating agencies, controversially downgraded Ghana's bond from B+ to B in August 2010 (Bloomberg, 2010); Moody's currently has Ghana rated as a B with a stable outlook. Ghana's bonds are not as highly rated as other comparator countries such as Botswana (A-), Cape Verde (B+), Kenya (B+), and Senegal (B+), to name a few countries, according to S&P reports in May 2011.

While Ghana's overall international credit rating could be better, the evidence overall suggests that international finance does not appear to be a major problem.

Figure 5-1 Comparison of Foreign Direct Investment in Ghana and Its Comparators



Source: World Bank (2011)

5.2. Bad Local Finance

Low domestic savings. Next, we examine Ghana's level of domestic savings as a percent of GDP relative to the comparator countries. Table 5.2 shows that Ghana's average domestic savings ratio for the period 2005-09 was 4.9 percent, the lowest in Ghana's group of peer countries and well below the average of the medium- and long-term comparators countries. This very low domestic savings rate signals there is a major problem. One key reason for the low savings rates is the

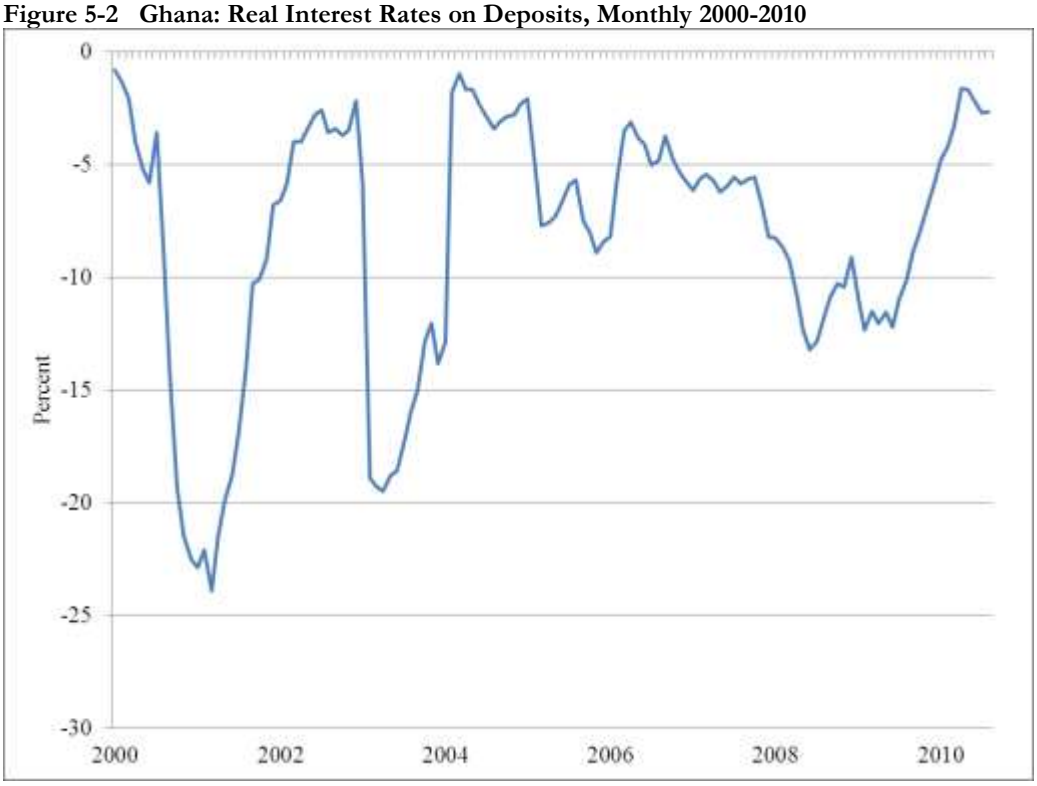
negative real interest rate on deposits (deposit rate minus inflation) that discourages savings and encourages consumption (see Figure 5.2).

Table 5-2 Gross Domestic Savings as a Percent of GDP, 2000-2009

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2005-09 Average
Peer countries											
Bangladesh	17.8	17.0	18.4	17.6	18.7	18.1	18.4	17.5	15.8	17.2	17.4
Benin	6.0	6.5	3.7	6.0	5.5	6.9	6.9	6.1	7.1	10.7	7.5
Ghana	5.6	7.0	7.4	7.0	7.3	3.7	6.1	3.8	2.0	8.7	4.9
Kenya	7.3	8.7	9.8	10.5	10.8	9.5	8.1	8.0	6.1	7.8	7.9
Senegal	11.2	9.4	6.8	8.8	7.9	14.1	10.7	8.6	3.6	8.0	9.0
Tanzania	10.2	8.8	11.8	12.0	11.2	9.7	10.7				10.2
Medium term countries											
Cape Verde	-14.2	-15.1	-15.7	-15.8	-1.5	4.4	5.0	5.8	9.2	12.0	7.3
Mongolia	14.5	9.2	7.9	18.3	23.8	33.1	40.8	38.8	24.3	43.4	36.1
Morocco	20.2	23.6	23.8	24.5	24.2	23.2	24.0	23.4	24.7	25.1	24.1
Sri Lanka	17.4	15.8	15.5	15.6	15.9	17.9	17.0	17.6	13.9	18.0	16.9
Vietnam	27.1	28.9	28.0	27.1	27.9	31.4	31.7	28.2	24.5	27.8	28.7
Long term countries											
Botswana	41.4	35.7	30.2	35.7	36.2	41.5	41.2	40.8	34.8	16.4	34.9
Ecuador	25.8	21.3	21.3	20.0	21.7	24.8	27.3	27.5	30.7	23.6	26.8
Malaysia	35.9	32.3	32.7	34.9	35.1	35.0	37.2	37.5	36.8	31.0	35.5
South Korea	33.0	31.1	30.5	31.8	34.0	32.0	30.7	30.8	30.7	30.3	30.9
Thailand	31.5	31.0	30.0	32.0	32.0	30.3	31.8	34.8	31.5	32.4	32.2

Source: World Bank (2011)

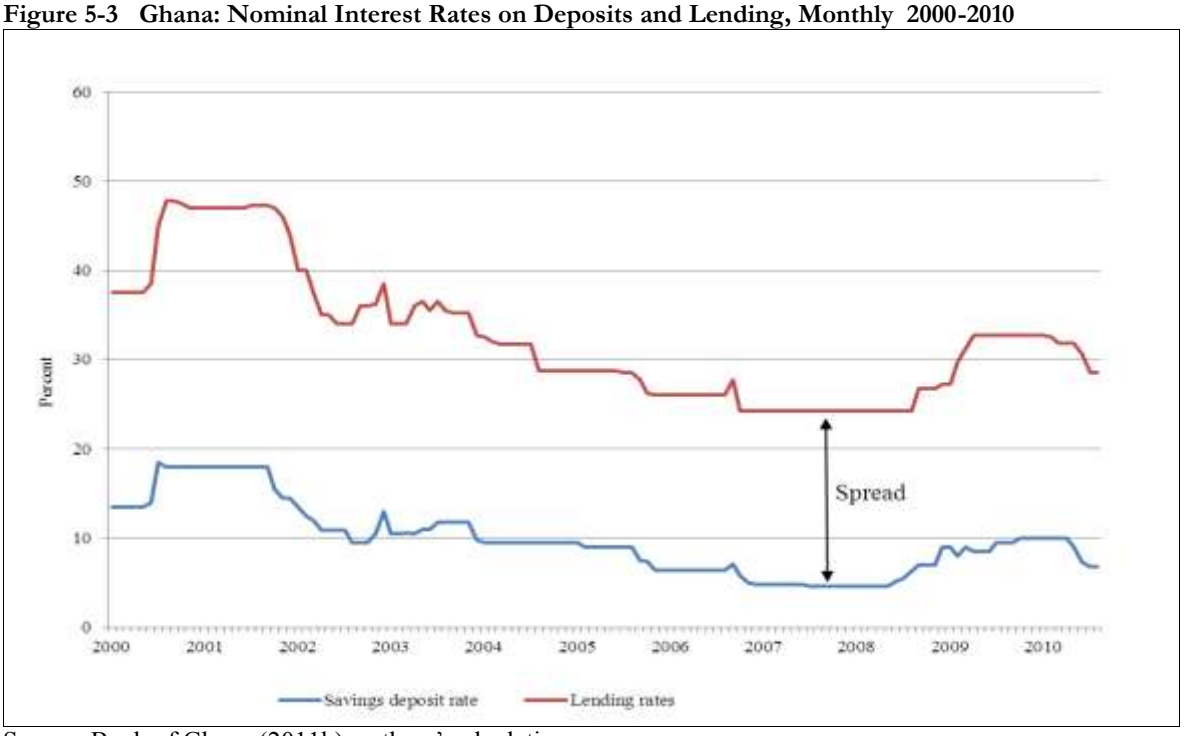
Figure 5-2 Ghana: Real Interest Rates on Deposits, Monthly 2000-2010



Source: Bank of Ghana (2011b).

Poor intermediation. High intermediation costs, as measured by the spread between real lending rates and real deposit rates, provide strong evidence that the cost of capital is very high (see Fig. 5.3). Costly intermediation may be due to several different reasons. This study finds that Ghana's real interest rate spreads (about 20 percent in recent years) are nearly twice as large as those in Ghana's peer and medium-term comparator countries. Those large spreads have been remarkably consistent, despite an increasingly competitive banking sector with 26 banks and a decreasing Herfandahl index indicating a less concentrated banking sector (see Table 5.3).

Figure 5-3 Ghana: Nominal Interest Rates on Deposits and Lending, Monthly 2000-2010



Source: Bank of Ghana (2011b), authors' calculations.

Table 5-3 Indicators of the Credit Sector in Ghana, 2003-2010

Indicator	2003	2004	2005	2006	2007	2008	2009	2010
Number of banks	17	18	20	22	24	25	26	26
Number of branches	344	352	380	391	596	639	698	…
Market share - top 5 banks	70	66	61	58	56	52	50	45
Gini concentration ratio	53	50	51	52	48	46	45	39
Herfindahl index	1,141	1,066	961	871	838	744	693	600
Return on assets before tax (percent)	6.5	6.4	4.8	4.8	3.7	3.2	2.8	…
Return on assets after tax (percent)	…	…	…	3.3	2.6	2.5	2.1	2.7
Return on equity before tax (percent)	…	…	…	39.6	35.8	30.1	23.6	28.6
Return on equity after tax (percent)	35.2	35.5	25.0	27.4	25.8	23.7	17.5	…
Nonperforming loan ratio	18.3	16.1	13.0	7.9	6.9	7.7	16.2	17.6

… = not available

Source: Bank of Ghana (2011a)

To explore the reasons for the high intermediation costs, the team interviewed some managers in Ghana's formal banking sector.[9] The managers described a very risky lending environment and generally agreed on the following causes: an uncertain macroeconomic environment with high inflation; a very high default rate among borrowers from the formal banking sector (default rates had in fact climbed over the past two years to about 18-20 percent, see Figure 5.4); highly asymmetric information between lenders and borrowers;[10] low levels of financial literacy among borrowers; and very weak human capital when it came to developing sound business plans. However what the managers describe as being the causes of 'a very risky lending environment' cannot all be tenable in the face of the evidence. For instance it is a fact that inflationary pressures have been reduced significantly over the last few years and the current rates of under 10% have been maintained for about a year

Although some of these risk factors associated with the lending environment remain important, there are efforts being made to attenuate them. A recent report by the International Monetary Fund has highlighted some of the major systemic risks in the financial sector in Ghana (IMF, 2011e). Among the risks identified were "stress test" outcomes (i.e., the potential for a significant increase in nonperforming loans already on the rise); institutional weaknesses with the Bank of Ghana (e.g., crisis management and bank resolution procedures); and the poor performance of 5 state-owned banks that account for 29 percent of banking system assets. Discussions with officials from Bank of Ghana suggest that many of the recommendations of the IMF report are being implemented. Indeed one can point to government' issue of bonds amounting to GHC891 to creditors as part of its liquidation strategy in the July 2011 supplementary budget as part of attempts to address the first recommendation in the IMF report. One could also point to the establishment by the Bank of Ghana, of a Financial Stability Department as indication of the Bank's intention to strengthen systemic risk analysis.

We further assess the nature of the credit constraint by looking at the availability of credit to the private sector in Ghana relative to the comparator countries. Figure 5.5 shows that financial depth is

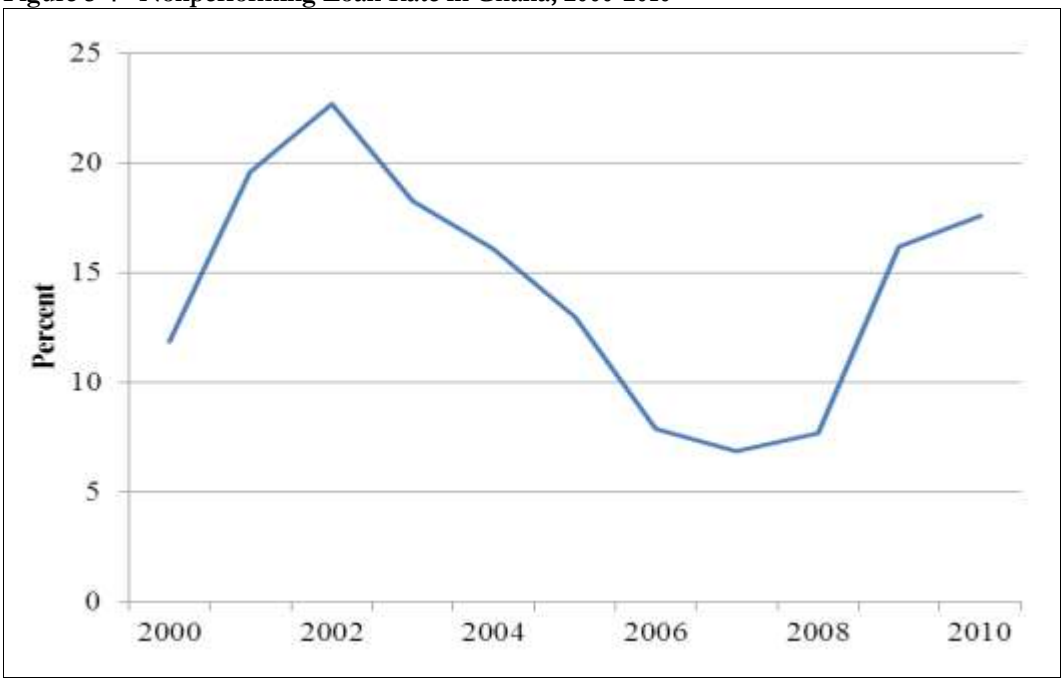
[9] In April 2011 the team met with senior bank managers from Pro Credit, Ecobank, Barclay's, and Standard Chartered bank.

[10] The bankers noted that a new credit agency was helping with the problem of asymmetric information, but that the agency was new. A few noted that the Central Bank was beginning to apply pressure on the banks to report to the credit agency as not all were reporting on their customers.

relatively low in Ghana compared to the benchmark countries. We assess that this weak availability of credit to the private sector in part reflects borrowing and crowding out by the government with its chronic budget deficits, as discussed in Section 3 above. This low depth is a signal that credit might be a binding constraint in Ghana. However, the low quantity of credit does not necessarily mean that it is scarce. It may simply reflect low demand, in which case credit will not be a binding constraint.

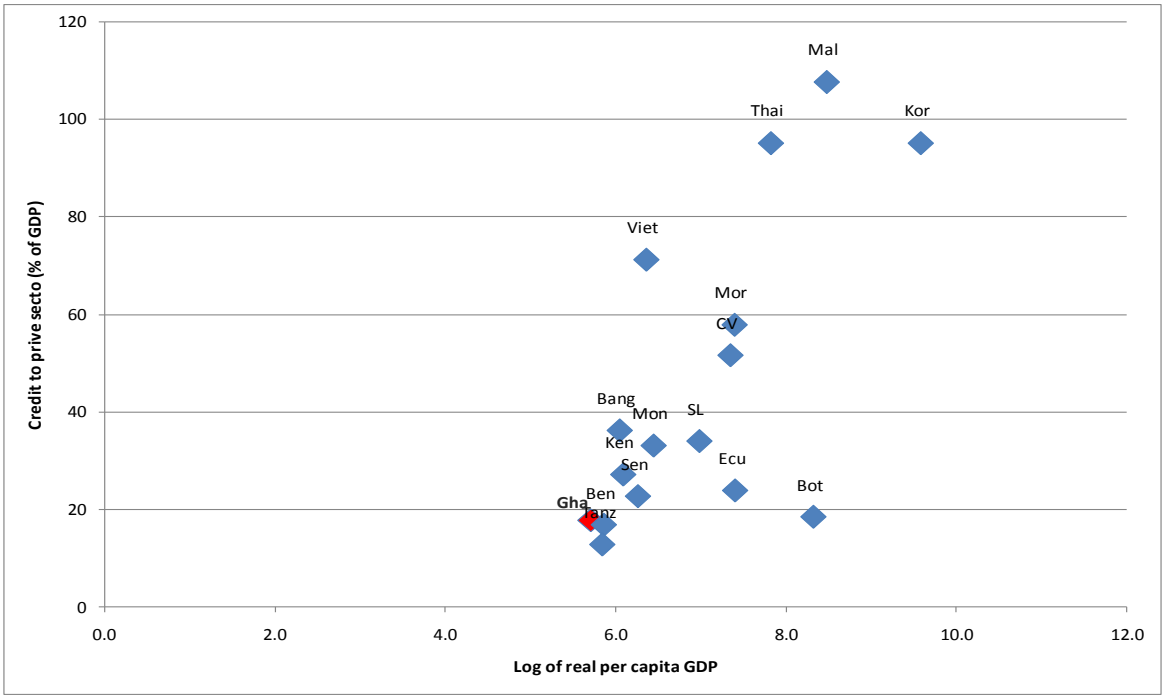
We note from Figure 5.6 that real lending rates for Ghana are very high relative to the comparator countries. The evidence of a relatively high price of capital in Ghana suggests there is excess demand for finance. This reinforces the conclusion based on Figure 5.5 (low quantity of credit to private sector) and suggests that credit is a binding constraint in Ghana.

Figure 5-4 Nonperforming Loan Rate in Ghana, 2000-2010



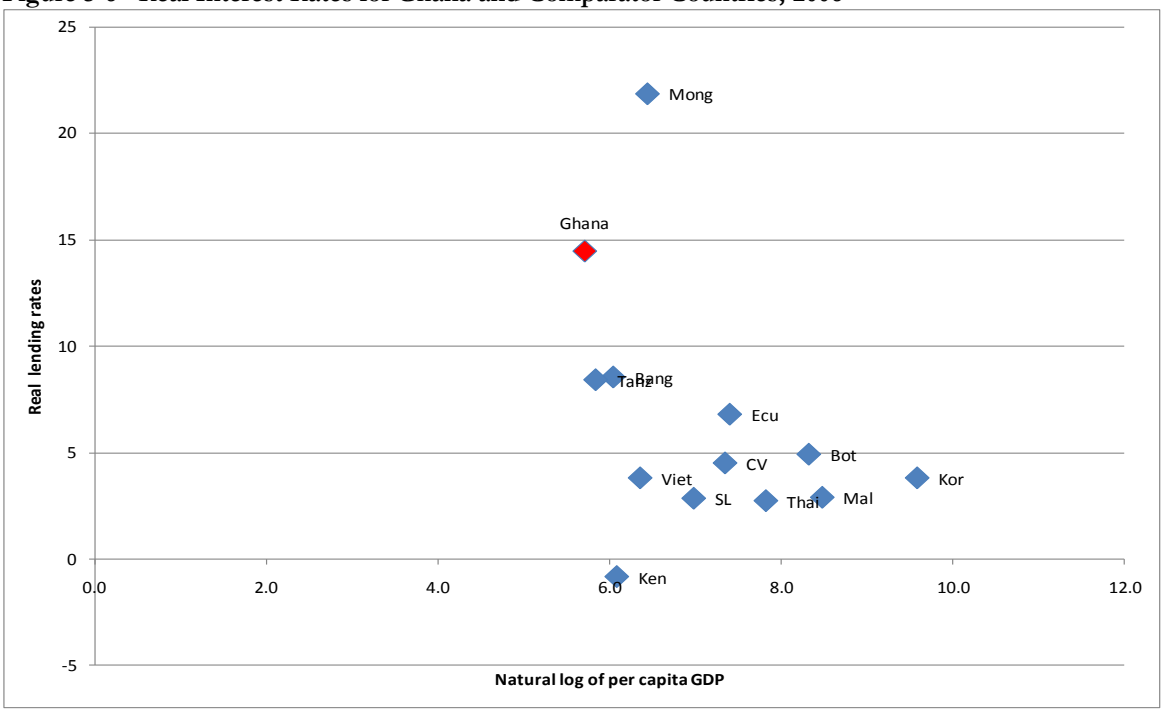
Source: Bank of Ghana (2011a)

Figure 5-5 Financial Depth in Ghana and Comparator Countries, 2006



Source: World Bank (2011).

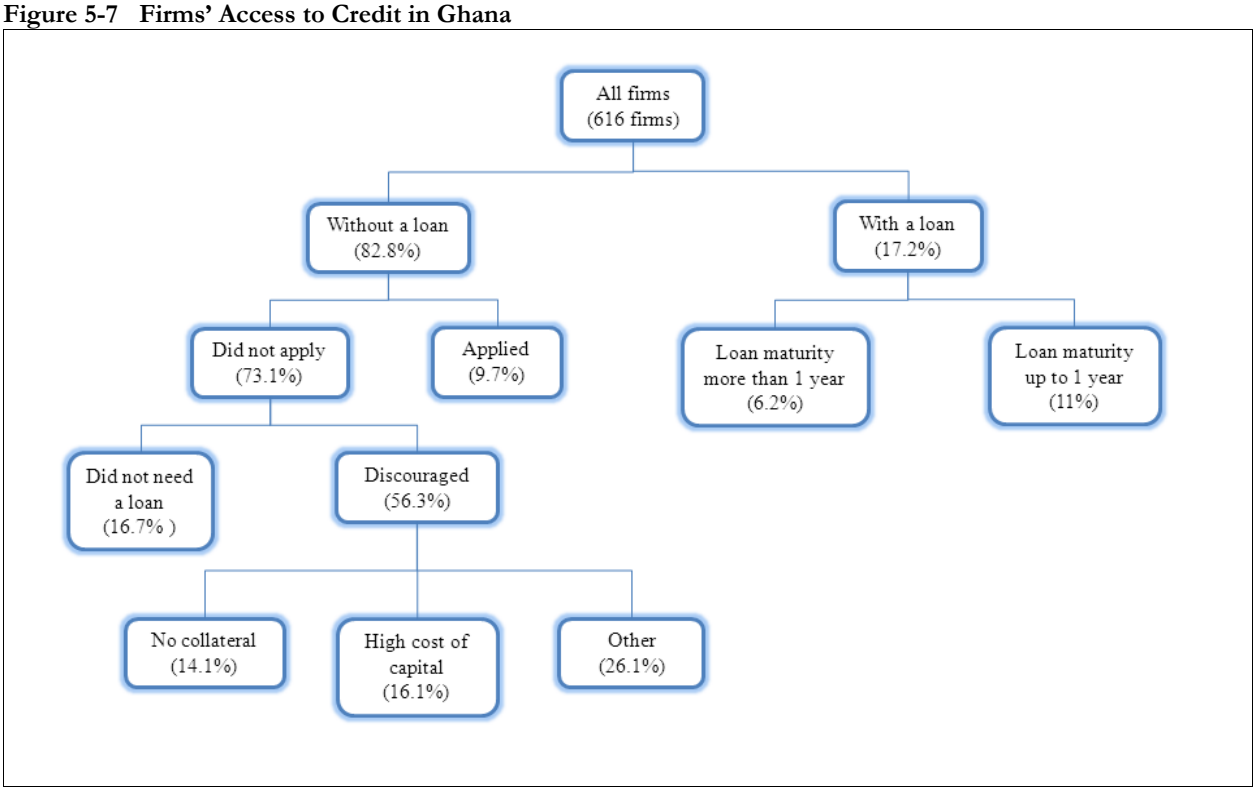
Figure 5-6 Real Interest Rates for Ghana and Comparator Countries, 2006



Source: World Bank (2011)

To further understand the demand-side issues with respect to credit, we analyse firms' demand for loans in Ghana using the World Bank (2007) enterprise survey data (Figure 5.7). The data suggests that most firms in Ghana did not apply for loans mainly because they were "discouraged." Some of the main sources of discouragement cited were lack of collateral and the high cost of capital. For those who were successful in their loan applications, about two-thirds of the loans were short term with maturities of one year or less, in large part reflecting the reluctance of banks to lend long term in a risky lending environment.

Figure 5-7 Firms' Access to Credit in Ghana



Source: Computed using Data from World Bank Enterprise Surveys

Putting all this information together, the picture that emerges is that credit is very costly and indeed a major economic constraint in Ghana. To summarize, domestic savings are very low due to negative real interest rates. Financial intermediation is a major problem: real interest rates spreads are very high due to a very risky lending environment. Real lending interest rates are very high in absolute and relative terms. Lending to the private sector is relatively low. And in enterprise surveys, borrowers cite access to credit as a major constraint, and many are too discouraged to even apply for loans. On this basis, we conclude that costly credit, rooted in bad local finance, is indeed a binding constraint to faster growth in Ghana, contrary to the conclusion of the AfDB growth diagnostic.

6. Is the Rate of Return to Investment in Ghana Low?

6.1. Social Returns

Geography. The AfDB growth diagnostic study included a thorough examination of the impact of geography on Ghana's growth prospects, concluding that Ghana is not disadvantaged in terms of the cost of transportation to major export markets. After reviewing the evidence presented on this point in the AfDB study, the PFG constraints analysis team accepted that conclusion.

Natural Resources. Ghana is endowed with abundant natural resources, which play an important role in the country's agricultural and manufacturing production. Gold, cocoa, and timber together account for 70 percent of the value of Ghana's merchandise exports. Oil from offshore fields began flowing in late 2010, promising to boost national income by several percentage points for at least a decade. Accordingly, a lack of natural resources cannot be cited as a binding constraint to Ghana's current or near-term growth.

Despite this, the constraints analysis team found evidence that overexploitation of Ghana's natural resources raises serious concerns regarding the sustainability of the nation's current resource-dependent growth path. The Annex to this study reviews the evidence on the contribution of natural resources to Ghana's growth, along with the challenges to the sustainability of this contribution.

Human capital. In Ghana, the importance of education to economic growth and development has been recognized in the country's development process since independence; education is viewed as a principal route out of poverty. The Seven-Year Development Plan for Ghana for the period 1963/64-1969/70, in particular, identified human capital formation and hence education as a critical factor in the growth and development process. The GSGDA argues that education and skill development underpin any strategy of human development and productivity (Ghana Ministry of Planning, 2010). It therefore recognizes education and skill development as pivotal in the growth and development agenda of the country.

Several concerns have been raised about the constraints posed by the lack of adequate skilled manpower needed to achieve the growth and capacity for poverty reduction and meeting the MDGs. The government of Ghana has been paying a lot of attention to education for years. This is exemplified in the large annual expenditure that is spent on education and related services. For

instance, education expenditure for 2011 is projected to be about 25 percent of total government spending (Ghana Ministry of Finance and Economic Planning, 2011). However, despite the government's strong support for education, the available evidence indicates that Ghana has not fully achieved its goals in the area of education.

Table 6-1 Gross Enrolment Rates in Ghana and Comparator Countries, 1975-2007

	1975			2005			2007		
	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
Bangladesh	72.1	18.6	2.3	93.7	42.9	5.6	93.8	44.1	7.0
Ghana	64.6	36.1	1.0	88.4	45.5	5.5	99.1	52.6	6.2
male	*71.6*	*43.7*	*1.5*	*90.0*	*50.1*	*7.1*	*99.6*	*55.8*	*8.0*
female	*57.3*	*28.4*	*0.4*	*86.8*	*42.0*	*3.9*	*98.6*	*49.2*	*4.3*
Korea, Rep.	104.0	54.4	7.7	101.5	96.5	91.8	103.7	97.5	96.1
Morocco	57.3	14.1	2.4	106.8	49.2	11.4	107.2	55.8	11.3
Senegal	40.9	10.6	2.0	79.0	22.6	5.6	82.6	26.8	6.4
Thailand	82.6	23.0	3.6	96.9	70.4	44.2	94.7	74.8	46.0

Source: World Bank (2011).

Data from the enterprise survey show that generally very few firms have managers with university or postgraduate degrees (World Bank, 2007b). Among small firms, about 15.7 percent of managers have a bachelor's degree or higher (Table 6.2). About 51 percent have a secondary school level education or lower. We note that the level of education of the managers improves with the size of the firm. So for the relatively large firms (100 employees or more), about 69 percent of them have managers with a bachelor's degree or higher. This begs the question of whether there is relative scarcity of educational attainment within the economy – in other words, is the relatively low level of educational qualification of managers a result of inadequate demand for skilled workers or inadequate supply?

Table 6-2 Educational Level among Managers in Ghana, by Firm Size (Percent)

	Small (5-19)	Medium (20-99)	Large (100 or more)	Overall
No education	3.8	6.5	3.1	4.3
Primary school	7.0	5.4	3.1	6.5
Started but did not complete secondary school	12.2	6.5	6.3	10.7
Secondary school	28.4	15.2	18.8	25.3
Vocational training	23.8	17.4	0.0	21.1
Some university training	9.2	15.2	0.0	9.7
Bachelor's degree (BA, BS, etc.)	14.3	25.0	25.0	17.0
MBA from university in Ghana	0.5	6.5	9.4	2.2
MBA from university in another country	0.3	1.1	21.9	1.8
Other postgraduate degree from university in Ghana	0.3	1.1	12.5	1.2
Other postgraduate degree from university in another country	0.3	0.0	0.0	0.2

Source: Generated from the World Bank (2007b)

Table 6-3 Profile of Wage Earners in Ghana, 1998 - 2006

	1998/99	2005/06
Nominal monthly earnings (in Ghana cedis)	10.85	53.73
Real monthly earnings (in Ghana cedis)	11.99	15.52
Female (percent of total)	0.55	0.50
Age	32.73	33.08
Urban resident (percent)	0.41	0.46
Worker Education		
None	0.10	0.05
Primary	0.34	0.14
Junior secondary school	0.25	0.37
Secondary	0.09	0.17
Father's Education		
None	0.48	0.47
Primary	0.04	0.04
Junior secondary school	0.19	0.22
Secondary	0.07	0.07
Mother's Education		
None	0.59	0.60
Primary	0.04	0.04
Junior secondary school	0.07	0.12
Secondary	0.01	0.02

Source: Ghana Living Standards Survey, IV and V

We assess the relative scarcity of educational attainment by estimating the returns to education in Ghana. Table 6.3 presents some summary statistics on education and earnings in Ghana, based on the 1998/99 and 2005/06 living standard surveys. For the period under study, mean real earnings increased by about 42 percent. In both periods, workers who had completed at least secondary education earned more income. In 2006, workers with secondary school education earned more than twice as much as those with just primary education and about two-thirds more than those with junior secondary school /middle school education.

Table 6.4 shows the results of the estimates of the returns to education in Ghana. The equation is first estimated for all workers (with and without controlling for other factors) and for workers in different sectors. We note that the rate of return to education in Ghana is about 5.5 percent for all workers – i.e. wages increase by 5.5 percent for an additional year of schooling. For the different sectors, the non-farm self-employed have the lowest return (3.9 percent) while the public sector has the highest return at 6.8 percent. These results indicate that Ghana exhibits relatively low returns to education. For instance the returns to education for some of the comparator countries are 7 percent (Bangladesh), 12 percent (Malaysia), 13 percent (Kenya) and 16 percent (Thailand).

Because of limitations on the time available for this study, Table 6.4 is based on a relatively simple estimation technique that considers only earnings in the form of wages. A more comprehensive (but far more complicated) estimate by Kingdon and Söderbom (2008) extends the analysis to earnings from farming and non-agricultural self-employment; finding that (1) an additional year of schooling boosts earnings in wage employment by 5.0 percent for men and 5.9 percent for women, similar to the findings reported in Table 6.4; (2) the returns to schooling for farmers and the self-employed is far lower than in wage employment – indeed, schooling appears to have no clear impact on farmers' earnings; and (3) much of the return to schooling comes from helping workers qualify for wage employment, where earnings are far higher than in farming or self-employment. Kingdon and Söderbom's estimates are based on data from the fourth round of the Ghana Living Standards Survey, conducted in 1998/99. Nevertheless, pending an application of similar techniques to the data from the fifth GLSS round (2005/6), those estimates suggest that the true impact of schooling on earnings in Ghana is likely to be even lower than is suggested by evidence from wage earners alone.

Table 6-4 Mincerian Wage Regressions, Ghana

	Basic Model	Basic (More controls)	Public Sector workers	Private Formal	Private Informal	Non-farm Self-Employed	Farmers
Years of schooling	**0.0905*** ** (-0.00367)	**0.0551*** ** (-0.00425)	**0.0684*** ** (-0.0095)	**0.0550*** ** (-0.0122)	**0.0495*** ** (-0.00969)	**0.0391*** ** (-0.00681)	**0.0476*** ** (-0.00953)
Age		0.00938* (-0.00526)	0.00386 (-0.00839)	0.0155 (-0.0124)	0.0117 (-0.013)	0.0102 (-0.00827)	0.0066 (-0.0091)
Age squared		-0.000163** (-6.43E-05)	-7.83E-05 (-0.000104)	-0.000215 (-0.000156)	-0.000194 (-0.000164)	-0.000154 (-0.0001)	-0.000124 (-0.000103)
Female		-0.047 (-0.032)	-0.00631 (-0.0652)	-0.111 (-0.0877)	-0.103 (-0.0674)	-0.0759 (-0.0517)	-0.0531 (-0.0692)
Manual worker		-0.544*** (-0.0433)	-0.239** (-0.0951)	-0.0217 (-0.0836)	-0.0775 (-0.102)	-0.269 (-0.166)	-0.474 (-0.356)
Years of experience		0.00676*** (-0.00183)	0.0130*** (-0.00334)	0.0246*** (-0.00446)	0.0153*** (-0.00466)	0.0194*** (-0.00358)	0.0122*** (-0.00329)
Urban		0.449*** (-0.0369)	0.210*** (-0.0756)	0.277** (-0.129)	0.113 (-0.0883)	0.208*** (-0.0604)	0.106 (-0.0884)
Observations	4,855	4,854	540	367	733	1,835	1,379
R-squared	0.122	0.196	0.303	0.192	0.124	0.081	0.059

Notes: Figures shown in parentheses are robust standard errors. Ten regional dummy variables were included in the regression; their coefficients are not shown in order to save space.
Source: Authors' calculations based on the GLSS 5

The conclusion that the rate of return to schooling in Ghana is lower than in other countries is complicated by evidence that the returns to schooling in Ghana increase with level of schooling, so that those who manage to remain in school through senior secondary or tertiary schooling derive much greater benefits from additional years of schooling than do those with only primary or lower-secondary schooling (see, for example World Bank 2007a, Volume 3). As seen in Table 6.3, relatively few Ghanaian workers have gone past junior secondary school, so it is possible that the returns to further increases in schooling may be higher than in the past.[11,12] But this is by no means certain: the returns to additional skills could easily fall unless the economy generates additional demand for those skills that grows at least as fast as the additional supply resulting from increased schooling. Just as important, the finding that the returns to schooling increase with the level of schooling is by no means confined to Ghana, but has been noted for a wide range of countries (see,

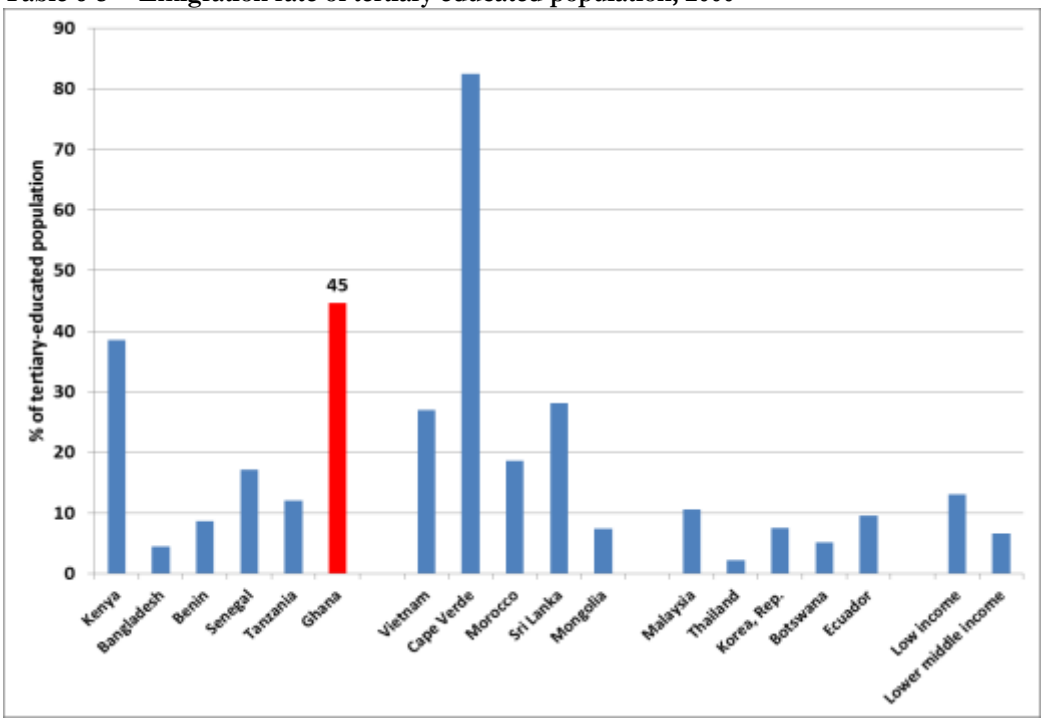
[11] As of 2009, average schooling among Ghanaian males aged 20-24 was 9.5 years, versus 7.5 years among females (World Bank 2011.)

[12] Similarly, the enterprise survey makes clear that many private firms perceive a shortage of skilled workers, a finding consistent with Ghana's relatively low tertiary enrolment ratios compared with its peer countries and medium- and long-term aspirant countries.

for example, Schultz, 2003.) In the context of this study, the key point to notice is that the return to schooling in Ghana is very low compared with that in other countries, and for that purpose, comparisons based on the simple model used in Table 6.4 is sufficient.

High levels of skilled emigration provide further evidence that so far, Ghana's economy has generated a relatively low demand for skills compared with the available supply. As seen in Figure 6.1, the share of college-educated Ghanaians living in OECD countries in 2000 was far higher than for low- or lower-middle income countries as a group, and for all compactor countries except Kenya and Cape Verde. Although these comparisons are a bit dated, they are consistent with more recent but less comprehensive data from other sources, which also point to high levels of emigration among highly skilled Ghanaians (OECD 2008, Lerárraga, 2010), reinforcing the verdict of the AfDB study that "the current productive structure of the economy is not able to absorb the existing stock of skills" (Lerárraga, 2010).

Table 6-5 Emigration rate of tertiary educated population, 2000



Source: World Bank 2011, based on estimates from Docquier and others 2009.

On the basis of this evidence, we reach a similar conclusion as the AfDB growth diagnostic on Ghana: insufficient schooling is not currently a binding constraint to growth in Ghana (Lerárraga, 2010).

Readers should carefully note that this conclusion does not at all lessen the urgency of continued efforts to expand and improve schooling in Ghana. Schooling is important not simply because of its long-term impact on economic growth. Equally important—if not more so—broad access to effective schooling is essential to provide young people with the skills they will need to gain access to better-paying, more productive employment in growing sectors of the economy, and to develop additional skills throughout their working lives. From this perspective, evidence of extremely low levels of learning achievement in Ghana's schools suggests that the nation faces a major, long-term challenge to improve the quality of its schools.[13] Vigorous, on-going efforts to overcome this challenge will not only help ensure that schooling enhances access to economic opportunity in Ghana, but moreover will enhance the long-term contribution of schooling to the rate and sustainability of growth. Nevertheless, the evidence reviewed here indicates that at the present moment, the supply of schooling (at current levels of quality) does not pose a binding constraint to faster growth.

6.2. Infrastructure

Infrastructure spending has high rates of social returns. The World Bank's Country Economic Memorandum of 2007 cites Canning and Bennathan's 2000 report which indicates that very high rates of return were found for investment in paved roads, the African average being 69 percent, approximately 2.5 times higher than the returns from non-infrastructure capital (World Bank, 2007a). Although not specific to Ghana, this evidence gives a sense of the potential social return to infrastructure investment in Ghana.

Apart from its impact on domestic production and consumption, the growth enhancing impacts of increased infrastructure through enhanced trade and integration between African countries must also be acknowledged.

Transportation. Ghana's transport system consists of four modes: road, aviation, rail, and maritime. Its national road network totals about 60,000 km while it has one international airport and

[13] Ghana's latest National Education Assessment found that only 20 percent of Ghanaian students reach proficiency in English, 25 percent in math. Likewise, a sample of 500 schools found that fewer than 8 percent of children in third grade could read individual words, and even fewer could read sentences (Duflo 2011.) Limited learning achievement almost certainly accounts for some of the low return to schooling.

four domestic airports. It has approximately 945 km rail network currently serving the southern half of the country, and its maritime infrastructure consists of 350 km of inland water transport over Lake Volta, in addition to the two seaports at Tema and Takoradi.

Roads are the dominant mode of transport in Ghana, carrying almost 95 percent of the passenger traffic and 97 percent of all movable freight in the country. The Government has identified high transport costs as a barrier to achieving sustainable economic growth, inhibiting the expansion of agricultural opportunities by restricting access and linkages to major domestic and international agricultural markets (Millennium Challenge Corporation, 2006).

For the transport sector, regional integration and support to the landlocked neighbours has always been a strong theme in Ghana's Transport Program. The two key corridors proposed under the government's Road Sector Development Program (RSDP)—Abidjan to Lagos and Tema to Bamako—became even more critical after the start of the crisis in Cote d'Ivoire in 2002. The rerouted trucks did great damage to Ghana's infrastructure, and the main trans-African routes deteriorated much more quickly than anticipated. However, it is believed that rerouting generated more transit and port revenues (World Bank, 2007a).

Ghana's transport infrastructure is quite advanced when compared with low-income countries in Africa (Foster and Pushak, 2011). But to sustain rapid economic growth in the years ahead, it is now necessary for Ghana to measure its transport infrastructure against the middle-income benchmark to which it now aspires. The sub-sections that follow briefly review and compare Ghana's transport infrastructure with that of its comparator countries.

Roads. Ghana's road transport receives good ratings in the World Bank's Africa Infrastructure Country Diagnostic (AICD) (Foster and Pushak, 2011). To quote from that study:

> *"By almost all measures, [Ghana's roads] are well ahead of those found among low-income peers and nearing the levels expected of a middle-income country [Table 6.5]. The length of the main (primary and secondary) network is more than adequate to achieve regional and national connectivity. The record on road network quality is quite reasonable, with 75 percent of the paved network in good or fair condition and, more impressive, 74 percent of the unpaved network in good or fair condition.*

Underpinning these achievements has been a serious reform of road sector institutions that has resulted in the creation of a second generation road fund and road agency. Ghana meets almost all of the best practice guidelines for road sector institutions. The country has also adopted a fuel levy ($0.06 per liter) that, as of 2006, was commensurate with road maintenance needs. In contrast to other African countries, Ghana allocates its road fund resources much more evenly across the different road networks—rural and urban roads receive 30 and 25 percent of the total, respectively. Overall, Ghana has allocated substantial resources to the road sector in recent years; it spends on average 1.5 percent of GDP on roads, one of the highest shares in West Africa."

The AICD study goes on to identify the major shortcoming of Ghana's road system:

"Although rural road quality is remarkably good, the physical extension of the rural network appears inadequate. According to GIS analysis, only 24 percent of Ghana's rural population lives within two kilometres of an all-season road. This is well below the 60 percent found in Africa's middle-income countries. Due to the spatial distribution of Ghana's rural population, raising the index to 100 percent would require a 200 percent increase in the length of the country's classified road network.[14] *But if the objective were modified to ensure that there is good road accessibility to land that produces 80 percent of Ghana's agricultural production by value, the requirements shrink substantially. A rural road network of some 6,400 kilometres would suffice for this purpose. By comparison, 13,000 kilometres would be needed to put even 50 percent of the rural population within two kilometres of an all-season road.*

Beyond the issue of rural network extension, there is the question of the appropriate standards for rural roads. Spatial analysis of the network suggests that about 30 percent of the rural network may be under-engineered, meaning that it consists of earth roads with traffic levels typically considered high enough to justify gravelling(above 30 vehicles per day). By contrast, some 20 percent of the main road network appears to be over-engineered, meaning that it consists of paved roads with traffic levels not typically considered adequate to justify paving (below 300 vehicles per day)."

Table 6-6 Ghana's Road Indicators Benchmarked against Africa's Low- and Middle-income Countries

[14] That is, adding 120,000 kilometres to the existing 60,000 kilometre network.

	Unit	Low income countries	Ghana	Middle-income countries
Paved road density	Km/1,000 km^2 of arable land	87	**158**	507
Unpaved road density	Km/1,000 km^2 of arable land	505	**804**	1,038
GIS rural accessibility	Percent of rural population within 2 km of all-season road	22	**24**	60
Paved road traffic	Average annual daily traffic	1,050	**1,314**	2,786
Unpaved road traffic	Average annual daily traffic	63	**40**	12
Paved network condition	Percent in good or fair condition	80	**75**	79
Unpaved network condition	Percent in good or fair condition	58	**74**	58
Perceived transport quality	Percent firms identifying roads as major business constraint	23	**18**	11

Source: Gwilliam and others 2010. Derived from AICD national database, downloadable from http://www.infrastructureafrica.org/aicd/tools/data

Even using the present standards for assessing road quality, there are questions over the reliability of the road condition mix figures reported by the sector Ministry (Ghana Ministry of Transportation, 2007). One of the key objectives of the RSDP was to clear the backlog of road maintenances geared towards network stabilisation and achieving a road condition mix of 59 percent good, 27 percent fair and 14 percent poor within the duration of the RSDP. Table 6.6 summarizes the reported improvement in the road condition mix over the period:

Table 6-7 Trends in Road Condition mix for Ghana, 2002 – 2007

Year	Good (percent)	Fair (percent)	Poor (percent)
2002	30	21	49
2003	34	26	40
2004	40	30	30
2005	42	31	27
2006	45	28	27
2007	39	29	32

Source: Ghana Ministry of Transportation (2007).

Although well below the target condition mix, the 2007 reported data still represents a significant improvement in the proportion of Good and Fair condition roads as compared to 2002. However a

2009-2010 survey reports that Ghana's road infrastructure is assessed by firms operating in the country as being comparable to that of similar per capita countries and most of the medium term target countries, but significantly below almost all of the longer term target countries (Table 6.7):

Table 6-8 Firms' Assessment of Road Infrastructure for Ghana and Comparator Countries

	Country Name	How Would You Assess Roads in Your Country? (1 = Extremely Underdeveloped, 7 = Extensive and Efficient by International Standards)	Country Rank (Out of 139 Countries Surveyed)
Similar Per Capita GNI in 2009	Kenya	3.6	77
	Bangladesh	3.0	100
	Benin	2.9	107
	Senegal	3.3	91
	Tanzania	2.9	104
	Ghana	3.4	86
Medium term targets	Vietnam	2.7	117
	Cape Verde	3.9	68
	Morocco	3.4	88
	Sri Lanka	4.2	55
	Mongolia	1.7	138
Long term targets	Malaysia	5.7	21
	Thailand	5.1	36
	Korea, Rep.	5.8	14
	Botswana	4.6	47
	Ecuador	3.5	83

Source: World Economic Forum (2011).

An evaluation of the EU-financed TRIP II programme for the 1996 – 2003 period, the major component of which was the provision of a 117 km long high quality all-weather inter-district access road (Awaso-Nobekaw-Bediakukruom) in the Western Region of Ghana, indicated that there are significant positive economic impacts to be derived from investments in the road transport sector (ECORYS Transportation, 2003). The selected main project road was in a very bad condition; routine and periodic maintenance were in a very bad state; and truck overloading was rampant and exerting serious damage to the roads. The assessed benefits of the programme included:

- Development of traffic: the weighted average traffic volume on the project road in 2003 is estimated to be around six-fold (1,200) the traffic volume of 1988 (200), an overall average annual growth percentage of 13 percent;

- Transport times/availability of transport: reduced travel times for both passenger and freight traffic, at least 30 shared taxis now operating between Goaso and Bibiani, performing three round trips per day on average, whereas there were none before;
- Transport costs: expressed in constant prices, transport fares to/from Bibiani significantly reduced after the new road was opened (by up to 40 percent), overall transport fares on the project were assessed about 35 percent lower than fares on feeder roads in poor condition; and
- Agricultural sector: despite the absence of a baseline survey, total agricultural production increased by more than 4 percent per year, with stakeholders reporting significantly improved accessibility to markets.

The only negative impact has been on road safety, with a large number of fatal accidents recorded after the completion of the project road, mostly due to drivers exceeding the speed limit and overtaking other vehicles without due care and attention.

Ghana's generally good performance in building and maintaining its physical road network is offset by the persistence of internal barriers to the transport of goods by road. A recent USAID study reported that truckers had to stop at 15 checkpoints between the Ghanaian port of Tema and the main border crossing into Burkina Faso, a distance of 881 km (USAID 2010). Each stop results in delay and uncertainty while the trucker waits in line to negotiate and pay a bribe to the "inspectors" who operate each checkpoint. Although the same study cites deregulation of the trucking market as a bigger source of potential cost savings along this corridor, reducing opportunities for corruption by eliminating internal checkpoints would yield additional benefits by reinforcing the rule of law.

Is Road Infrastructure a Binding Constraint?

We have noted that comparisons with middle-income African countries and Ghana's long run comparator countries make clear that Ghana must make on-going, well-planned efforts to expand and improve its roads to prevent road transport from emerging as a constraint to growth in the future. Meanwhile, Ghana's poor showing on rural access to roads suggests a major opportunity to improve access to agricultural input and product markets for rural communities, thereby improving agricultural productivity and helping extend the benefits of growth to a larger share of the population.

Data[15] from the Ministry of Roads and Highways also show the following:

- Expansion and maintenance of the road network is presently underfunded, with total inflows amounting to US$ 274million in 2009, the lowest sector funding since 2006. Contributions from the road fund and the consolidated fund reduced by 42% and 77% respectively. In 2009 there was a 50% reduction in government expenditure on maintenance and minor rehabilitation from the 2008 level.
- In 2009 the road network size grew minimally (0.2%), and the network distribution by class remained at 19% trunk roads, 63% feeder roads and 18% urban roads. The percentage of the paved network remained at 19% for the period 2008 to 2009. Eighty one percent (81%) of the entire network was unpaved as at the end of 2009, representing a major constraint to economic and other activity in the rainy season.
- Total maintenance coverage achieved in 2009 stood at 35%, representing a 12% decrease from 2008. The total maintenance coverage of the network has been on a consistent decline since 2007.
- The majority of workers surveyed cited bad roads (33.8%), long distances (24.7%), and heavy traffic on roads (18.8%) as the main difficulties they faced when going to work, and 19.4% of students cited bad roads in the rainy season as the main obstacle to attending school. 88.2% of respondents who complained about encountering difficulties in visiting health facilities, cited bad roads as their main obstacle.
- In respect of market access for agricultural produce, 36.7 percent of respondents indicated that the roads to the markets were in a bad shape. This was followed by the lack of means of transport (23.4%) to the marketing centres. The Brong-Ahafo region recorded the highest proportion of farmers (71.9%) who complained about the bad nature of roads, followed by Greater Accra (58.1%) and Northern (45.0%) regions.
- The survey indicated that a national average of 36.7% of persons engaged in agricultural activities were within one kilometre from the nearest motorable road, with another 27.4 percent operating in areas that were between one and two kilometers from a motorable road.

[15] National Transport Household Survey Report, Ministry of Transportation and Ghana Statistical Service, January 2009; and Statistical and Analytical Report (2000-2009) – Transport Indicators Database, Ministry of Roads and Highways, Ministry of Transport and Ghana Statistical Service, August 2011.

In comparison, as many as 30.6 percent of farmers in the Northern region were undertaking their farming activities in areas at least 10 kilometres from a motorable road, with a further 21.3 percent of respondents in the rural areas living between 10 and 15 kilometres away from a motorable road, and another 16.1 percent living more than 15 kilometres away.

- More than half (57.7%) of farmers reported that the nearest road was motorable with difficulty during the rainy season. This was the situation in the Upper West (77.5%) and Western (74.4%) regions. About a third (33.7%) of farmers in the Northern region, and 35.1 percent in the Volta region, also indicated that the road nearest to them was unmotorable during the rainy season.
- 30% of commuters surveyed reported that bus routes were not convenient for them, with 76.2% of this group citing bad roads as the main reason for the inconvenience of the routes.

In terms of the four tests, this evidence suggests, but does not yet conclusively prove, that road infrastructure is indeed a binding constraint to growth. First, there is a strong indication of a high shadow price, in terms of lost productivity and restricted access to markets for agricultural produce, in particular in the rural areas during the rainy season, as the result of poor road infrastructure, Second, the TRIP II programme evaluation demonstrates that relaxing the constraint of bad roads results in observably faster growth particularly in the case of rural roads. Third, the overwhelming concentration of industrial activity and agricultural production for export in the Accra-Tema area, as opposed to the Northern and Middle Belt areas of Ghana, is an indication that private agents are seeking to circumvent the binding constraint of poor road infrastructure by limiting their dependence on road usage. However this evidence is also true for power and so one needs to interpret with some care. In terms of the fourth test there is little evidence, that firms that survive consist disproportionately of those that do not depend on the constraint. This is possibly due to the fact that most economic production depends in some measure on road infrastructure. There is therefore strong evidence to support the case that inadequate and poorly maintained road infrastructure, particularly rural roads meets two out of the four tests of a binding constraint to growth.

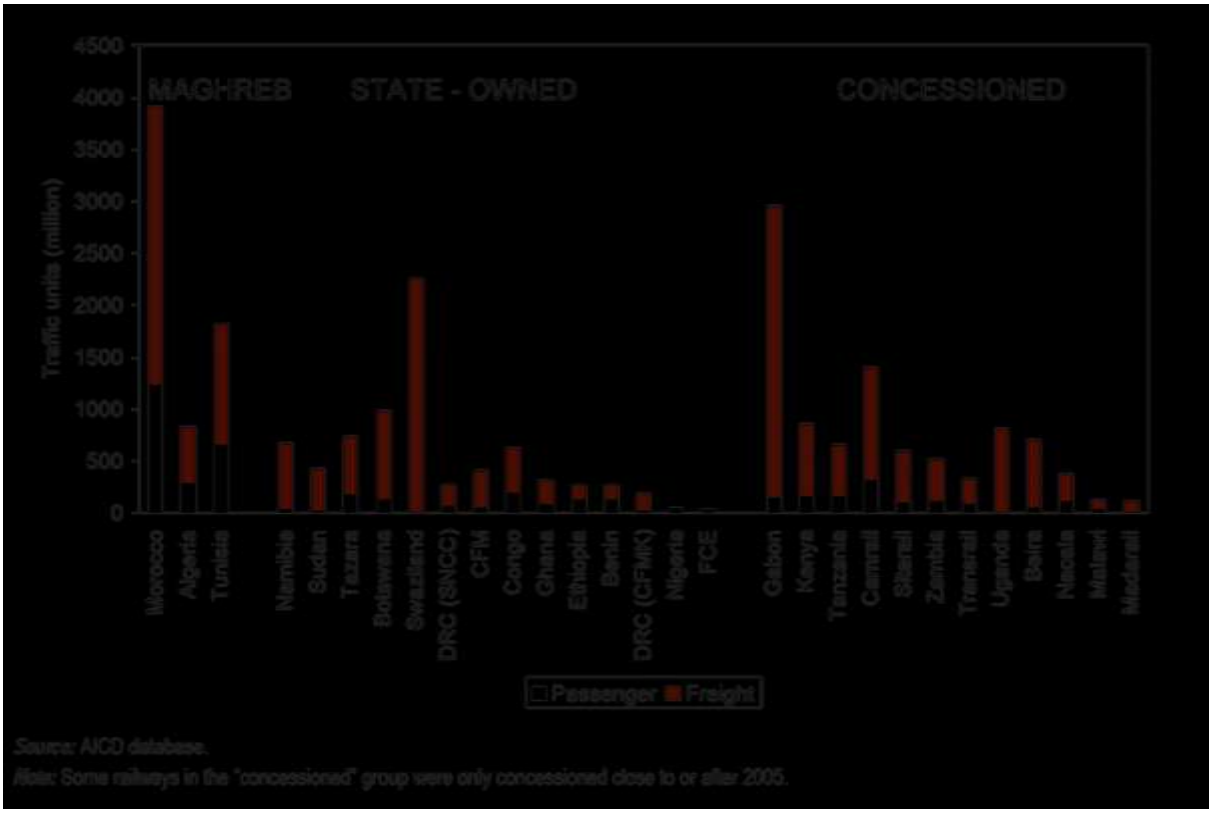
Railways. In common with most Sub-Saharan railway networks, Ghana's is characterised by low traffic densities, overall light freight loads dominated by specialised mineral lines, and an on-going struggle to generate enough funds to maintain and renew its infrastructure as required. The network forms a triangle that links Accra-Kumasi-Takoradi, though only the Kumasi-Takoradi segment has been operational in recent years, together with a small commuter line linking Accra with Tema. This reflects the main pattern of traffic on the railway, namely the transfer of bauxite and

manganese from the mining areas around Kumasi to the Port of Takoradi. The Ghana Railway Company (GRC) performed satisfactorily in the past, when Government support gave the company the monopoly to haul bulk commodities in the country like bauxite and manganese as well as cocoa and timber.

The performance of GRC peaked at over 2.3 million tonnes of freight in 1965, with passenger traffic achieving its highest performance of over 8 million passengers in 1971. Thereafter, due to a number of factors including ineffective management of the rail system, the changing world economy, sharp drops in commodity prices and encroaching competition from the road sector, there was a general decline in both freight and passenger traffic. Freight traffic reduced from the peak level in 1965 to the lowest performance of 357,000 tonnes in 1983. The corresponding decreases in the passenger service were from 6 million passengers in 1980 to the lowest of 546,000 in 1990.
Ghana's railways still operate at the standard to which they were originally constructed, and now face major problems from competing modes of transport. Its lines can accommodate only relatively lightweight and slow-moving trains, and poor maintenance over a long period of time has caused many sections of the track to deteriorate, in some cases almost beyond repair, resulting in a loss of competitiveness and rolling-stock productivity. This is a major handicap when competing against the modern roads being constructed in major corridors. Rehabilitating the network will be expensive; finding a sustainable way to do this given the low traffic volumes and revenues that exist today is the central problem faced by most Sub-Saharan African railways, including Ghana Railways Development Authority (GRDA) (Bullock, 2007).

Figure 6.2 illustrates the problem of low traffic density, for both passengers and freight, which is faced by GRDA (Bullock, 2009):

Figure 6-1 Network Traffic Density (2001-5 Average)



In Ghana, railway freight traffic is entirely domestic, and dominated by bulk mineral ore exports. The requirement for specialised wagons in any case means that trains cannot carry compensating return loads. The graph below illustrates this (the acronym GRC is used, to represent GRDA's predecessor Ghana Railways Corporation).

Added to the imbalances in demand for railway services, is the legacy problem of limited capacity. A further constraint to growth in the railways sub-sector is low labour productivity as measured between 1995 and 2007, probably reflecting a decline in traffic without any adjustment to staff levels:[16]

[16] However, this situation has changed in recent years, particularly since the creation of GRDA and the shedding of surplus labour inherited from GRC.

Figure 6-2 Composition of Wagon Loads in GRC Compared with Other Rail Lines

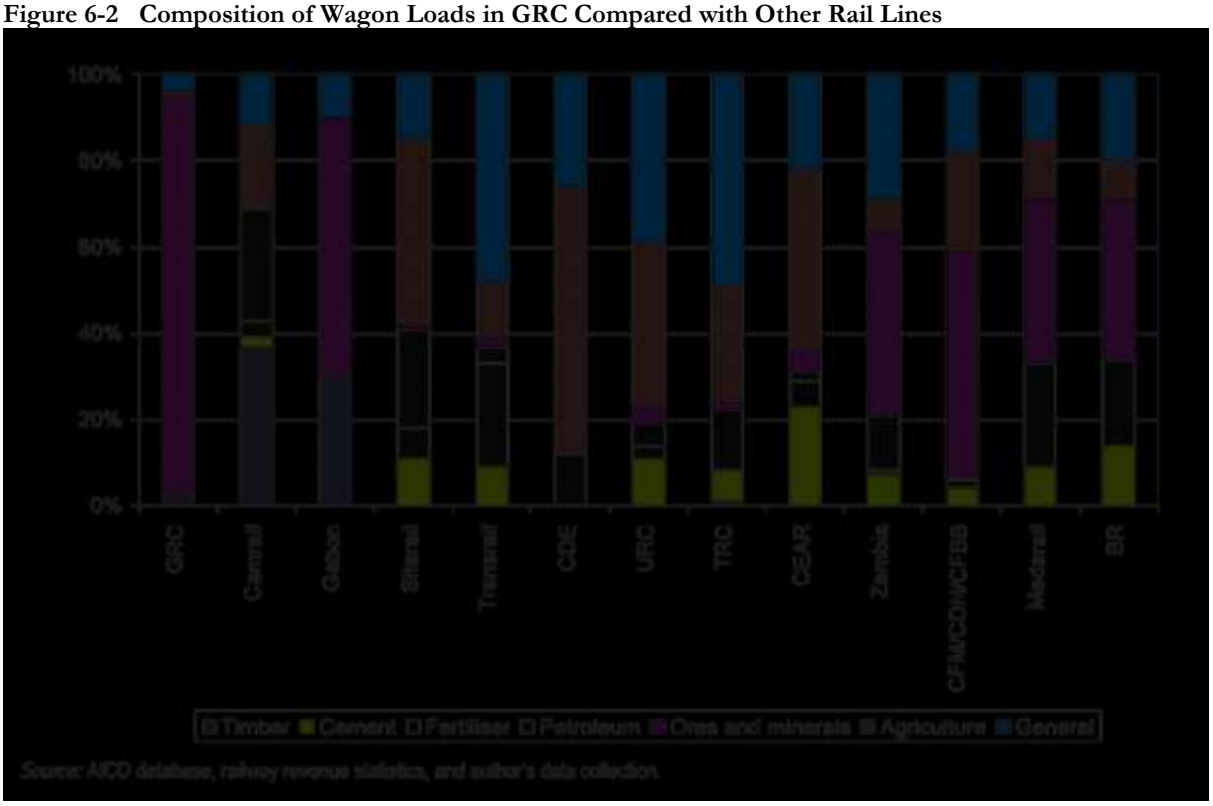


Figure 6-3 Minerals Transported by Road in Ghana

Bauxite and manganese headed to the port of Takoradi have been the dominant freight traffics on Ghana Railways for over a decade, representing about 90 percent of the tonnage loaded. But in most years, GRC has been unable to carry all the traffic due to a lack of rolling-stock (aggravated by poor infrastructure that has limited operating speeds and thus extended cycle times) or, as in 2008, due to a strike. The excess demand has gone by road at an additional cost of $1 per tonne for the manganese ore and rather more for the bauxite. The figure below shows that the railway could have carried an additional 30 percent of traffic if the capacity had been available.

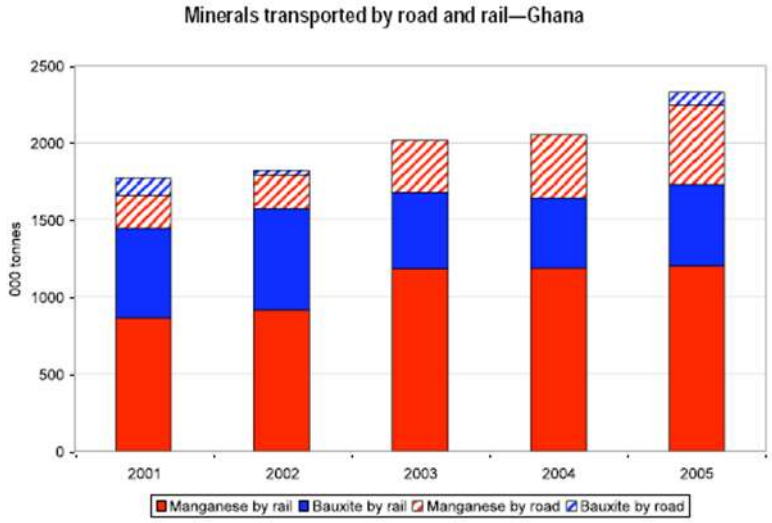
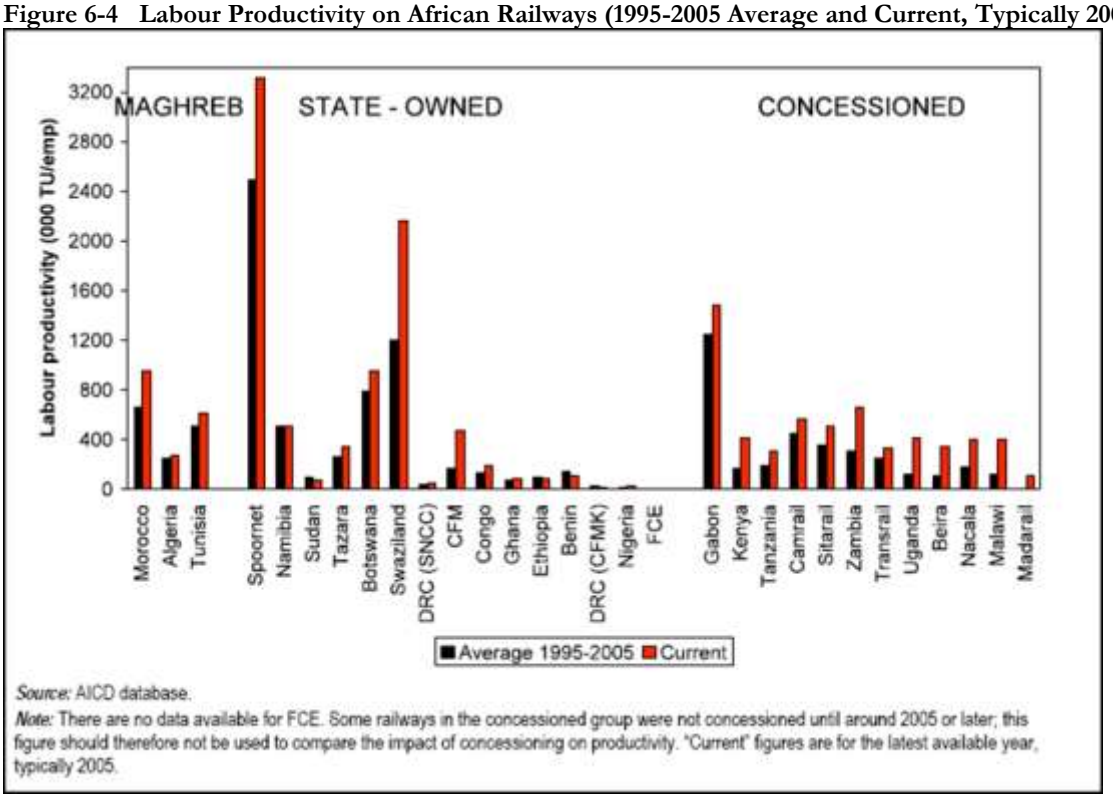


Figure 6-4 Labour Productivity on African Railways (1995-2005 Average and Current, Typically 2007)



Source: Bullock (2009)

GRDA is now exploring various options for renewing and improving the service offered by Ghana's railways.

In assessing the viability of any proposed new ownership-management approach, four key issues have been identified as critical to decision-making (Bullock, 2009):

1) Classic concession schemes (that is, those that require the private operator to take on a significant debt burden in relation to revenues) in Sub-Saharan Africa are unlikely to be financially attractive to bidders, except in cases in which concessionaires can secure financial benefits not directly linked to the railway operations (for example, by controlling the entire distribution chain or through the supply of rail equipment). Consequently, unless the financial structure of Sub-Saharan African rail concessions is changed and/or the market environment in which they operate is favourably altered, the limited interest shown by private operators in railway concessions will continue.

2-3) Two major operational issues are how to provide passenger services and how to do major track renewals and rehabilitation in a cost-effective way; most concessions require public funding for both. However, if such funding is provided, governments will need to strengthen their regulatory capacity to ensure that concession conditions are met.

4) Finally, they must also consider how policies under consideration in other sectors of the economy will impact the rail sector in general and concessionaires in particular.

The economic criteria for railway investment are linked to the policy environment in which the railway operates, and consists of three main elements (Bullock, 2009):

1) First, the railway can transport freight more efficiently than other modes, using fewer resources and creating smaller external impacts on the environment and general public. It can be more efficient than road over relatively short distances for bulk freights, such as ores and minerals, petroleum, and agricultural products; over medium distances for semi-bulk freight, such as steel and cement; and over longer distances for general freight. Greater efficiency flows through to manufacturers and consumers to create more general developmental benefits.
2) Second, the railway can often perform an important social role in carrying passenger traffic that would otherwise be carried via road, and thus can lower expenditures on road infrastructure, decrease overall accident numbers, and mitigate vehicles' environmental impact. But since rail service rarely, if ever, covers even its variable operating costs in Africa, expenditures and investment need to be concentrated where rail service is most competitive.
3) Finally, as rail is competing for both recurrent and capital expenditure with other transport modes, and with other sectors, investment should be targeted to ensure it is as efficient and effective as possible.

To summarize, railroads do not appear to be a binding constraint to economic growth at this time. The railroads have endured a long run decline while other competing modes of transportation, notably roads, have improved and thus far have accommodated the transportation needs. Railways may offer interesting future investment opportunities, but many issues would need to be resolved.

Inland Water Transport. It is difficult to argue that inland water transport is a binding economic constraint when Ghana has not yet fully explored the scope for inland navigation on the Volta River. However, it does offer interesting future investment prospects. Like many other African countries, Ghana has focused on developing its road network without taking a broader multi-modal view of surface transport issues. In particular, Inland navigation has a number of advantages over road transportation for commodities that are not overly time sensitive.

The capital costs associated with establishing basic navigation infrastructure are typically quite modest in relation to the cost of a road or rail network, while the operating costs of transporting goods by river tend to be significantly lower than the equivalent road or rail costs. The Volta Lake and River along the eastern

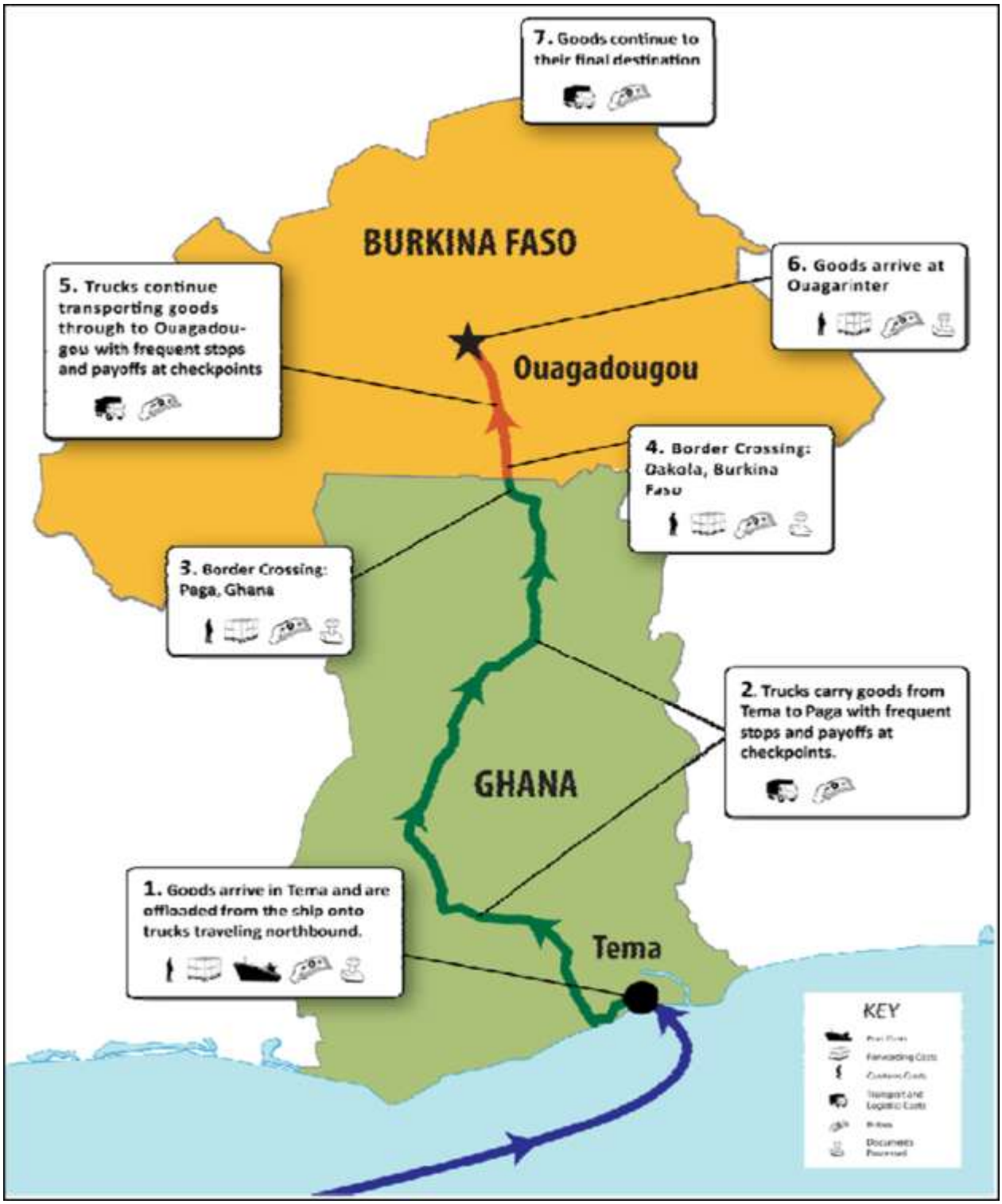
side of the country connects various high value agricultural production areas and therefore should be considered as another transportation option for the country (Foster and Pushak, 2011).

The Volta Lake is a man-made lake created after the River Volta was dammed at the Akosombo gorge. The lake is dendritic in shape and has a generally north- south orientation with an average length and width of 400 km and 25 km respectively. It has a catchment of 385,185 km2, excluding its own area of 8,730 km2. Nearly 60 percent of this area lies outside of Ghana. The lake was created to store up water primarily to generate hydro- electricity. Additionally it was envisaged that it would improve inland water transport, boost fishing, ensure enough water for domestic and industrial use and for irrigation, etc. The project was implemented by Impregilo (an Italian civil engineering firm) under the supervision of the Volta River Authority of Ghana, at the cost of £70 million ($116 million in 2011), and was completed in 1966. The lake provides 1,125 km of arterial and feeder waterways, both North-South and East-West

Management of the Volta Lake Transport Company (VLTC) estimates that 1.3 million tonnes of dry goods, and an equal tonnage of fuel, are transported annually through Ghana by road. An estimated 1.4 million tonnes of dry goods and fuel go to Niamey and eastern Mali. A further 1 million tonnes of trade goods are transported from southern Ghana to the north of the country per annum, again by road. In total an estimated 5 million tonnes of cargo are transported from south to north by road, plus a smaller volume of northbound cargo, all of which could be transported at lower unit cost and with significant gains in terms of road safety, fuel consumption, and subsequent carbon emission reduction, if the required investment was made in the inland water option.

Although a full study on the Volta Lake's potential for inland water transport has yet to be conducted, a similar study in India found that even though India has 14,500 km of navigable waterways, inland water transport (IWT) plays only a marginal role in the transport sector (Sarkar et al., 2007). Although the total cargo market in 2000 was 1,000 billion tonne kilometres, cargo movement by IWT was only about 1.5 billion tonne kilometres (i.e., a modal share of 0.15 percent). The study concluded that in India, IWT has great potential as an economical and eco-friendly mode of transport, if the necessary infrastructure investment is made in fairways, terminals, vessels, and navigational aids. A pilot study conducted on two major national waterways, NW1 (Ganges–Bhagirathi–Hoogly River system) and NW2 (Brahamaputra River system) to determine the viability of such investments, quantified a number of tangible economic gains, along with intangible social and environmental benefits. Measured as economic internal rate of return (EIRR), the project feasibility was determined to be 17 percent, with a positive net present value of Rs 2,290 million (1 Re = $0.025 in 2007 U.S. dollars) and a benefit–cost ratio of 1.81 at a 10 percent discount rate

Figure 6.6– Primary Transportation Route through Ghana to Burkina Faso



The Government of Ghana in its 2008 Discussion Paper for the Consultative Group annual partnership meeting identified inland water transport as a priority area within the transport sector. It recommended carrying out feasibility studies on landing stages and reception facilities, and the provision of these, if proven, to improve accessibility in the rural areas bordering the Volta Lake

Air Transport. Air transport can stimulate regional economic development. In Africa, 120,000 people are employed directly in air transport, and 20 percent of tourism jobs are associated with air travellers. Air cargo is also important in some export trades (such as flowers from Kenya and fish from Tanzania). Overall, traffic has been growing at about 6 percent a year from 1997 to 2006. In southern and eastern Africa, the market growth is strongest, with three vigorous hubs and three major African carriers dominating international and domestic markets. In central and western Africa, however, the market is stagnating, with the vacuum created by the conflict in Côte d'Ivoire and the demise of several regional airlines (in particular, the collapse of Air Afrique in 2004) still unfilled.

Air transport in Sub-Saharan Africa is still expensive by international standards. Landing charges are high, partly caused by the absence of the support from concessions revenue enjoyed by many airports in the world. Because of relatively low volumes of traffic on many routes in Africa, airfares are also high, despite the efforts of some governments to subsidize domestic fares from protected intercontinental routes (World Bank, 2008).

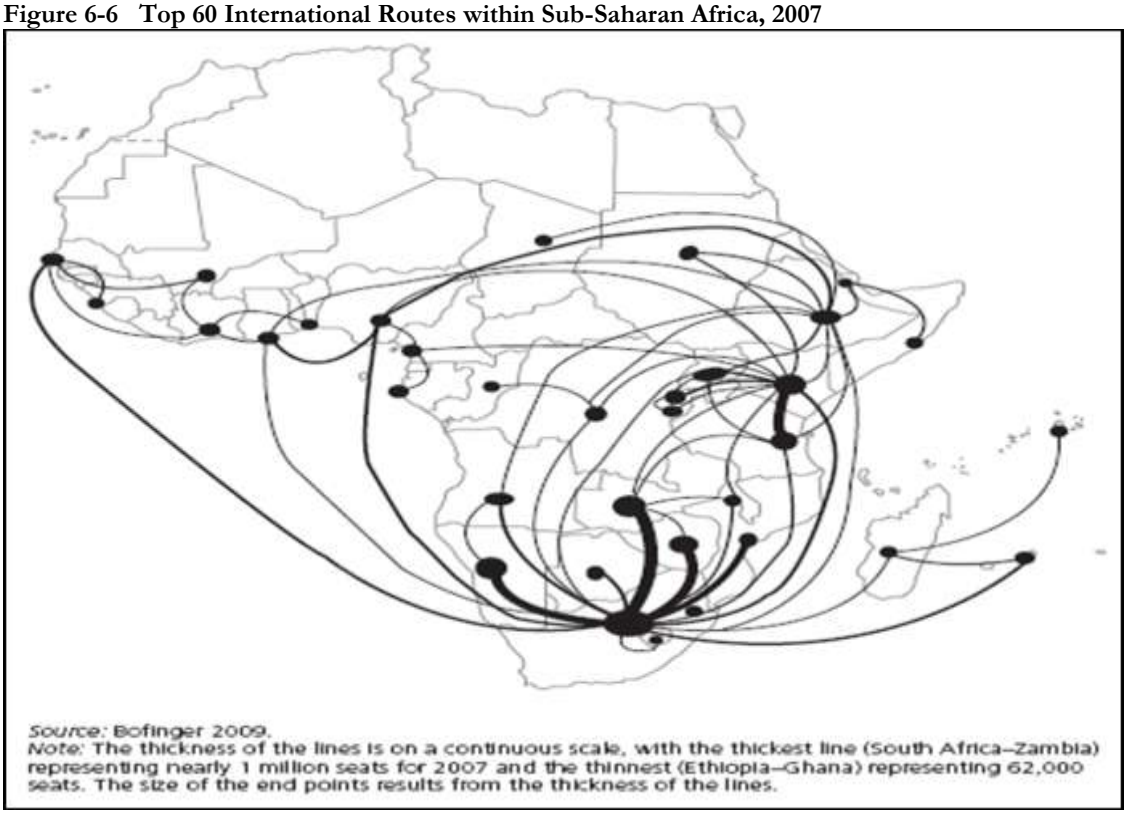
Ghana's air transport infrastructure is rated as average for quality, as indicated by the results of the 2010–2011 Global Competitiveness Report Opinion Survey summarised in Table 6.8 below:

Figure 6-5 Firms' Assessment of Air Transport for Ghana and Comparator Countries

		How would you assess passenger air transport infrastructure in your country? [1 = extremely underdeveloped; 7 = extensive and efficient by international standards] 2009–10 weighted average	Country Rank (Out of 139 Countries Surveyed)
Similar Per Capita GNI in 2009	Kenya	5.0	57
	Bangladesh	3.5	117
	Benin	3.9	96
	Senegal	4.5	76
	Tanzania	3.4	118
	Ghana	4.2	85
Medium Term Targets	Vietnam	4.2	88
	Cape Verde	4.3	82
	Morocco	4.7	67
	Sri Lanka	4.8	62
	Mongolia	3.0	129
Longer Term Targets	Malaysia	5.9	29
	Thailand	5.9	28
	Korea, Rep	6.0	22
	Botswana	4.0	94
	Ecuador	4.6	73

Source: World Economic Forum (2011)

Figure 6-6 Top 60 International Routes within Sub-Saharan Africa, 2007



Source: Bofinger 2009.
Note: The thickness of the lines is on a continuous scale, with the thickest line (South Africa–Zambia) representing nearly 1 million seats for 2007 and the thinnest (Ethiopia–Ghana) representing 62,000 seats. The size of the end points results from the thickness of the lines.

While the air transportation system in Ghana appears to be below average compared to some of its peers, it does not appear to be a binding economic constraint for the Ghanaian economy overall. However, the deficiencies noted above may be constraining the emergence of products with higher value per unit of weight, or those which are time-sensitive (e.g. perishable goods), which do feature strongly in Ghana's export basket. More importantly, air transport is likely to be constraining the mobility of entrepreneurs, which is essential to the development of private activities in virtually any sector. Even if most goods are traded by other means of transportation, discovering potential markets, distribution channels, and know-how necessitates the frequent movement of business people across borders.

Other Intangible Aspects of Transport. As per the 2007 Logistics Performance Index, Ghana scored poorly on domestic logistics costs. Ghana was rated 2.00, while the next lowest country within the similar per capita group scored 2.75, and all others scored above 3.00. This suggests that domestic transport costs may be an area in which Ghana is significantly more constrained than its comparators.

The recent study carried out by USAID (2010) on the Tema-Ouagadougou corridor found that transport and logistics in West Africa are handicapped by high costs, long transit times, uncertainty in costs and transit times, and corruption. Transporting goods from Tema port to Ouagadougou costs seven times as much as moving goods the same distance from Newark to Chicago. Similarly, the West African leg of importing takes an unpredictable 13 to 22 days, compared to the highly predictable 5 days it takes from the arrival of the vessel in Newark until the cargo arrives at the terminal in Chicago. In the case of export, the Ouagadougou-Tema leg costs more than twice as much as moving goods from Chicago to Newark and takes an unpredictable 6 to 9 days compared to the predictable 2.5 days it takes in the United States. As for corruption, the study found that it made up about 8.2 percent of the total transport and logistics costs in West Africa for imports and 2.9 percent for exports.

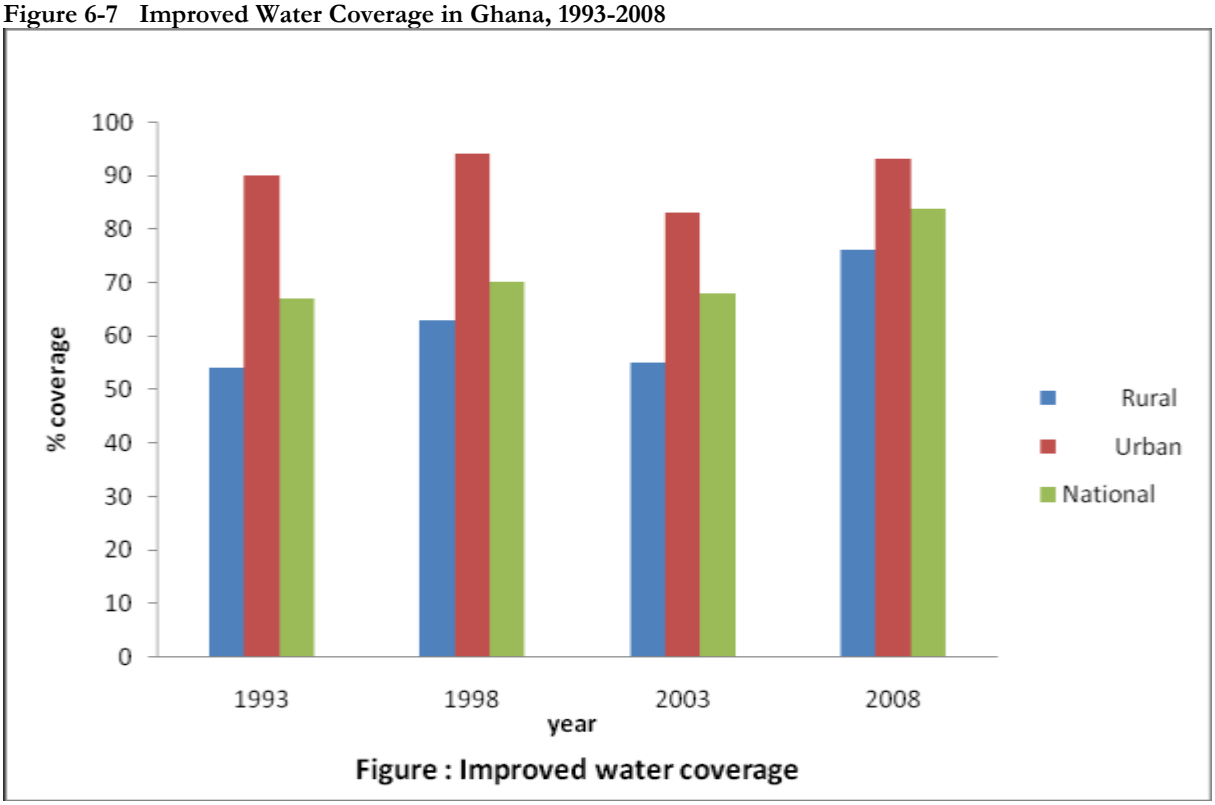
This indicates that there are significant inefficiencies and additional costs arising out of the management and organisation of domestic transportation, which may merit further study.

Water Systems. According to the World Bank World Development Indicators (2011), out of the estimated 30 billion cubic metres of Ghana's internal renewable freshwater resources in 2007, only

1 billion cubic metres, representing 3.2 percent of the country's internal water resources, was withdrawn for use in domestic, agricultural, and industrial sectors. If this situation persists the consequences will be dire for the country in the future since the adverse effects of climate change will put a further stress on water availability particularly in parts of the country prone to desertification (see section on natural resources management). It is expected that climate change will increase intra-annual rainfall variability in the country, which will lengthen the dry period and shorten the wet ones. This could be accompanied by wide variations in stream flows and runoff, which could increase the risk of both floods and droughts in urban and rural areas (World Bank, 2008).

According to the Joint Monitoring Programme (JMP) by the World Health Organisation (WHO) and United Nations Children's Fund (UNICEF), the percentage of Ghana's population that uses improved drinking water increased from 68 percent in 2003 to 83.6 percent in 2008. Urban drinking water coverage also increased by 10 percent over the same period from 83 to 93 percent. Use of improved drinking water by the rural population increased significantly from 55 percent in 2003 to 76.6 percent in 2008, representing about a 22 percent increase (see Figure 6.8 below).

Figure 6-7 Improved Water Coverage in Ghana, 1993-2008



Source: Ghana Demographic and Housing Survey (GDHS)

According to the Community Water and Sanitation Agency (CWSA), improved rural drinking water coverage also increased from 46 percent in 2003 to 57 percent in 2008 representing an 11 percent increase.

Available provider based data by the Ghana Water Company Limited (GWCL) shows in Table 6.9 that urban water coverage declined consistently from 59 percent in 2003 to 55 percent in 2006 but rose gradually thereafter to 58 percent in 2008 (Water and Sanitation Monitoring Platform (WSMP), 2009).

Table 6-9 Provider-Based Improved Water Coverage

Year	Rural Percent Coverage	Urban Percent Coverage
2001	41.0	..
2002	41.3	..
2003	46.4	59.0
2004	51.6	57.5
2005	52.0	56.0
2006	52.9	55.0
2007	54.9	56.0
2008	57.1	58.0

Source: WSMP (2009).

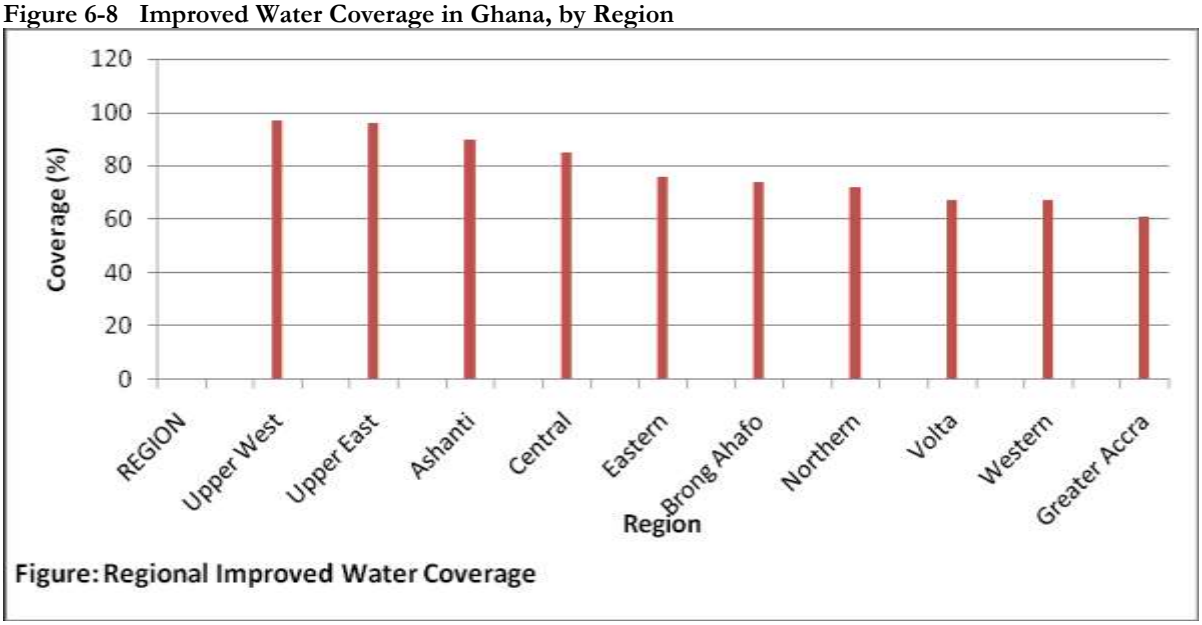
In contrast to what is described above, among the urban poor water can be a critical resource in short supply. Nationally, the Ghana Demographic and Housing Survey (GDHS) found that only four out of ten respondents (41.4 percent) living in urban areas had piped water in their homes and a similar number (42.6 percent) purchased water from a public tap or neighbour's residence. The Ghana Living Standards Survey, Round 4 (GLSS4) reported that approximately 40 percent of urban families were relying on neighbours and vendors for their water (Ghana Ministry of Water Resources, Works, and Housing, 2007).

Water and sanitation sector monitoring systems in Ghana are inadequate in providing data/information for decision making on national water and sanitation sector investments, sub-sector resource allocation, sub-national disbursing, accountability of funds, and actual disbursement. Equally, civil society groups do not have ready access to user friendly relevant data/information to support or challenge sectoral decisions. Generally, data streams are not harmonized and sector data literacy is low resulting in poor and limited interpretation and dissemination of sector-related data and information to stakeholders. The potential of good sector monitoring impacting on resource

allocation is therefore lost at all levels (WSMP, 2009). Concerted effort is therefore required to address this weakness in the sector.

Improved drinking water coverage in the ten regions of the country varied markedly with the Upper West region having the highest coverage of 97 percent while Greater Accra region had the lowest coverage of 61 percent (see Figure 6.9 below).

Figure 6-8 Improved Water Coverage in Ghana, by Region



Source: GDHS 2008

According to the World Bank AICD Ghana's Infrastructure Report, the country has a moderate share of the population having access to an improved water source relative to other comparator countries (see Table 6.10 below). However, compared with other low-income African countries, Ghana has a relatively large share of the population relying on utility water (private or public taps). In the mid-2000s, 25 percent of Ghanaian households reported access to utility water of some kind, well ahead of the 26 percent in the low-income peer group, but still far behind the 76 percent in the middle-income peer group. By 2008, that figure had exceeded 40 percent (see Table 6.11 below). During the period 2003-2008, coverage of stand posts in Ghana rose by 1.8 percent of the population per year and reliance on surface water declined by 1.4 percent of the population per year. Nevertheless, as of 2008, about 11 percent of the population continued to rely on surface water (World Bank, 2008).

Table 6-10 Access to Improved Water Source by Comparator Countries

	Improved water source			Improved water source, Urban		
	Percent of population with access			Percent of urban population with access		
	2000	**2005**	**2008**	**2000**	**2005**	**2008**
Kenya	52	56	59	87	85	83
Bangladesh	79	80	80	86	85	85
Benin	66	72	75	78	82	84
Senegal	65	68	69	90	91	92
Tanzania	54	54	54	86	82	80
Ghana	71	78	82	88	89	90
Vietnam	79	88	94	94	97	99
Cape Verde	83	84	84	86	86	85
Morocco	78	80	81	96	97	98
Sri Lanka	80	86	90	95	97	98
Mongolia	66	73	76	88	94	97
Malaysia	97	100	100	99	100	100
Thailand	96	98	98	98	99	99
Korea, Rep	93	96	98	98	99	100
Botswana	94	95	95	99	99	99
Ecuador	86	92	94	91	96	97

Source: World Bank (2011).

Table 6-11 Benchmarking Water and Sanitation Indicators

	Low-Income Countries	Ghana		Middle-Income Countries
	Mid-2000s	Mid-2000s	Late 2000s	Mid-2000s
Access to piped water (Percent of population)	10.1	15.1	13.1	56.4
Access to stand posts (Percent of population)	16.1	20.5	27.5	20.4
Access to wells/boreholes (Percent of population)	38.3	42.1	40.1	6.3
Access to surface water (Percent of population)	33.8	20.1	11.1	13.9
Access to septic tanks (Percent of population)	5.3	10.3	14.1	44.0
Access to latrines (Percent of population)	57.2	63.1	62.5	33.9
Open defecation (Percent of population)	37.1	24.6	23.1	15.8
Domestic water consumption (Litre/capital)	72.4			N/A
Urban water assets in need of rehabilitation (Percent)	35.5			25
Revenue collection (Percent of sales)	96.0	75.0	95.0	99.2
Distribution losses (Percent of production)	33.0	53.0	50.8	23.1
Cost recovery (Percent of total cost)	56.0	48.4	61.8	80.6
Total hidden costs as percent of revenue	130.0	183.7	128.9	84.9

Source: Banerjee et al. (2009); Morella et al. (2009), as cited in World Bank (2008)

Rural water reforms played an important role in reducing the reliance on surface water. Ghana is relatively advanced in the adoption of rural water reforms, including a rural water policy, dedicated agency and funding source, and a move toward cost recovery for rural water services. Cross-country analysis indicates that surface water reliance tends to decline more rapidly in countries that have adopted these kinds of reform measures (AICD Infrastructure Country Report). In rural areas of Ghana, surface water reliance reduced substantially, from 47 percent in 1993 to 32 percent in 2003 and 18 percent in 2008.

The performance of GWCL has improved somewhat in recent years following institutional reforms and the contracting of a private operator. As of 2005, the utility was recovering only 48 percent of costs and collecting only 75 percent of revenue. According to the World Bank AICD Ghana report, tariff increases have substantially improved cost recovery since 2007. At the same time, the private operator's stronger commercial incentives have improved revenue collection from 75 percent to 95 percent in a short period of time. As a result, the hidden costs associated with the water sector fell from $113 million per year in 2001 to $96 million per year in 2009 (see Table 6.12 below), and they now absorb a much smaller share of GDP. Relative to sector revenue, hidden costs have fallen from

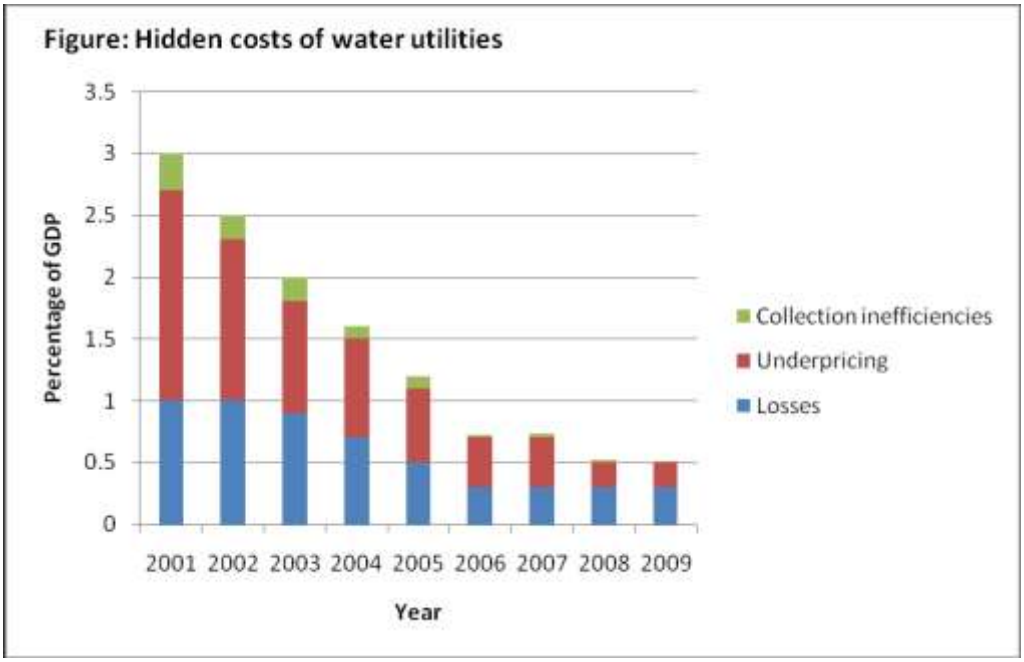
190 to 129 percent over the same period. Nonetheless, Ghana remains only a middling performer on utility efficiency by regional standards.

Table 6-12 Evolution of Hidden Costs Associated with Ghana Water Company

	Water delivered	System losses	Collection ratio	Average total cost	Average effective tariff	Total hidden costs	Total hidden costs
	(mil. m^3/ year)	(Percent)	(Percent)	(US$/$m^3$)	(US$/$m^3$)	(US$m/ year)	(Percent of revenue)
2001	90.2	52.0	77	1.08	0.33	112.9	190.0
2002	86.1	58.0	74	1.18	0.45	121.3	204.1
2003	88.2	57.0	75	1.24	0.53	124.7	209.9
2004	97.8	54.0	75	1.24	0.55	127.0	213.7
2005	98.9	53.4	75	1.14	0.55	109.2	183.7
2006	100.1	52.7	95	1.05	0.61	89.9	147.4
2007	103.9	51.5	89	1.09	0.70	93.1	126.7
2008	107.7	50.1	93	1.19	0.86	90.3	94.9
2009	112.3	51.5	97	1.07	0.66	95.5	128.9

Source: AICD Infrastructure Ghana Country Report

Table 6-13 Hidden Costs of Water Utilities



Source: Banerjee et al. (2009) (cited from AICD Infrastructure Ghana Country Report)

Ghana is in a period of rapid urbanization. Over fifty percent of the people live in urban areas, and almost half of the country's urban population lives in Accra and Kumasi. Ghana's urbanization average growth rate in the1990's and 2000's was 4.5 and 3.7 percent per year, respectively –

comparable to most of its current peer countries and much higher than medium and long run comparators (UNFAO, 2011 and author's calculations). The current rate of urbanization exceeds current levels of urban water supply. GWCL currently operates 82 urban systems with an average daily output of 572,012 cubic metres/day as against a daily demand of 1,049,306 cubic metres/day. Water is rationed to many consumers with only a few customers able to obtain 24-hour supply. In the peri-urban areas and the densely populated poor urban areas, customers receive supplies once a week or none at all (Water Resources Commission, 2005; Ghana Ministry of Water Resources, Works, and Housing, 2007).

Most of the water supply systems were built over 30 years ago. The yields from supply sources are thus no longer able to meet current demand. In addition, the variability of rainfall has increased and dry season shortages are becoming more pronounced. The quality of water resources are increasingly being degraded as a result of agricultural, housing, commercial, industrial and mining activities. Treatment costs are therefore increasing.

Despite the water utility's improvements in cost recovery and revenue collection, distribution losses remain high at around 50 percent with adverse impacts on service quality. By comparison, best practice levels of distribution losses are 20 percent, and the benchmark is 33 percent for the low-income country peer group. There are two explanations for Ghana's poor performance in this respect. One is the country's aging distribution infrastructure, which is full of leaks. The other is the reportedly large scale commercial theft from the network, sometimes for the purpose of secondary retailing of water sachets. As a result of these huge losses, there is relatively little water left to attend to the demands of the final customer, leading to highly intermittent supply. The very poor quality of water service seriously devalues the country's achievement of the Millennium Development Goal for water since providers supply water only intermittently, even though connections are relatively widespread. The institutional reforms undertaken in the sector do not seem to have improved this aspect of performance. Going forward, the challenge will be to create stronger incentives for the utility to address this issue (Foster and Pushak, 2011).

As shown above, there are substantial variations between data on improved drinking water sources given by the water providers (GWCL and CWSA) and those provided by the WHO/UNICEF Joint Monitoring Programme. Even though these differences are partially attributable to the different

definitions being used by different institutions that are providing the data, there is a clear need to reconcile the data sets for planning purposes among others.

As noted above, the GLSS4 found that approximately 40 percent of urban families were relying on neighbours and vendors for their water. Table 6.13 below illustrates the high prices paid by urban dwellers that rely on such vendors in a number of African large cities. The table shows that the cost of vendor water, particularly when transported directly to the household, can be 2 to 11 times more expensive than having a household connection. This strong willingness to pay for vendor water is a potential revenue source that the utilities are typically unable to capture (World Bank, 2010).

Table 6-14 Average Price for Water Service in 15 Largest Cities, by Type of Provider

	House Connection	Small piped network	Stand Post	Household reseller	Water tanker	Water vendor
Average price ($/m3)	0.49	1.04	1.93	1.63	4.67	4.00
Mark up over house connection (Percent)	100	214	336	402	1,103	811

Source: World Bank (2010)

The rapid expansion of household boreholes, especially in the peri-urban areas of Accra, is an even more striking example of the efforts that some urban dwellers are prepared to make to gain access to a secure water supply. With the rapid expansion of new housing developments, often ahead of utility services, more and more urban residents will depend on vendors, tanker services, and at times boreholes at costs far in excess of utility rates. Additionally, many urban industrial and commercial activities require adequate and reliable water supplies for efficient production. It is also worth noting that the overwhelming majority of urban dwellers in Accra in particular have water storage facilities.

In summary, water systems appear to be at least a moderately severe, if not binding economic constraint. Current supply meets only about half of the urban demand, and urbanization growth rates remain fairly elevated. As noted above, there are very large losses (about 50 percent) in the water delivery system. We observe some signs of economic stress based on the Haussmann, Klinger, and Rodrigo (2008) criteria. For example, consumers appear quite willing to pay 2 to 11 times the household water price, which can be viewed as a type of shadow price. There appear to be many efforts to circumvent the shortages by illegally tapping supplies in urban areas, perhaps accounting for a large part of the losses. Arguably, water is highly inelastic as a multi-purpose

necessity, so it may not be realistic to see alternative work-around patterns by businesses and consumers, the final criterion.

Power. Ghana's power generation compares favourably with low-income countries in Africa (Lejárraga, 2010; Foster and Pushak, 2011), while its progress in expanding coverage is particularly impressive. Ghana's 44 percent coverage rate in 2003 was already three times the average among low-income African countries, while the 66 percent rate achieved in 2010 placed Ghana above the 60 percent average among Africa's middle-income countries. Viewed from another perspective, Ghana's installed generation capacity of 132 MW per million-population in the mid-2000s greatly exceeded the 24 MW per million average among low-income African countries, but fell significantly short of the 796 MW per million average among middle-income African countries. Household expenditure on electricity as a percent of total household expenditure of 3.1 percent also compared well with the 6.0 percent average for low-income countries but not so well with the 2.1 percent average for middle-income countries.

For a country at the take-off stage like Ghana, electric power is a critical resource and can become a major constraint on development initiatives unless the right configuration of supply, availability, and accessibility is achieved. It has also been estimated that the rate of return in electricity generating capacity is approximately 40 percent, comparable to non-infrastructure rates of return, which would make a significant impact on growth in the economy. Indeed, over the years 2006-07, a drought-related shortfall in hydro power is estimated to have cut Ghana's GDP growth by 1.5 percentage points (World Bank, 2007a, volume 1, p. 49).

Table 6.14 shows comparative trends in electricity production for all the comparator countries for selected years 1991 through 2007 (World Bank, 2011). Two points of concern emerge from this table. First, although production of electricity in Ghana is higher than countries with similar per capita GDP, it is much lower than in any of the medium and long term targets. This comparison suggests that any attempt at industrialization must include increasing production of electricity. Second, in spite of the strides that Ghana has made since 2000 in terms of growing and modernizing the economy, electricity production per capita has declined over the period. The implication here is that supply has not kept pace with the demand.

Table 6-15 Electricity – Gross Production, Public & Self-Producers (kWh per Capita)

	Country Name	1991	1995	2000	2005	2007
Similar Per Capita GNI in 2009	Kenya	134	138	142	193	183
	Bangladesh	78	96	119	153	159
	Benin	5	6	13	14	16
	Senegal	121	112	176	177	186
	Tanzania	71	61	74	80	106
	Ghana	**387**	**350**	**366**	**308**	**304**
Medium term targets	Vietnam	135	191	335	633	803
	Cape Verde	153	216	340	504	554
	Morocco	376	463	532	751	747
	Sri Lanka	199	268	359	436	479
	Mongolia	1,422	1,074	1,100	1,193	1,254
Longer term targets	Malaysia	500	596	592	865	850
	Thailand	938	1,421	1,641	2,058	2,202
	Korea, Rep	3,051	4,547	5,657	8,111	8,856
	Botswana	718	754	663	528	585
	Ecuador	668	741	852	981	1,227

Source: World Bank (2011).

Table 6-16 Average Duration of Power Outages

	If There Were Outages, Duration of Outages (hours)					
	Country Name	Country Average	Small Firms	Medium Firms	Large Firms	YEAR
Similar Per Capita GNI in 2009	Kenya	4.45	4.55	4.09	4.72	2007
	Bangladesh	1.12	1.11	1.14	1.09	2007
	Benin	2.50	2.55	2.44	n/a	2009
	Senegal	6.18	6.06	7.19	5.21	2007
	Tanzania	7.88	8.33	7.31	5.70	2006
	Ghana	**12.59**	**12.78**	**11.95**	**12.51**	**2007**
Medium term targets	Vietnam	6.69	6.18	7.58	6.21	2009
	Cape Verde	7.38	4.69	4.83	54.67	2009
	Morocco	1.61	1.00	1.44	1.81	2007
	Sri Lanka	..	..	..	..	2007
	Mongolia	3.66	3.09	4.06	4.10	2007
Longer term targets	Malaysia	2.27	2.29	2.24	2.26	2007
	Thailand	1.89	1.64	1.65	2.16	2006
	Korea, Rep	0.11	0.08	0.16	0.15	2005
	Botswana	2.68	2.55	2.72	3.10	2010
	Ecuador	2.52	3.25	1.61	1.41	2006

Source: World Bank Enterprise Surveys.

However, the major challenge to growth posed by Ghana's power sector is not primarily a matter of limited generating capacity, but rather one of poor reliability. The World Bank Enterprise Surveys point to unreliable power being a problem for firm growth in Ghana relative to comparator countries. While the available data do not all pertain to the same year, the evidence strongly suggests that unreliable power is hurting firm growth in Ghana. Table 6.15 shows that the average duration of power outages in Ghana – 12.6 hours – was far higher than in any comparator country.

We further note from Table 6.16 that the frequency of power outages in Ghana is quite high when compared with the medium and long term target groups. The average number of power outages per month in Ghana is about 11, compared with about 5 for Cape Verde and Botswana and much lower in other comparator countries. However, reported sales lost as a result of power outages in Ghana (5.6 percent) is lower than in most of the countries with similar per capita income, though much higher than in the medium- and long-term target countries (Table 6.17).

Table 6-17 Average Number of Power Outages in a Typical Month

	Average Number of Power Outages in a Typical Month					
		Country Average	Small Firms	Medium Firms	Large Firms	YEAR
	Country Name					
Similar Per Capita GNI in 2009	Kenya	6.90	7.03	6.85	6.26	2007
	Bangladesh	101.56	109.45	101.91	90.22	2007
	Benin	13.89	14.98	9.06	n/a	2009
	Senegal	11.75	11.68	11.94	12.47	2007
	Tanzania	12.00	11.42	13.49	12.77	2006
	Ghana	**9.65**	**9.76**	**8.83**	**10.73**	**2007**
Medium term targets	Vietnam	1.98	1.80	2.10	2.11	2009
	Cape Verde	4.87	4.85	5.02	4.55	2009
	Morocco	2.50	1.95	2.51	2.46	2007
	Sri Lanka	..	..	..	..	2007
	Mongolia	2.62	2.25	2.92	2.72	2007
Longer term targets	Malaysia	0.81	0.85	0.79	0.81	2007
	Thailand	1.28	0.94	1.18	1.42	2006
	Korea, Rep	..	..	..	..	2005
	Botswana	4.48	4.18	4.67	5.26	2010
	Ecuador	2.52	2.38	2.70	2.71	2006

Source: World Bank Enterprise Surveys.

Table 6-18 Value Lost Due to Power Outages (Percent of Sales)

	Value Lost Due to Power Outages (% of sales)					
	Country Name	Country Average	Small Firms	Medium Firms	Large Firms	YEAR
Similar Per Capita GNI in 2009	Kenya	6.35	7.42	4.51	4.24	2007
	Bangladesh	10.56	11.80	11.02	8.43	2007
	Benin	7.53	10.01	1.35	12.50	2009
	Senegal	4.98	4.97	4.84	5.66	2007
	Tanzania	9.62	9.51	10.21	8.89	2006
	Ghana	**5.60**	**5.43**	**6.23**	**5.54**	**2007**
Medium term targets	Vietnam	3.60	6.47	1.92	2.21	2009
	Cape Verde	5.50	6.98	2.23	3.16	2009
	Morocco	1.27	1.18	1.63	1.14	2007
	Sri Lanka	..	..	..	..	2007
	Mongolia	0.84	0.56	1.03	1.11	2007
Longer term targets	Malaysia	3.00	3.63	2.95	2.70	2007
	Thailand	1.53	1.63	1.75	1.31	2006
	Korea, Rep	..	..	..	..	2005
	Botswana	3.69	4.07	3.67	2.29	2010
	Ecuador	2.73	2.84	3.02	1.27	2006

Source: World Bank Enterprise Surveys.

Table 6.18 provides further insight into the extent and nature of power outages, as tracked through the system network control centre. In the nine regions covered by the table, customers in the median region suffered 238 hours of power outage in 2010 – a bit less than 10 days' equivalent. By far the largest part – 88 percent - was due to faults in the distribution network or ECG's operations. Further analysis shows that a significant part of the outages (56 percent) resulted from unplanned system faults, that is, some breakdown in the distribution network.

Table 6-19 Availability - Duration of Supply Hours Lost Per Connected Customer, 2010

Region/ Area	Duration of Unplanned Outages (Hrs) ECG Faults		Duration of Planned Outages (Hrs) ECG MTCE		Sub-Total Distribution of Outages (Hrs) by ECG		Sub-Total Duration of Outages (Hrs) by VRA		Total Outages Urban & Rural (Hrs)	Average Duration of Outages (Hrs) ECG + VRA	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	ECG+VRA	Urban	Rural
Accra East	63.4	16.8	20.6	2.6	84.0	19.5	6.0	1.9	111.4	90.0	21.3
Accra West	11.3	1.6	2.8	0.9	14.1	2.5	9.3	0.6	26.4	23.3	3.1
Tema	54.5	45.2	35.0	18.4	89.5	63.6	14.3	9.1	176.4	103.8	72.6
Eastern	33.2	82.5	24.1	81.6	57.2	164.0	6.1	10.6	238.0	63.3	174.7
Volta	20.8	132.2	8.8	54.0	29.6	186.2	9.7	32.1	257.7	39.3	218.4
Western	34.9	82.3	26.8	94.9	61.7	177.3	20.6	10.8	270.5	82.4	188.1
Central	21.5	71.3	8.2	15.7	29.7	87.0	3.8	2.3	122.8	33.4	89.3
Ashanti West	62.0	50.6	23.7	82.8	85.7	133.4	13.9	38.0	271.0	99.6	171.4
Ashanti East	126.6	57.6	12.2	46.1	138.8	103.8	13.3	3.2	259.0	152.0	107.0
ECG Global with VRA outages - Averages									192.6	76.4	116.2

Source: Ghana Ministry of Energy.

More broadly, for the power sector to support the growth needs of the economy, many challenges must be overcome to translate existing and planned production capacity into efficient service delivery. In other words, even the level of gross production of power may not reflect the

amount of power available for economic agents in the country. In particular, Ghana's power system suffers substantial transmission and distribution losses. The AICD study estimates these losses at around 25 percent -- roughly twice the best-practice level (Foster and Pushak, 2011).

Readers should note that Ghana's challenges in the power sector go well beyond power outages. More importantly, in recent years Ghana's power system has suffered huge financial losses through underpricing. As demand has grown beyond what the hydro generators at the Akosombo Reservoir can supply, Ghana has initially relied on oil-based thermal generators to fill the gap. The much higher (and rapidly rising) costs of oil-based thermal power, together with slow adjustments in power tariffs, have created a financial deficit from underpricing equal to 1.9 percent of GDP in 2009 (Foster and Pushak 2011.)[17] The total hidden costs of power generation and distribution – from underpricing, system losses, and incomplete collections – are estimated at 3.8 percent of GDP, or 126 percent of collected revenues in 2009. The problem of underpricing seems to have been addressed in 2010 as the reopening of the West Africa Gas Pipeline gave Ghana access to a cheaper source of thermal power, and as Ghana raised power tariffs 17 percent to cost-covering levels to meet an IMF condition (IMF 2011d).

Inadequate and unreliable power imposes a variety of costs on Ghana's economy, some better documented than others. The "hardest" number available is the cost of leasing and operating emergency thermal generators to supply power to the grid, estimated at 1.9 percent of GDP in 2007 (Eberhard and others, 2008). A second cost is the value of firms' lost sales due to power outages. Multiplying the estimate reported in Table 6.17 (5.6 percent) by the share of GDP produced outside of agriculture (69.8 percent) yields an additional cost of 3.9 percent of GDP. Together, these two elements imply a burden on the economy of *at least* 5.8 percent of GDP. The many additional cost elements not included here would surely add substantially to this estimate. These include

- the cost to firms and households of buying or leasing standby generators and operating those generators when power from the grid is interrupted;
- the cost of power outages to agricultural producers, not included in the enterprise survey that forms the basis for Table 6.17; and
- the cost of repairing or replacing equipment damaged by voltage spikes when the source of power switches from grid to generator and back (source cite air conditioning and refrigeration systems as being especially vulnerable.)

Based on the evidence reviewed in this section, we find that contrary to the AfDB report, lack of access to reliable electric power is indeed a binding constraint to growth in Ghana. At least three of

[17] The deficit-to-GDP figures reported here are lower than those reported by Foster and Pushak because they are adjusted to the rebased GDP statistics.

the four tests are met: First, the cost estimates above provide clear evidence of the high shadow price imposed by the constraint. Second, the economy suffered a large reduction in growth in 2007 in response to power shortages. Third, the widespread use of standby generators represents a classic example of private agents making costly efforts to circumvent the constraint. The only test for which we have no direct evidence is the fourth, which predicts that the firms that survive in Ghana disproportionately consist of those that do not depend heavily on reliable power. The conspicuously small share of Ghana's GDP contributed by manufacturing provides indirect evidence that this fourth test is met as well. Pending further evidence on the fourth test, we offer the first three as strong evidence for regarding Ghana's lack of access to adequate and reliable power as a binding constraint to its growth.

Information and Communication Technology (ICT). ICT has become a "smart development" leader in recent times as economic development models shift from *factor-driven* production systems through *efficiency-driven* systems to *innovation-driven* paradigms. The direction of growth really seeks to accrete higher value added to investment in the nation's production infrastructure. Ghana is thought to have the potential to deploy ICT to significant advantage to the growth and development process. Indeed Ghana has been recognized as a potential destination for business process outsourcing (BPO) / information technology enabled services (ITES) in Africa, even ahead of South Africa, and its potential has been ranked 22 globally out of 40 countries (World Bank, 2007). In 2006, BPO potential was estimated to be able to generate close to 40,000 direct jobs in 5-years, while each BPO direct job could also create three to four jobs in related sectors such as transportation, construction, health, and entertainment.

The impact in Ghana of initial significant investment in ICT via e-governance has been noted and measurable. For instance, the introduction of GCNet, an ICT intervention, into the customs clearance process is estimated to have reduced clearance time at Ghana's airport from 6-days to less than 4 hours (World Bank, 2007). Over the same period up to 2006, the contribution of ICT to GDP moved from 1.8 percent in 2000 to 6 percent in 2005, and by 2010, ICT was estimated to be the fastest growing sector of the economy, growing at roughly 20 percent annually. Indeed, the high voice-telecom penetration in Ghana as compared to other African countries has been touted to showcase Ghana as a vibrant leader in ICT in the region (Lejárraga, 2010; Foster and Pushak, 2011).

However, the benefits of ICT and the potential impact on Ghana's economic development paradigm will only present real strategic choices if the pre-conditioning investments are made in the critical areas to ensure that the cost of bandwidth is competitive, the fixed broadband internet access is comparable, and secure internet servers available to carry traffic backstops the opportunities in the sector. Analysis of the leading indicators moreover shows that in almost all the areas that matter, Ghana falls significantly behind the targeted comparators even when it does well with its peers.

WDI data show that the percentage of fixed broadband internet subscribers in Ghana fell far short of all near- and long-term comparators, as well as Senegal (Table 6.19).

Table 6-20 Fixed Broadband Internet Subscribers (Per 100 People)

ICT 1:	*Fixed Broadband Internet Subscribers (per 100 people)*								
	Country Name	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Similar Per Capita GNI in 2009	Kenya	-	-	-		0.0151	0.0482	0.0470	0.0085
	Bangladesh	-	-	-	-	-		0.0277	0.0312
	Benin	-	0.0003	0.0003	0.0011	0.0025	0.0184	0.0239	0.0312
	Senegal	-	0.0115	0.0223	0.0697	0.1598	0.2497	0.3206	0.3878
	Tanzania	-	-	-	-	-		0.0061	0.0152
	Ghana	**-**	**-**	**-**	**0.0042**	**0.0087**	**0.0569**	**0.0708**	**0.0984**
Medium term targets	Vietnam	-	0.0013	0.0113	0.0643	0.2527	0.6140	1.5197	2.3767
	Cape Verde	-	-	-	0.0602	0.1963	1.5423	0.7789	1.4799
	Morocco	-	0.0068	0.0091	0.2144	0.8170	1.2701	1.5288	1.5310
	Sri Lanka	0.0017	0.0031	0.0178	0.1051		0.1151	0.3162	0.5057
	Mongolia	0.0020	0.0037	0.0201	0.0358	0.0706	0.1356	0.2832	1.3710
Longer term targets	Malaysia	0.0168	0.0796	0.4467	1.0030	1.8847	2.8458	3.8067	4.9298
	Thailand	0.0026	0.0235	0.0697	0.1149	0.1592		1.3631	1.4098
	Korea, Rep	16.4833	21.8502	23.3572	24.8162	25.3245	29.0757	30.3574	31.8368
	Botswana	-	-	-	-	0.0870	0.0965	0.1871	0.4633
	Ecuador	0.0210	0.0515	0.0541	0.0899	0.2051		0.2249	0.2609

Source: World Bank (2011).

Except for Bangladesh, Benin, and Tanzania, secure internet serves per one million people in Ghana is the worst as compared to all other countries as WDI data shows, 0.71 secure internet servers (per 1 million people) (Table 6.20).

There is little reported data on Ghana's expenditure on ICT (Table 6.21), although it is measured to be the fastest growing part of the economy as at 2010, when ICT was estimated to constitute just about 2 percent of the re-based GDP (Ghana Statistical Service, 2010).

Table 6-21 Secure Internet Servers (Per 1 Million People)

ICT 2: *Secure Internet servers (per 1 million people)*									
		2001	2002	2003	2004	2005	2006	2007	2008	2009
	Country Name									
Similar Per Capita GNI in 2009	Kenya	0.03		0.12	0.23	0.25	0.46	0.82	1.06	1.31
	Bangladesh	0.01		0.01	0.02	0.02	0.02	0.04	0.09	0.18
	Benin	0.15				0.13	0.25	0.12	0.23	0.11
	Senegal	0.10		0.28	0.27	0.27	0.43	3.20	1.06	0.88
	Tanzania				0.03		0.02	0.07	0.19	0.23
	Ghana	**0.05**		**0.24**	**0.05**	**0.14**	**0.31**	**0.44**	**0.69**	**0.71**
Medium term targets	Vietnam	0.08		0.04	0.12	0.14	0.14	0.60	1.11	1.86
	Cape Verde						2.06	2.03	2.01	11.87
	Morocco	0.17		0.50	0.56	0.72	0.78	1.06	1.39	1.94
	Sri Lanka	0.32		1.20	1.54	1.78	1.96	2.55	3.18	3.55
	Mongolia	0.41		1.21	1.99	3.14	4.26	7.28	8.71	8.24
Longer term targets	Malaysia	6.14		7.04	11.28	14.71	17.09	22.07	27.32	33.60
	Thailand	1.84		2.77	3.95	4.73	5.71	7.06	9.11	9.81
	Korea, Rep	7.29		14.38	18.61	20.03	60.11	498.95	695.70	926.66
	Botswana				0.55		1.07	1.59	1.56	3.59
	Ecuador	0.88		1.80	2.94	4.13	4.92	7.27	10.09	11.96

Source: World Bank (2011).

Table 6-22 ICT Expenditure (Percent of GDP)

ICT 3: *Information and communication technology expenditure (% of GDP)*									
		2001	2002	2003	2004	2005	2006	2007	2008
	Country Name								
Similar Per Capita GNI in 2009	Kenya			5.43	5.46	5.84	5.15	5.55	5.75
	Bangladesh			1.93	2.41	4.07	5.86	8.04	9.04
	Benin								
	Senegal			6.53	7.68	9.01	10.42	10.61	10.75
	Tanzania								
	Ghana								
Medium term targets	Vietnam			7.49	7.27	6.72	6.24	5.73	4.85
	Cape Verde								
	Morocco			5.33	6.66	7.51	7.44	10.00	12.45
	Sri Lanka			2.40	2.70	3.27	3.81	4.57	4.33
	Mongolia								
Longer term targets	Malaysia			12.83	13.42	12.06	12.22	11.09	9.73
	Thailand			5.81	6.19	6.11	6.16	6.07	6.20
	Korea, Rep			8.97	9.48	9.21	9.41	9.20	9.05
	Botswana								
	Ecuador			3.91	3.79	5.73	5.59	5.54	5.26

Source: World Bank (2011).

Except for Benin, ICT goods exports as a percentage of total goods export in Ghana is the worst as compared to all the other countries as the WDI data below shows (Table 6.22). It was 0.01 percent of total goods exports in 2006 and rose to 0.05 percent in 2008, barely a tenth of Senegal's exports and vastly behind Kenya's 2008 achievement of 1.26 percent of GDP.

Table 6-23 ICT Goods Exports (Percent of Total Exports)

ICT 4:	*ICT goods exports (% of total goods exports)*								
		2001	2002	2003	2004	2005	2006	2007	2008
	Country Name								
Similar Per Capita GNI in 2009	Kenya	0.18	0.78	0.32	0.16	0.30	0.45	0.97	1.26
	Bangladesh		0.04	0.08	0.10	0.08	0.11	0.59	
	Benin	0.03	0.20	0.04	0.01	0.04	0.08		
	Senegal	0.24	0.31	0.27	0.47	0.49	1.61	0.53	0.61
	Tanzania	0.09	0.03	0.04	0.15	0.42	0.33	0.37	
	Ghana			**0.03**	**0.06**	**0.03**	**0.01**	**0.02**	**0.05**
Medium term targets	Vietnam	4.74	3.81	4.50	5.13	4.94	5.14	5.63	
	Cape Verde	2.20	0.91			3.50	2.86	1.15	
	Morocco		7.38	7.90	7.18	6.31	6.56	5.73	
	Sri Lanka	2.71	2.06	2.26	1.95	1.66	1.45	1.99	1.85
	Mongolia	0.02	0.13	0.03	0.01	0.01	0.13	0.06	
Longer term targets	Malaysia	54.54	54.19	50.75	47.43	45.66	45.07	41.54	26.18
	Thailand	26.83	26.53	25.95	24.20	23.77	24.18	22.24	19.41
	Korea, Rep	31.11	33.87	34.33	33.92	30.65	27.21	26.21	
	Botswana	0.19	0.22	0.12	0.18	0.23	0.23	0.19	0.21
	Ecuador	0.05	0.11	0.12	0.09	0.25	0.38	0.34	0.22

Source: World Bank (2011).

Table 6-24 ICT Service Exports (Percent of Service Exports, BoP)

ICT 5:	*ICT service exports (% of service exports, BoP)*								
		2001	2002	2003	2004	2005	2006	2007	2008
	Country Name								
Similar Per Capita GNI in 2009	Kenya	4.09	1.53	1.27	7.30	9.51	11.69	11.24	13.46
	Bangladesh	1.77	4.63	7.57	6.08	3.41	7.01	5.72	7.05
	Benin	2.54	3.68	2.45	2.41	2.79	5.44	0.77	
	Senegal	14.70	12.40	13.79	13.81	13.57	17.92	15.46	
	Tanzania	1.20	1.60	2.16	2.78	2.68	2.50	2.29	2.03
	Ghana	-	-	-	-	-	-	-	-
Medium term targets	Vietnam								
	Cape Verde	8.41	8.36	7.23	7.18	6.97	5.95	5.28	5.13
	Morocco	4.19	5.31	4.56	5.09	4.05	3.96	3.30	5.93
	Sri Lanka	7.82	9.38	8.35	7.52	8.20	10.21	13.93	15.51
	Mongolia	6.78	3.87	3.17	1.77	3.67	3.72		
Longer term targets	Malaysia	2.90	2.80	3.07	4.34	5.36	5.19	4.75	5.37
	Thailand								
	Korea, Rep	1.42	1.40	1.13	1.12	1.11	1.78	1.40	1.33
	Botswana	1.70	2.34	1.51	1.06	2.68	2.26	5.09	3.09
	Ecuador	11.14	11.05	11.66	9.90	7.91	7.29	8.10	5.21

Source: World Bank (2011).

Although data are not readily available, the cost of bandwidth in Ghana is the number one complaint amount intensive data users. Anecdotal evidence suggests that a considerable number of

entrepreneurs are jostling to launch bandwidth reduction enterprises to present real options for BPO/ITES providers.

Sanitation. Over the last twenty years, Ghanaians' access to improved household sanitation facilities (shared or not shared) has expanded considerably in both urban and rural areas. The most recent data on facilities come from the 2008 Demographic and Health Survey (GDHS, 2008). The GDHS defines the following facilities "improved:"

- Flush/pour flush to piped sewer system
- Flush/pour flush to septic tank
- Flush/pour flush to pit latrine
- Ventilated improved pit (VIP) latrine
- Pit latrine with slab, and
- Composting toilet.

If such facilities are shared, however, the GDHS classifies them as "unimproved." The GDHS data indicate that among children under five years old, the prevalence of diarrhoea is highest among households without improved facilities. These include – in addition to the shared facilities listed above – those that are much more primitive ("strictly unimproved"):

- Flush/pour flush not to sewer/septic tank/pit latrine
- Pit latrine without slab/open pit
- Bucket, and
- No facility/bush/field.

By this GDHS classification, only about 12 percent of the population have access to improved sanitation facilities. Among the urban population, access to improved facilities is about 18 percent, as compared to rural population at approximately 8 percent. However, the percentage of the total population having access only to "strictly unimproved" facilities as defined above amounts to about 34 percent. The share of the urban population having access to improved facilities, whether shared

or not, amounted to about 86 percent in 2008; while in rural areas the share was about 50 percent. In total, about 66 percent of the population has access to improved facilities, including those that are shared. In short, the state of sanitation in Ghana is not as bleak as the GDHS classification might imply.

Geographically, there is a stark contrast between the situation in the northern regions (Northern, Upper East and Upper West) and the rest of the country. In the north, the percentage of the population having access only to strictly unimproved facilities (primarily no facilities) ranges from about 65 percent in the Upper West to approximately 86 percent in the Upper East. These regions, however, constitute a small (16 percent) share of Ghana's total population.

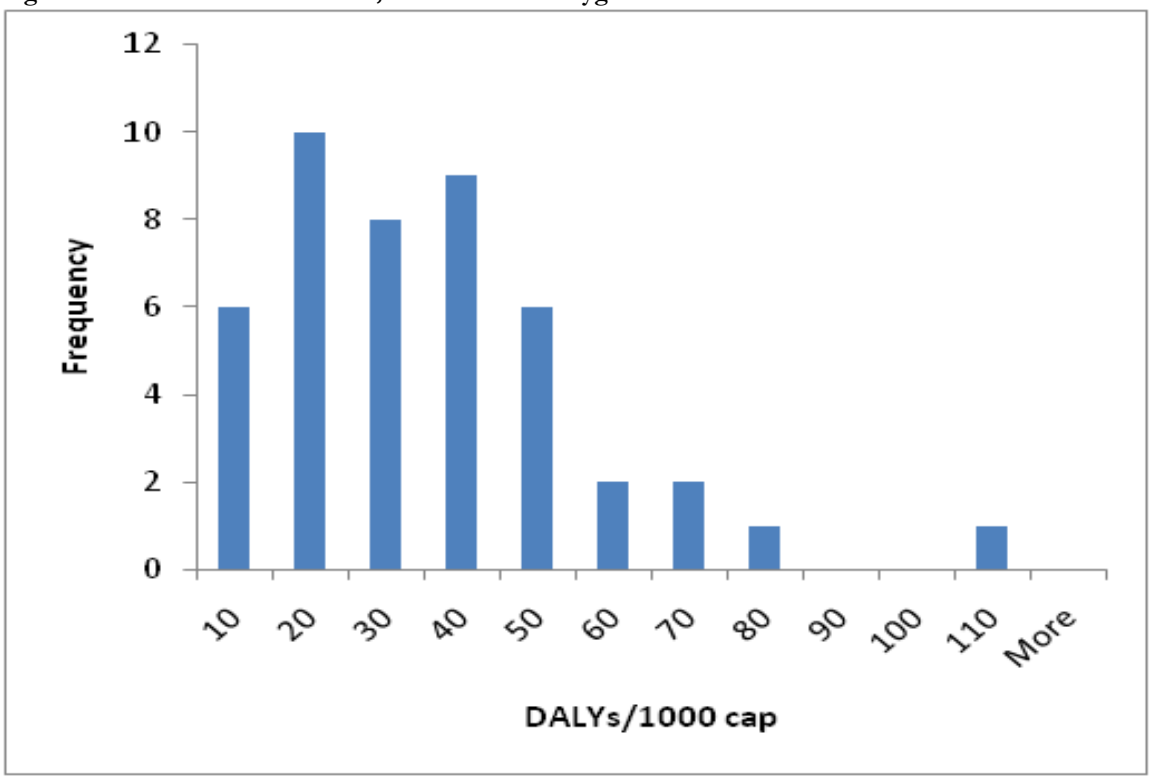
Health statistics also show that with respect to water, sanitation and hygiene, Ghana's environmentally related disease burden is not extraordinary. A large portion of the population has access to improved water facilities (75 percent according to WHO 2004 health statistics). This achievement, coupled with the fact that a large number of households have access to improved sanitation facilities, even if they are shared, may help explain the country's performance relative to the continent as a whole when measured either in Disabled-Adjusted Life Years (DALYs) or number of deaths.

DALYs for a disease or health condition are calculated as the sum of (1) Years of Life Lost due to premature mortality in the population; and (2) Years Lost due to Disability for incident cases of the health condition. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measure of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability.

Using WHO (2004) health statistics, across all age groups the annual number of deaths related to water, sanitation or hygiene is estimated at about 0.92 deaths per 1000 capita in Ghana. For Africa the number of deaths is estimated at 1.21 per 1000. In absolute numbers, conditions related to water, sanitation and hygiene contribute to about 20,000 premature deaths each year in Ghana (among a population of nearly 24 million). In terms of DALYs, Ghana registered about 18 DALYs per 1000 capita as compared to 39 DALYs per 1000 for all of Africa. Ghana's performance ranks fairly well. Worldwide, the lowest environmental disease burden across all diseases – not just

diarrhoea, which is the primary disease group associated with water, sanitation and hygiene – is estimated at 13 DALYs per 1000 population (the highest is estimated at 289 per 1000). Ghana's total environmental burden of disease is estimated at 89 DALYs per 1000 capita, which is again at the lower end of the distribution for the continent (WHO, 2009).

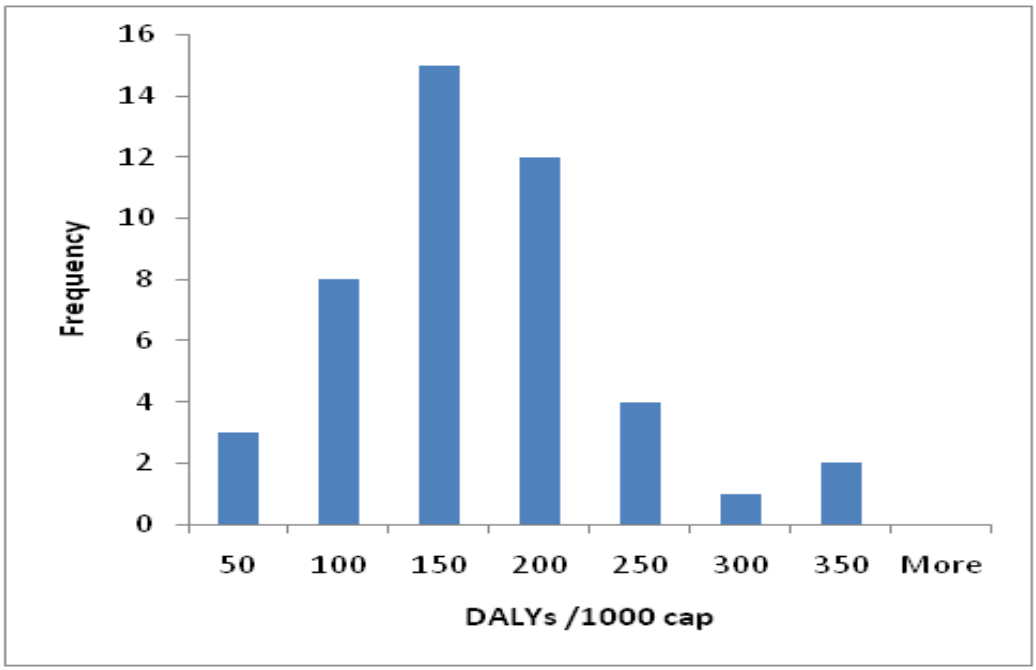
Figure 6-9 Distribution of Water, Sanitation and Hygiene Risk Factors in Africa



Source: World Health Organization.

The estimated disease burden expressed in DALYs can be used to gauge the scale of the cost of current conditions of water quality, sanitation and hygiene to the economy. Converted to an annual steady state value, 18 DALYs per 1000 capita corresponds to the functional loss to the economy of 1.035 persons per 1000 capita. Multiplying this figure by average GNI per person provides an estimate of the cost to the economy of the disease burden. The estimated annual disease burden represents *less than 0.15 percent of GNI*, or about $42 million.

Figure 6-10 Distribution of Environmental Burden of Disease per Year in Africa



Source: World Health Organization.

To this base cost one can add the costs of disease treatment and the value of household caregivers' time. The environmental risk of diarrhoea is most prevalent among children under five years old. Approximately 13 percent of the population of Ghana is younger than 5 years. Among households interviewed for the 2008 GDHS, about 22 percent of children aged five years or younger were reported to have had diarrhoea in the two weeks prior to survey interviews. From this information one can extrapolate the number of cases of diarrhoea within the child population throughout the year. The DHS data also show that treatment is sought for approximately 40 percent of cases. Travel and treatment costs are not well known. Here, average household travel and medication expenses of $2 are assumed for each treatment, which can be considered relatively high compare with costs in other low-income countries. Furthermore, Ghana's average daily GNI per capita ($3.64) was applied as an estimate of the opportunity cost for the household member accompanying a child to treatment (assuming one day's time per treatment).

Given the size of the population and these cost parameters, the additional economic costs of the disease burden associated with water, sanitation and hygiene problems might amount to another $49 million annually. A high-end estimate of the annual economic costs of the disease burden might therefore be calculated to be *on the order of 0.3 percent of GNI,* and certainly less than 1 percent of GNI.

Considering the relatively high level of improved and shared facilities in use, it seems doubtful that current household conditions could have much of an impact upon tourism or inland fisheries.[18] As the impact of sanitation problems on the economy is estimated to amount to less than 1 percent of GNI – perhaps significantly less – limited sanitation infrastructure is not considered to be a binding constraint at this time.

Irrigation. Water is an essential input to agricultural production. Except for those rare locations where both the quantity and timing of natural precipitation are ideally suited to farming, access to irrigation can boost agricultural value added by permitting more than one crop to be grown per year, by permitting farmers to raise higher-value crops than otherwise, and by increasing yields. Equally important, access to reliable irrigation reduces the risks of farming, particularly the risk of drought. In addition, irrigation has been cited as an effective adaptation against loss of rainfall and higher temperatures linked to climate change in parts of Africa with sufficient water available (Kurukulasuriya and Mendelsohn 2008). For Ghana, where roughly 30 percent of GDP arises from agriculture, increased access to irrigation has a clear potential to boost total output. However, in the context of this study, the key question is whether this potential increase would be sufficient to view irrigation as a binding constraint, or even a major constraint to growth.

A recent cross-country analysis of opportunities for expanded irrigation in sub-Saharan Africa provides a clear, though tentative answer to this question: it would not. Expanding irrigation to its economic potential might raise irrigated area in Ghana from its current 31,000 hectares to around 118,000 hectares, but this increase would leave the vast majority of Ghana's cultivated area rain-fed. The potential returns to this investment would be attractive, but the affected area is too limited to offer a realistic prospect of substantially increased growth. As a result, irrigation should not be regarded as a major constraint to growth in Ghana.

The empirical basis for this conclusion rests on the work of scholars from the International Food Policy Research Institute (IFPRI), who recently carried out a detailed analysis of irrigation potential as part of the World Bank AICD project. Using a wide variety of economic, agronomic, and medium-density geospatial information, the AICD analysis estimated the technical potential for

[18] Most arrivals for domestic tourism occur in the south and along the coast, where access to improved sanitation facilities is relatively high. There are not many foreign holidaymakers among arrivals at these locations, but that in itself is not evidence that local sanitation conditions have much bearing upon this segment of the market.

African countries to expand two types of irrigation: dam-based and small-scale systems – the latter involving trapping rainfall in a local storage location for later use on crops. Further calculations estimate the economic rate of return to each type of irrigation in each location analysed. This in turn provides a basis for estimating the additional area that could be irrigated subject to various minimum rates of return (You et al., 2009).

Although the details of these calculations are too complex to be repeated here, the general sequence is as follows:

- First, assess production geography and existing and potential performance, using data on actual area, average farm-level rain-fed yields, and potential irrigated yields of 20 crops, all based on a 10 km by 10 km grid.
- Second, calculate the runoff potential that could be used for small-scale irrigation, based on the sustainable water availability within each area.
- Third, identify the potentially irrigable area and the associated water costs. Calculations for dam-based irrigation assume that irrigation is gravity-fed until the crop field is reached. This limitation, in connection with local topography, helps identify the potential command area of each irrigation scheme. Small-scale irrigation either converts current rain-fed production into irrigated production or brings new irrigable area into crop production.
- Fourth, calculate the maximum annual net revenue that could be achieved through optimum geographic distribution of irrigation water within the potential command area for dam-based irrigation, or within each 10 km x 10 km grid cell for small-scale irrigation. Simultaneously identify the most profitable crop mix, given crop prices, yield increases with irrigation, the cost of irrigation water, and a water availability constraint.
- Finally, estimate the economic internal rate of return (IRR), based on various values for water cost, alternative levels of irrigation investment costs, and two time trajectories for investment spending. For dam-based irrigation, IRRs are calculated for each dam. For small-scale irrigation, profitable areas are identified at the level of the grid cell. A key assumption applied to small-scale irrigation is that for irrigation to be profitable, the affected area must be within 5 hours trucking time to a town where the produce could be marketed. This assumption ties the potential for expanding irrigation to the existing network of major

and feeder roads. More specifically, further expansion of Ghana's rural road network or upgrading of existing rural roads could expand the area that might be profitably irrigated.

The authors of the AICD study caution that the results should be treated as an estimate only; performing this analysis for all of Africa forced them to rely on a relatively coarse grid, whereas more detailed conclusions or investment planning would require more detailed geospatial information (You, 2011). Nevertheless, pending the emergence of such detailed information, the AICD study provides the basis for several important conclusions regarding Ghana's irrigation potential.

First, only small portion of Ghana's land is currently irrigated. Out of an estimated 6.385 million hectares of cultivated area, only 30,900 hectares are irrigated – 0.5 percent. This share falls far below the 3.5 percent irrigation rate for sub-Saharan Africa as a whole, and even farther below the 34 percent rate in Asia. Focusing solely on the area that could be irrigated if economic considerations were disregarded, Ghana irrigates 2 percent of its 1.5 million hectares of potentially irrigable land, compared with 18 percent for sub-Saharan Africa as a whole.

Second, despite the seemingly large technical potential for expanding irrigation in Ghana, only a small portion of this potential expansion makes economic sense. Table 6.24 summarizes the key results. As seen there, limiting attention to potential investments with any positive rate of return reduces the scope for expansion to 315,000 hectares, barely a fifth of the technically feasible area. Of this total, around three-quarters of the expansion would involve large dam-based systems. In contrast, if investments were limited to those systems that offer a "reasonable" rate of return of 12 percent or more, the potential expansion drops much further – to less than 15,000 hectares. In this scenario, new irrigated area consists exclusively of additional small-scale systems. An intermediate scenario, requiring a minimum return of only 6 percent, raises irrigated area by 88,000 hectares.
Even if Ghana were to expand irrigation using the undemanding 6 percent return threshold to guide investment, irrigated area would increase from 0.5 percent of cultivated area to a bit less than 2 percent and support a roughly similar increase in the value of output from irrigated land as a share of total agricultural output – currently 0.4 percent. This increase would be realized over a number of years. The broad implication of these calculations is that Ghana's "irrigation gap" – the shortfall between current coverage and economic potential – cannot plausibly be regarded as a binding

constraint to Ghana's growth, or even a significant constraint. The likely impact on national income growth from closing this gap would be vanishingly small. Promising opportunities to expand irrigation should be pursued as discreet investments, rather than be mistaken as the keys to unlocking faster growth.

Table 6-25 Sensitivity of Irrigation Potential to Thresholds for Economic Return

	Potential ('000 hectares)			Average IRR (Percent)		Investment needs ($ millions)		
	Large dam-based	Small-scale	Total	Large dam-based	Small-scale	Large dam-based	Small-scale	Total
IRR > 0%	242.2	73.0	315.2	5.8	14.0	473	377	850
IRR > 6%	50.8	36.8	87.6	11.5	23.0	99	190	289
IRR > 12%	0/0	14.9	14.9	0	34.0	0	77	77
IRR > 24%	0.0	6.0	6.0	0	53.0	0	31	31

Note: Simulations based on assumptions that large scale dam-based irrigation can be developed at a cost of $3,000 per hectare, while schemes based on localized water collection could be developed at a cost of $2,000 per hectare. Should these costs be significantly exceeded, the number of viable hectares falls sharply.
Source: You et al. (2009).

6.3. Is Low Appropriability Reducing the Return to Investment in Ghana?

6.3.1. Policy Failures

Micro risk – Are insecure property rights (land tenure) a binding constraint to growth? A World Bank study stated that 78 percent of Ghana's land is controlled by customary owners, while the remaining area is owned by the state either directly (20 percent) or indirectly on behalf of a local community (2 percent) (Deininger 2003, citing Kasanga and Kotie 2001.) In this context, "customary owners" refer to chiefs ("stools" in the south, "skins" in the north) who hold allodial (root) title to the land but are expected to manage it on behalf of the members of their community – in particular, to reallocate access to land so that no member of the community is landless. In effect though not in theory, the chiefs rent out the land to users (Aryeetey and Udry, 2010.)

Although this arrangement has helped prevent the emergence of a class of landless labourers (Udry, 2010), in practice it undermines the security of land tenure, and thereby imposes a number of offsetting limitations on the productivity of Ghana's economy – limitations which, if unaddressed, seem likely to increase in severity as the economy becomes more developed.

The most obvious problem is that the occupants and users of the land – notably small farmers – are generally not its owners, and as a result are unable to pledge that land as collateral for borrowing, as they could under freehold or similar tenure arrangements prevalent in industrialized countries. Experience from other countries suggests that holding a land title does not always assure access to credit, but not holding a title greatly reduces such access (Deininger, ibid, p. xxv.) This situation almost certainly contributes to the difficulty Ghana has experienced in creating an unsubsidized market for agricultural credit, and by extension contributes to the very limited use of fertilizer and other purchased inputs by Ghanaian farmers. A recent survey of communities in 24 districts identified lack of credit -- particularly for input purchase – as the most prevalent constraint to agricultural development (Ghana Ministry of Food and Agriculture, 2007).

While customary tenure poses challenges regarding access to credit – challenges that arguably can be reduced, if not eliminated (see below) – other problems appear to arise because of the way Ghana's tenure system operates in practice, rather than reflecting its mere existence.

One such problem arises from the fact that individual claims to occupy a particular piece of land can vary widely in their security, depending on the position of the claimant within the local political hierarchy. As documented by Goldstein and Udry (2008), this situation manifests itself in the progressive depletion of soil fertility in the many areas of Ghana where fertility is maintained through shifting cultivation, wherein a single food crop cycle on a given piece of land is followed by a prolonged period of fallowing. Individuals with greater political or social power in local hierarchies can follow this strategy with confidence that their subsequent access to the land will be respected.[19] In contrast, less powerful farmers face a high risk of losing access to any piece of land they allow to lie fallow, creating a strong incentive to cultivate the land continuously despite the adverse impact on fertility. In the area studied, female farmers were twice as likely to lose access to fallowed land as male farmers. As previously noted, the use of fertilizer as an alternative means to ensure soil fertility is limited by lack of access to credit.

Although Goldstein and Udry (2008) document one dimension of the impact of insecure tenure on farming with particular care, the problem manifests itself much more widely. Besley (1995) shows that in rural Ghana, the security of tenure on a particular plot strongly affects the likelihood that

[19] In this context, political or social power is measured on the basis of holding an office in the village or matrilineage, including lineage head, chief.s spokesman, lineage elder, or subchief.

individuals plant trees and undertake a wide range of other investments such as drainage, irrigation, and mulching.

The problems created by tenure insecurity are by no means confined to agriculture – indeed, non-agricultural dimensions appear to be increasing in severity as urban economic activity increasingly dominates Ghana's economy. Although around 40 percent of urban and peri-urban land is owned by the state, the remainder continues to be held under customary tenure arrangements that are generally not documented and therefore subject to serious dispute. Aryeetey and Udry (2010) describe an informal land market beset by numerous problems including:

> *"protracted litigation and adjudication failures, documentation bottlenecks, and uncertainty. Land legislation in Ghana is perceived as incoherent, conflicting, and often outdated. An unwieldy public land sector dominates the documentation of land rights, revenue collection and distribution. Land conflicts are becoming more frequent, judicial processes are overburdened, authority is overcentralized and corrupt. Conflict over multiple claims to particular plots occasionally becomes violent*." (Aryeetey and Udry, 2010.)

Aryeetey and Udry (ibid.) describe a situation in which individual chiefs rent out the same plot of land to multiple tenants, while tenants who have paid one chief for a lease allowing them to build on a particular piece of land are served an injunction filed by another chief claiming to own the same piece of land. This latter phenomenon was regarded as commonplace in discussions among the constraints analysis team, with the example cited of a large multinational that was forced simply to pay twice for the same piece of land on which it planned to build a local headquarters.

A new study of the characteristics of foreign direct investors in Ghana provides further evidence of the severity of land tenure problems for the modern sector (Barthel, Busse, and Osei, 2011). In response to a survey carried out by the authors, "access to land" was the problem most frequently cited by foreign firms (62 percent), followed by "registering property" (38 percent). Even higher percentages of medium-sized and large foreign investors cited access to land as a serious constraint to operating in Ghana. In view of the very small inflows of FDI into Ghana prior to the oil boom, it is reasonable to view this problem as a serious constraint to improving Ghana's access to modern production and marketing technology from abroad.

Based on this evidence, there appears to be a reasonable case for regarding insecure land tenure as a binding constraint to Ghana's growth. The shadow price of land tenure appears to be quite high, particularly if one views the extraordinarily high (30-300 percent per year) returns to capital prevailing among farmers as a measure of this shadow price (Udry and Anagol, 2006). The cost of deteriorating land fertility provides another measure of that shadow cost. Agents are observed taking steps to circumvent the constraint, including paying twice for the same plot of land and engaging in lengthy and expensive court cases to resolve tenure disputes. The prevalence of self-finance among farmers – other than those that benefit from directed credit programs – can reasonably be interpreted as an example of the pattern of economic activity one would expect to see in a world with weak property rights. The only one of the four tests for identifying a binding constraint that this problem cannot claim to pass is an observed growth response to the relaxation of the constraint – but of course, any such response could only be observed after Ghana improves the security of its property rights – not before.

Readers should note that customary ownership is deeply rooted in Ghana's legal tradition, so it is probably realistic to regard it simply as a fact of life – in the sense that Ghana is highly unlikely to replace it with freehold tenure or other common law institutions in the near future. However, Ghana has considerable scope for improving the security of tenure within the broad framework of customary tenure – for example, by a credible and demonstrated commitment on the part of the government to recognize customary rights in certificates of occupancy, the adoption of stronger leasehold laws, and improved dispute resolution – which, if implemented effectively, could go a long way toward making farmers become more appealing customers for commercial lenders, and help assuage the concerns of foreign investors in securing premises for headquarters and operations (Boudreaux, 2011). Meanwhile, as a complement to (or substitute for) public efforts, private arrangements along the lines of Aryeetey and Udry's "land banks" deserve consideration (Aryeetey and Udry, 2010).[20]

Taxes. For reasons discussed in Section III of this report on post-independence growth trends, as well as those discussed in the AfDB report (Lejárraga, 2010), we do not find the microeconomic

[20] The proposed land banks would rent plots from traditional chiefs on long-term leases, and undertake the cost of litigating against rival claimants. They would then rent those plots out to farmers or other users, again on a long-term basis, at a higher price to cover its costs and risks. In principle at least, the land bank would eventually make a profit on the basis of its ability to provide secure long-term land tenure.

risk due to taxes to be a binding constraint. To review some of the arguments, Ghana's revenue levels and collection efforts are considered very strong relative to its comparator countries. Lejárraga (2010) also fairly pointed out that there are relatively few instruments of taxation collected in Ghana compared with other countries. This joint economic study team discussed and debated the tax issue and came to agreement about these key arguments. Some team members argued about particular taxes and their rates, but overall the team agreed that this is not a binding economic constraint.

Corruption. Corruption is an important economic problem all around the world. Ghana is not without its share of corruption problems. For example, the USAID (2010) study noted earlier found that corruption accounted for 8 percent of transport and logistics costs for imports in West Africa. The question is – how bad is the problem in Ghana? Is it really a severe constraint to economic growth?

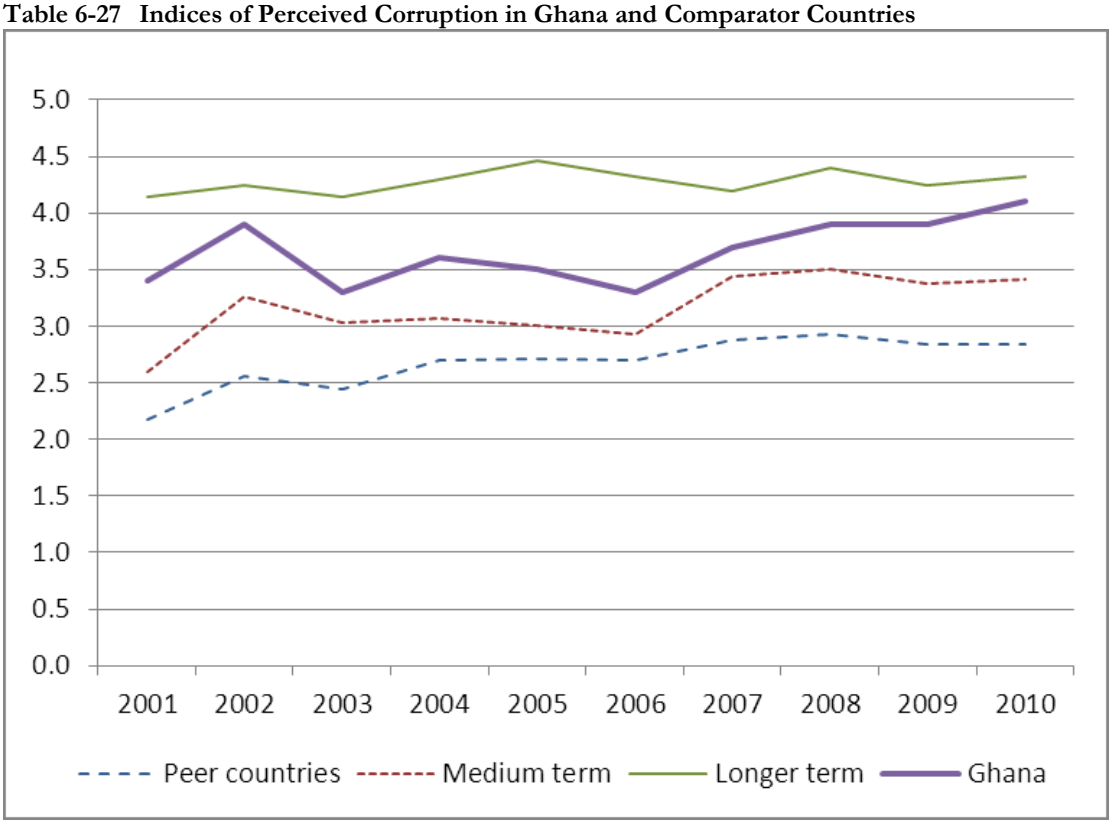
There is perhaps no way to know the answer for sure, but there are certainly ways to try to gauge the level of the problem. This study has compiled the corruption perception indices published each year by Transparency International (2011). The data were compiled for Ghana and its comparator countries back from 2001 to 2010. While it is very important to note that perceptions are not necessarily reality, as noted by authors such as Rose-Ackerman (1999), these data give us a good insight of how foreign investors perceive doing business in Ghana. The data show that Ghana's corruption perception index score is well above its peer countries and even most of the medium-term comparators and a couple of the long-term comparators – meaning that Ghana is perceived as relatively less corrupt than most of its comparator countries (see Table 6.25 below), in some cases by a fairly wide margin. Moreover, the trend perception score has been slowly improving in Ghana (see Figure 6.13).

Table 6-26 Indices of Perceived Corruption, 2001-2010 (1 = high corruption, 10 = low corruption)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Peer countries										
Bangladesh	0.4	1.2	1.3	1.5	1.7	2.0	2.0	2.1	2.4	2.4
Benin	...	...	...	3.2	2.9	2.5	2.7	3.1	2.9	2.8
Ghana	3.4	3.9	3.3	3.6	3.5	3.3	3.7	3.9	3.9	4.1
Kenya	2.0	1.9	1.9	2.1	2.1	2.2	2.1	2.1	2.2	2.1
Senegal	2.9	3.1	3.2	3.0	3.2	3.3	3.6	3.4	3.0	2.9
Tanzania	2.2	2.7	2.5	2.8	2.9	2.9	3.2	3.0	2.6	2.7
Medium term countries										
Cape Verde	...	...	...	...	...	...	4.9	5.1	5.1	5.1
Mongolia	...	...	...	3.0	3.0	2.8	3.0	3.0	2.7	2.7
Morocco	...	3.7	3.3	3.2	3.2	3.2	3.5	3.5	3.3	3.4
Sri Lanka	...	3.7	3.4	3.5	3.2	3.1	3.2	3.2	3.1	3.2
Vietnam	2.6	2.4	2.4	2.6	2.6	2.6	2.6	2.7	2.7	2.7
Long term countries										
Botswana	6.0	6.4	5.7	6.0	5.9	5.6	5.4	5.8	5.6	5.8
Ecuador	2.3	2.2	2.2	2.4	2.5	2.3	2.1	2.0	2.2	2.5
Malaysia	5.0	4.9	5.2	5.0	5.1	5.0	5.1	5.1	4.5	4.4
South Korea	4.2	4.5	4.3	4.5	5.0	5.1	5.1	5.6	5.5	5.4
Thailand	3.2	3.2	3.3	3.6	3.8	3.6	3.3	3.5	3.4	3.5

Source: Transparency International (2011)

Table 6-27 Indices of Perceived Corruption in Ghana and Comparator Countries



Source: Transparency International (2011)

While Ghana's corruption score of 4.1 in 2010 period is far below that of countries perceived as having very low corruption (such as Finland, New Zealand, and Singapore with scores typically at 9.5 or higher), Ghana is still well-above most of the comparator countries, suggesting that the problem is not a binding constraint to the nation's economic growth.

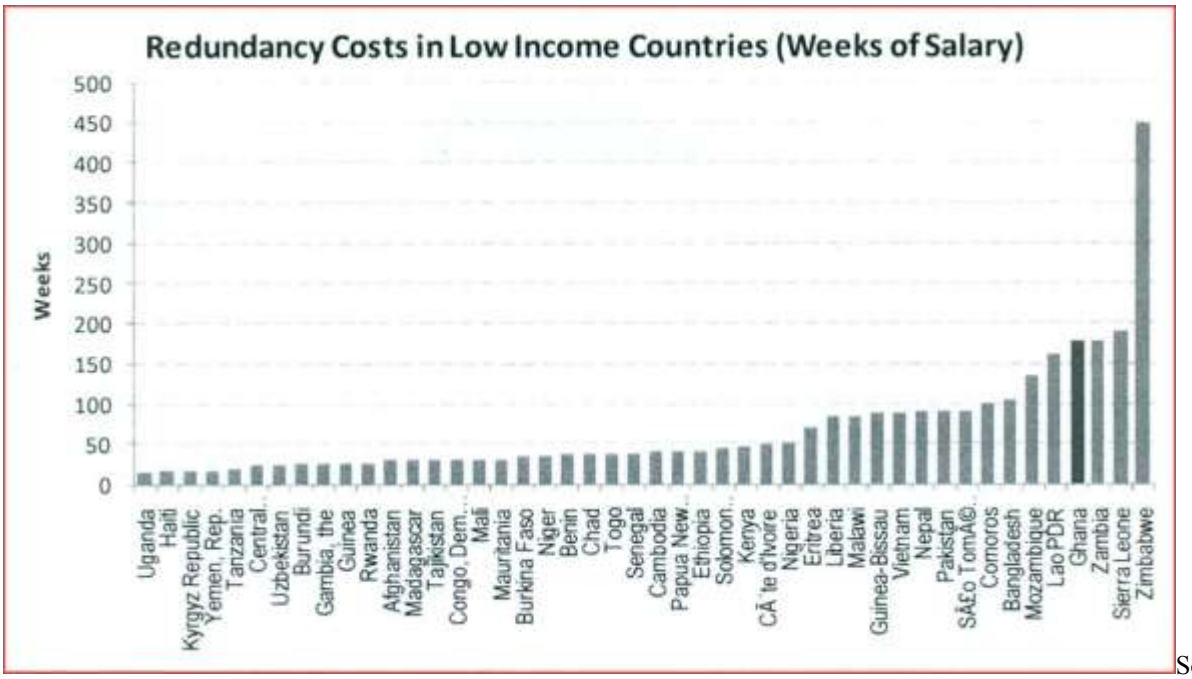
Labour regulations. The AfDB diagnostic study on Ghana presents a mixed picture on the effect of the labour regime on the country's development (Lejárraga, 2010). On one hand, it rates Ghana's performance on the "Rigidity of Employment" indices as positive. This is the indices which measures 'contract flexibility, the ratio of minimum wage to value added per worker, requirements relating to working time and the legal grounds and procedure for work dismissal'.

On the other hand, the AfDB scores Ghana low marks on what it calls 'Redundancy Cost'. This is the cost that is associated with severance pay, penalties and advanced notice requirement when terminating a worker.

According to the AfDB, it cost an average of 178 weeks of salary -- almost four years of salary -- to make a worker redundant in Ghana. For labour regulations to be a binding constraint, one or two situations must exist: 1) existing firms must wish to hire more labour, but be inhibited from doing so because of high redundancy cost; or 2) stringent labour laws would imply that labour-intensive firms do not thrive.

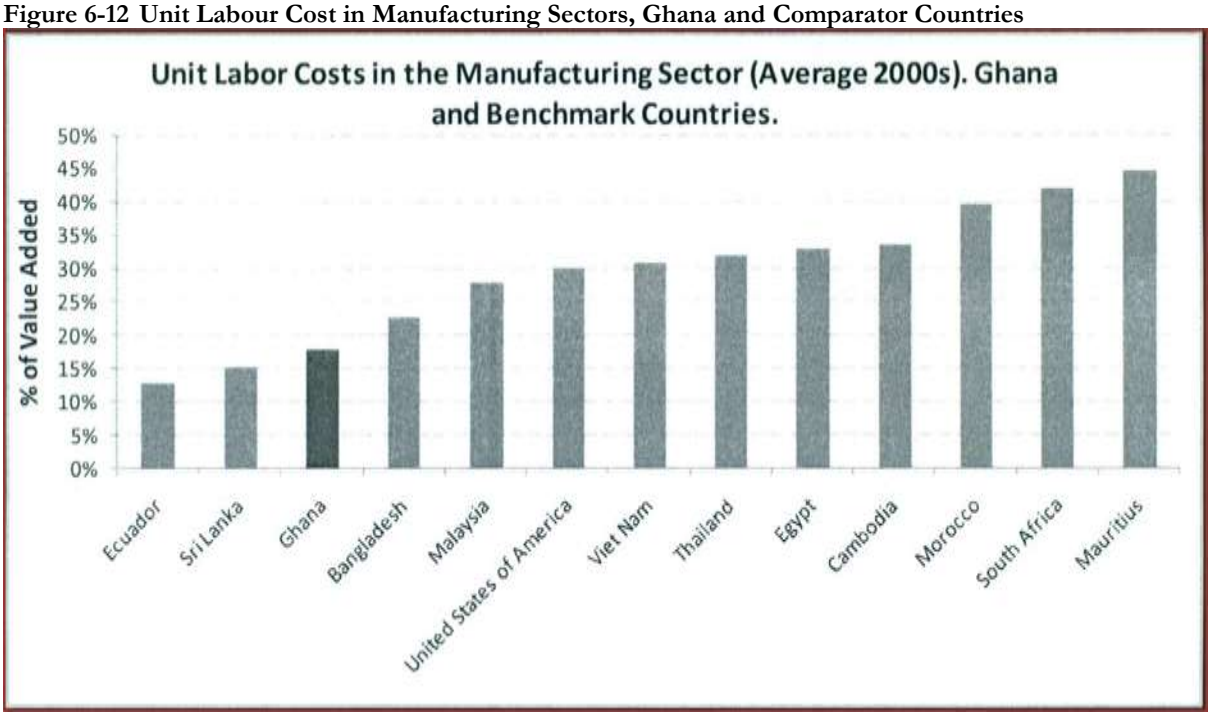
While the AfDB dismisses the first factor as not applicable to Ghana, it accepts the second situation as applicable on the basis of a few factors but in the main because labour-intensive sectors such as textiles and tourism have not thrived over time.

Figure 6-11 Redundancy Costs in Low Income Countries



Source : Lejárraga, (2010)

Figure 6-12 Unit Labour Cost in Manufacturing Sectors, Ghana and Comparator Countries



Source: Lejárraga (2010).

However, on the basis of the information available, we reject the second factor also as not being a constraint to Ghana's economic development.

While accepting that the textile industry is not doing well and has severe challenges, it is a well-documented fact that the textile industry is facing competition from cheap imports from China whose products are usually smuggled into the country without the payment of the appropriate taxes and hence deepens the uncompetitiveness of Ghanaian products.

In contrast, there is no indication that the tourism sector is in decline. Rather, the evidence shows a sector on the rise (see Tables 6.26 to Table 6.30).

Table 6-28 Proportion of GDP due to Tourism

	2003	2004	2005	2006	2007	2008	2009
GDP (Percent)	4.7	4.9	5.7	5.8	6.3	6.5	6.7

Source: Ghana Tourist Board

Table 6-29 Average Tourist Expenditures, 2003-2008

	2003	2004	2005	2006	2007	2008
Average Expenditure (US$)	1,344	1,711	1,950	1,985	1,998	2,010

Source: Ghana Tourist Board

Table 6-30 Tourist Expenditures by Component, 2003-2008

	2008	2009	2008	2009
	Number		Percent	
Business	160,556	184,639	23	23
Conference/meetings	62,826	72,250	9	9
Study/Training	55,846	64,222	8	8
VFR	174,517	192,667	25	25
Medicals	6,981	8,028	1	1
Holiday	132,633	160,556	19	19
Transit	69,807	80,278	10	10
Others	34,903	40,139	5	5

Source: Ghana Tourist Board

Table 6-31 Number of Hotels, Rooms, and Beds 1998-2009

Year	Hotels	Rooms	Beds
1998	730	10,879	14,299
1999	834	11,384	16,184
2000	992	13,641	17,558
2001	1,053	15,453	19,648
2002	1,169	16,180	21,442
2003	1,250	17,352	22,909
2004	1,315	18,079	23,538
2005	1,345	18,752	23,924
2006	1,427	22,835	27,839
2007	1,432	20,788	26,057
2008	1,595	24,410	29,645
2009	1,775	26,047	31,702

Source: Ghana Tourist Board

Table 6-32 Number of Tourist Arrivals to Ghana (in Thousands), 2006 – 2008

	2006	2007	2008
United States	62.8	76.9	86.8
United Kingdom	36.8	50.4	58.1
Germany	17.1	21.8	26.4
France	11.9	12.9	15.2
Netherlands	14.7	18.3	21.6
Canada	11.1	16.3	18.8
Switzerland	2.1	2.9	3.5
Scandinavia	8.6	11.7	14.8
Italy	4.6	5.9	7.5
Cote D'Ivoire	25.9	26.3	35.5
Nigeria	56.3	66.4	79
Togo	13.9	17.2	22
South Africa	11	16.3	19.8
Overseas Ghanaians	67	69.2	79.6
Other	153.3	174.1	209.5

Source: Ghana Tourist Board

When one looks at the legal regime on labour, redundancy payment is based on negotiation between workers (or their union) and management, Article 65 (4) of Ghana's labour law states that:

> *The amount of redundancy pay and the terms and conditions of payments are matters which are subject to negotiations between the employer or a representative of the employer on the one hand and the worker or the trade union concerned on the other.*

Even with these provisions there are exceptions. It does not apply to:

a) Workers engaged under a contract of employment for a specified period of time or specified work;

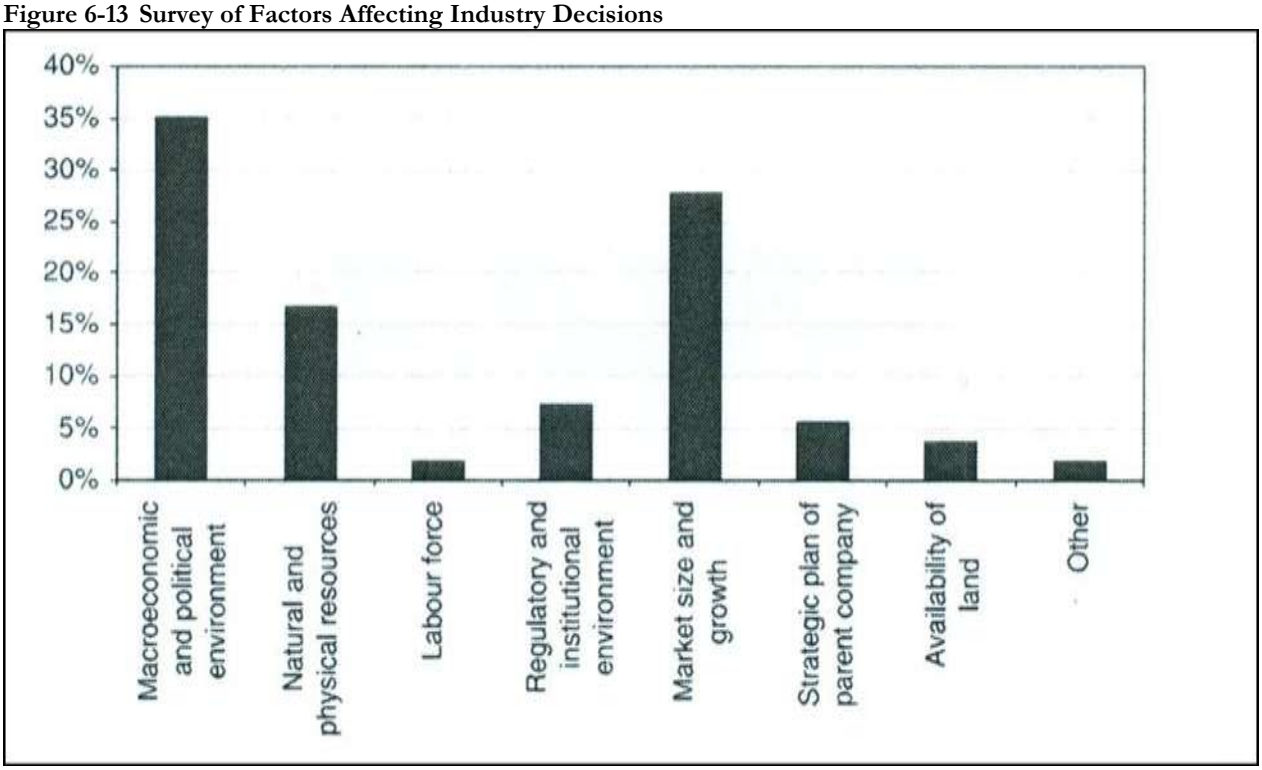
b) Workers serving a period of probation or period of employment of reasonable duration determined in advance; and

c) Workers engaged on a casual basis.

Redundancy cost may thus come from contractual obligation freely negotiated by employers.

A survey of past payment may show that redundancy cost in Ghana may be a little higher than the average in sub-Saharan Africa but this does not appear to be a major problem for industry. In the ICA survey, firms rated labour related issues lower down the scale of their concerns and did not consider cost of labour to be a major issue.

Figure 6-13 Survey of Factors Affecting Industry Decisions



Source: Barthel et al. (2011).

Thus although there might be some issues with cost of redundancy it cannot be said to be a binding constraint.

Macro Risks. There are two principal concerns regarding macro-risks that may inhibit appropriability in Ghana: macro-stability with respect to an acceleration of inflation and appreciation of the real exchange rate. In the short term, at least, the former risk can negatively affect consumption and through shocks in demand lower output and capital accumulation. The

latter risk affects Ghana's longer-run prospects to participate in export-led growth and economic diversification.

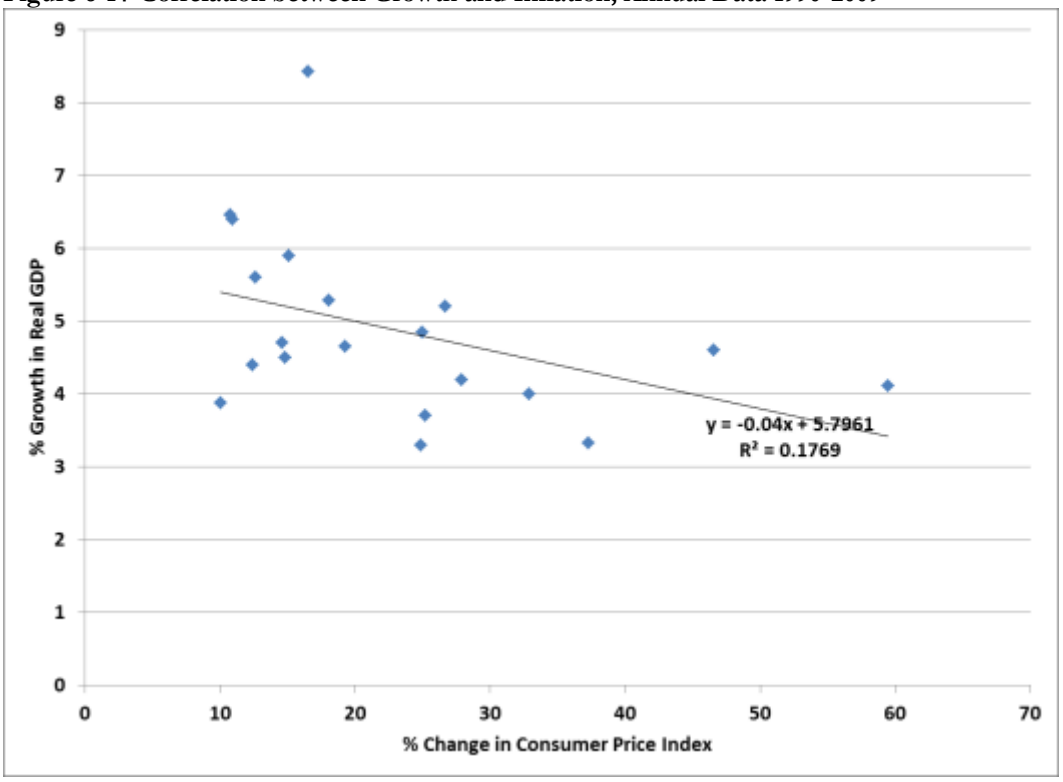
Over the past two decades the impact of inflation on economic growth has been vigorously contested by research results that have asserted adverse impacts of inflation on growth (Barro, 1995, Andres and Hernando, 1997) and work that cite numerous counterexamples and the neutrality of money on aggregate economic performance (Levine and Renelt, 1992; Levine and Zervos, 1993; and Bruno and Easterly, 1996, 1998). More recent studies have contrasted short- and long-term effects (Faria and Carneiro, 2001) and have focused on the presence of a threshold effect: a rate of inflation below which adverse impacts on growth are not detected and above which the negative relationship emerges (Khan and Senhadji, 2001). Li (2006) distinguishes between effects of inflation via financial channels for developing and developed economies, and transmission mechanisms operating on levels of investment and TFP. In the TFP transmission mechanism, inflation reduces savers' real rates of return and lowers the real rates of interest that borrowers pay. This induces additional demand for borrowing by reduces incentives to save. To cope with the large numbers of potential borrowers, many of whom are perceived to be default risks, the financial market rations credit and directs resources into fewer loans. The limited availability of investment capital diminishes the efficiency of financial allocation as well as intermediary activity, and economic growth declines or stagnates. This scenario appears at least to fit the stylized facts of credit markets in Ghana, where public borrowing may represent a safer alternative for lenders.

The econometric approach introduced by Khan and Senhadji has recently applied to Ghana by Frimpong and Oteng-Abayie (2010), who detect evidence of the threshold effect and provide an estimate of its level. Given this estimate, one can infer that past price instability has been a drag on growth and, following Li (2006) and the earlier discussion of credit in this constraints analysis, likely to have transmitted its effects via financial markets on the efficiency of investment.

For Ghana, a basic inverse linear relationship between inflation and real growth can be established. Working with data from 1960 to 2008, Frimpong and Oteng-Abayie estimate for Ghana a threshold of about 11 percent at which inflation significantly reduces growth. This result compares with that of Khan and Senhadji, and suggests the significance of the nexus between public expenditure management, financial market performance, investment and growth.

Over the last twenty years Ghana has experienced episodes of high inflation as measured in consumer prices, ranging between roughly 10 and 60 percent. However, Ghana appears to be moving toward greater price stability (Figure 3.8).

Figure 6-14 Correlation between Growth and Inflation, Annual Data 1990-2009



Source: World Bank 2011.

The most recent inflation episode dates to 2009, when in January inflation was estimated to have exceeded 21 percent. Ghana subsequently adopted stabilization measures that have shown to be effective and despite recent increases in early 2011 attributable to energy price shocks, the outlook appears favourable so long as Government is credible in its pursuit of sound macroeconomic management. The trend indicates that inflation and macro-instability are not now a serious threat to growth. This not to say that past damage has not been done that persists to the present, particularly upon the performance of financial markets. Also, the current trend does not take into account the implications of oil production, which is likely to affect the economy in ways that may change the assessed likelihood of future inflation shocks.

Dagher, Gottschalk and Portillo (2010) explore the impacts of oil production on the Ghanaian economy through simulations of a calibrated multi-sector Dynamic Stochastic General Equilibrium (DSGE) model. The simulations develop the consequences of inflation resulting from aggregate

consumption demand that is stimulated from an expansion of fiscal spending following receipt of oil revenues. Here, oil revenues are treated as a transfer from the rest of the world to the government, comparable to the receipt of foreign aid. In this respect the model coincides with the analytical framework of categorizing the potential "Dutch Disease" consequences of aid flows according to patterns of aid absorption and spending (Hussain, Berg, and Aiyar, 2009). As such the DSGE approach does not track oil production itself or the factors used in its production, and is incomplete in this sense. The study is useful in providing insights into the effects of oil revenues upon Ghana's non-oil economy according to fiscal and monetary responses of the Government.

In the case of Ghana, Dagher, Gottschalk and Portillo (2010) argue as follows:

> *'In the short term, an oil-driven fiscal expansion—similar in size to the expected oil windfall—is likely to generate a moderate demand-led expansion in output and a moderate increase in non-traded goods inflation. The impact on aggregate inflation would be minimal provided that the real exchange rate is allowed to appreciate.*
>
> *The impact on medium term competitiveness could be negative if there are sizeable learning externalities in the traded sector. However, this negative effect could be reverted if the fiscal expansion translates into higher public capital.*
>
> *The short-run challenges associated with the windfall can be greatly reduced if the government implements an appropriate fiscal policy. A smoother fiscal response to the oil windfall as well as a higher import component in government spending will greatly reduce the associated demand pressures. As for the central bank, a discretionary tightening of monetary policy—to reduce inflation from current high levels to a new, lower steady state—would also reduce inflationary pressures, but it requires a strong commitment to price stability.*
>
> *If the government decides to save part of the oil windfall domestically, reserve policy must be consistent with fiscal policy. If the central bank simultaneously accumulates the foreign currency proceeds from oil—while the government spends the local currency proceeds on domestic goods—the real exchange rate appreciation will be smaller but inflation will be higher. This will be the case, even if the accumulation of reserves is sterilized. This highlights the role of the supply of foreign currency—associated with the oil proceeds—in stabilizing aggregate demand and containing inflationary pressures.*
>
> *The structural features of the Ghanaian economy will also play an important role in the adjustment process. In particular, frictions in the labour market and the financial market, features that are accounted for in the model, amplify the impact on inflation. Hence, any progress in decreasing these frictions in the coming*

years would have a beneficial effect for the economy overall, and in its response to the large oil shock.'

Whether oil revenues lead to a re-ignition of inflation and adverse impacts upon growth via financial markets therefore again focuses on the Government's management of public expenditures and its monetary regime. A distinct dilemma, however, now arises because the one of the mitigating measures in response to demand-led inflationary pressures is an appreciation of the real exchange rate. This development obviously would hurt the competitiveness not only of export agriculture but further complicate prospects for the development of export diversification.

In general, a protracted real exchange rate (RER) overvaluation tends to be associated with lower economic growth. As argued in the World Bank's Country Economic Memorandum, although, overall economic activities might be partially boosted by an overvaluation-driven growth in the non-tradable sector, the impact may be particularly harmful to export growth and economic diversification. As is well known, Ghana's export range is extremely narrow and dominated by trade in basic commodities. It is difficult to imagine how diversification cannot involve significant learning by doing and embody better default risks than those now perceived in the environment in which credit markets now operate.

Despite substantial aid flows over the last ten to fifteen years, Ghana has managed to avoid misalignment of its real exchange rate following two surges in aid inflows in the periods of 2000-2003 and 2004-2007. As discussed in the World Bank CEM, Ghana avoided appreciation of its RER in switching from a policy regime of not absorbing and not spending foreign aid to one of absorbing and spending. That is, particularly for the latter period, Ghana used aid to finance imports and expenditures on non-traded goods, increasing its non-aid current account and fiscal deficits while avoiding acceleration in inflation. This regime broke down in 2008 and 2009, when aid was spent but not absorbed. A return to sounder fiscal management since 2009 has lowered inflation without implications for the equilibrium real exchange rate. Over all, empirical evidence does not support the proposition that real exchange rate misalignment at present inhibits growth and production possibilities.

The particular problem imposed by oil revenues, as presented in the framework developed by Dagher, Gottschalk and Portillo is that temptation to loosen fiscal discipline will be re-enforced by

the pressures that accumulating foreign exchange receipts from oil will exert on the real exchange rate. Appreciation of the RER would reduce domestic inflationary pressures, inducing consumption to switch from non-traded goods to imports.

While lower inflation might benefit growth in the short term by improving prospects of financial resources flowing to oil-related sectors of the economy, in the longer term non-oil exports, particularly cocoa, pineapples and other agricultural (or manufactured) product exports Ghana might be able to diversify into, as well as non-traded good production, would be adversely affected. At present, resource reserves in the Jubilee field are projected to be economically viable for a period of about twenty years. If revenues from oil revenues are not managed well, the episode is likely to inhibit – at the minimum not favour – inclusive growth and promote widening of income disparities. In summary, macro-risks presently are not a binding constraint, but concerns for the near future are not without warrant. As noted, the management of public expenditures has direct consequences for the performance of financial markets and the productivity of overall investment in the economy. In particular, the DSGE analysis of the impacts of oil revenues suggests that a possibly viable strategy entails the development of public infrastructure that enhances the productivity of non-traded sectors. The implication is that mitigating solutions to pending macro-risks may very well involve investments that address problems that inhibit "social returns" on private sector investment.

7. Conclusions

Ghana has made noteworthy progress in promoting development on both the political and economic fronts. Although the economy has grown at a reasonable rate over the last decade, continuing at this pace will not deliver the "Asian Miracle-type" transformation that Ghana seeks, even with the discovery and production of oil. Indeed even the current economic growth situation remains precarious. Growth and structural change have been mainly driven by public investment (financed from aid), whereas private investment (particularly the efficiency-seeking type) has been slow to respond. The fiscal and debt situations remain worrisome, with internal budgetary slippages and continued pressure for increases in recurrent spending. There is no doubt that sustaining Ghana's growth and development will require increasing the level of private investment. How can Ghana achieve this? What constraints are most binding for private sector growth in Ghana?

In this study we investigate what the most binding constraints are to private sector investments and growth in Ghana. We employ a growth diagnostic approach à la Hausmann, Rodrik and Velasco (2005). We build on a previous growth diagnostic for Ghana published in 2010 by Iza Lejárraga of the African Development Bank (Lejárraga, 2010). The AfDB study concluded that neither credit nor infrastructure poses a binding constraint to growth in Ghana. Rather, it identified Ghana's high labour redundancy costs as the most pressing constraint to private investment and the growth of non-traditional exports. This study first discusses the current economic situation and subsequently provides an analysis of why private investment is low in Ghana. It reaches different conclusions than the AfDB study. The main findings of this study summarised in Table 7.1 is as follows:

The rate and composition of Ghana's growth is improving. Ghana's growth, after the economic collapse in the 1980s, has been relatively good – averaging about 3 percent in real per capita terms and with less volatility. However, most of this growth has been due to factor accumulation, with limited improvement in efficiency: over the entire period 1970-2005, growth in the labour force accounted for roughly two-thirds of Ghana's overall growth, with growing capital stocks adding another third. Indeed, the evidence points to a decline in total factor productivity – a measure of the efficiency at which labour and capital are being used to produce goods and services – over this period. This situation seems to be changing: total factor productivity has begun to play more of a positive role in Ghana's growth since the early 2000's, rivalling the contributions of growth in labour and capital inputs.

Private investment in Ghana remains low. Although Ghana's investment rate of about 25 percent is relatively high, its domestic savings remains relatively low. This suggests that it has been financing its investments using foreign savings. A notable feature of investment in Ghana is that it is dominated by public, as opposed to private investment. This study argues that the low savings in Ghana can be partly explained by the nation's high and persistent fiscal deficits. Not only does the high deficit make the country more vulnerable to external shocks, but also it crowds out the private sector. The fiscal situation, an outcome of "inherent momentum in public spending," perpetuates the savings-investment gap by keeping the interest spread very high. This in turn keeps borrowing by private agents for investment purposes at a low level.

Credit is a binding constraint for private investment in Ghana. The study notes that credit to the private sector in Ghana is low compared with other countries. Evidence from firm surveys cites credit as a major constraint, while the limited credit that is provided to the private sector is largely short term in nature. In addition, domestic savings remain very low and the cost of borrowing very high. On this basis, we conclude that lack of access to credit is a binding constraint to growth in Ghana.

Power is a binding constraint to firm growth in Ghana. The evidence shows that the supply of power has not kept pace with the demand. This is evident from the declining electricity production per capita. Meanwhile, high transmission and distribution losses cause the effective supply to economic agents to fall significantly short of the production capacity that exists. Just as important, the available power supply is highly unreliable, with frequent and prolonged outages disrupting production, damaging equipment, and forcing firms to rely on generators to provide standby power. We argue that insufficient and unreliable power is causing losses of at least 5.6 percent of GDP. In addition, firms point to power as being the most important constraint to their growth. This study therefore argues that unmet demand for reliable power is a binding constraint to growth in Ghana.

Insecure property (land use) rights emerge as a third binding economic constraint to growth. The evidence reviewed does not indicate that the severity of the problems is as severe as the constraints evident in the financial markets and the power sector. Nevertheless, insecure land tenure appears to meet at least three of the four tests of a binding constraint. First, the shadow price of land

tenure appears to be quite high, particularly if one views the extraordinarily high (30-300 percent per year) returns to capital prevailing among farmers as a measure of this shadow price. The cost of deteriorating land fertility provides another measure of that shadow cost. Second, agents are observed taking steps to circumvent the constraint, including paying twice for the same plot of land and engaging in lengthy and expensive court cases to resolve tenure disputes. Third, the prevalence of self-finance among farmers can reasonably be interpreted as an example of the pattern of economic activity one would expect to see in a world with weak property rights.

Urban water systems also appear to pose a severe, if not binding economic constraint. Again, the evidence is not as strong as with credit or power. The urban population share is about 51 percent and urbanization growth rates remain elevated at 3.7 percent per year. Current urban water supplies meet only about half of the demand. There are very large losses in the water delivery system (about 50 percent). We observe some signs of economic stress. Consumers are willing to pay 2 to 11 times the household water price, which can be viewed as a type of shadow price. There appear to be many efforts to circumvent the shortages by illegally tapping supplies in urban areas, perhaps accounting for a large part of the losses. Because demand for water – a multi-purpose necessity – is highly inelastic, it may not be realistic to see alternative work-around patterns by businesses and consumers as with other types of constraints.

Road Transport appear to pose a severe, if not binding constraint on economic growth. Ghana's poor showing on rural access to roads suggests a major opportunity to improve access to agricultural input and product markets for rural communities. This has the potential of improving agriculture productivity and helping to extend the benefits of growth to a larger share of the population. In terms of the four tests, we find that road infrastructure meets two with a possible third being met when one considers rural roads. Therefore inadequate and poorly maintained road infrastructure, particularly rural roads is an important constraint to growth of the agricultural sector in Ghana. However the evidence suggests that it is not as yet a binding constraint to private investments to Ghana.

Other factors, such as geography, human capital, and other non-power and road infrastructure, taxes, corruption, and macroeconomic risk were examined and were not found to be binding constraints. For example, with human capital, several concerns have been raised about the

constraints posed by the lack of adequate skilled manpower. For example, data from the latest enterprise survey shows that very few firms have managers with a bachelor's degree or higher. However, we show that the returns to education in Ghana remain relatively low. We conclude that human capital is not a binding constraint in Ghana.

Table 7-1 A summary of the Constraints Analysis Results

Indicator	Shadow Price test	Growth test	'Circumvention' test	Non-reliance test	Private Investment Literature	Is it a binding Constraint?
Finance						
International Finance	No	No	No	No	No	No
Local finance	Yes	Yes	Yes	Yes	Yes	Yes, a binding constraint
Low Social Returns						
Poor Geography	No	No	No	No	No	No
Low human Capital	No	No	No	No	No	No
Infrastructure						
Transport	Yes	Evidence of growth dividend for rural roads	No	No	Not major	No, but rural roads seem to be a major constraint
Power	Yes	Yes	Yes	Yes	Yes	Yes, a binding constraint
Water	No?	Not much evidence	Not much evidence	Not much evidence	No	No, but urban
Sanitation	No?	No?	No	Not much evidence	No	No
ICT	Not much evidence	No	No	No	No	No
Irrigation	No	No	No	No	No	No
Government Failures						
Micro risks						
Property rights	Yes	Yes	Yes	Yes	Yes	Yes a binding constraint
Taxes	No	No	No	No	No	No
Corruption	No	No	No	No	No	No
Labour regulations	No	No	No	No	No	No
Macro risks						
Inflation	No	No	No	No	No	No

Exchange rate	No	No	No	No	No	No

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APPENDICES

Annex A: Natural Resource Issues Affecting Growth in Ghana

Natural resource management issues in Ghana may be discussed under the following headings: land, forestry, biodiversity, water, marine and coastal ecosystems, and minerals (including oil and gas).

Ghana is endowed with abundant natural resources, which have played a very important role in the agricultural and industrial development efforts of the country. However as a result of the unplanned exploitation of some of these natural resources to meet legitimate socio-economic needs, irreparable damage has been done to productive lands through deforestation, air and water pollution, desertification, overgrazing, and the destruction of biodiversity (Ghana Ministry of Planning, 2010).

In the late 1980s a preliminary estimation of the costs imposed on Ghanaians and the economy from environmental degradation in sectors such as agriculture, forestry, hunting, industry and mining showed that the costs of environmental degradation were significant. The total estimated annual losses in 1988 amounted to 41.7 billion cedis, the equivalent of 4 percent of total GDP (Ghana EAP Vol.1). The total economic cost of poor environmental management and sanitation is currently estimated at over 10 percent of Ghana's GDP (Ghana Ministry of Planning, 2010).

Land. The total surface area of Ghana is about 239,000 km^2. The country has a north-south extent of 670km and an east-west extent of 539 km. Ghana is heavily dependent on primary land-based products – notably, agriculture, mining, and timber – for its growth and socio-economic development.

The country has a strong natural resource base with a range of 40 – 60 percent of its total land area either arable or covered with permanent crops and pasture while forests and woodlands cover additional 35 percent (Table A1 below). However about 69 percent of the total land surface area of the country is estimated as being prone to severe or very severe soil erosion and the soil fertility is generally classified as low.

Table A1 : Ghana land use

Category	Percent	Area in sq km
Arable land	12	27,600
Permanent crops	7	16,100
Permanent pasture	22	50,600
Forests and woodlands	35	80,510
Other	24	55,210
Total land area	100	230,020

Source: www.ghanatimber.org

One third of the country's land is affected by desertification (UNCCD, 2002). The threat of desertification is greater in the savannah zone (sudan, guinea and coastal savannah zones) which forms about 68 percent of the total land area of Ghana. Lowered water tables, siltation of rivers, and increased flooding are evidence of increasing aridity. Rapid deforestation and poor cultivation practices are mainly responsible although occasional droughts and wildfires intensify the problem. On the coast, land degradation is a consequence of the heavy concentration of people and industries. Overexploitation of mangroves and rapid development are increasing the rate of coastal erosion.

The strength of Ghana's economy, and hence the integrity of the environment, is related to the efficient use and management of available land. Land management is pivotal to addressing issues related to environmental and natural resources management in the country. Land ownership underpins sound management of land since it has an effect on land tenure, land use planning, and therefore optimal land use.

The land tenure system in Ghana is rather complex. In general about 80 percent of the land is held under customary land arrangements while the remaining 20 percent is state-acquired land. The land boundaries are generally not demarcated and so the establishment of land ownership tends to be problematic. According to the Ghana Lands Commission, the non-demarcation of most of the lands in the country is a major constraint to land administration.

There are four categories of land ownership in Ghana governed by both customary practices and enacted legislation. These are: (i) state lands, compulsorily acquired by the government through the invocation of appropriate legislation and held in trust for the entire people of Ghana; (ii) vested lands, belonging to stools or skins but vested in the state in trust for the people of the stool or skin or family from which it was vested; (iii) private lands belonging to stools, skins or

family communities and held in trust on their behalf by chiefs, tendana, or family heads; and (iv) private lands given or sold as freeholds by stools, skins and families to individuals, corporations and institutions (only freehold private ownership obtained prior to the enactment of the 1992 Constitution is legally recognized as Act 267 (5) bars creation of freehold interests in land out of stool land and by implication skin land as well).

Partly due to the predominance of customary tenure administered by traditional authorities, only a small proportion of the estimated 6 million total land parcels of Ghana are registered. About 30,000 are registered under the title registration system while an unknown number is registered under the deeds registration system. The latter system is inherently weak. The weakness in the deeds system is that it does not prove that the party that registered the land actually owns the property. It has failed to assure security and has become characterized by inaccurate maps, multiple sales of the same parcel of land, use of unapproved schemes, haphazard developments, conflicting land issues and time-consuming litigation (Ghana Lands Commission, 2010). Ghana's Shared Growth and Development Agenda (2010 – 2013) (GSGDA) report has underscored the fact that the issue of land ownership poses a major challenge to land use in the country (Ghana Ministry of Planning, 2010). This is in line with the generally held view that the land system is a constraint to investment, particularly in the agricultural sector.

A 2008 study on land rights and agricultural investment in Ghana conducted showed that insecure land tenure in the country was associated with greatly reduced investment in land fertility. Individuals who were not central to the networks of social and political power that permeated the villages were found to be much more likely to have their land expropriated while it was lying fallow. Their reduced confidence of maintaining their rights over land while it was fallow induced such individuals to fallow their land less than would be technically optimal. As a consequence, farm productivity for these individuals was correspondingly reduced. There was a strong gender dimension to this pattern as women were rarely in positions of sufficient political power to be confident of their land rights to land. So women fallowed their plots less than their husbands, and achieved much lower yields (Goldstein and Udry, 2008).

The difficulty associated with access to land for agricultural, industrial, commercial and residential development purposes due to conflicting and often undocumented claims to ownership, and varied outmoded land disposal procedures, is limited investment. This is evidenced by the numerous land disputes and conflicts in the country. There were over 40,000

land tenure disputes pending before the courts in the mid-2000s and some of them could take decades to be resolved if alternative dispute/conflict resolution measures are not taken.

To compound the adverse cumulative effect of the number of issues facing land administration in the country, Ghana lacks up-to-date maps to support, among others, critical on-going land administration operations in support of agriculture, forestry, environment management, urban and regional planning, municipal services and administration, and infrastructure systems (such as electricity, telecommunications, and water).

Forests. Forests have a multitude of functions, uses and values. In its 2005 global forest resources assessment report, the United Nations Food and Agriculture Organization (UNFAO) provided data to show the designated function of forests and other wooded land from 1990 to 2005 (see Table A2 below). The protective functions of forests are worth noting and these are described to range from soil and water conversation, desertification control, and coastal protection, among others. The global assessment also indicated that roundwood removals in 2005 were forecast at a value of around $64 billion, mainly due to industrial roundwood. A very conservative forecast value of non-wood forest products amounted to $4.7 billion in 2005. In Ghana such non-timber forest products include among others the following: fruit trees, honey, bee waxes, wood fuel; live animals and bush meat; plant-based oil, shea butter, essential oils and fats; medicinal plants and herbal medicines; bamboo and rattan products; natural insecticides and natural dyes (Ghana Forest Research Institute).

Table A2 - Designated Function of Forest and Other Wooded Land

	Area (1000 hectares)					
	Primary Function			**Total Area with function**		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Forest production	1,694	1,386	1,255	1,696	1,386	125
Protection of soil and	353	353	353	353	353	353
Conservation of	43	43	43	43	43	43
Social services	89	73	66	89	73	66
No or unknown function	5,269	4,923	3,800	-----	-----	-----
Total forest	7,448	6,094	3,800	-----	-----	-----

Source: UNFAO (2005).

Ghana's forest resources are linked to the micro- and macro-climate, water and soil resources, genetic resources of plants and animals, food production and food security, and to energy resources. They are also important to the economic and socio-cultural environment of local communities and of the country. Table A3 below gives some statistics on wood production and trade. The high volume of wood used as fuel from 1996 to 1998 is noteworthy.

Table A3 - Wood Production and Trade

Annual roundwood production	Ghana	Sub-Saharan Africa	World
Total, 1996 -1998 (000 m^3)	21,931	512,491	3,261,621
Fuel, 1996 – 1998 (000 m^3)	20,678	445,783	1,739,504
Industrial, 1996 -1998 (000 m^3)	1,253	66,709	1,522,116
Wood- based panels, 1996-1998 (000 m^3)	136	1,630	151,390
Paper and paperboard, 1996 -1998 (000 m^3)	….	…	313,206
Recovered paper, 1996-1998 (000 m^3)	….	….	126,404
Average value of trade in forest products			
Imports, 1996-1998 (thousand US$)	15,808	980,339	142,932,629
Exports, 1996-1998 (thousand US$)	144,719	2,628,858	135,313,009

Source: Earth Trends (2003).

According to the Ghana Forestry Commission, about 17 percent of the 23.85 million hectares of land in Ghana is dedicated to forest and wildlife management (Ghana Forestry Commission). The gazetted permanent forest reserves and wildlife protected areas cover 11 percent and 6 percent respectively of the total land area. Table A4 below shows the steady reduction of the land area covered by forests in the country. Ghana has one of the highest deforestation rates in Africa at two percent annually (United Nations, 2007).

Table A4 - The Proportion of Land Area Covered by Forests

Years	1990	1995	2000	2005	2006	2007
Forest area (percent of	33	30	27	24	20	21

Source: World Bank/IMF (2009)

Table A5 - Forests, Grasslands, and Drylands

Forest Area and Change	Ghana	Sub-Saharan Africa	World
Total forest area, 2000 (000 ha)	6,335	486,571	3,869,455
Natural forest area, 2000 (000 ha)	6,259	478,576	3,682,722
Plantations area, 2000 (000 ha)	76	6,210	186,733
Total dryland area, 1950 – 1981 (000 ha)	15,892	1,120,649	5,059,984
Change in forest area:			
Total, 1990 - 2000	-16%	-9%	-2%
Natural, 1990 - 2000	-16%	…	-4%
Plantations, 1990 – 2000	3%	…	3%
Original forest {b} as a percent of total land area	66%	…..	48%
Forest area in 2000 as a percent of total land area	27%	20%	29%

Source: Earth Trends, 2003

This is also shown by the high rate of deforestation in Ghana relative to comparator countries (see Table A6 below). In less than 50 years, Ghana's primary rain forest has been reduced by 90

per cent, and between 1990 and 2005, the country lost 26 per cent of its forest cover (UNEP, 2008).

Table A6 - Data on Comparator Countries (Forest Area and Agricultural Land)

	Forest Area (1000 sq. km.)		**Agricultural Land (Percent of land area)**	
	2000	**2005**	**2000**	**2005**
Kenya	35.8	35.2	46.7	47.4
Bangladesh	8.8	8.7	69.8	69.5
Benin	26.8	23.5	28.9	32.2
Senegal	89.0	86.7	45.5	45.8
Tanzania	373.2	352.6	38.4	39.2
Ghana	60.9	55.2	63.5	65.3
Cote D'Ivoire			61.6	62.9
Vietnam	117.3	129.3	28.2	32.4
Cape Verde	0.8	0.8	17.6	19.1
Morocco	43.3	43.6	68.7	67.2
Sri Lanka	20.8	19.3	36.4	37.3
Mongolia	106.7	102.5	84.0	74.2
Malaysia	215.9	208.9	24.0	24.0
Thailand	148.1	145.2	38.8	38.4
Korea, Rep	63.0	62.7	20.0	19.4
Botswana	125.4	119.4	45.8	45.6
Ecuador	118.4	108.5	29.1	27.1

Source: World Bank (2011).

Apart from the physical disappearance of forest cover, the integrity of the forest remnants is also threatened. About 70 percent of the forest reserves are reportedly degraded. UNEP's publication *Africa – Atlas of Our Changing Environment* clearly illustrates the extent to which the vegetation inside and outside the forest reserves in Southwestern Ghana had been degraded over a thirty year period (1973 – 2003). Satellite imageries showed the extent of decimation of parts of the forests. In spite of the enormous ecological benefits of the forest and the efforts being made to sustainably manage the reserves, shifting cultivation, uncontrolled logging, surface mining, charcoal production, and increasing population place enormous pressure on these remnants of tropical forests in the country.

It is well known that worse forms of degradation are taking place in the forest and savannah ecosystems outside the Reserves. Ghana's forests continue to be threatened by a combination of

factors, including extensive agriculture, commercial harvesting, increased fuelwood collection, illegal mining in particular, and bushfires.

The increasing use of fuelwood is worthy of note because wood for fuel is obtained mainly from natural ecosystems rather than from plantations. According to the Ghana Energy Commission, total primary energy produced in Ghana in 2000 was 6.2 million tonnes of oil equivalent, about eleven and half times the yearly average energy generated at Akosombo and Kpong hydroelectric plants. This rose to 6.2 million tonnes of oil equivalent by 2004. Primary indigenous energy comprised 90-95 percent woodfuels (i.e. biomass), 5-10 percent hydro energy and less than one percent solar energy. The share of woodfuel in the energy supply mix of the country increased from about 60 percent in 2000 to almost 67 percent in 2004.

Biodiversity. The biodiversity of Ghana is contained in habitats distributed within a very large expanse of terrestrial and aquatic ecosystems. The terrestrial ecosystems are made up of forests and savannas in which are a large distribution of other land uses including protected areas, reserves, agricultural lands and settlements. The aquatic ecosystems including their wetlands are made up of inland fresh water systems consisting of dams, ponds, rivers, streams, reservoirs, estuaries, and marine and coastal water systems made up of lagoons, tidal pools and the open seas.

Table A7 - Ecosystems in Ghana

Ecosystem Areas by Type	Ghana	Sub-Saharan Africa	World
Total land area	23,854	2,429,241	13,328,979
Percent of total land area covered by:			
Forests	7%	15%	24%
Shrublands, savanna, and grasslands	64%	50%	37%
Copland and crop/natural vegetation mosaic	22%	15%	20%
Urban and built –up areas	…	…	…
Sparse or barren vegetation; snow and ice	2%	18%	16%
Wetlands and water bodies	5%	2%	3%

Source: Earth Trends, 2003

Each of these ecosystems is characterized by very distinctive species which provide the genetic diversity base of the country. It is the utilization of these species and their accompanying genetic resources that has been the source of livelihoods for the people and is contributing to the total wellbeing of Ghanaians. There is no doubt therefore about the importance of these biodiversity components for the survival of the people of Ghana (Ghana Ministry of

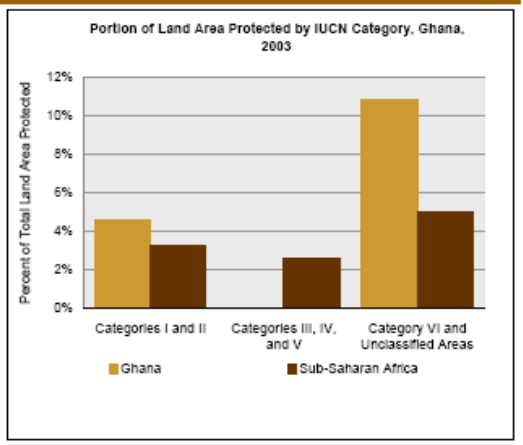
Environment, Science, and Technology, 2011). There has been significant biodiversity loss in the country over the years and this is well documented.

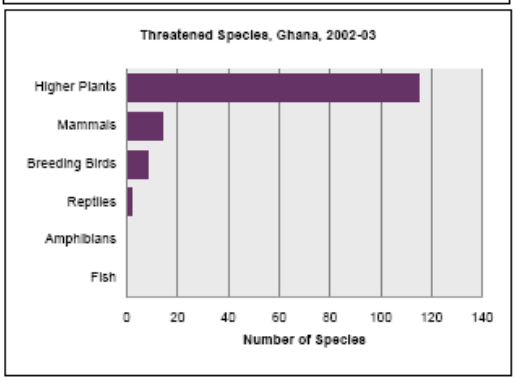
Data on biodiversity and protected areas in Ghana are shown above. It is noteworthy that there is yet no marine protected area in Ghana. The continued absence of a marine park in the country should be addressed in view of its importance to the sustainability of the fishing industry.

Biodiversity and Protected Areas-- Ghana

EarthTrends Country Profiles

	Ghana	Sub-Saharan Africa	World
Total Land Area (000 ha)	23,854	2,429,241	13,328,979
Protected Areas			
Extent of Protected Areas by IUCN Category (000 ha), 2003:			
Nature Reserves, Wilderness Areas, and National Parks (categories I and II)	1,097	78,828	438,448
Natural Monuments, Species Management Areas, and Protected Landscapes and Seascapes (categories III, IV, and V)	7	63,482	326,503
Areas Managed for Sustainable Use and Unclassified Areas (category VI and "other")	2,583	122,080	692,723
Total Area Protected (all categories)	3,687	264,390	1,457,674
Marine and Littoral Protected Areas {a}	X	X	417,970
Protected Areas as a Percent of Total Land Area, 2003 {b}	15.4%	10.9%	10.8%
Number of Protected Areas, 2003	321	6,867	98,400
Number of Areas >100,000 ha, 2003	4	425	2,091
Number of Areas > 1 million ha, 2003	X	50	243
Wetlands of International Importance (Ramsar Sites), 2002:			
Number of Sites	6	X	1,179
Total Area (000 ha)	178	X	102,283
Biosphere Reserves, 2002			
Number of Sites	1	46	408
Total Area (000 ha)	8	X	439,000
Number and Status of Species			
Higher Plants			
Total known species (number), 1992-2002	3,725	X	X
Number of threatened species, 2002	115	X	5,714
Mammals			
Total known species (number), 1992-2002	222	X	X
Number of threatened species, 2002	14	X	1,137
Breeding Birds			
Total known species (number), 1992-2002	206	X	X
Number of threatened species, 2002	8	X	1,192





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Water resources. Ghana's water resources are derived from surface and ground water sources. The surface sources are from three main river systems, namely: Volta, South Western and Coastal river systems. Lake Bosumtwi, a meteoric crater lake, is the only significant natural freshwater lake in Ghana. Generally, rainfall decreases from the south-west of the country (2,000 mm/year, or 80 inches/year) towards the north (950 mm/year, or 38 inches/year) and the south east (800 mm/year, or 32 inches/year). The Volta Lake, a man-made lake, has generally north-south orientation with an average length and width of 400 km and 25 km respectively, and surface area coverage of about 8,730 km^2.

Wetlands constitute about 10 percent of Ghana's total land area. The three main types of wetlands are: i) marine/coastal wetlands; iii) inland wetlands; iii) human-made wetlands. Wetlands in Ghana are very productive and their resources have been traditionally used by local populations as a source of the basic necessities of life, ranging from building materials, hunting, and fishing areas, to sources of water for humans and livestock. Local populations have developed traditional knowledge systems and practices that govern the management of wetlands. Ghana is a signatory to the Ramsar Convention and there are five Ramsar sites of international importance in the country: i) Densu Delta; ii) Songor; iii) Keta Complex; iv) Muni-Pomadze; v) Sakumo Lagoons. All these are protected areas and they have been gazetted as such. Other wetlands located in the forest and wildlife reserves of the Mole National Park, Black Volta, Sene, Bia, and Owabi Wildlife Sanctuaries are protected too. Some wetlands, which fall outside the conserved wetland areas, are subject to traditional conservation practices such as the rivers Ankobra and Pra. The two most important lakes in the country are Lake Volta and Lake Bosomtwi in the Ashanti region.

Ghana's total annual runoff is 56.4 billion cubic metres with the Volta River accounting for 41.6 billion cubic metres. The mean annual runoff from the country alone is about 40 billion cubic metres. The Volta, South Western and Coastal systems contribute 65 percent, 29 percent and 6 percent respectively, of this runoff. The runoffs are characterized by wide disparities between the wet season and dry season flows. The total water available from surface water sources is 39.4 billion cubic metres per annum (National Water Policy Document). Furthermore there are water deficits in some parts of the country not drained by the above-mentioned river systems.
The chart below shows that Ghana's total actual renewable water resources are estimated to be 53.2 cubic kilometres per year (km^3/yr), of which 30.3 km^3/yr are internally produced. The internally produced surface water amounts to 29 km^3/yr, while groundwater is estimated at 26.3 km^3/yr. The overlap between surface water and groundwater is estimated at 25 km^3/yr. About 22.9 km^3 of surface water enter the country annually, of which 8.7 km^3 come from Burkina Faso, 6.2 km^3 from Côte d'Ivoire and 8 km^3 from Togo.

The Akosombo Dam was completed in the mid-1960s and impounds the Volta River to form Lake Volta, one of the largest artificial lakes in the world. The hydropower capacity of the dam is 912 megawatts (MW). Lake Volta has a surface area of 8,502 km^2, a maximum depth of 91 m and a capacity of 147.96 km^3. The total dam capacity of the country is 148.5 km^3.

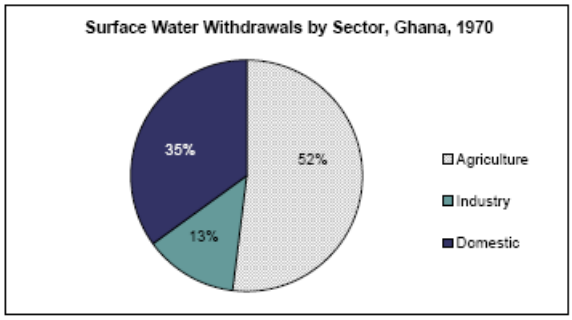
Ghana is underlain by three main geological formations, namely the basement complex comprising crystalline igneous and metamorphic rocks; the consolidated sedimentary formations underlying the Volta basin (including the limestone horizon); and the Mesozoic and Cenozoic sedimentary rocks. These formations represent 54, 45 and 1 percent of the country respectively. The depth of aquifers in the basement complex and the Volta basin is normally between 10m to 60m with yields rarely exceeding 6 m^3. The aquifer depths in the Mesozoic and Cenozoic formations are usually between 6 and 120m with average yields of about 184m^3/h, particularly in the limestone aquifer. Groundwater occurrences in limestone formations, which also exist, are much deeper located, typically in the range of 120m to 300m. The average yield in the limestone formation is 180m^3/h.

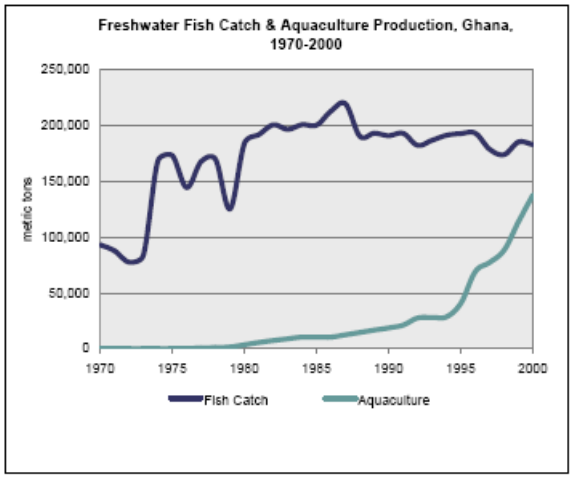
The main consumptive uses of water in Ghana are water supply, irrigation and livestock watering. On the basis of surface water resources alone, the consumptive water demand for 2020 has been projected to be 5 billion m^3, which is equivalent to only some 12 percent of the total surface water resources.

Water Resources and Freshwater Ecosystems-- Ghana

EarthTrends Country Profiles

Internal Renewable Water Resources (IRWR),1977-2001, in cubic km	Ghana	Sub-Saharan Africa
Surface water produced internally	29	3,812
Groundwater recharge	26	1,549
Overlap (shared by groundwater and surface water)	25	1,468
Total internal renewable water resources (surface water + groundwater - overlap)	30	3,901
Per capita IRWR, 2001 (cubic meters)	1,502	5,705
Natural Renewable Water Resources (includes flows from other countries)		
Total, 1977-2001 (cubic km)	53	X
Per capita, 2002 (cubic meters per person)	2,637	X
Annual river flows:		
From other countries (cubic km)	23	X
To other countries (cubic km)	X	X
Water Withdrawals		
Year of withdrawal data	1970	
Total withdrawals (cubic km)	0.3	X
Withdrawals per capita (cubic m)	35	X
Withdrawals as a percentage of actual renewable water resources	1.3%	X
Withdrawals by sector (as a percent of total) (a)		
Agriculture	52%	X
Industry	13%	X
Domestic	35%	X
Desalination (various years)		
Desalinated water production (million m^3)	0	X
Freshwater Fish Species, 1990s		
Total number of species	X	X
Number of threatened species	0	X





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Notwithstanding the availability of water to meet water supply, there are deficits in coverage. Climate change and variability are expected to worsen the deficits in future. While urban water supply coverage is estimated at 55 percent (2004), the rural and small town coverage is 51.6 percent (2004). With respect to irrigation, the projected demand by 2020 is about 400,000 m^3, to cover a projected area of 100,000 hectares.

Table A8 - Data on Comparator Countries (Freshwater)

	Internal renewable freshwater resources		Annual freshwater withdrawals					Water productivity
	Flows billion m^3	Per capita m^3	Billion m^3	% of internal resources	% for agriculture	% for industry	% for domestic	GDP/water use 2000 $ per m^3
	2007	2007	2007	2007	2007	2007	2007	2007
Kenya	21	548	2.7	13.2	79	4	17	6
Bangladesh	105	666	79.4	75.6	96	1	3	1
Benin	10	1,227	0.1	1.3	45	23	32	23
Senegal	26	99	23.7	…	88	3	9	10
Tanzania	84	2,035	5.2	6.2	89	0	10	3
Ghana	**30**	**1,325**	**1.0**	**3.2**	**66**	**10**	**24**	**7**
Cote D'Ivoire	77	3,819	0.9	1.2	65	12	24	11
Vietnam	367	4,304	71.4	19.5	68	24	8	1
Cape Verde	….	….	…	….	….	….	….	….
Morocco	29	929	12.6	43.4	87	3	10	4
Sri Lanka	50	2,499	12.6	25.2	95	2	2	2
Mongolia	35	13,326	0.4	1.3	52	27	20	4
Malaysia	580	21,841	9.0	1.6	62	21	17	15
Thailand	84	3,135	87.1	41.5	95	2	2	2
Korea, Rep	65	1,338	18.6	28.7	48	16	36	40
Botswana	2	1,268	0.2	8.1	41	18	41	41
Ecuador	432	32,379	17.0	3.9	82	5	12	1
Ghana	**30**	**1,325**	**1.0**	**3.2**	**66**	**10**	**24**	**7**
Low Income	4,418	5,452	240.9	5.6	93	2	5	1
Sub-Saharan Africa	3,858	4,826	120.5	3.2	87	3	10	4
Middle income	29,421	6,271	2,672.1	9.1	78	14	9	3
High Income	9,624	9,017	937	10.5	42	43	15	32

Source: World Bank, (2011).

Table A9 - Irrigated Land for Selected Comparator Countries

Country Name	Irrigated Area (ha.)	Share of irrigation potential (percent)
Kenya	103,203	29
Benin	12,258	4
Senegal	119,680	29
Tanzania	184,330	67
Ghana	30,900	2
Cape Verde	2,780	89
Morocco	1,484,160	89
Botswana	1,439	11

Source: UNFAO, 2007 (cited in World Bank, 2008__)

The main non-consumptive uses are inland fisheries, water transport and hydropower generations. Impoundment and reservoirs have been constructed for hydropower generation, potable water supply and irrigation. There is widespread pollution of surface water bodies due to the discharge of all manner of wastes into such water bodies without any form of treatment.

Marine and Coastal Ecosystems. The geographical scope of Ghana's coastal zone formally includes a land area extending to the 30 metre contour, and a coastal offshore shelf area to the 100 fathom depth. As a proxy for watershed boundaries that might influence the coastal areas, a 'management zone' includes all areas below the 75 metre contour. A World Bank assessment of the environmental, economic and social implications and extent of a number of potential problems facing the coastal zone that were narrowed down to five high and moderate priority problem areas included the following: (i) domestic sanitation; (ii) fisheries degradation; (iii) wetland and mangrove degradation; (iv) industrial water pollution; and (v) coastal erosion (World Bank, 1997). The assessment showed that by 2020, pollution in majority of the coastal districts will range from extreme to a high category if urgent interventions were not made.

Ghana's coastal ecosystems and marine biodiversity, like that of many African countries, contribute significantly to the economy of the country. The coastal and marine resources contribute to the revenue of the country through, among others, fishing, tourism, manufacturing, and mining. Mangroves have high ecological and socio-economic importance.

Nevertheless these resources are under increasing threat from human activities. The uncontrolled urbanization of the coastal zone is a major cause of such degradation. The relatively high population and over-concentration of industries in the coastal zone have exacerbated the environmental pressures in both the coastal and marine zones. The main

sources of pollution are municipal, industrial effluents and agricultural runoffs. Climate change is expected to cause sea level rise and also exacerbate the adverse effects of sea erosion of Ghana's coastline in future. These are matters that require urgent attention.

The Chemu Lagoon, for example, is grossly polluted with high nutrient loads. Table below shows the levels of some parameters in the waters of the Lagoon in comparison with natural levels (i.e. sea water). The Lagoon is heavily polluted because there are several factories including fish canning, food processing, oil refining, car assembly and aluminum processing plants located in the environs of the lagoon. It is noteworthy that the dissolved oxygen content of the lagoon was found to be 0.0 mg/l while that of the sea water was 9.2mg/l at high tide and 6.7 mg/l at low tide. This meant that the waters of the Chemu II therefore could not support life. The Korle Lagoon is also heavily polluted. Manufacturing industries, including food processing, textiles, metals and chemical industry are sited in the catchment area of the Korle Lagoon and the Odaw River. Out of the total of 2,703 industrial enterprises in the Greater Accra Region, about 30 percent are located in the catchment area of the lagoon. The major channels are interconnected by a network of medium and smaller sized drains that are mostly uncovered and used for the disposal of untreated domestic and industrial effluents, which are ultimately flushed into the lagoon by floodwaters. In addition, there are a number of small scale and artisanal workshops that discharge effluents into a network of drains feeding the lagoon. It is estimated that the small garages dispose about 50 gallons of spent oil per day (approximately 50-60 tonnes/yr) into drains, which are flushed into the Lagoon. As a result, the Lagoon has become grossly polluted with very high biochemical and bacteriological quantities. The total daily Biological Oxygen Demand Loads (BOD_5), which enters the different catchments of the Greater Accra Metropolitan Area, has been estimated at 140 x 103 kg with 60 percent of this amount going into the Odaw/Korle/Chemu II (Biney, 1991). Asante et al. (2003) concluded in their study that the water quality was worst at Abossey Okai Road and Graphic Road, where the number of faecal coliforms were highest and dissolved oxygen concentration remained at 0.0 mg/l. In general, Korle Lagoon showed very high bacterial density with faecal coliform values ranging from 0.24 x 10^3 counts/100 ml at Riviera Beach to 8.6 x 10^3 counts/100 ml at Abossey Okai road (GCLME).

Table A10 - Physico-Chemical Characterization of Canalized and Uncanalized Sections of Chemu II Lagoon and Adjoining Seawater, 1994

	MAIN LAGOON		CANALISED SECTION		SEA WATER	
PARAMETRE/ POLLUTION INDICATOR	**High Tide**	**Low Tide**	**High Tide**	**Low Tide**	**High Tide**	**Low Tide**
pH	10.0	8.60	8.30	8.60	7.90	7.20
Temp (ºC)	35.0	33.5	35.0	33.5	33.0	30.5
Suspended Solids (mg/l)	124	46.0	117	147.5	15.0	2.0
Turbidity (NTU)	1040	55.0	135	143	2.0	5.0
Dissolved Oxygen (DO)(mg/l)	0.0	0.0	0.0	0.0	9.2	6.7
BOD (mg/l)	240	120	128	104	5.76	5.26
Nitrate, NO_3-N (mg/l)	0.36	0.35	0.20	0.28	0.32	0.27
Ammonia, NH_3-N (mg/l)	12.6	7.74	11.1	2.24	5.15	1.18
Phosphate PO4-P (mg/l)	2.85	0.88	2.51	0.78	0.16	0.08

Source: Ghana Environmental Protection Agency (1994).

The discharge of nutrients into coastal waters is a major cause of nutrient enrichment (eutrophication), especially in areas of limited water circulation. Nutrient enrichment is an increasing concern in Ghana and in the West African Sub-Region at large. The main nutrients are nitrogen and phosphorus compounds, and they enter coastal waters from point sources and non-point sources. Eutrophication impacts relate mainly to the attractiveness for recreation and sporting activities; the presence of toxic metabolites; and the presence of taste- and odour-causing compounds. The natural biotic system may be disturbed by the modification of the water's physical characteristics (such as lower light penetration) and modification to the natural water chemistry (e.g. lower oxygen stress, elevated pH). Anthropogenic sources of trace metals may include industrial discharges (e.g., metal fishing and plating industries), mine drainage and atmospheric deposition (lead from vehicle emissions). The case of lagoon nutrients in Ghana is shown in Table A12 below.

Table A12 Nutrient Levels of the Lagoon Waters

Location of Lagoon	NH_4-N mg/l	NO_3-N mg/l	NO_2-N mg/l	PO_4-P mg/l	SiO_2 mg/l
Keta	0.120	0.255	0.010	0.015	2.50
Songhor	0.015	0.165	< 0.001	0.030	1.20
Benya	0.460	0.500	< 0.001	0.135	4.70
Amisa	0.497	0.001	< 0.001	0.010	1.30
Oyibi	6.110	0.804	< 0.001	0.145	5.20
Kuntu	1.440	0.081	0.008	0.016	4.20
Apam	0.372	1.260	0.001	0.103	1.30
Nyanya	0.739	0.085	0.001	0.020	2.50
Background Levels	0.300-0.500	10.0	10.0	0.0-5.0	10-15

Source: Water Resources Institute (2005).

Most of the ammonium levels were higher than their background levels because of the impact of human activities on the lagoon waters, including those at Nyanyano (0.739 mg/L), Benya (0.460 mg/L) and Amisa (0.497 mg/L) (Ansa-Asare et al., 1995). Asante et al. (2003) concluded in their study that the Korle Lagoon contributes nutrient loads to the inshore waters, reflecting the impact of domestic and industrial wastes as main pollution sources.

Minerals. Ghana is well-endowed with mineral resources and has a relatively well-established mining sector. The mining industry of Ghana accounts for 5 percent of the country's GDP and minerals make up 37 percent of total exports, of which gold contributes about 95 percent of the total mineral exports. Thus, the main focus of Ghana's mining and minerals development industry remains focused on gold. The other mineral exports from Ghana include bauxite, manganese, diamonds and lately crude oil. Ghana has a large potential for solar salt production along the coastline from Elmina to Keta. There is ready market for salt in the West Africa sub-region, particularly in Nigeria. Potential also exists for the use of part of the salt to produce caustic soda for the proposed bauxite/alumina industry and for a petrochemicals industry. Salt production and related industries are projects that investors with the technical know-how would wish to consider.

Investment in the mining sector has been more than all the other sectors combined. Total investment into the minerals and mining sector from 1994 to 2008 amounted to about $6.7 billion. This has led to corollary benefits of expansion in the economy. Out of this, foreign investment represents about 95 percent. Comparatively, investment into other sectors of the economy as captured by the Ghana Investment Promotion Centre (GIPC) for agriculture, manufacturing, service, tourism, export trade and building and construction – amounted to about $4.5 billion. Again FDI accounted for about 94 percent of this figure, and is largely attributable to the high 2008 inflow that was due mainly to investment from Vodafone ($1.29 billion) in the country's communication sector (Mining Journal, 2010).

Table A13 - Trends in Traditional Minerals

Year	Gold ('000 oz)	Diamonds ('000 ct)	Bauxite ('000 t)	Manganese ('000 t)
1984	282	346	44	268
1990	541	637	369	245
1995	1,716	632	530	188
2000	2,457	878	504	896
2005	2,139	1,065	973	1,720
2008	2,797	599	574	1,261

The Table above shows the trend in the production of gold, diamonds, bauxite and manganese. The annual gold production increased significantly from 1984 to 2008. At least 40 percent of the annual export revenues generated by mining from 2005 to 2009 were repatriated back to Ghana. From 2005 to 2009, an average of 54 percent of mineral export revenues was repatriated into the country (Mining Journal, March 2010).

Table A13 - Contribution of Mining to Government Revenue

Year	Corporate tax	Mineral royalties	PAYE	Other	Total IRS collection	Mining/ total IRS
	GHc'000	GHc'000	GHc'000	GHc'000	GHc million	Percent
2004	10,033	21,574	13,436	5,318	533.3	9.4
2005	26,989	23,595	15,437	14,462	644.6	12.5
2006	21,566	31,625	18,271	1,583	734.1	10.0
2007	47,416	40,882	34,587	137	910.2	13.5
2008	73,555	59,006	47,139	278	1,222.5	14.7
Total	**179,559**	**176,682**	**128,870**	**21,778**	**4,044.8**	**12.0**

Source: Ghana Internal Revenue Service

Revenue collected by the Internal Revenue Service accounts for 40 percent of government revenue (IRS, 2010). According to the Mining Journal, between 1990 and 2008 the mining sector contributed an average of over 12 percent of such government revenue annually, especially in the form of corporate and personal income taxes and royalties (see Table A13 above). The sector has contributed on average 98 percent (GHc59 million in 2008) of the total royalties paid to government for the past decade.

The contribution of mining to Ghana's economy will even be further enhanced if industrial minerals production in the country is promoted since the production of such minerals has a greater multiplier effect in the local economy. As stated above, the production of salt can lead to chlor-alkali and related industries. Development of limestone deposits in the country to produce cement, for example, is worthy of consideration.

It is worth noting however that there is environmental cost associated with mining. The cost of environmental degradation from mining to Ghanaians and the country's economy is yet to be determined. Land degradation and pollution from mine discharges are well-documented.

Annex B – SUMMARY OF COMMENTS AND ISSUES RAISED DURING PUBLIC CONSULTATIONS ON CONSTRAINTS ANALYSIS REPORT

As part of the process for the development of Compact 2, the Constraints Analysis report was widely distributed to the public and private sectors. A series of consultative fora were held with targeted stakeholders in August 2011 as per schedule below.

1. Non-governmental Organizations and Civil Society Groups	August 12
2. Private Sector Institutions	August 16
3. Public Sector Institutions	August 17
4. Political Parties/Parliamentarians/Media	August 18

The fora provided the opportunity for the various stakeholder groups to make comments and provide feedback on the Ghana Constraints Analysis. A synopsis of the inputs obtained from each group is provided below.

Non-governmental Organizations and Civil Societies

- Private sector capacity in Ghana is low, it should be one of the factors under 'low private investments'
- Low cost of finance - crowding out effect of the public finances must be considered.
- There is human capital deficiency in Ghana and should be a binding constraint.
- Where does technology feature in this study?
- Infrastructure deficit exist in the country, for example the roads sector
- There is the need to focus on growth as a national strategy in development
- Public sector investment is what has driven growth – aid has not been directed at promoting growth. The efficiency of public versus private investment needs to be examined.
- We need to look at the terms of procuring financing for growth
- Government failures in economic management and governance are key problems.

- Another issue for consideration is the poor management of fiscal resources and the need for a long term development plan for the nation
- How does this work tie in with the current medium term development plan- Ghana Shared Growth and Development Agenda (GSGDA)?
- It is important to provide credible information to allow informed choices and investment decisions. The media angle should be taken more seriously.
- General agreement with the report on the binding constraints identified.

Private Sector Institutions

- There is mismatch between industry and academia. Poor quality of human capital is driving investors to seek workers from outside Ghana.
- Human capital as a constraint needs a second look e.g. the global competiveness report rates Ghana very low in terms of human capital.
- Technical education very low – there seems to be more business than technical schools.
- Illicit and counterfeit products have resulted in flooding of our markets with low quality products. For example, the textile industry is dying as a result of cheap quality textiles from outside.
- Legal/tax regimes are disincentive to business in Ghana. Legal process very slow despite the existence of commercial courts
- How do we distinguish between the public and private sector investor – because government financing comes from the private sector?
- Private sector investment is in the real estate sector – mostly in residential estates
- We need energy and water bonds in the market
- There was general agreement with the conclusions of the Constraints Analysis report and the three binding constraints identified.

Public sector institutions

- What evidence was used for the analysis – concrete evidence or perceptions? Was trade deficit considered as a constraint?
- Why link only the private sector to growth, how about attitudes of citizens?
- There should be more investment in the Tourism industry
- Discussion on corruption in the public should also focus on the public servants not on politicians alone
- The view that government is crowding out private sector should be re-examined. It was suggested that currently government is not crowding out the private sector.
- There could be price fixing within the banking sector. Do more analysis on the banking sector.
- Use current data on natural resource management for the analysis.
- Where do we place security?
- Surprised that I.C.T., roads and human capital are not binding constraints.
- There is the need to reexamine the roads classification in the report. Ghana has a haulage economy and analysis on the road sector needs to be looked at again.
- All groups agreed with the CA conclusions and the three binding constraints recommended. In addition, road infrastructure and human capital came up strongly in the discussions

Political parties/Media and other agencies

- Not convinced that human capital is not a binding constraint it should be reexamined.
- How do we circumvent transport to pass the third test as a binding constraint?
- Transportation should be considered as binding constraint. Poor road infrastructure and its effects on production calls for reconsideration as a binding constraint – e.g. beverage producers will consider transport as a binding constraint
- There has to be a mix between the private and public investment.
- Irrigation is key to get private sector into the agriculture sector. What structures are being put in place to promote marketing of products?

- Water in many urban areas is a ‘major’ constraint
- Growth remains precarious because of political will of government. This calls for greater government commitment and strong political will
- All the break-out groups agreed with the Constraints Analysis conclusions and recommendations. In addition, road infrastructure, water and human capital came up strongly in the discussions as worthy of further consideration.

Annex C – List of attendees at the Public consultations

	NAME	AFFILIATION
1	Dr. J. L. S. ABBEY	Centre for Economic Policy Analysis
2	Mr. Dominic ABORAAH	Ministry of Foreign Affairs
3	Miss Rhoda ACHEAMPONG	CDD-Ghana
4	Mr. Victor ADAJIE	Ministry of Communications.
5	Mr. E.N ADJEI	Ministry of Foreign Affairs
6	Mr. Solomon ADJETEY	Ministry of Health
7	Dr. Charles AFETORNU	Ministry of Roads and Highways
8	Mr. Kwame AFFARI	TV3
9	Mr. Maxwell AGYEI ASHON	CDD-Ghana
10	Dr. T. M AKABZAA	Ministry of Energy
11	Mrs. Elizabeth AKPAH	Convention Peoples' Party
12	Mr. Samuel AMANKWAH	Ministry of Interior
13	Mr. John AMEKAH	Democratic Freedom Party
14	Dr. Benjamin AMOAH	Bank Of Ghana
15	Mr. Kodwo Edisi AMPOFO	Emos Consultancy/Compact II Core Team
16	Mr. Joseph AMUAH	Ghana Employers' Association
17	Mr. Nii ANSAH-ADJAYE	Ministry of Trade & Industry
18	Mr. Adu A. ANTWI	Securities E. Exchange(SEC)
19	Miss Abena ANTWI	Ministry of Environment Science and Technology
20	Mr. E. APPAH-SAMPONG	Environmental Protection Agency
21	Mr. Kofi ATAKLI	Ministry of Finance and Economic Planning
22	Dr. Albert ASAMOA-BAAH	MOFEP/Compact II Core Team Member
23	Mrs. Julie ASANTE	Compact II Core Team Member
24	Mr. Nana K. ASANTE	Okay FM
25	Mr. E.N.K ASHONG	Department of feeder Roads
26	Mr. Emmanuel ATTAFUA-DANSO	New .Patriotic .Party
27	Mr. Sammy-Longman ATTAKUMA	Ministry of Water Resources. Works and Housing
28	Mrs. Efua AYANFUL	Ministry of Women & Children Affairs
29	Dr. Raymond B. BABANAWO	Ministry of Environment Science and Technology
30	Mr. George BLANKSON	Ghana Revenue Authority
31	Mr. Bright BLEWOO	Ghana Journalist's Association
32	Hon. Akua Sena DANSUA	Ministry of Tourism
33	Dr. Robert DARKO OSEI	University of Ghana/Compact II Core Team
34	Mr. Bruno DERY	NDPC/ Compact II Core Team Member
35	Dr. Eric E. DONYINA	Public Utilities Regulatory Commission

	NAME	AFFILIATION
36	Mr. Sam DOWUONA	Adom/Asempa FM
37	Mr. Robert DWAMENA	Electricity Company of Ghana
38	Ms. Deidra FAIR	Millennium Challenge Corporation
39	Mr. R. K. FEGLO	Public Works Department
40	Miss Araba FORSON	e.TV Ghana
41	Mr. Abdulai FUHLANBA	New Patriotic Party
42	Hon. Inusah FUSEINI	Ministry of Energy
43	Mr. James Kofi GABIANU	Ministry of Chieftaincy & Culture
44	Mr. Emmanuel GARTI	Policy Planning Monitoring & Evaluation. Ministry of Food & Agriculture
45	Mr. Kwame JANTUAH	Convention Peoples' Party
46	Mr. Komla KLUTSE	TV3
47	Mr. N.O. KOAS	Public Utilities Regulatory Commission
48	Ms. Maame A. KOOMSON	Peace FM
49	H.A KUMA	Ministry of Tourism
50	Dr. J. K. KWAKYE	Institute for Economic Affairs
51	Mr. M. O. MANTEAW	Public Works Department
52	Dr. Maureen MARTEY	Ministry Of Health
53	Gp. Captain A.K MENSAH	Ghana Armed Forces
54	Mr. Anthony MINLA	Ghana Revenue Authority
55	Maj Gen Carl MODEY	Ghana Revenue Authority (Customs Division)
56	Mr. Roland A. MODEY	Ministry of Interior
57	Mr. Atik MOHAMMED	People's National Convention
58	Mrs. Katerina NTEP	Millennium Challenge Corporation
59	Mrs. Esther NUOTUO	Ministry of Chieftaincy and Culture
60	Mr.Bernard A.K NYATEFE	Electricity Company of Ghana
61	Mr. Emmanuel OFORI	Ministry of Communication
62	Mrs. Adwoa OFORI- ADARKWA	Ministry of Defence
63	Mr. Martin OKECHUKU	Hot FM
64	Mr. Ken OKWABI	Securities Exchange Commission
65	Mrs Comfort Boahene OSAFO	Ghana Revenue Authority DTRD
66	Mr. Ken OWUSU	NDPC/ Compact II Core Team Member
67	Mr. Osei PIESIE-ANTO	Democratic Freedom Party
68	Mr. Nanabanyin PRATT	GIMPA/ Compact II Core Team Member
69	Prof. Samuel K. SEFA-DEDEH	University of Ghana/National Coordinator Compact II Core Team
70	Mr. K. Edem SENANU	Africa 2000 Network
71	Mr. Glenn SLOCUM	USAID
72	Mr. Fred SMITH	e. TV
73	Dr. Joel SONNE	Ministry of Tourism
74	Mr. Alhassan S. SUHUYINI	Radio Gold
75	Mr. Philip TETTEH	Hot FM
76	Hon. Hannah TETTEH	Ministry of Trade & Industry

	NAME	AFFILIATION
77	Mr. Alhassan UMAR	ITES / Ministry of Communications
78	Mr. Victor ADAJIE	Ministry of Communications.
79	Mr. Joseph WILSON	Ghana Employers' Association
80	Mr. Daniel YEBOAH	TV3
81	Mr. R. K YEBOAH	Public Works Department
82	Mr. Bede ZIEDENG	Democratic Freedom Party