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# **Food, Fuel and Electricity: The Political Economy of “Green Growth” in Southern Africa**

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## **Abstract**

Concepts like “Green Growth” imply that developmental objectives, such as job creation, economic prosperity and poverty alleviation, can be easily reconciled with environmental goals. This paper, however, argues that rather than being “win-win,” Green Growth is similar to most types of policy reforms that advocate the acceptance of short-term adjustment costs in the expectation of long-term gains. In particular, Green Growth policies often encourage developing countries to redesign their national strategies in ways that might be inconsistent with natural comparative advantages and past investments. In turn, there are often sizeable anti-reform coalitions whose interests may conflict with a Green Growth agenda. We illustrate this argument using case studies of Malawi, Mozambique, and South Africa, which are engaged in development strategies that rely on inorganic fertilizers, biofuels production, and coal-based energy, respectively. Each of these countries is pursuing an environmentally-suboptimal strategy for addressing critical development needs, including food security, fuel, and electricity. Yet, we show that adopting a Green Growth approach would not only be economically costly but also generate substantial domestic resistance, especially amongst the poor.

## Introduction

In recent years, the international community has shifted from promoting “sustainable development” to advancing concepts such as “green growth,” the “green economy” and “green jobs.” The use of the “green” modifier implies that developmental objectives, such as job creation, high economic growth, and poverty alleviation, can be easily reconciled with environmental goals. This is the tenor of many recent reports on the topic. For instance, the United Nation’s Environmental Program (UNEP) defines the “green economy” as one that “results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities” (UNEP 2011: 1). Likewise, the Organization for Economic Cooperation and Development (OECD) notes that “Green growth means fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies” (OECD 2011: 9). For the UN’s Economic and Social Commission for Asia and the Pacific (UN-ESCAP), green growth is a policy of “environmentally sustainable economic progress to foster low-carbon, socially inclusive development.”<sup>1</sup>

There are a number of notable cases where green initiatives offer greater stewardship of the environment while simultaneously providing growth opportunities or help the poor. For example, the World Bank (2010: 221) points to the Mediterranean Solar Plan, which aims to provide 20 gigawatts of solar power by 2020 to reduce reliance on fossil fuels and allow Middle Eastern and North African countries to export power to Europe. UNEP (2011: 12) highlights the case of the Grameen Skakti Program in Bangladesh where microfinance is used to help rural residents afford solar home systems. Yet, these and many other promising enterprises often are discussed in isolation from countries’ broader development strategies, with little reference to the opportunity costs already foregone by certain investments or the political economy challenges of shifting towards large-scale, green strategies.

As such, this paper poses the following question: what are the economic implications and the political challenges of a broad Green Growth strategy for developing countries? We argue that a number of trade-offs are inherent in Green Growth and therefore, it is often less “win-win” than much of the literature suggests. Specifically, at the macro-level, such strategies often require countries to deviate from the prescriptions of conventional development theory as well as their current development trajectories, which can be extremely costly and potentially detrimental to the poor in the short-term. In addition, like many other past trends promoted by the development community, a Green Growth agenda often overlooks the domestic political challenges to adopting new development strategies, such as the formation of anti-reform coalitions that might include the poor.

To illustrate these points in greater detail, we focus on the region of Southern Africa. This region represents a high level of diversity, ranging from mineral-rich to agricultural-dependent economies and includes both middle-income and extremely poor countries. In particular, we look at three countries within this region: Malawi, Mozambique, and South Africa. These cases were chosen because they are currently pursuing development strategies that revolve around fertilizers, biofuels, and coal, respectively. Although these strategies generate large costs to the environment, they are

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<sup>1</sup> See [www.greengrowth.org](http://www.greengrowth.org), accessed in August 2011.

being used to address development issues, such as the provision of adequate food, fuel, and electricity, that are highly relevant to the broader African context. Moreover, such strategies allow each of these three countries to not only tackle their current development priorities but also pursue their respective comparative advantage in terms of resource availability.

More specifically, Malawi's comparative advantage lies in its favourable agro-ecological conditions. Yet, given its land scarcity, the sustainability of an agriculture-led development strategy requires a more intense use of available land. To do this, the Government of Malawi has been heavily promoting the use of fertilizer, even though fertilizer can be highly detrimental to water sources and generates high levels of greenhouse gases (GHG). Since fertilizer use has been promoted through a subsidy scheme that is highly popular among poor farmers and therefore an electoral boon to many politicians from the ruling party, shifting towards a more environmentally-friendly mode of enhancing soil fertility will be extremely challenging.

In contrast to Malawi, Mozambique's comparative advantage lies in its land abundance as well as possessing ideal agro-ecological conditions for growing bio-fuels. As such, the country has pursued an agricultural extensification strategy that involves clearing forests in order to grow sugar and jatropha. Even though such deforestation is a major contributor to GHG, the biofuels industry offers the potential to create jobs for the rural poor and offer a diversified export base for Mozambique. A more environmentally-friendly strategy for biofuels production would involve a more intensive plantation approach, but this would create fewer employment opportunities. As such, certain interest groups would be opposed to shifting towards such a strategy.

Finally, an abundance of mineral resources constitutes South Africa's comparative advantage. In a country where electricity demands are high, South Africa has exploited its coal resources for energy production. Shifting to a more environmentally-friendly source of electricity, including nuclear and renewable energy, requires South Africa to forego long-standing and expensive investments in physical capital. Moreover, electricity generated from coal is relatively cheaper than other potential alternatives, which is critical in a country where much of the poor population still lacks any type of reliable and affordable electricity. Deviating from coal production will not be popular for unionized workers in the mining and metals industries, private businesses, and poor South Africans who cannot afford higher electricity prices. The Government's potential adoption of a carbon tax to reduce energy demand likewise produces powerful anti-reform constituencies.

In order to further illustrate these points, the following section elaborates on the nexus between economic development, Green Growth, and the political economy of reform. Subsequently, each of the three country cases is discussed in greater detail. The final section summarizes the case studies and concludes.

# Green Growth, Economic Development and the Political Economy of Reform

## *Development strategies and Green Growth*

While there is debate over the role of government in promoting economic development, there is greater consensus on the nature of the development process itself, which involves a reallocation of resources away from less productive activities towards more advanced, higher value-added industries (see Lewis 1954). The literature examining this “structural transformation” in developing countries predicts that agriculture’s importance will decline with industrialization. However, while the underlying transformation process may be similar, countries’ “patterns of development” have been shown to vary considerably (Chenery and Syrquin 1986). As such, the debate surrounding the appropriate choice of development strategies for low-income countries centres on the primacy of agriculture versus industry in *initiating* the development process, and as such, on the targeting and sequencing of sector-oriented investments and policies (see Diao et al. 2007).

Governments in low-income countries are usually advised to base their development strategies on observed “comparative advantages”. From this perspective, countries should promote exports that use abundant resources most intensively. For example, countries with favourable agro-ecological conditions or large mineral deposits should adopt strategies that promote agriculture- or mining-led industrialization, respectively. The concept of “comparative advantage”, as a means of identifying growth opportunities, is perhaps most applicable during early stages of development, when countries have not accumulated sufficient capital (human, physical, etc.) and must therefore rely on natural resources. As development proceeds, the concept of “competitive advantage” becomes more relevant (Porter 1985), which is the idea that more developed countries possess a wider range of higher-value growth opportunities beyond their natural comparative advantage. Development strategies should then focus more on identifying global market opportunities and creating the necessary knowledge and productivity levels to exploit them.

Comparative advantage remains a key consideration when designing development strategies in low-income countries. Countries may, however, possess a number of natural advantages from which to choose. Here the concept of “growth linkages” becomes pertinent. A sector has strong linkages when its growth generates positive spillovers in other sectors, and so these sectors are often favoured over others. For example, agriculture is often promoted as a strategic sector since it supports downstream agro-processing, and so its growth creates both farm *and* off-farm jobs and promotes industrialization. Agriculture is therefore a priority sector in many low-income countries’ development strategies, including those of Malawi and Mozambique, as it exploits these countries’ favourable agro-ecological conditions (i.e. comparative advantage) and generates growth linkages that support economy wide development (Diao et al. 2007). Similarly, South Africa has exploited its mineral resources and established downstream metals and heavy industries, which are still favoured in national policies and constitute both the country’s main comparative *and* competitive advantage in its current development strategy.

Adopting a Green Growth strategy means that developing countries may have to deviate from the strategies traditionally promoted based on comparative advantage and growth linkage considerations. Certain natural resources may have to remain unused, such as

coal and crude oil. Developing countries may also have to adopt new technologies and therefore abandon past investments in physical and human capital. This could weaken growth linkages, at least in the short-run, as new green technologies are often imported until local industries can be established and made sustainable. Finally, many new technologies underpinning Green Growth are more expensive than existing options. Developing countries will therefore have to adopt more expensive strategies that redirect scarce resources away from other development priorities. As such, Green Growth strategies may be at odds with traditional prescriptions, and could require countries to adopt strategies that are more expensive and less effective in the short-run for achieving development objectives.

### ***Political economy considerations***

Any development strategy has distributional consequences and therefore influences the formation of pro- and anti-reform interest groups. Interest group analyses assume that individuals are self-interested and that their preferences for certain policies are determined deductively according to their position within the economy. A large range of political economy literature is based on this presumption (e.g. Frieden and Rogowski 1996; Milner 1997, Hiscox 2001), and initiatives such as the World Bank's Poverty and Social Impact Analyses have incorporated interest group analyses to determine whether and who will support pro-poor reforms (World Bank 2003).

Much of the literature on the political economy of reform focuses on trade, financial, or structural adjustment policies. Like these reforms, Green Growth policies exhibit a strong temporal component because the promised benefits occur in the long-term while significant costs can be incurred in the short-term, and those who ultimately gain may not be the same as those who sacrificed. There are also a wide range of actors whose interests are at stake, including farmers, consumers, unionized workers, politicians, and business.

The interest group approach posits that policy decisions are often the result of the interaction between citizens' and governments' preferences, as well as those of important external actors (see Putnam 1988). For individual citizens, Nelson (1992) observes that there are at least three main channels through which government policies demonstrate an impact and influence preferences: employment and incomes, prices of goods and services consumed, and the provision of public services. Naturally, individuals' willingness to accept trade-offs across these different channels depends on their socioeconomic position and the availability of alternative coping mechanisms.

Yet, individuals possess disparate abilities to convey their preferences. Van de Walle (2001) argues that the mere existence of certain economic preferences among a segment of the population does not guarantee their effective representation within the political system. Certain groups possess greater resources and access to policy-makers, which thereby ensures that their voices are better heard during periods of reform (see Olson 1965; Srinivasan 1985).

Indeed, the decision to respond to the interests of individuals will in turn depend on a government's own preferences. In some instances, this might be an ideological commitment to improve national well-being. In others, particularly in democracies, it may be more oriented towards basic political survival. The timing of the electoral cycle can play an important role in this regard since incumbents are rarely inclined to

undertake unpopular reforms right before an election (see Haggard and Kaufman 1992). The promise of financial rewards from important external actors, such as private corporations, may also influence government policy decisions.

Consequently, we expect that governments will pursue Green Growth policies only when they benefit a sizeable proportion of the electorate or result in alternative sources of support from other important constituencies. In all three of the cases that we discuss below, both the rural and urban poor remain a highly important electoral constituency due to their size. Shifting to a Green Growth development strategy creates short-term disadvantages for the poor including higher prices for electricity in South Africa, foregone employment opportunities in Mozambique, and reduced access to farm inputs in Malawi. This is particularly true given the added costs for these countries of deviating from their prevailing development strategies. Collectively, this suggests that Green Growth is no less “win-win” than many other policy reforms and highlights that a number of additional interventions would be needed from the international community in order to make Green Growth more financially and politically feasible.

## **Electricity and Coal in South Africa**

Though well-endowed with mineral resources, South Africa faces tremendous challenges in terms of improving the welfare of its citizens. The country has some of the world’s highest inequality, and unemployment, broadly defined, averages around 40 per cent. Since the end of apartheid, improving service delivery for the poor has been a major objective of the ruling African National Congress (ANC). In fact, section 24 of the country’s Bill of Rights stipulates that all citizens have “the right to an environment that is not harmful to their health or well-being” (see RSA 1996). As a result, water connections increased by one million in the five years after the end of apartheid, and more than 1.5 million households were added to the electricity grid (Pape and McDonald 2002).

Yet, the demand for electricity remains high in both rural areas (see Davis 1998) as well as in urban ones, which are experiencing industrial expansion and rapid population growth. The inadequacy of the electricity system’s capacity was evident in early 2008, when peak period shortages led to nationwide blackouts, the temporary closure of energy-intensive industries, and measureable losses in national income (Altman et al. 2008). Electricity supply and mining production was also disrupted in neighbouring countries that rely on imported electricity (Childress 2008). Addressing South Africa’s electricity challenge is therefore of both national and regional concern.

Taking advantage of its natural resources, South Africa’s development strategy within the electricity sector has long relied on exploitation of the country’s substantial coal deposits, state investment in the energy sector, and subsidized electricity prices (Büscher 2009).<sup>2</sup> One of the reasons why South Africa has favoured coal-fired technologies is because coal-fired plants have higher load factors than renewables. A power plant’s load factor is a measure of its operational output relative to its maximum capacity, and higher load factors typically imply lower unit costs. In turn, this means that coal is a much cheaper source of bulk electricity than renewables. Currently, coal accounts for 81 per cent of total electricity system capacity but is responsible for 94 per

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<sup>2</sup> In fact, South Africa’s electricity tariffs have, until recently, been amongst the world’s lowest (Winkler 2005).

cent of actual electricity supply due to the low load factors associated with hydropower and other renewable sources (RSA 2011).

This focus on coal-based energy was renewed in the wake of the 2008 shortages when the state-owned electricity supplier, ESKOM, decided to return decommissioned coal-fired plants to service and to commission the building of new coal-fired generators. The World Bank and the African Development Bank are funding the new generators through sizeable loans equivalent to almost two per cent of national income.<sup>3</sup> Various donors to the World Bank objected to the loans on environmental grounds, suggesting that investments should be targeted towards cleaner technologies (Goldenberg 2010). However, the South African Government and its lenders defended the continuation of coal-fired plants, highlighting they were necessary for avoiding further shortages as well as for safeguarding economic growth and the wellbeing of poorer households (Goldenberg 2010). Consequently, South Africa is now locked into coal-fired electricity until at least 2020.

In addition to the loans, the costs of the new investments have been concurrently funded by increasing South Africa's historically low electricity tariffs. ESKOM and state regulators agreed to double tariffs during 2010-2015 (RSA 2011). This has heightened inflationary pressures, which are felt disproportionately by poorer households who spend a greater share of their incomes on energy (Arndt et al. 2011a). Higher tariffs may also worsen unemployment if businesses close down or shed workers to curb production costs (Altman et al. 2008). Not surprisingly, tariff increases have therefore met considerable resistance. Labour unions arranged national strikes during 2010 and business organizations lobbied the government for smaller tariff increases (Sapa 2010). The Congress of South African Trade Unions (COSATU) has also joined civil society organizations in protesting against higher electricity prices (Johwa 2010). The state regulator has not rescinded the tariff increases, but instead responded by lengthening the period over which the increases will take place (Sapa 2010). It is thus within this context of growing electricity demand and considerable political pressure to curb tariffs that the Government must design its environmental policies.

Indeed, this pursuit of coal-based energy is antithetical to the goals of a Green Growth agenda. In absolute terms, South Africa was the world's 13<sup>th</sup> largest GHG-emitting country in 2007, with per capita emissions similar to those of the European Union, despite having three times lower per capita income (World Bank 2011). The country's "dirtiness" is almost entirely due to its dependence on coal-based energy, which accounts for 80 per cent of total emissions (RSA 2010). It is in South Africa's interest to limit climate change, since many projections predict worsening climatic conditions for the country. By not curbing emissions, South Africa also undermines its position in global forums and faces the threat of retaliatory trade policies from countries that do reduce their emissions (Arndt et al. 2011a).

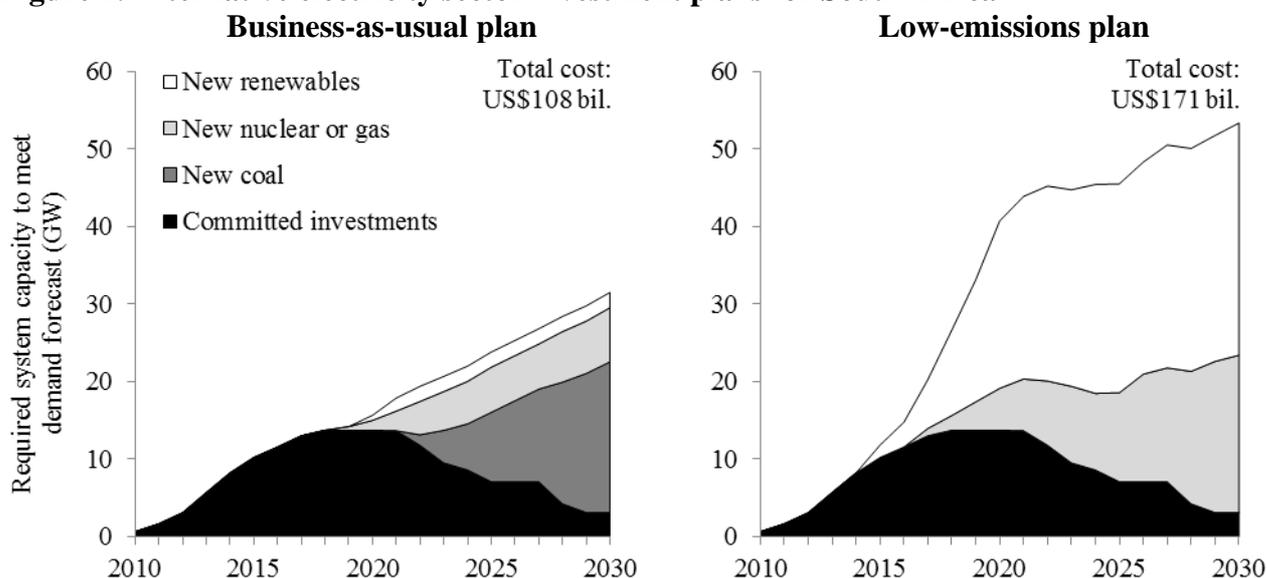
Recognizing this, the government adopted a climate change resolution at a conference in Polokwane that highlighted its intention to mitigate greenhouse gas emissions and adopt a low carbon growth path (see Tyler 2009). In particular, the Government committed to a 42 per cent reduction in GHG emissions by 2025 (from a baseline projection) (RSA 2010). However, meeting these commitments via reductions of GHG in the electricity sector would be extremely costly for the country.

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<sup>3</sup> Authors' calculations using World Bank (2011) national income data for 2010.

Specifically, Figure 1 shows South Africa’s “business-as-usual” (coal-intensive) investment plan for the electricity sector. Almost all new investments in infrastructure capacity for the next decade have already been committed, reflecting the long lead times required for investments in electricity generation (i.e., decisions must be made well in advance and are difficult and costly to change). The “low-emissions” scenario reflects adjustments in the country’s electricity investments to meet its GHG emission targets. The incremental cost of this revised investment strategy is substantial, i.e., US\$63billion or almost the equivalent of one per cent of national income in 2010. This is over and above the US\$108 billion cost of the business-as-usual plan. Costs are higher because renewable technologies are still being developed and because the lower load factors of renewables means that more installed system capacity is required to achieve the same level of actual electricity supply. Lower load factors also imply higher unit production costs and hence require higher user tariffs. Given past contention over high tariff prices, the Government realized that this low-emissions plan was not politically feasible.

**Figure 1: Alternative electricity sector investment plans for South Africa**



**Source:** Authors’ calculations using Republic of South Africa (2011).

**Notes:** Installed capacity in 2010 was 260GW. Both scenarios supply the same demand forecast. Total cost includes operational costs and capital investment. Renewables include wind, solar and hydropower.

As a result, the Government has endorsed a more modest investment strategy that reduces the size of politically-unpopular tariff increases (RSA 2011). The more modest plan includes a substantial shift away from coal towards nuclear and renewables. However, under this plan, the electricity sector will fail to meet its emissions targets and will instead only achieve an 18 per cent reduction by 2025 (RSA 2011). Moreover, this will still increase electricity tariffs since higher investment costs will need to be passed onto consumers. It will also make South Africa more dependent on imported technologies. Finally, shifting away from coal means that South Africa will no longer be able to exploit its own natural resources. Proven reserves suggest that there is about 120 years of coal left in South Africa, and so the opportunity cost of not using these resources will be substantial.

A concurrent approach that the Government is considering is the introduction of a carbon tax to reduce energy demand. Currently the government has proposed a tax of US\$20 per ton of CO<sub>2</sub> (RSA 2010), which is equivalent to a five per cent tax on national

income based on current industrial structures and energy use. This tax doubles the price of coal and substantially increases real electricity tariffs. The carbon tax will cause a significant structural transformation of the economy, and the higher cost of investment in new and more energy-efficient technologies could reduce the size of the economy by two per cent in 2030 (relative to a no-carbon-tax baseline) (RSA 2011).

The effects of the carbon tax will be unevenly distributed across industries and households. Various interest groups have already voiced opposition to this proposed tax. First, business interests, particularly those in mining and heavy industry, are opposed to higher tariffs caused by more expensive electricity generation (Creamer 2011). Businesses are especially concerned about an erosion of competitiveness in export markets and about heightened competition from imports from countries that do not implement similar environmental policies. Certain industries have lobbied for special dispensation (e.g. airlines and mines) and for a slower introduction of the carbon tax or for subsidized electricity.

As such, while the Government has demonstrated a willingness to ameliorate its historically high levels of GHG caused by a high dependence on coal-based energy, substantial costs are involved from deviating from its current investment and development strategy. As a result, many important interest groups could be alienated. Poor households and labour unions have already indicated opposition to existing tariffs for electricity and would therefore oppose the even higher tariffs expected in order for the government to meet the GHG emission targets in the modest scenario outlined above. A carbon tax likewise hurts major stakeholders.

## **Food and Fertilizer in Malawi**

Malawi deviates from the South African case in terms of its much higher levels of poverty and heavy dependence on agricultural production. Agriculture accounts for 39 per cent of GDP compared with 11 per cent for manufacturing (Chirwa et al. 2006). Seventy-four per cent of Malawi's population lives below the dollar-a-day poverty line and 80 per cent reside in rural areas, and the country relies heavily on dwindling earnings from tobacco exports (IMF 2007). Food insecurity remains a perennial threat. In fact, Malawi was seriously affected by droughts in 1991-1992, which affected 5.7 million people and caused a 60 per cent decrease in the production of the country's main staple crop, maize (Babu and Chapasuka 1997). A decade later, severe flooding reduced maize production by 30 per cent and this, along with a number of institutional and political factors, triggered a famine in 2002 (see Rubin 2008). During the 2004/2005 growing season, poor weather plunged Malawi into yet another food crisis that resulted in approximately 34 per cent of the population unable to meet its food needs.<sup>4</sup>

Nevertheless, due to Malawi's sub-humid climate, the country possesses a comparative advantage in agro-ecological conditions favourable for maize farm production (Dixon et al. 2001). Land scarcity, however, means that an agricultural intensification approach is unavoidable. Repeated farming on the same land leads to a decline in soil nutrients and serious land degradation, which has only been exacerbated during periods of flooding (see Phillips 2007). Most soils in Malawi suffer from poor infiltration and moisture retention, lack key minerals and nutrients such as sulphur, nitrogen, and phosphorus,

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<sup>4</sup> See [www.fao.org/newsroom/en/news/2005/107298/index.html](http://www.fao.org/newsroom/en/news/2005/107298/index.html).

and suffer from high levels of acidity (Munthali 2007). Pressure from the World Bank in the late 1990s led the Government to remove subsidies on fertilizers, seeds, and credit. This, combined with liberalization of the parastatal Agricultural Development and Marketing Corporation (ADMARC), left many smallholders without access to affordable inputs (see Harrigan 2003, Dorward and Kydd 2004).

In order to address low soil fertility and to avoid further food insecurity, Malawi's President, Bingu wa Mutharika, launched the Agricultural Input Subsidy Program (AISP) in 2005.<sup>5</sup> The main component of the AISP, fertilizer subsidies, had already been a major electoral promise of Mutharika's party, the United Democratic Front (UDF), in the country's 2004 electoral campaign. After defecting from the UDF and forming a new party in 2005, the Democratic Progressive Party (DPP), President Mutharika deviated from the UDF's promise of a universal subsidy and instead announced a more targeted subsidy aimed at resource-constrained maize farmers (see Chinsinga 2007).

Although donors remained sceptical and the Government was forced to fund the entire program during the 2005/2006 growing season, the fertilizer subsidies quickly demonstrated a notable impact on maize production. Maize production grew from 1.2 million metric tons in 2005 to 3.4 million by 2007, and Malawi began exporting its surplus to Zimbabwe while also becoming a food aid donor to Lesotho and Swaziland (see Dugger 2007; Sanchez et al. 2009). While favourable levels of rainfall were partially responsible for these increases, Denning et al. (2009) note that two-thirds of the increase could be attributed to the subsidies. Even though the cost of the AISP has more recently prompted concern about its impact on Malawi's macro-economy, Dorward and Chirwa (2011) concur that the program contributed to higher maize yields, higher food availability, and declines in poverty. Based on Malawi's success, a number of other African countries, including Ghana, Kenya, and Tanzania, began considering the implementation of similar voucher-based fertilizer subsidy schemes (Minot and Benson 2009).

In many respects, the AISP responded to calls by development practitioners for the creation of an African Green Revolution that revolves around increasing smallholder farmers' access to fertilizers, high-yield seeds, and irrigation (see Denning et al. 2009; Sanchez et al. 2009). Indeed, the 2006 Abuja Declaration on Fertilizer for an African Green Revolution advocated an increase from 8 to 50 kilograms of fertilizer per hectare between 2006 and 2015<sup>6</sup>. However, the AISP program has potentially over-promoted the usage of fertilizer at the expense of other investments, particularly in agricultural research and development<sup>7</sup>.

For a number of reasons, fertilizer use can be detrimental to the environment. First, the manufacture of inorganic fertilizers can lead to high levels of carbon dioxide emissions and can also stimulate the release of nitrous oxide from the soil, which contributes to GHG. According to the Stern Review (2006), fertilizers are the largest single source of GHG emissions created by the agricultural sector, and nitrous oxide possesses a global warming potential that is 300 times greater than carbon dioxide. Secondly, fertilized

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<sup>5</sup> The program subsequently has been renamed the Fertilizer Input Subsidy Program (FISP).

<sup>6</sup> See [www.nepad.org/foodsecurity/knowledge/doc/2420/progress-abuja-declaration-fertilizers-african-green-revolution](http://www.nepad.org/foodsecurity/knowledge/doc/2420/progress-abuja-declaration-fertilizers-african-green-revolution).

<sup>7</sup> For instance, incremental fertilizer use per metric ton in Malawi almost doubled between 2005/6 and 2008/9, growing from 98,541 to 181,800 (Dorward and Chirwa 2011).

land needs to be watered more, placing pressure on potentially scarce water resources or requiring irrigation. Thirdly, high levels of fertilizer use can increase toxins in groundwater with attendant impacts on fishery stocks and human health (Tilman et al. 2002). In India, pollution of waterways and aquifers has been a legacy of that country's Green Revolution (see World Bank 2010).

As a consequence of these environmental hazards, the AISP approach is contrary to the objectives of Green Growth. According to the OECD (2011: 126), fertilizer subsidies constitute a "government failure" that not only hinders growth but also creates a number of negative environmental externalities. Alternative approaches include "microdosing," which involves the application of only small amounts of fertilizer with the seed at planting time or three to four weeks after the emergence of the crop, has been used successfully in some parts of Africa (ICRISAT 2009). In addition, the process of growing two or more crops simultaneously, known as inter-cropping, can result in increases in nutrient- and water-use efficiency (Tilman et al. 2002). Other options include greater use of organic fertilizers and conservation farming techniques that aim to conserve soil and water use by using mulch and minimum tillage to minimize runoff and erosion.

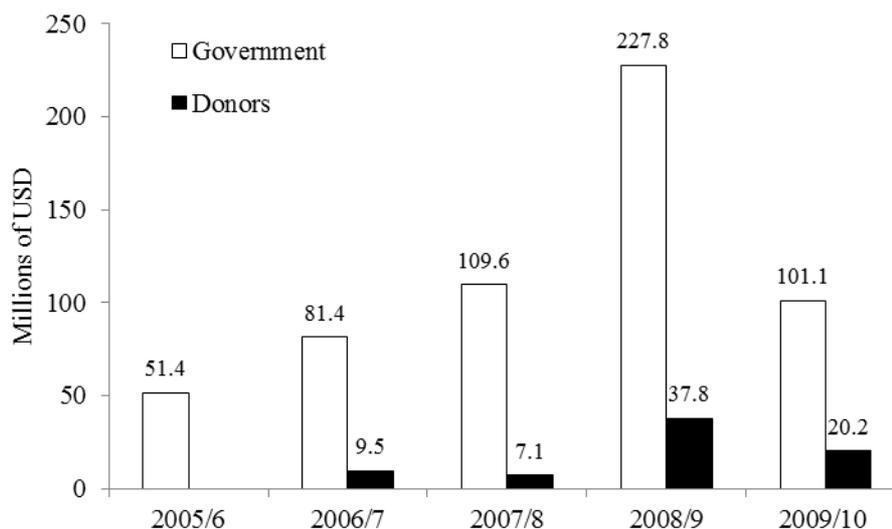
Yet, many of these alternatives are not feasible in the short-term in Malawi. Specifically, they involve changing the behaviour of farmers on a relatively broad scale. However, Dorward and Chirwa (2011) note that past attempts to promote organic fertilizers have not been widely adopted by Malawian farmers. Moreover, they observe that while there are efforts to include subsidized legume seeds to encourage inter-cropping, this is far from the major focus of the AISP. Encouraging greater adaptation of legumes and other seeds through subsidies would further increase the cost of an already expensive program.

Most significantly, however, Malawi's fertilizer subsidy program is both popular among smallholder farmers as well as a politically advantageous to the ruling DPP. Since the DPP is a relatively new party that lacks the same grassroots ties to rural voters as the UDF or the Malawi Congress Party (MCP), President Mutharika used the AISP as a way to consolidate the party's support base in preparation for the May 2009 elections (see Chinsinga 2009). As Dorward and Chirwa (2011: 16) observe, "Political pressures to expand the program and to use it for patronage were evident in the run up to the election." Figure 2 illustrates a large increase in costs devoted to the AISP in the year of the 2009 elections<sup>8</sup>. Indeed, the fact that Mutharika overcame ethno-regional voting patterns and won the 2009 elections with 66 per cent of the vote, compared with only about half that vote share five years earlier, illustrates the success of this strategy.

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<sup>8</sup> Although the increase in costs was partially linked to the rise in the price of fertilizer, there was also an increase in the quantity of fertilizer purchased because the Government decided to extend the subsidy to other crops as well, including coffee and tea (see Dorward et al. 2010).

**Figure 2: Evolution in the financial cost of Malawi's AISP**



**Source:** Data from Dorward and Chirwa (2011)

As the 2014 presidential elections loom, Mutharika faces growing discontent over living conditions in urban areas and remains keen to promote his brother as his successor. Thus, the fertilizer input subsidies will remain a useful electoral tool for the DPP to retain support from numerically sizeable rural constituencies. The possible loss of the elections to opposition parties such as the UDF or the MCP would presumably lead to a greater promotion of fertilizer use since both of these parties have long advocated a universal subsidy scheme rather than the targeted one implemented under the DPP (see Smiddy and Young 2009).

## **Biofuels in Mozambique**

Contrary to Malawi, one of Mozambique's major comparative advantages is land abundance. Specifically, only 12 per cent of Mozambique's 36 million hectares of arable land is under cultivation (GoM 2006). Much of this land possesses favourable agro-ecological conditions (Diao et al. 2007); although it would have to be cleared in order to be cultivated.

While there has been some minor success in promoting export crops, such as cashews, Mozambique historically has concentrated on subsistence farming. Recently, poverty reduction has slowed in Mozambique, primarily as a result of stagnant agricultural production (Arndt et al. 2011b). As a result, the Government has been eager to find new opportunities for agricultural growth. This is particularly important given that approximately 70 per cent of the country's population resides in rural areas, and almost half of these rural inhabitants are unable to obtain enough food to meet their daily caloric requirements (Arndt and Simler 2007).

Consequently, the Government has taken advantage of Mozambique's land abundance to promote the production of biofuels. Traditionally, Mozambique has been highly dependent on oil imports. In fact, as of 2007, the Government expended 17 per cent of its GDP on fuel and energy (Schut et al. 2010a). Biofuels therefore are viewed as means of reducing this dependence. Moreover, given the growing global demand for biofuels,

especially in the European Union (EU) and South Africa, biofuels offer the promise of expanding into more high-value export markets.

Biofuels first appeared on Mozambique's policy agenda during the 2004 election campaign when the country was facing high and volatile oil prices. During this campaign, the Government began encouraging farmers to cultivate jatropha, which is used in the production of biodiesel, on marginal lands (Schut et al. 2010a). Subsequently, a Commission on Biofuels was established that recommended producing ethanol from sugar cane, sorghum and cassava, and using jatropha, sunflower, coconut, soya and African palm oil as raw material for biodiesel (Nhantumbo and Salomão 2010). By 2007, Mozambique's first biofuel project was approved for a company known as Procana Ltd., which was offering \$500 million in investment for 30,000 hectares of sugar cane (Schut et al. 2010b)<sup>9</sup>. By mid-2008, the Government had requests for the use of almost 12 million hectares of land, most of which were related to biofuels production (Arndt et al. 2010).

By 2009, the Government published a National Biofuels Policy and Strategy (NBPS), partly based on an analysis conducted by Econergy. The NBPS stated that the biofuels industry could potentially create 150,000 new jobs (GoM 2009). Since then, biofuels production has attracted the interest of a number of investors from around the globe, including those from Brazil, Canada, China, Italy, Portugal, and the United Kingdom (Cuvilas et al. 2010). Currently, there are more than 30 biofuels projects underway in Mozambique with a total investment of over 100 million USD. If the projects all become operational, it's estimated that the country will save \$682 million a year by reducing its fuel imports (AIM 2011). Petromac, the Mozambican oil company, is also projecting the production of 226 million litres of biodiesel via jatropha and the creation of about 800 new jobs (Cuvilas et al. 2010).

Yet, while biofuels promise to reduce oil dependency, increase jobs, and generate investment for previously unused land, this fuel alternative also poses a number of threats to the environment. For instance, biofuels can result in land degradation, water pollution, mono-cropping, and over-use of water resources (Dufey 2007). More significant is the threat of increasing deforestation, which globally contributes 14 per cent of GHG emissions each year (World Bank 2010). While biofuels produce less carbon dioxide than traditional fossil fuels, Fargione et al. (2008) find that GHG reductions from using biofuel depend on land use. Clearing new land for biofuels may generate large GHG emissions due to burning and decomposition of organic matter. According to the FAO (2011), the amount of forest land in Africa that will be cleared for biofuels production totals 1.3 million hectares by 2030. Since very little land currently is under cultivation in Mozambique, a substantial amount of land clearance will be needed to accommodate current and planned biofuels projects.

A Green Growth approach would therefore advocate a focus on biofuels production that is less land-intensive. This would require concentrating on the production of ethanol rather than bio-diesel because the source of most biodiesel production in Mozambique, jatropha, is highly land-intensive. By contrast, ethanol production via sugar is more capital-intensive and based on plantations. Therefore, less land needs to be cleared for production.

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<sup>9</sup> The Government ultimately cancelled Procana's contract when the company did little with the land it was granted.

Yet, this strategy poses important trade-offs. According to Arndt et al (2010), a biofuels strategy based on jatropha is much more pro-poor due to its greater use of unskilled labour and due to the fact that plantation owners, rather than smallholders, typically accrue land rents for production of ethanol. In addition, they find that the plantation approach in Mozambique is unlikely to generate many jobs for farm labourers. In other words, while sugar cane is more environmentally-friendly, jatropha is more pro-poor. Given that the Government's original adoption of biofuels was motivated by a desire to create jobs and assist the rural poor, a Green Growth approach to establishing a biofuels industry would deviate from these objectives.

## Conclusions

The three cases presented in this paper focused on issues that are highly relevant to Africa's current development needs. The analysis demonstrated that Malawi, Mozambique, and South Africa are all following their comparative advantage by investing in their favourable agro-ecological conditions, land abundance, and mineral wealth, respectively. These countries' various development strategies not only adhere to the tenets of prescribed development theory but also benefit the poor by providing affordable electricity in South Africa, employment in Mozambique, and food security in Malawi. Consequently, each strategy has generated policy champions among both the poor and other key stakeholders.

Moreover, while we predominantly focused on these countries in isolation, their current development strategies hold implications for the broader Southern African region. South Africa's coal-based electricity is often exported to its neighbours, and the country would provide an important export market for Mozambique, which recently has discovered coal deposits. At the same time, South Africa constitutes a major export market for Mozambique's biofuels industry. Finally, as noted, maize production spurred by Malawi's fertilizer subsidies has been exported to food-scarce countries during periods of drought with the region.

Simultaneously, however, we showed that each country is pursuing a sub-optimal strategy for the environment by focusing on products, such as coal and fertilizers, as well as activities, such as deforestation, that contribute significant shares of GHG. While shifting to Green Growth approaches for addressing the development challenges in these countries would provide environmental gains in the long-term, they result in economic and political costs in the short-term. Therefore, rather than being a "win-win" alternative, Green Growth policies are no different than most other types of policy reforms, such as structural adjustment. To highlight this, Table 1 summarizes the cases and illustrates the short-term costs of shifting to a development strategy more aligned with Green Growth objectives.

**Table 1: Summary of case studies**

|                     | <b>Current development strategy</b>  | <b>Green Growth strategy</b>   | <b>Short-term costs</b>   | <b>Losers</b>   |
|---------------------|--|--|---|---|
| <b>South Africa</b> | Invest in natural resources, particularly coal-fired electricity generation to support heavy industries. | Shift to nuclear and renewable energy sources.   | <ul style="list-style-type: none"> <li>• Higher electricity prices.</li> <li>• Job losses in coal mining with secondary impacts on heavy industry.</li> </ul>     | <ul style="list-style-type: none"> <li>• Poor consumers.</li> <li>• Unionized workers.</li> <li>• Corporations in the mining and metals sectors.</li> </ul>                 |
| <b>Malawi</b>       | Agricultural intensification based on input subsidies for fertilizers.                                   | Shift to conservation farming, organic fertilizers, micro-dosing, and inter-cropping.  | <ul style="list-style-type: none"> <li>• Falling production while smallholders change farming behaviours.</li> <li>• Loss of handouts to rural voters.</li> </ul> | <ul style="list-style-type: none"> <li>• Current ruling party.</li> <li>• Private sector suppliers of fertilizer.</li> <li>• Poor smallholders who cannot adapt.</li> </ul> |
| <b>Mozambique</b>   | Agricultural extensification based on cultivation of feedstock crops for biofuels.                       | Reduce land clearing by either shifting towards plantation-based production or promote smallholder agricultural intensification. | <ul style="list-style-type: none"> <li>• Fewer rural employment opportunities.</li> </ul>   | <ul style="list-style-type: none"> <li>• Poor rural farmers.</li> </ul>   |

To confront these costs, the donor community may need to finance the transfer of technology and technical skills essential for preserving growth linkages and bolstering local job creation. Attention will be needed to both facilitating a transition to new production techniques *and* to reducing resistance to such transitions among the losers of reform. This, however, may contradict other development objectives, such as reducing the dependence of low-income countries on foreign assistance and technology.

Overall, the Green Growth agenda undoubtedly has worthy objectives. Stewardship of the environment is essential to the sustainability of economic and social progress in both developed and developing countries alike. Yet, its proponents often have neglected to acknowledge the costs, both economic and political, inherent in the Green Growth agenda. The experience of past reform initiatives, such as structural adjustment programs, cautions against ignoring these trade-offs.

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