UNU-WIDER
World Institute for Development Economics Research

Working Paper No. 2012/11

The Political Economy of Green Growth

Illustrations from Southern Africa

Danielle Resnick, Finn Tarp, and James Thurlow

February 2012

Abstract

The concept of 'green growth' implies that a wide range of developmental objectives, such as job creation, economic prosperity and poverty alleviation, can be easily reconciled with environmental sustainability. This study, 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 involve inorganic fertilizers, biofuels production, and coal-based energy, respectively. Each of these countries is pursuing an environmentally suboptimal strategy but nonetheless addressing critical development needs, including food security, fuel, and electricity. We show that adopting a green growth approach would not only be economically costly but also generate substantial domestic resistance, especially amongst the poor.

Keywords: development policy, green growth, political economy, Southern Africa
JEL classification: D72, N57, P48, Q00

*All authors UNU-WIDER, Helsinki. Corresponding author email: resnick@wider.unu.edu

This study has been prepared within the UNU-WIDER project on Development under Climate Change. UNU-WIDER gratefully acknowledges the financial contributions to the project by the Finnish Ministry for Foreign Affairs and the Swedish International Development Cooperation Agency—Sida, and the financial contributions to the research programme by the governments of Denmark (Ministry of Foreign Affairs), and the United Kingdom (Department for International Development).

ISSN 1798-7237 ISBN 978-92-9230-474-4

The World Institute for Development Economics Research (WIDER) was established by the United Nations University (UNU) as its first research and training centre and started work in Helsinki, Finland in 1985. The Institute undertakes applied research and policy analysis on structural changes affecting the developing and transitional economies, provides a forum for the advocacy of policies leading to robust, equitable and environmentally sustainable growth, and promotes capacity strengthening and training in the field of economic and social policy making. Work is carried out by staff researchers and visiting scholars in Helsinki and through networks of collaborating scholars and institutions around the world.

www.wider.unu.edu *publications@wider.unu.edu*

UNU World Institute for Development Economics Research (UNU-WIDER)
Katajanokanlaituri 6 B, 00160 Helsinki, Finland

Typescript prepared by Janis Vehmaan-Kreula at UNU-WIDER

1 Introduction

Over the last decade, the growing threat of climate change has mobilized the international development community around a variety of initiatives. These efforts initially revolved around a commitment to 'low-carbon development,' which primarily aims to reduce greenhouse gas emissions. The broader notion of 'sustainable development' sought to not only address carbon emissions but to preserve scarce water sources, fragile ecosystems, and biodiversity. More recently, the politically palatable concept of 'Green Growth' (GG) has emerged, which promises to reconcile low-carbon and sustainable development with other valued outcomes, including job creation, poverty alleviation, and high economic growth.

Indeed, the belief that GG represents a 'win-win' option for developing countries is suggested in many recent reports on this topic. For instance, 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 United Nation's Environmental Programme (UNEP), the concept refers to 'improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities' (UNEP 2011: 1). According to the United Nation's Economic and Social Commission for Asia and the Pacific (UNESCAP), green growth is a policy of 'environmentally sustainable economic progress to foster low-carbon, socially inclusive development' (UNESCAP 2011). World Bank researchers state that 'Green growth is about making growth processes resource-efficient, cleaner and more resilient without necessarily slowing them' (Hallegatte et al. 2011).

This study, however, argues that GG strategies are only 'win-win' with respect to certain micro, project-level interventions, such as the installation of solar panels in poor households. In terms of a national development strategy, GG poses more trade-offs than is readily acknowledged. The reasons for this are at least twofold. First, despite the rhetoric, the main focus of GG strategies essentially remains to reduce carbon emissions. Doing so requires that countries deviate from both the prescriptions of conventional development theory and their current development trajectories. Although the long-term environmental benefits could be sizeable, this naturally will prove extremely costly in the short-term. Second, the GG agenda shares many parallels with the structural adjustment programmes of previous decades, which were motivated by a crisis in economic management rather than environmental sustainability. Importantly, the short-term costs associated with those policies often generated substantial anti-reform coalitions that, in some cases, included both powerful actors as well as the poor. Without concurrent interventions by donors to protect the 'losers' of reform, the same reality confronts the GG agenda.

To illustrate these points in greater detail, we focus on 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 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 offers 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, key 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, GG, and the political economy of reform, drawing on relevant lessons from the structural adjustment era where applicable. Subsequently, each of the three country cases is discussed in greater detail. The final section summarizes the findings concludes.

2 Economic development, green growth, and the political economy of reform

As noted above, one of the main reasons why GG strategies are not win-win is because they implicitly require that countries deviate from their existing development strategies. The essential aim of the development process is to reallocate resources away from less

productive activities towards more advanced, higher value-added industries through a process of structural transformation (see Lewis 1954). For low-income countries, the main issue centres on the primacy of agriculture versus industry in initiating the development process, and relatedly, on the targeting and sequencing of sector-oriented investments and policies (see Diao et al. 2007).

At early stages of development, when countries have not accumulated sufficient human or physical capital, conventional development theory typically has advocated that such targeting and sequencing should be based 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-focused industrialization, respectively. As development proceeds, the concept of *competitive advantage* becomes more relevant, which is the idea that more developed countries possess a wider range of higher-value growth opportunities beyond their natural comparative advantage (Porter 1985), In this regard, development strategies should then focus more on identifying global market opportunities and creating the necessary knowledge and productivity levels to exploit them.

To exploit both comparative and competitive advantages, the concept of *growth linkages* is extremely pertinent. A sector has strong linkages when its growth generates positive spillovers in other sectors, and so these sectors should be favoured over others. For example, agriculture is often promoted as a strategic sector since it supports downstream agro-processing, creating both farm and off-farm jobs and promoting industrialization. Agriculture is therefore a priority sector in many low-income countries' development strategies, including those of Malawi and Mozambique, because the sector 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 GG strategy means that developing countries may have to deviate from the strategies traditionally promoted based on comparative advantage and growth linkage considerations. Consequently, certain natural resources, such as coal and crude oil, may have to remain unused. Moreover, a common refrain, advocated at the 2011 Global Green Growth Summit, is that technology is the key to implementing a GG strategy (Weigand 2011). However, for developing countries, adopting new technologies could lead to the abandonment of past investments in physical and human capital. In the short-run, this can weaken growth linkages because new green technologies are often imported until local industries can be established and made sustainable. Many new technologies underpinning GG also are more expensive than existing options and may require high levels of human capital that remain absent in low-income countries. Developing countries will therefore have to adopt more expensive strategies that re-direct scarce resources away from other pressing development priorities.

The second challenge to the GG agenda is an insufficient understanding of the political economy dimensions that such reforms entail. Any development strategy has distributional consequences, creates pro- and anti-reform interest groups, and in turn

influences governments' decisions about whether and how to pursue reform. This was a key lesson from the structural adjustment era in Africa when economic reforms were often halting and piecemeal as a result of political considerations (see Bienen 1990; Callaghy 1990). Like structural adjustment, GG 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.

What are the various preferences of these groups and how might they influence governments' approaches to GG? 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 (e.g. Frieden and Rogowski 1996: 25–47; Hiscox 2001; Milner 1997). They may consider how a change in policies will affect their employment and incomes, the prices of goods and services consumed, and the provision of public services (see Nelson 1992: 221–69).

Yet, individuals possess disparate abilities to convey their preferences. The mere existence of certain economic preferences among a segment of the population does not guarantee their effective representation within the political system (van de Walle 2001). Certain groups possess greater resources and access to policy-makers, which thereby ensures that their voices are heard better during periods of reform (see Olson 1965; Srinivasan 1985). As is well-known, the potential losers of reforms typically are more vocal and better able to organize (e.g. Rodrik 1996). This is especially true with respect to GG because the perceived benefits, such as a reduction in climate change and a regeneration of environmental resources, are highly intangible.

Moreover, the decision to respond to certain stakeholders' interests in turn depends on a government's own capabilities and preferences. Particularly in nascent democracies, politicians may be loath to implement unpopular policies if there are not political institutions that can isolate the government from pluralist pressures (Haggard and Kaufman 1995; Mainwaring and Shugart 1997). 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: 3–40).

Thus, we expect that developing country governments will pursue GG policies only when they do not generate large losses to a sizeable proportion of the electorate or do not alienate powerful interest groups. 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 GG 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. In the case of South Africa, additional anti-reform pressures against GG strategies have also emerged from labour unions and the mining sector. Collectively, the cases show that GG is no more win-win than many other policy reforms.

2.1 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: section 24). 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).[1] 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 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.[2] 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 that 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

1 In fact, South Africa's electricity tariffs have, until recently, been amongst the world's lowest (Winkler 2005).

2 Authors' calculations using World Bank (2011) national income data for 2010.

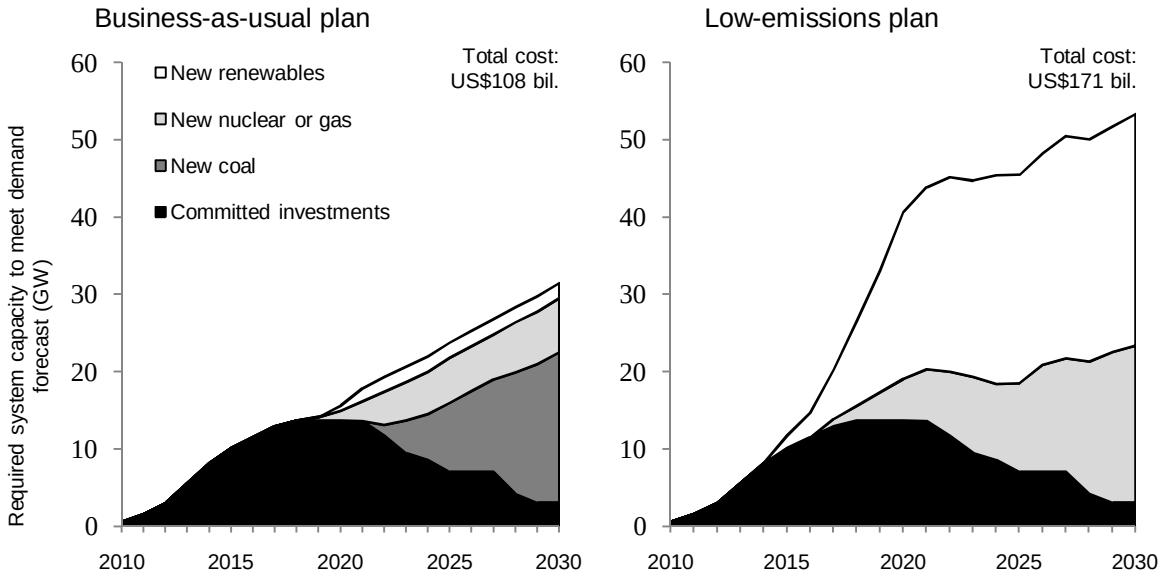
inflationary pressures, which are felt disproportionately by poorer households who spend a greater share of their incomes on energy (Arndt et al. 2011). Higher tariffs may also worsen unemployment if businesses close down or shed workers to curb production costs (Altman et al. 2008). Not surprisingly, 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 GG agenda. In absolute terms, South Africa was the world's 13th 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. 2011).

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.

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$63 billion 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



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.

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

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 carbon dioxide (CO_2) (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.

2.2 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 hurt by droughts in 1991-92, 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 2004-05 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 (FAO 2005).

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: 135–48). Most soils in Malawi suffer from poor infiltration and moisture retention, lack key minerals and nutrients such as sulphur, nitrogen, and phosphorus, and suffer from high levels of acidity (Munthali 2007: 531–36). 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 Dorward and Kydd 2004; Harrigan 2003).

In order to address low soil fertility and to avoid further food insecurity, Malawi's President, Bingu wa Mutharika, launched the Agricultural Input Subsidy Programme (AISP) in 2005.[3] The main component of the AISP, fertilizer subsidies, had already

3 The programme subsequently has been renamed the Fertilizer Input Subsidy Programme (FISP).

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 programme during the 2005-06 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 metric tons 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 programme 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 (NEPAD 2011). However, the AISP programme has potentially over-promoted the usage of fertilizer at the expense of other investments, particularly in agricultural research and development.[4]

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. Second, fertilized land needs to be watered more, placing pressure on potentially scarce water resources or requiring irrigation. Third, 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 GG. 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

4 For instance, incremental fertilizer use per metric ton in Malawi almost doubled between 2005-06 and 2008-09, growing from 98,541 to 181,800 (Dorward and Chirwa 2011).

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 programme.

Most significantly, however, Malawi's fertilizer subsidy programme is popular among smallholder farmers as well as 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: 115–52). As Dorward and Chirwa (2011: 16) observe, 'Political pressures to expand the programme 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.[5] 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.

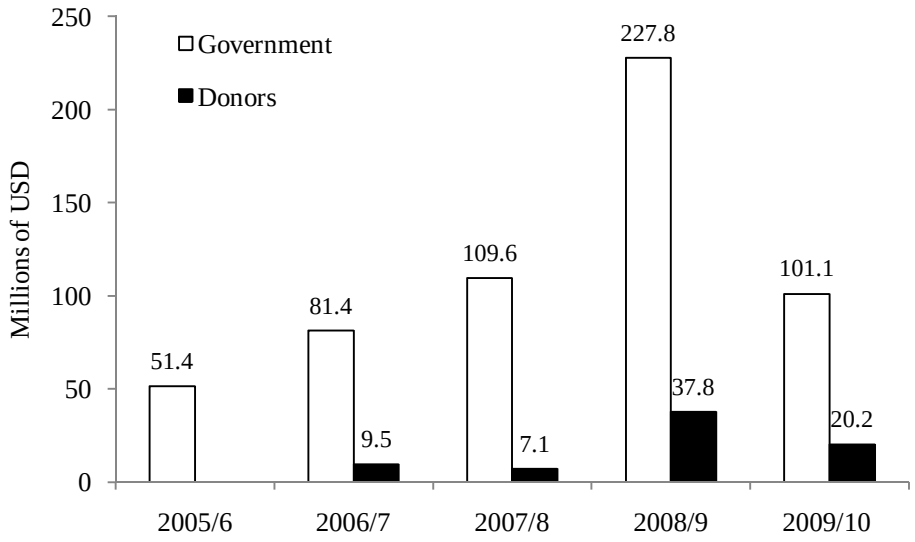
As the 2014 presidential elections loom, Mutharika faces growing discontent over living conditions in urban areas and remains keen to promote his brother as his successor. Thus, the fertilizer input subsidies will remain a useful electoral tool for the DPP to retain support from numerically sizeable 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).

2.3 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.

5 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: Authors' calculations using data from Dorward and Chirwa (2011).

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. forthcoming). 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. 2010). Biofuels therefore are viewed as a 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. 2010). 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 US$500 million in investment for 30,000 hectares of sugar cane (Schut et al. 2010).[6] By mid-2008, the government had requests for the use

6 The government ultimately cancelled Procana's contract when the company did little with the land it was granted.

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 US$100 million. If the projects all become operational, it's estimated that the country will save US$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 GG 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 biodiesel because the source of most biodiesel production in Mozambique, jatropha, is highly land-intensive. By contrast, ethanol production via sugar cane is more capital-intensive and based on plantations. Therefore, less land needs to be cleared for production.

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 GG approach to establishing a biofuels industry would deviate from these objectives.

4 Conclusions

The three cases presented in this study 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 and exploring growth linkages 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 contributes significant shares of GHG. While shifting to GG 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, GG 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 further emphasizes that in all three cases, the poor are potential losers as a result of shifting to a GG strategy. In some cases, powerful actors, including political parties, unions, and private sector corporations, also face disadvantages from shifting away from their country's current development strategy. As such, this suggests that a GG strategy is only feasible when the interests of all of these groups are properly aligned and when the benefits are sizeable to all constituencies.

Employment creation geared towards protecting or restoring environmental quality, otherwise known as *green jobs*, might offer one means of meeting such objectives simultaneously. Such jobs can benefit the poor, constitute new and productive areas of investment for the private sector, and in turn bolster the performance of incumbent governments that are concerned with remaining in office. UNEP (2008) highlights some of these initiatives in the African context, including South Africa's *Working for Water* programme, which created approximately 25,000 new jobs for the unemployed by involving local communities in the removal of invasive plant species that consume high levels of water. Another initiative is the *Kibera Community Youth Programme*, which involves Nairobi's unemployed youth in the assembly of small and affordable solar panels that can be used to charge radios and mobile phones in both the slum of Kibera and elsewhere in Kenya.

Table 1: Summary of case studies

	Current development strategy	Green growth strategy	Short-term costs	Losers
South Africa	Invest in natural resources, particularly coal-fired electricity generation to support heavy industries.	Shift to nuclear and renewable energy sources.	• Higher electricity prices. • Job losses in coal mining with secondary impacts on heavy industry.	• Poor consumers. • Unionized workers. • Corporations in the mining and metals sectors.
Malawi	Agricultural intensification based on input subsidies for fertilizers.	Shift to conservation farming, organic fertilizers, micro-dosing, and inter-cropping.	• Falling production while smallholders change farming behaviours. • Loss of handouts to rural voters.	• Current ruling party. • Private sector suppliers of fertilizer. • Poor smallholders who cannot adapt.
Mozambique	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.	• Fewer rural employment opportunities.	• Poor rural farmers.

Source: Authors.

Such positive examples, however, remain both very micro-oriented and very sparse in Africa, with most initiatives concentrated in industrialized countries. In other words, they are not part of a broader development strategy. Moreover, African governments have faced tremendous challenges in creating large-scale employment for their citizens, let alone jobs that can be considered 'green.' Considerable investment of scarce resources by governments would be needed, as would viable public-private partnerships and a shift in the education system to provide the specific technical skills often required for green jobs.

To confront these costs and the ones associated with the broader GG agenda, 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. Furthermore, despite commitments at the Copenhagen climate summit to allocate US$30 billion to climate financing over the 2010-12 period, donors have disbursed only seven per cent of this amount. Much of it has been directed at supporting mitigation in Africa than to adaptation because the former can be linked to the exportation of mitigation technologies by donor country firms (*Development Today* 2011).

Overall, the GG 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, economic and political, inherent in the GG agenda. The experience of past reform initiatives, such as structural adjustment programmes, cautions against ignoring these trade-offs.

References

Agência de Informação de Moçambique (AIM) (2011). Government Confident Biofuels Will be Ready Next Year. *All Africa*. 5 September 5. Accessed at http://www.allafrica.com/stories/201109051562.html.

Altman, M., R. Davies, A. Mather, D. Fleming, and H. Harris (2008). *The Impact of Electricity Price Increases and Rationing on the South African Economy*: *Final Report to the National Electricity Response Team (NERT) Economic Impact Task Team*. Human Sciences Research Council: Pretoria, South Africa.

Arndt, C., R. Benfica, F. Tarp, J. Thurlow, and R. Uaiene (2010). 'Biofuels, Poverty, and Growth: A Computable General Equilibrium Analysis of Mozambique. *Environment and Development Economics*, 15(1): 81–105.

Arndt, C., R. Davies, K. Makrelov, and J. Thurlow (2011). 'Measuring the Carbon Content of the South African Economy'. UNU-WIDER Working Paper 2011-45. UNU-WIDER: Helsinki, Finland.

Arndt, C., M.A. Hussain, E.S. Jones, V. Nhate, F. Tarp, and J. Thurlow (forthcoming). 'Explaining Poverty Evolution: The Case of Mozambique'. *American Journal of Agricultural Economics.*

Arndt, C., and K. Simler (2007). 'Consistent Poverty Comparisons and Inference. *Agricultural Economics*, 37(2-3): 133–43.

Babu, S., and E. Chapasuka (1997). 'Mitigating the Effects of Drought Through Food Security and Nutrition Monitoring: Lessons from Malawi'. *Food and Nutrition Bulletin*, 18(1): 71–83.

Bienen, H. (1990). 'The Politics of Trade Liberalization in Africa'. *Economic Development and Cultural Change*, 38(4): 713–32.

Büscher, B. (2009). 'Connecting Political Economies of Energy in South Africa'. *Energy Policy*, 37(10): 3951–58.

Callaghy, T. (1990). 'Lost Between State and Market: The Politics of Economic Adjustment in Ghana, Nigeria, and Zambia'. In J. Nelson (ed.), *Economic Crisis and Policy Choice: The Politics of Adjustment in the Third World*. Princeton, NJ: Princeton University Press.

Childress, S. (2008). 'Power Struggle in Africa, Outages Stifle a Boom'. *Wall Street Journal*, 17 April.

Chinsinga, B. (2009). 'Malawi's Political Landscape 2004-2009'. In M. Ott and F.E. Kanyongolo (eds), *Democracy in Progress: Malawi's 2009 Parliamentary and Presidential Elections*. Zomba, Malawi: Kachere Books.

Chinsinga, B. (2007). 'Reclaiming Policy Space: Lessons from Malawi's 2005/2006 Fertilizer Subsidy Programme'. *Policy Brief No. 13*. Brighton, UK: Future Agricultures Initiative.

Chirwa, E., J. Kydd, and A. Dorward (2006). 'Future Scenarios for Agriculture in Malawi: Challenges and Dilemmas'. Paper presented at the Future Agricultures Consortium, Institute for Development Studies, University of Sussex, Brighton, UK, 20-21 March.

Creamer, T. (2011). 'SA Moves to Finalise Carbon Tax this Year, Despite Global Loose Ends'. *Mining Weekly*, 16 March. Accessed at http://www.miningweekly.com/article/sa-moves-to-finalise-carbon-tax-this-year-despite-global-loose-ends-2011-03-16-1.

Cuvilas, C., R. Jirjis, and C. Lucas (2010). 'Energy Situation in Mozambique: A Review'. *Renewable and Sustainable Energy Reviews*, 14: 2139–46.

Davis, M. (1998). 'Rural Household Energy Consumption: The Effects of Access to Electricity—Evidence from South Africa. *Energy Policy*, 26(3): 207–17.

Denning, G., P. Kabambe, P. Sanchez, A. Malik, R. Flor, R. Harawa, P. Nkhoma, C. Zamba, C. Banda, C. Magombo, M. Keating, J. Wangila, and J. Sachs (2009). 'Input Subsidies to Improve Smallholder Maize Productivity in Malawi: Toward an African Green Revolution'. *PLoS Biology*, 7(1): 2–10.

Development Today (2011). 'Bypassing Africa: Donors Pour Climate Aid into Emission Reductions, 17: 7.

Diao, X., P. Hazell, D. Resnick, and J. Thurlow (2007). *The Role of Agriculture in Pro-Poor Growth in Sub-Saharan Africa*. Washington, DC: International Food Policy Research Institute.

Dixon, J., A. Gulliver, and D Gibbon (2001). *Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World*. Rome and Washington, DC: Food and Agricultural Organization and World Bank.

Dorward, A., and E. Chirwa (2011). 'The Malawi Agricultural Input Subsidy Programme: 2005-6 to 2008-9'. *International Journal of Agricultural Sustainability* 9(1): 232–47.

Dorward, A., E. Chirwa, and R. Slater (2010). *Evaluation of the 2008/9 Agricultural Input Subsidy Program, Malawi: Report on Program Implementation.* London, UK: School of Oriental and African Studies.

Dorward, A., and J. Kydd (2004). 'The Malawi 2002 Food Crisis: The Rural Development Challenge'. *Journal of Modern African Studies*, 42(3): 343–61.

Dufey, A. (2007). 'International Trade in Biofuels: Good for Development? And Good for Environment?' *IIED Briefing*. London, UK: International Institute for Environment and Development.

Dugger, C. (2007). 'Ending Famine, Simply by Ignoring the Experts'. *The New York Times*, 2 December. Accessed at http://www.nytimes.com/2007/12/02/world/africa/02malawi.html.

Fargione, J., J. Hill, D. Tilman, S. Polasky, and P. Hawthorne (2008). 'Land Clearing and the Biofuel Carbon Debt'. *Science*, 319(5867): 1235–38.

Food and Agricultural Organization (FAO) (2011). *State of the World's Forests*. Rome, Italy: FAO.

Food and Agricultural Organization (FAO) (2005). 'Malawi Facing Serious Food Crisis'. Rome, Italy: FAO. Accessed at http://www.fao.org/newsroom/en/news/2005/107298/index.html.

Frieden, J., and R. Rogowski (1996). 'The Impact of the International Economy on National Policies: An Analytical Overview'. In R. Keohane and H. Milner (eds), *Internationalization and Domestic Politics*. New York, NY: Cambridge University Press.

Goldenberg, S. (2010). 'World Bank's $3.75bn Coal Plant Loan Defies Environment Criticism'. *The Guardian*, 9 April. Accessed at http://www.guardian.co.uk/business/2010/apr/09/world-bank-criticised-over-power-station.

Government of Mozambique (GOM) (2009). *Política e Estratégia de Biocombustíveis*. Maputo, Mozambique: Ministry of Energy.

Government of Mozambique (GOM) (2006). *Programa Nacional de Desenvolvimento Agrário (PROAGRI II) 2006-2010*. Maputo, Mozambique: Ministry of Agriculture.

Haggard, S., and R. Kaufman (1995). *The Political Economy of Democratic Transitions*. Princeton, NJ: Princeton University Press.

Haggard, S., and R. Kaufman (1992). 'Institutions and Economic Adjustment'. In S. Haggard and R. Kaufman (eds), *The Politics of Economic Adjustment*. Princeton, NJ: Princeton University Press.

Hallegatte, S., G. Heal, M. Fay, and D. Treguer (2011). 'From Growth to Green Growth: A Framework'. *Policy Research Working Paper 5872*. Washington, DC: World Bank.

Harrigan, J. (2003). 'U-Turns and Full Circles: Two Decades of Agricultural Reform in Malawi 1981-2000'. *World Development*, 31(5): 847–63.

Hiscox, M. (2001). 'Class versus Industry Cleavages: Inter-Industry Factor Mobility and the Politics of Trade'. *International Organization*, 55(1): 1–46.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) (2009). 'Fertilizer Microdosing: Boosting Production in Unproductive Lands'. Accessed at http://www.icrisat.org/impacts/impact-stories/icrisat-is-fertilizer-microdosing.pdf.

International Monetary Fund (IMF) (2007). 'Malawi Growth and Development Strategy: From Poverty to Prosperity, 2006-2011'. *IMF Country Report No. 07/55*. Washington, DC: IMF.

Johwa, W. (2010). 'Cosatu Plans to Protest Against Increase in Electricity Prices'. *Business Day*, 5 March. Accessed at http://www.businessday.co.za/articles/Content.aspx?id=95389.

Lewis, W.A. (1954). 'Economic Development with Unlimited Supplies of Labour'. *The Manchester School*, 22(2): 139–91.

Mainwaring, S., and M.S. Shugart (eds) (1997). *Presidentialism and Democracy in Latin America*. New York: Cambridge University Press.

Milner, H. (1997). *Interests, Institutions, and Information: Domestic Politics and International Relations*. Princeton, NJ: Princeton University Press.

Minot, N., and T. Benson (2009). 'Fertilizer Subsidies in Africa: Are Vouchers the Answer?' *IFPRI Issue Brief 60*. Washington, DC: International Food Policy Research Institute.

Munthali, M. (2007). 'Integrated Soil Fertility Management Technologies: A Counteract to Existing Milestone in Obtaining Achievable Economical Crop Yields in Cultivated Lands of Poor Smallholder Farmers in Malawi'. In A. Bationo, B. Waswa, J. Kihara and J. Kimetu (eds), *Advances in Integrated Soil Fertility Management in sub-Saharan Africa: Challenges and Opportunities*. Dordrecht, The Netherlands: Springer.

Nelson, J. (1992). 'Poverty, Equity, and the Politics of Adjustment'. In S. Haggard and R. Kaufman (eds), *The Politics of Economic Adjustment*. Princeton, NJ: Princeton University Press.

New Partnership for Africa's Development (NEPAD) (2011). *The Abuja Declaration on Fertilizers for an African Green Revolution-Status of Implementation at Regional and National Levels.* Johannesburg, South Africa: NEPAD.

Nhantumbo, I., and A. Salomão (2010). *Biofuels, Land Access, and Rural Livelihoods in Mozambique.* London, UK: International Institute for Environment and Development.

Olson, M. (1965). *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, MA: Harvard University Press.

Organization for Economic Cooperation and Development (OECD) (2011). *Towards Green Growth*. Paris, France: OECD.

Pape, J., and D. McDonald (2002). *Cost Recovery and the Crisis of Service Delivery in South Africa*. Cape Town, South Africa: Human Sciences Research Council.

Phillips, E. (2007). 'The 2002 Malawi Famine'. In P. Pinstrup-Andersen and F. Cheng (eds), *Food Policy for Developing Countries: Domestic Policies for Markets, Production, and Environment*. Ithaca, NY: Cornell University Press.

Porter, M. (1985). *Competitive Advantage.* New York, NY: Free Press.

Republic of South Africa (RSA) (2011). *Integrated Resource Plan for Electricity: 2010-2030 (Revision 2 Final Report)*. Pretoria, South Africa: Department of Energy, Government of the Republic of South Africa.

Republic of South Africa (RSA) (2010). *Reducing Greenhouse Gas Emissions: The Carbon Tax Option.* Pretoria, South Africa: National Treasury, Government of the Republic of South Africa.

Republic of South Africa (RSA) (1996). *Constitution of South Africa, Chapter 2: Bill of Rights*. Pretoria, South Africa: Government of the Republic of South Africa.

Rodrik, D. (1996). 'Understanding Economic Policy Reform'. *Journal of Economic Literature*, 34: 9–41.

Rubin, O. (2008). 'The Malawi 2002 Famine- Destitution, Democracy, and Donors'. *Nordic Journal of African Studies*, 17(1): 47–65.

Sanchez, P., G. Denning and G. Nziguheba (2009). 'The African Green Revolution Moves Forward'. *Food Security*, 1(1): 37–44.

Schut, M., M. Slingerland, and A. Locke (2010). 'Biofuel Developments in Mozambique: Update and Analysis of Policy, Potential and Reality'. *Energy Policy*, 38(9): 5151–65.

Schut, M., S. Bos, L. Machuama, and M. Slingerland (2010). *Working Towards Sustainability: Learning Experiences for Sustainable Biofuel Strategies in Mozambique*. Wageningen, The Netherlands: Wageningen University and Research Centre.

Smiddy, K., and D. Young (2009). 'Presidential and Parliamentary Elections in Malawi'. *Electoral Studies*, 28(4): 642–73.

South African Press Association (SAPA) (2010). 'Electricity Price Hikes Slammed'. *Mail and Guardian*, 24 February. Accessed at http://mg.co.za/article/2010-02-24-electricity-hikes-slammed.

Srinivasan, T.N. (1985). 'Neoclassical Political Economy, the State, and Economic Development'. *Asian Development Review*, 3(2): 38–58.

Stern, N. (2006). *Stern Review on the Economics of Climate Change*. Cambridge, UK: Cambridge University Press.

Tilman, D., K. Cassman, P. Matson, R. Naylor, and S. Polasky (2002). 'Agricultural Sustainability and Intensive Production Practices'. *Nature*, 418(6898): 671–77.

Tyler, E. (2009). *Aligning South African Energy and Climate Change Mitigation Policy*. Cape Town, South Africa: Energy Research Centre.

United Nations Environmental Program (UNEP) (2011). *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication – A Synthesis for Policymakers*. Nairobi, Kenya: UNEP.

United Nations Environmental Program (UNEP) (2008). *Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World.* Nairobi, Kenya: UNEP.

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) (2011). *What is Green Growth?* Accessed at http://www.greengrowth.org/index.asp.

Van de Walle, N. (2001). *African Economies and the Politics of Permanent Crisis, 1979-1999*. New York, NY: Cambridge University Press.

Weigand, M. (2011). 'Green Growth: Emerging Paradigm Shift in Development and Economic Growth'. *Asia-Pacific Business and Technology Report*, 3(8): 8–12.

Winkler, H. (2005). 'Renewable Energy Policy in South Africa: Policy Options for Renewable Electricity'. *Energy Policy*, 33(1): 27–38.

World Bank (2011). World Development Indicators Database. Washington, DC: World Bank.

World Bank (2010). *World Development Report: Development and Climate Change*. Washington, DC: World Bank.