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IMPACT OF AGRICULTURAL POLICIES ON CROP PRODUCTIVITY AND FOOD SECURITY IN MALAWI, 1964-2014

Henry Geoffrey Hunga
University of Malawi, Box 280, Zomba, Malawi and Ministry of Agriculture, Irrigation and Water Development, PO Box 30291, Lilongwe, Malawi

Richard J. Culas
School of Agriculture and Wine Sciences, Charles Sturt University, PO Box 883, Orange NSW 2800, Australia, Email: rculas@ csu.edu.au

Abstract

Malawi agriculture has undergone various policy regimes targeted at improving productivity and food self-sufficiency. Policy influence has often come from the World Bank and other donors who have pushed for a costly and state minimalist policy, against government wish for a welfarist approach. This situation has created a long-standing schism between the Bank and Government since the signing of the first SAP loan in 1981, thus affecting implementation of agricultural policies. This has resulted in food market reforms being partial and often reversed, with state marketing boards still playing a major role. These have created instability in maize prices and stocks in the national strategic grain reserve, often resulting in food crises and putting into question the achievements of the farm input subsidy program in achieving food security. This paper analyses the impact of Malawi agricultural policies on crop productivity over the past fifty years (1964-2014) and the resulting food security status of the country by drawing on national level data. This is confounded by the fact that up to 38% of Malawians still do not get adequate food supplies and the percentage of stunted children is high at 42.4%. Dietary diversification, improved research and technology development and transfer, upscaling of irrigation and policy consistency are critical to achieving national and household food security. Equally, development and empowerment of the private sector is the panacea for a strong maize marketing system that would deliver stable supply and pricing.
Key Words: Agricultural policies, smallholder farmers, maize production, food security indicators, Malawi
JEL Codes: *Q10, Q18, O55*

1. Introduction

1.1 African Agriculture and Food Security

Climate change effects and volatile food prices have affected world food security over the last few years. African agriculture is at a crossroads with recurrent food shortages now exacerbated by climate change and increased population (Juma, 2011). Maize remains crucial for food security in sub-Saharan Africa (SSA). In some regions, Malawi included, maize is the major crop and the staple diet for the population at large. Efforts to achieve food security must attend to improving maize yields, in the same way that rice and wheat have played a central role in attaining food security in Asia (Smale, Byerlee, & Jayne, 2013). Nevertheless there has been little progress towards achieving higher agricultural production levels in recent years, hence little changes in agricultural growth and food security in Africa (Smale et al., 2013).

Globally, developing countries have registered significant progress towards achieving Millennium Development Goal - MDG1 of hunger reduction target (now Sustainable Development Goal - SDG2, zero hunger) though marked differences across regions have been observed (FAO, IFAD, & WFP, 2013). On the demand side, changing diets as a result of economic growth, population increase and urbanisation has caused increase in food and feed demand in developing countries (OECD/FAO, 2008). On the supply side increased productivity achieved through improved technology is necessary as opposed to increasing land area for agriculture (OECD/FAO, 2008). SSA remains the region with the highest prevalence of undernourishment and malnutrition (FAO et al., 2013).

To achieve food security, in 1980s African governments through market and price intervention policies encouraged smallholder farmer adoption of improved seed and fertiliser use (Smale et al., 2013). This drive to increase yields came about with a huge cost on the national budgets and led to fiscal crises that were faced by most African governments in the late 1980s and early 1990s (Jayne & Jones, 1997). Consequently, between 1980 and 1995 privatisation and liberalisation of strategic grain crop marketing happened in more than 25 African countries (Jayne & Jones, 1997).

Food security has been defined as food availability, access and utilisation (FAO et al., 2013). Where domestic policies do not regulate agricultural commodity pricing it is hard for the larger population to access the minimum quantities of recommended daily calories intake (Francesco, Luigi, Alessia, & Gary, 2013). This is evident in the 2002 Malawi food crises which exposed the failure of development policies needed to create wealth, develop a strong economy and markets on which it could stand (Dorward & Kydd, 2004).

The impacts of rising food prices have a direct bearing on distribution and production efficiency and determine consumption patterns of a county's population (Francesco et al., 2013). In developing countries, Malawi inclusive, where food expenditure accounts for 60-80% of per capita income, increasing agricultural commodity prices translates into an unattainably high cost of living and inflation (Francesco et al., 2013).

1.2 Agricultural Sector and Food Security in Malawi

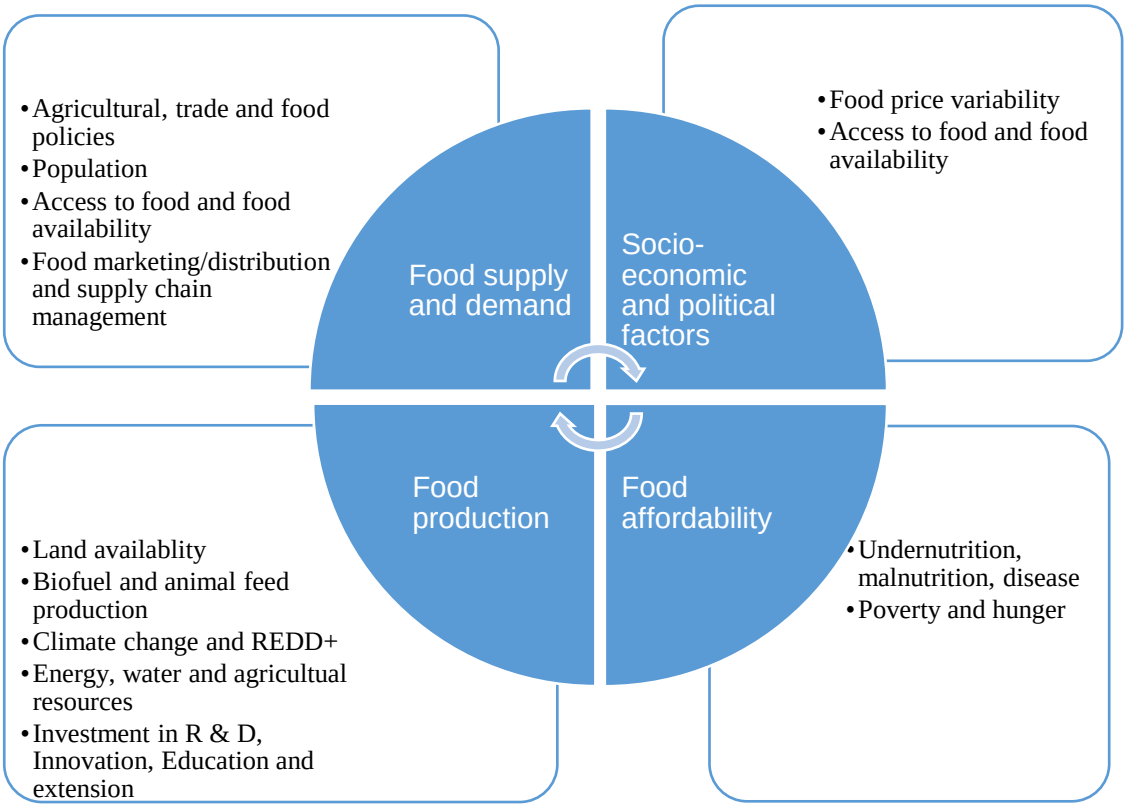
Agriculture and maize remain important to the Malawi economy and to the daily lives of most people. Although, small landholding size, low unit area agricultural productivity and below optimum yields have resulted in high prevalence of poverty plus national and individual or household food insecurity (Chilowa, 1998; Dorward & Kydd, 2004).

Farmers who produce less food than what they consume (net buyers) make up 50% or more of total farm families in Africa (Dorward, Chirwa, & Poulton, 2008). Although agriculture growth has improved, more than 60% of rural households in Malawi are net buyers of food (Ellis & Manda, 2012; Holden & Lunduka, 2011). Thus regardless of the many social protection programs and policies that have of late been implemented in Malawi they have not reduced vulnerability, suggesting a systemic policy implementation failure (Devereux & Macauslan, 2006). The situation has been worsened by Africa's more than 20 years of experimentation with structural adjustment programs which has been a devastating failure (Gibson, 2004) moving the continent from crisis to disaster (Leys, 1994).

Seasonal food crises (annual food lean periods) which are common in Malawi result in sharp rises in staple food prices year in, year out, and it is the key determinant of vulnerability to hunger especially for the net food buyers (Ellis & Manda, 2012). Over a period of 20 years between 1989 and 2009 Ellis and Manda (2012) found the gap between lowest and highest price of maize to be 60%, with extreme maize price spikes observed in 2007 and 2009 growing seasons of up to 395%. Coincidentally world food prices including those of traditional staples such as maize and rice rose sharply within the same years (Jayne & Tschirley, 2010). Such

levels of food price disparities result in acute food insecurity incidents for the vulnerable rural poor in Malawi who derive 80% of their energy calories from the crop (Ellis & Manda, 2012).

This paper examines the agricultural policies from independence in 1964 spanning three reform periods (Chilowa, 1998; Chirwa & Muhome-Matita, 2013; Dorward & Chirwa, 2011). Their impact on production and marketing of agriculture produce with special focus on the strategic staple crop of maize has been assessed. Food security indicators as spelt out by FAO et al. (2013) were analysed to assess the impact of the policies. A conceptual framework of the factors influencing food security has been outlined in Figure 1.



Source: Authors' construction

Figure 1. The Multidimensional Aspects of Food Security.

1.3 Organisation of the Paper

The main objective of paper is to analyse the impact of Malawi agricultural policies on crop productivity over past fifty years (1964-2014) and resulting food security status of the country by drawing on national level data. Section 2 of the paper reviews the status of poverty and smallholder agriculture in Malawi. Section 3 assesses the impact of agricultural policy reforms on crop productivity. Section 4 provides an analysis of the food security situation in Malawi, followed by conclusion in section 5.

2. Status of Poverty and Smallholder Agriculture in Malawi

2.1 The Poverty Scorecard for Malawi

Malawi with a population of 16.8 million and GDP growth of 5.7% in 2014 has more than 73% of the population living on less than US$1.25 a day (World Bank, 2015b). In 2013 Malawi was ranked 174th of 187 countries globally on the Human Development Index (HDI). Malawi has an average HDI of 0.411, life expectancy at birth of 55.3 years and 10.8 years of schooling (UNDP, 2014). The Gini coefficient, an indicator of inequality was at 0.462 in 2010 with rural areas having higher levels of inequality than urban areas (Hanjra & Culas, 2011; World Bank, 2015b). The country was ranked 134th globally based on purchasing power adjusted GDP per capita (World Bank, 2015b). The proportion of the poor in rural areas increased from 55.9% in 2004 to 56.6% by 2010, but on the other hand poverty levels declined in urban areas within the same period from 25.4% to 17.3% (World Bank, 2015b).

The poverty levels are manifested through high cases of child undernutrition which is a big challenge, often associated with 50% of child mortality benchmark globally (Chikhungu & Madise, 2014). Malawi is ranked 37th among counties with highest under five mortality rates in the world, despite that global trends have been declining (Chirwa & Ngalawa, 2008; UNICEF, 2015). Malnutrition in Malawi is associated with: national and household food insecurity, heavy workloads and poor nutrition of mothers, recurrent infections, poor eating habits, and HIV infections leading to frequent illnesses (Chirwa & Ngalawa, 2008). More than 60% of Malawian smallholder farming households are net food buyers, and face repeated cycles of seasonal food shortage (Chikhungu & Madise, 2014; Jayne, Yamano, Weber, & Tschirley, 2003).

Agriculture accounts for a third of the Malawi gross national domestic product and 90% of export revenues and employment (Castel, Phiri, & Stampini, 2010; Edriss, Tchale, & Wobst, 2004). However agricultural GDP has shrunk from 8.9% between 1990 and 2000 to 4% during the period 2000 and 2014 (World Bank, 2015b). Malawi's gross domestic product has likewise declined in the past three years from 6.1% in 2013 to 5.7% in 2014 and 2.8% by 2015 (AfDB, OECD, & UNDP, 2015; World Bank, 2015a).

2.2 Smallholder Agriculture in Malawi

Agriculture productivity in SSA has not grown at the same pace as population growth (Denning, Kabambe, Sanchez, Malik, & Flor, 2009). Although the area under maize cultivation in SSA (excluding South Africa) has tripled between 1961-2010, the increase has only contributed to 40% increase in yield (Bezu, Kassie, Shiferaw, & Ricker-Gilbert, 2014). With southern Africa having the lowest maize yields at an average of 1.1 t/ha (Cooper et al., 2008; Smale et al., 2013).

Malawian agriculture is predominantly rain-fed and provides 90% of the staple food maize (Cooper et al., 2008; Jayanthi et al., 2013). The rainfall is unimodal, from early December to early April, and rain-fed maize occupies 52% of cropped area (Holden & Lunduka, 2011; Smale, Heisey, & Leathers, 1995). Climate variability has brought with it new challenges including shifts in seasons, long dry spells, droughts and floods (Cooper et al., 2008; Hansen, 2002).

Malawian smallholder agriculture sector comprises more than 4.3 million farm families cultivating around 4.5 million hectares under the customary land tenure system (Dorward & Chirwa, 2014; Minot, Kherallah, & Berry, 2000). Maize accounts for 60% of total calories consumed by Malawians annually (Denning et al., 2009). Maize production is limited by high input costs associated with sub-optimal use of chemical fertilisers and improved seed, and non-adoption of good agricultural practices by smallholder farmers resulting in low yields

(Akinnifesi, Makumba, & Kwesiga, 2006; Denning et al., 2009; Fisher & Snapp, 2014; Ngwira, Aune, & Mkwinda, 2012; Place & Otsuka, 2001; Smale, 1995).

Increase in population and the need for more food has driven farmers to expand their areas of cultivation into fragile land, thereby exposing large land areas to erosive forces (Evenson & Fuglie, 2010; Mkanda, 2002). Several explanations have been given for the slow paced intensification in agriculture, a development characterised by these factors: lack of farmer awareness of existing technologies, their benefits and costs; reliance on less productive technologies; and low profitability, given the price of inputs versus outputs (Doss, 2006; Lunduka, Fisher, & Snapp, 2012).

The existence of wide and pervasive gender gap has affected agricultural growth, with women often discriminated against regardless of them making up to 80% of the agricultural labour force in SSA (FAO, 2011; World Bank, 2014). In Malawi women make up 52% of the agricultural workforce, yet their productivity, measured as the value of agricultural produce per unit of cultivated land, is 25% less than that of their male counterparts (Palacios-Lopes, Christiaensen, & Kilic, 2015; World Bank, 2014). The gap has emerged because women don't have the same opportunities to access fundamental agricultural inputs like land, labour, knowledge, fertiliser, and improved seeds (World Bank, 2014).

3. Impact of Agricultural Policy Reforms in Malawi

3.1 Pre-reform Period

The performance of the agriculture sector and the economy was generally good during the early post-independence years until 1979-80, although characterised by high dependence on input subsidies, preferential loans for the estate sector and huge government intervention through marketing boards (Harrigan, 2003; Lele, 1987; Sahn & Arulpragasam, 1991). This growth was interrupted by the world oil crisis and the civil war in Mozambique which blocked Malawi's routes to the sea (Chirwa, 2004b) raising international transportation costs by close to 20% of the value of exports and nearly 3% of GDP by 1984 (Lele, 1987). This was compounded by a fall in the price of tobacco, the major source of export earnings, and by drought in early 1980s, which required food imports resulting in an increased current account deficit and debt service ratio (Lele, 1987).

3.2 The Reform Period

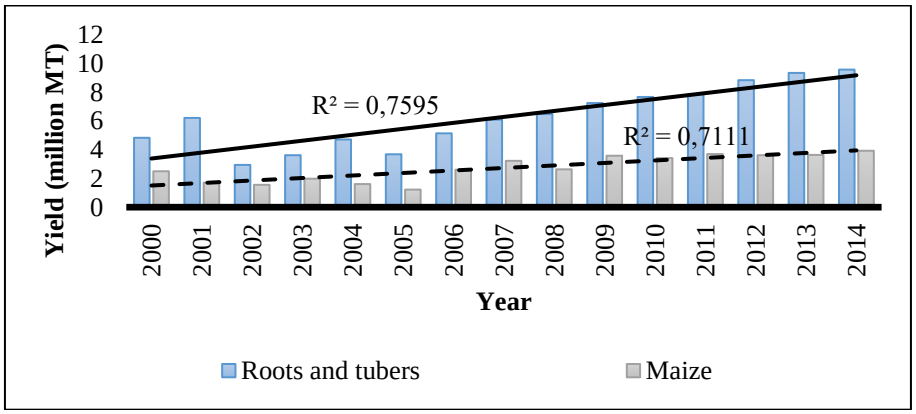
In response to unbearable external shocks and macro-economic imbalances, Malawi committed to a series of structural adjustment and stabilisation programs (SAP) with the World Bank, IMF and other donors from 1981 (Minot et al., 2000). The country's commitment to SAP was in response to the perceived weakness in the national economy and an emphasis on pricing policies within the agriculture sector as a key strategy for renewed growth (Sahn & Arulpragasam, 1991). The adjustments generally favoured supply increase over demand contraction, because agriculture value addition lagged behind and did not keep pace with population growth.

The reforms resulted in maize production declining in the 1986-87 production season due to reduced use of fertiliser by farmers after partial removal of subsidies, resulting in postponement of full removal of subsidies to 1989-90 financial year (Chirwa, 2004a). The postponement was late as impacts of the reform had started to bite leading to the national food crisis of 1987 which forced government to import more than 140,000 tons of maize the highest since early 1970s (Harrigan, 2008). Within two years of phased removal of subsidies up to 1987, the Malawian fertiliser price to official maize price ratio was the highest in the developing world (Chilowa, 1998). To deal with this situation the government unilaterally

withdrew from the third Structural Adjustment Loan (SAL) and re-introduced a 25% fertiliser subsidy, increased maize producer price by 44% (Lele, 1987).

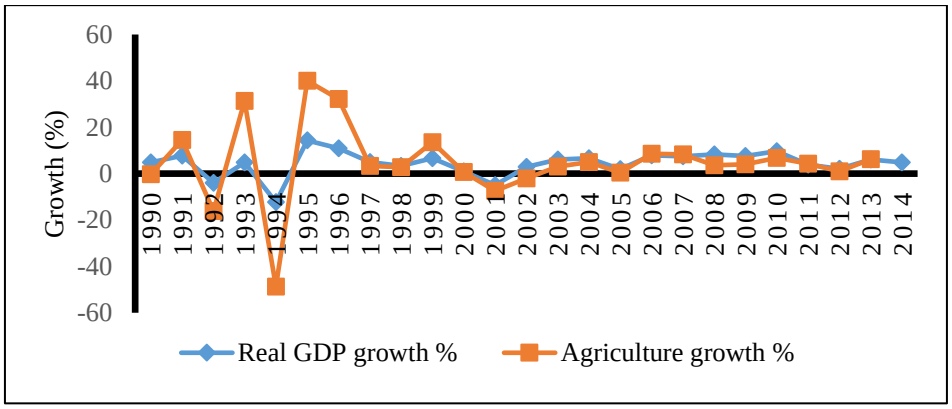
As government and the donors settled their scores on the reforms, in 1990 Malawi renegotiated and committed to the World Bank and IMF Agriculture Sector Assistance Credit (ASAC) in which limited support was to be provided to producers (WTO, 2002). ASAC acknowledged the need for improving food crop productivity, especially among the resource poor, so that some land is released for other cash crops without affecting food production, which required increased fertiliser use and adoption of high yielding varieties (Harrigan, 2003). Other notable reforms under ASAC to address the above constraints were: revised legislation to allow smallholders to grow burley tobacco; stopping the transfer of customary land to estates and revise upwards land rents; phased removal of subsidies to allow increase in food production among the poor; promotion of private traders with support from ASAC; discontinued Agricultural Development and Marketing Corporation (ADMARC) divestiture especially in rural areas to be able to defend floor and ceiling prices, through transparent funding from government (Harrigan, 2003).

The reforms resulted in an increase of up to 70% in the contribution of smallholder farmers to tobacco production by 1998, notable diversification into non-maize food crops (Figure 2) and a decline in the share of maize in smallholder plantings from 72% to 50% between 1990 and 1999 (Harrigan, 2003). And there was strong evidence that among farmers, especially those in the lowest third of land holding size, tobacco was crowding out maize (Mkandawire, 1999). While some observers saw signs of recovery, any improvements were soon neutralised by the 1992 and 1994 droughts, an increased influx of Mozambican refugees and suspension of direct foreign aid at the climax of pro-democracy activity (Harrigan, 2003). However, in favourable years like 1991, 1993, 1995, 1996 and 1999 agriculture growth of more than 10% was registered, which resulted in corresponding increased annual GDP growth of above 5% (Figure 3).



Data source: FAOSTAT (2016)

Figure 2. Change in Smallholder Production of Food Crops Other Than Maize Since 2000.



Source: Harrigan (2003) and AfDB (2009, 2015)

Figure 3. Annual Real GDP and Agriculture Growth Since 1990.

The Malawi Government emphasised food availability through increased production whereas World Bank was biased towards access and entitlements, neglecting the fact that Malawi's economy is linked to maize production politically and culturally (Harrigan, 2003). Although by now there was flexibility in the program implementation on both sides, but politics started dominating government policies after the adoption of multiparty democracy in 1994 (Chilowa, 1998; Harrigan, 2003).

3.3 Post-reform Period

The change of government and political system to democracy in 1994 brought with it new areas of intervention in the Malawi economy. This coincided with the peace deal in Mozambique (Harrigan, 2003). The new Government acknowledged that the past adjustment reforms had generally failed as agricultural GDP grew at an average of 1.6% from 1980-1994 and was negative between 1992-94 (Figure 3), triggering emphasis on poverty alleviation. At the same time the World Bank and other donors were also changing their approach with a shift from structural adjustment to poverty alleviation, which was linked to debt relief under the Highly Indebted Poor Countries (HIPC) initiative (Ellis, Kutengule, & Nyasulu, 2003). The Malawi Poverty Reduction and Strategy Plan (PRSP) with support from the IMF-Malawi Poverty Reduction and Growth Facility (PRGF) was adopted in 2001 and was meant to achieve sustainable poverty reduction through empowerment of the poor (Devereux & Macauslan, 2006; Ellis et al., 2003).

Malawi's desire to address the challenges of food security through input subsidies were implemented in defiance of the rulebook of economic dogma that has encouraged the discontinuation of agricultural subsidies for farmers (Juma, 2011). This was in response to the impact of SAP on Malawi's agriculture which was evident by late 1980s and mid-1990s with stagnated growth in the smallholder sector which held negative implications for rural people (Harrigan, 2008; Juma, 2011). In support of the input subsidies a number of social protection measures were put in place to cushion the most vulnerable from food insecurity (Devereux & Macauslan, 2006). The social protection instruments have been grouped into three: production enhancing, direct welfare transfer, and market interventions (Devereux, Baulch, Macauslan, Phiri, & Sabates-Wheeler, 2006).

3.3.1 Production Enhancing Policies

3.3.1.1 Farm Input Subsidies

Subsidies started with distribution of free fertiliser and seed to smallholder resource constrained farmers (Table 1) in 1992, followed by the Starter Pack Initiative (SPI) in 1998 as a response to reduced use of inputs by farmers due to high costs after the conclusion of the ASAC and heavy devaluation of the local currency in 1995 (Minot et al., 2000). The justification for the SPI was that it was cost effective to subsidise food production before harvest rather than food consumption after harvest (Devereux & Macauslan, 2006; Harrigan, 2003; Levy, 2005b).

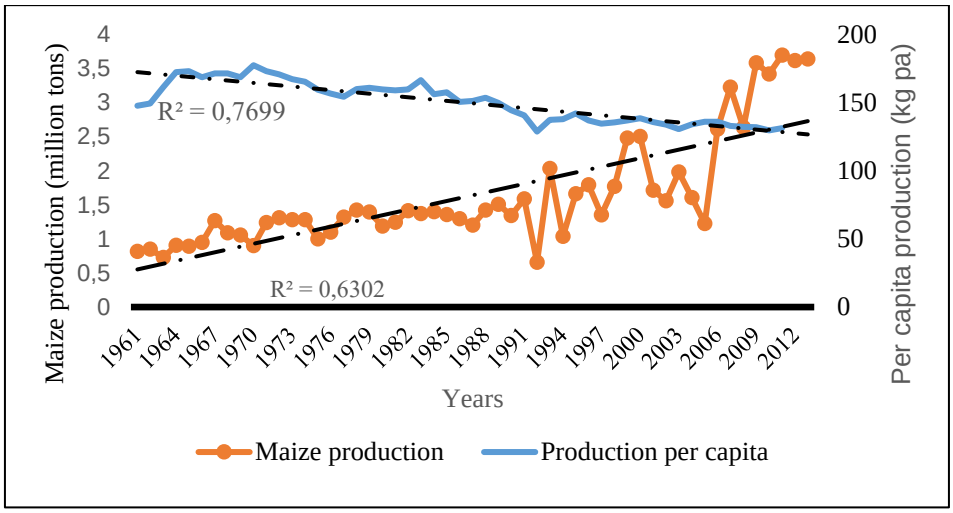
Table 1. Free Input Programs Implemented in Malawi (1992 – 2004).

Date	Program	Number of beneficiaries
1992-1993	Drought Recovery Inputs Project	1.3 million
1994-1995	Supplementary Inputs Project	800,000
1995-1996	Supplementary Inputs Project	660,000
1998-1999 and 1999-2000	Starter Pack	2.8 million
2000-2001	Targeted Input Program	1.5 million
2001-2002	Targeted Input Program	1 million
2002-2003	Extended Targeted Input Program	2.8 million
2003-2004	Extended Targeted Input Program	1.7 million
2005-2009	Farm Input Subsidy Program	50% of farmers
2010-2015	Farm Input Subsidy Program	1.5 million

Source: Dorward and Chirwa (2011, 2014); Harrigan (2008)

The SPI was followed by the implementation of large-scale Agricultural Input Subsidy Programme later on known as Farm Input Subsidy Program (FISP) in 2005-2006, which attracted sizeable international interest. FISP represented significant logistical achievement and increased national maize production and productivity, contributing to increased national food production, high real wages, wider economic growth and poverty reduction (Dorward & Chirwa, 2011). The program was implemented through targeted coupons for purchase of subsidized fertiliser and seed to rural poor households targeting on average 1.5 million smallholder farmers (Denning et al., 2009; Holden & Lunduka, 2013; Lunduka et al., 2012).

Just as with the SPI, there have been questions on who actually benefits from the FISP keeping in mind the problems associated with selection and targeting of the poor, the program has experienced enormous errors creating conflict and rampant corruption (Banful, 2011; Holden & Lunduka, 2013; Keen, 1992; Ricker-Gilbert & Jayne, 2009; Sen, 1992). Nevertheless maize production doubled in 2006 and almost tripled in 2007 (Figure 4), as a result of the national input subsidy program coinciding with better rainfall (Denning et al., 2009). There was a turnaround in Malawi's food situation from having a 40% deficit in 2005 to having more than 50% surplus by 2007 with some maize exported to neighbouring countries (Denning et al., 2009; Ellis & Manda, 2012). This according to government fulfilled the objectives of FISP which were to increase maize production, promote household food security, and enhance rural incomes (Dorward & Chirwa, 2013; Lunduka, Ricker-Gilbert, & Fisher, 2013).



Data source: FAOSTAT (2016)

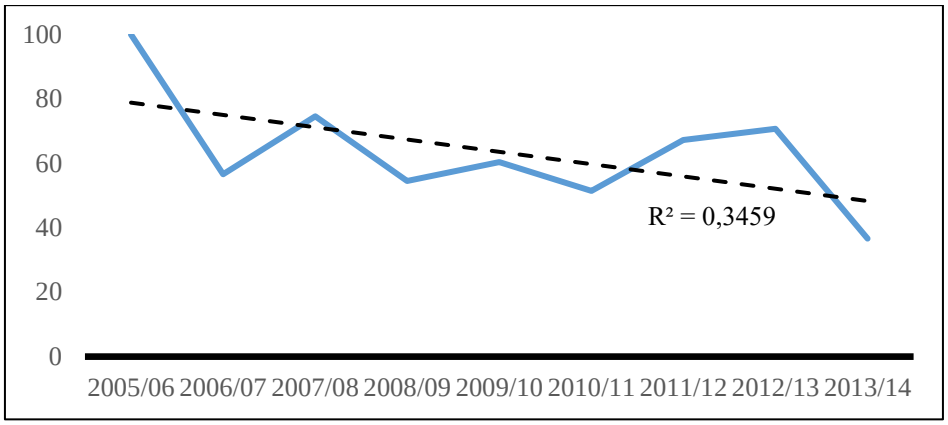
Figure 4. National and per Capita Maize Production.

Although the recovery was not smooth with intermittent food crises. For instance in 2001-2003, 2005-2006, 2007-2009, and 2013-2016 Malawi suffered food crises that left on average 3.5 million people food insecure (Ellis & Manda, 2012; FAOSTAT, 2016; Harrigan, 2008). With limited data for calculating maize deficit, available data showed that in the absence of interventions the nation required additional 500,000 to 600,000 tons (Levy, 2005a).

An earlier food crisis in 1991-92, though severe as production was almost a third of the 2000-2001 and 2001-2002 seasons the latter's impact on welfare was critical, indicating a more vulnerable Malawian population (Harrigan, 2008; Webb & Harinarayan, 1999). It must be noted that regardless of the input subsidies national per capita maize supply, has constantly declined since early 1990s, below the annual requirement of 139 kg (see Figure 4) (Ecker & Qaim, 2011). The persistent maize crises emanate from climatic shocks, mismanagement of the country's strategic grain reserve, poor crop estimates, and delayed response in maize imports (Ellis & Manda, 2012; Harrigan, 2008; Levy, 2005b).

While national crop production estimates were suggesting a huge increase in maize production and productivity during the years of input subsidies, Lunduka et al. (2013), using farm level studies, found relatively modest increases in yields and maize production over the same period at household level. The authors concluded that there has been an increase in real maize prices and that the country has continued to import maize.

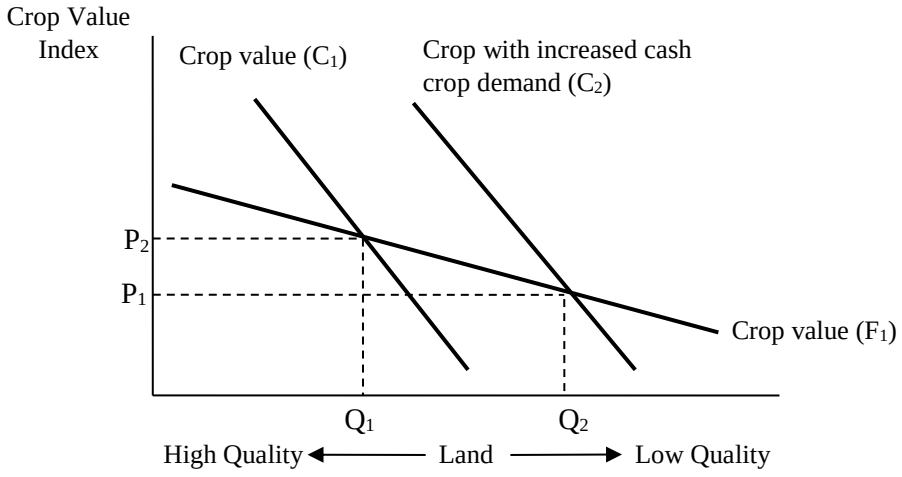
Using partial Total Factor Productivity (TFP) which measures output (gross crop) to input (fertiliser and seed) ratio indicated that the FISP has been inefficient since its inception with a reduction in TFP over the years (Figure 5). Coelli and Rao (2005) investigating cross country differences in agriculture productivity reported Africa and Latin America as being on the bottom in terms of TFP growth. Although TFP has slowly increased for Africa as a whole, Malawi's maize TFP has declined from 56.6% in 2006-07 season to 36.6% by 2013-14 production season. This may be a result of several factors.



Data source: FISP Reports and FAOSTAT (2016)

Figure 5. Maize Total Factor Productivity Since Reintroduction of Input Subsidy, 2005-06 = 100 (base year).

Firstly, given the declining per capita land holding, currently at 0.7 ha, and given that most useable land is already under production, the market economy will ensure that fertile land will generally be used for crops that have highest crop value index (Figure 6). The crop value index represents the marginal revenue product of the land (MPP*Price).



Source: Adapted from Harris (2006)

Figure 6. Land Quality, Crop Value and Land Use Patterns.

In figure 6, the two crop value lines' show how the land will be allocated between production of cash crops (e.g. Tobacco C_1) and production of food crops (e.g. Maize F_1). When demand for cash crops increases, while the demand for domestic food crops remains the same, the crop value line for cash crops will shift to C_2. In the end the land use pattern will change from point Q_1 to Q_2, and as a result, farmers will allocate more (high quality) land and other resources to the cash crops or even displace the purely subsistence farmers (Culas, 2016). Deregulation of the Special Crops Act in 1995 that allowed smallholder farmers to produce

and sell cash crops like tobacco, might have resulted in land allocation decisions that disadvantaged maize which has a high nutrient price/maize price ratio (Lele, 1987).

Secondly, this may suggest lack of efficiency through adoption of improved technologies like hybrid seeds and use of good agricultural practices, resulting in low output (Zeigler & Steensland, 2015). This is in line with the observation by Dorward and Chirwa (2014) who reported a lot of inefficiencies in the FISP programme ranging from late delivery of inputs to imbalanced quantities and types of fertilisers distributed to selling points. In addition the implementation inefficiencies have resulted in cost increases that have constantly affected the national budget due to carryover costs, interest on late payment of contracts compounded by fluctuations of the local currency (World Bank, 2015a).

3.3.1.2 Public Works Programs

Pilot public works programs started in 1995 and later at national level in 1996 when Malawi Social Action Fund (MASAF) was established to provide targeted assistance to the chronically poor through self-targeting in food deficit areas (Chirwa, Zgovu, & Mvula, 2002; Harrigan, 2008; Kalanidhi, del Nino, Colin, & Rodriguez-Alas, 2013). The strategies used include economic growth and employment creation; risk mitigation; livelihood diversification and insurance mechanisms; and risk copping that includes safety nets like food aid (Devereux et al., 2006; SALDRU, 2005). Public works promote self-targeting, avoids dependence and reduces leakage to the non-poor because of the work requirement (Chirwa et al., 2002; Devereux et al., 2006). Well timed public works have helped stabilise income and consumption when seasonal under-employment critically affects livelihoods (Devereux et al., 2006).

According to Integrated Household Survey III (IHS3) of 2010 approximately 2% of the population in Malawi benefited from public works programs with male headed households at 3% benefiting more than female headed households at 2% (NSO, 2012). More than 3% of people in rural areas participated in public works programs while participation rates among their urban counterparts was less than 1%, implemented over a 1.9-month period.

3.3.2 Direct Welfare Transfer Policies

In 2006 the Malawi Government started the implementation of a Social Cash Transfer System (SCTS) to reduce poverty and contribute to social and economic development (Miller, Tsoka, & Reichert, 2010; W. Smith, 2001). Priority has been labour constrained and ultra-poor households which are targeted in the SCTS (Devereux, 2002; Miller et al., 2010). Reliance on agriculture compounds the effects of stress and shock (Table 2) which are experienced by rural people (Davies, Guenther, Leavy, & Mitchell, 2009). Short term seasonal safety nets (food- or cash-for-work programs) have been replaced with monthly cash transfers especially for the ultra-poor, thus shifting social protection from discretionary responses to institutionalised rights (Devereux, 2009; Dorward & Kydd, 2004; Ellis & Manda, 2012; Harvey & Savage, 2006; Jere, 2007).

By 2009 the SCTS was operational in seven districts covering 28,000 beneficiaries, representing 10% of the ultra-poor households within the districts (Miller et al., 2010; Schubert, 2007; Schubert & Huijbregts, 2006). Data from IHS3 shows that in 2010 only 0.5% of the population benefited from social cash transfer programs operated by both government and development partners with 0.4% of that being rural people (NSO, 2012).

On the other hand, orphan care programs are common in Malawi as a result of the effects of HIV/AIDS. By 2005 more than 73 programs were caring for over 100,000 vulnerable and orphaned children using three approaches: community-based orphan care, institutional and residential care, and self-care (Beard, 2005; Kidman & Heymann, 2009). Similarly, School Feeding Program was introduced in Malawi as a follow up to the free primary education in

1994 to improve learning of pupils, reduce dropout rates, increase enrolment and attendance, targeting 703,630 pupils in selected schools in 13 districts by 2011 (Kadzamira & Rose, 2003; Nkhoma, Duffy, & Cory-Slechta, 2013). IHS3 survey revealed that 14.8% of the population benefited from the school feeding programs in 2010.

Table 2. Proportion of Malawian Farming Households Affected by Shocks, Expressed as Percentage of Total ISH3 Survey.

		Place of residence	
Shock	**Total affected**	**Urban**	**Rural**
Drought/irregular rains	37.8	9.1	43.1
Unusually high cost of inputs	26.2	8.5	29.5
Unusually high price of food	24.5	17.7	25.7
Unusually low price of agricultural output	12.2	2	14.1

Data source: NSO (2012)

In extreme years food aid has been used to respond to food crises that have affected the country in recent years such as the 2001-03 and 2005-06 scenarios (Jere, 2007). For instance in 2010 3% of female headed households in Malawi received free maize as compared to 2% of male headed households for 2.8 months (NSO, 2012).

3.3.3 Market Intervention Policies

Rural poverty in Malawi is directly related to the lack of household food security, which is often associated with family level maize production (Chilowa, 1998; Orr, Mwale, & Saiti, 2001; L. D. Smith, 1995). While the smallholder sector dominates Malawian agriculture, maize contributes more than two thirds of the total value of agriculture production (Govindan & Babu, 2001). It takes up 55% of the Malawian consumer basket, thus any escalation of inflation rate is usually predominantly a result of increase in food prices (WTO, 2010).

3.3.3.1 Maize Marketing

Liberalisation in the agriculture sector entailed the increase of ADMARC's producer price for smallholder export crops whilst reducing the relative producer price for maize (Harrigan, 2008). The reduced role of ADMARC in the maize market resulted in the widening of intra-season (from harvest to late in the year) consumer prices (Harrigan, 2008). As price liberalisation happened in advance of market reforms, ADMARC faced financial strain, making it unstable, such that by 1987 ADMARC faced severe financial crises and the formal maize marketing system collapsed (Harrigan, 2003).

Because the liberalisation was partial and wrongly timed, ADMARC's capacity to defend ceiling consumer prices of the staple food crop was compromised. This raised food prices by over 50% between 1985 and 1988, on the other hand failure to liberalise the financial markets meant that private traders were unable to get credit and hence not able to relocate into remote areas abandoned by ADMARC (Chilowa, 1998). Later, it was agreed that ADMARC must retain some markets in remote areas to defend floor and ceiling prices with transparent funding from government (Harrigan, 2003). There was a suggestion that food security be overseen of by a National Food Reserve Agency (NFRA), a trust formulated in 1999 mandated to buy maize for stocking in silos, sell, export as well as take over ADMARC's maize importation role. Since NRFA establishment there have been unresolved issues on the appropriate level of

reliance on maize imports through financial reserves or becoming self-reliant existed (Harrigan, 2003).

Firstly, as a result of the NRFA management conflict Malawi experienced three instances of extraordinary seasonal maize price increases in 2001-02, 2004-05 and 2007-09 by 354%, 218% and 395% respectively (Ellis & Manda, 2012), with the most recent in 2013-16. This is a direct result of food market reforms being partial and often reversed, with state marketing boards still playing a major role (Byerlee, Jayne, & Myers, 2006; Jayne & Tschirley, 2010). The policies used in the intervention of maize marketing have exacerbated rather than reduce the instances of extreme seasonal maize price instabilities see Table 3 (Jayne, Zulu, & Nijhoff, 2006; Poulton, Kydd, Wiggins, & Dorward, 2006). This is due to poor functioning of liberalised food markets and lack of public-private coordination due to governments' discretionary powers to intervene (Harrigan, 2003; Jayne, Govereh, Mwanaumo, & Nyoro, 2002; Jayne et al., 2006).

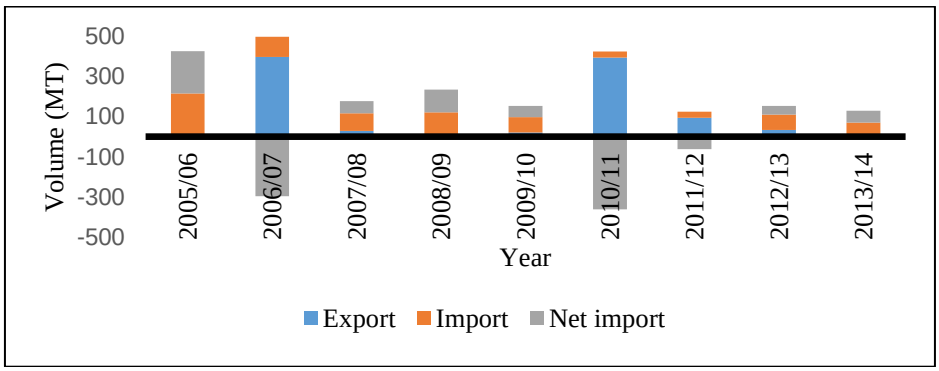
Table 3. Effects of Seasonal Maize Price Instability on Different Consumer Groups in Malawi.

Affected group	**Significance**	**Problem**	**Inter- or intra-seasonal variability (the bigger issue)**
1. Poor consumers	Majority of both rural and urban population; includes all poor households	High prices reduce real incomes, especially in years of low harvest	Peaks in both
2. Net deficit producers	70-80% of rural households	As in 1 and high prices discourage investment in high value crops	Peaks in both
3. Net deficit sellers	10-15% of rural households	As in 2 and low prices immediately after harvest reduces real income	Intra-seasonal troughs
4. Surplus producers	20-30% of rural households; often non-poor	Price collapse at bumper harvest and low prices immediately after harvest reduce real incomes	Troughs in both, especially inter-seasonal troughs

Source: Poulton et al. (2006)

Secondly, questions have been raised on the reliability of the production estimates by the MOAFS (Ministry of Agricultural and Food Security). From various estimates depending on the year, Malawi's informal maize trade has ranged from 5 to 25% of annual consumption (see Figure 5) (Whiteside, 2005). Detailed unchartered imports were reported by Jayne and Tschirley (2010) who indicated that regardless of an estimated surplus of one million tonnes in 2006-07 season government failed to raise 450,000 tons which were earmarked for export through private traders. After exporting only 391,000 tons, maize prices escalated and an export ban was put in place with rationing of consumer maize sales by ADMARC and an import of 50,000 tons (Figure 7). Within the same period FEWSNET (2012) reported over 75,000 tons of informal maize import from neighbouring countries. The trend continued in

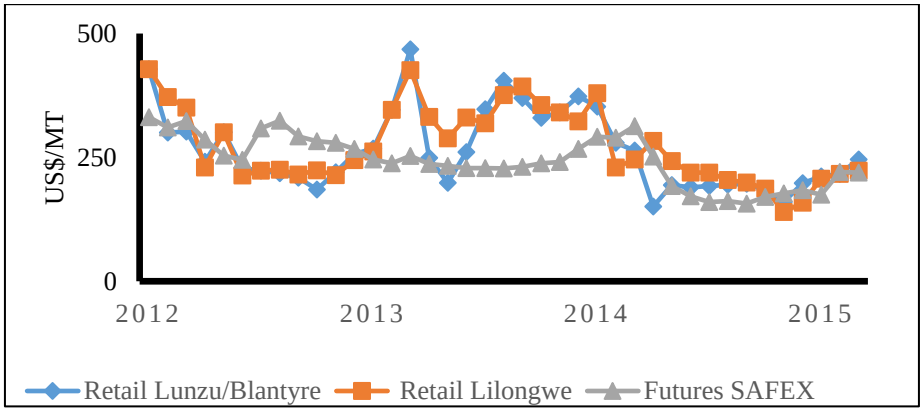
2007-08, 2008-09, 2009-10 with net imports of 50,000, 62,000, and 49,000 respectively.



Data source: FEWSNET (2012) and FAOSTAT (2015)

Figure 7. Formal and Informal Maize Trade Between Malawi and Neighbouring Countries.

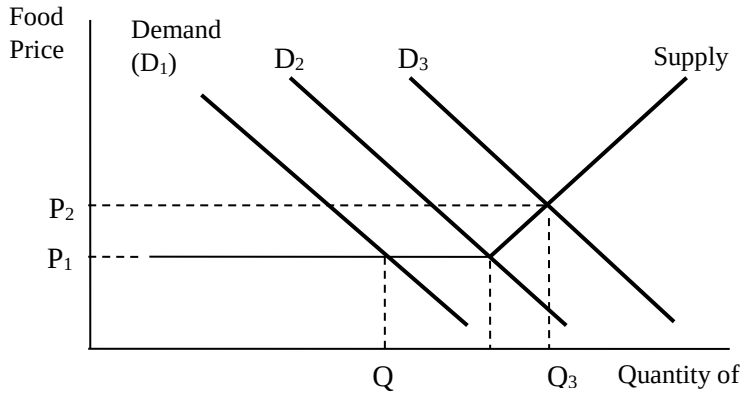
Thirdly, although success stories of FISP have been reported by Government of maize production doubling, from an average of 1.5 million tons in 2004-05 to 3 million tons between 2005-09, maize price behaviour did not square with the figures (Ellis & Manda, 2012; Jayne & Tschirley, 2010). The maize price escalations (Figure 8) are also compounded by high volumes of maize export based probably on wrong production figures, for example the exports done in 2006-07, 2010-11 and 2011-12 (Figure 8). Local maize demand is so inelastic that any small changes in supply results in a disproportionately high increase in prices (see Figure 9) (Dorward & Chirwa, 2011).



Data source: FEWSNET monthly bulletins and SAFEX

Figure 8. Nominal Retail Maize Price Trends in Major Cities Versus SAFEX (South African Futures Exchange).

When demand increases from Q_1 to Q_2 and elasticity of supply is high (closed to perfectly elastic), there is no upward movement on price (Figure 9). With inelastic supply, an increase from Q_2 to Q_3 causes a disproportionately bigger movement in price from P_1 to P_2.



Source: Adapted from Harris (2006)

Figure 9. Elasticity and inelasticity of Food Supply.

4. Analysis of Food Security Situation in Malawi

4.1 Food Security Indicator Dimensions

Food security exists when all people, at all times, have physical, social and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO et al., 2013). Therefore, the situation where food is secure is when food availability, food accessibility, food use and utilisation are maintained. FAOSTAT (2016) came up with food security determinants and outcomes.

4.2 Methodology

To assess the impact of the agricultural policies in Malawi the study used the food security indicators suggested by FAO et al. (2013). The indicators have been defined and grouped below as determinant and outcome (Culas & Tek, 2016). In this paper they have been grouped as food availability, accessibility, utilisation and stability according to the food security dimension they represent.

The determinant of food security indicators include:

- *Average dietary energy supply*: the average supply of calories from food consumption in each country or region.
- *Food production index*: the total value of annual food production, as estimated by FAO in International Dollars (I$) divided by the total population.
- *Average protein supply*: national average protein supply (expressed in grams per capita per day).
- *Road/rail density*: The ratio of the length of the country's total road or rail network to the country's land area.
- *Purchasing power parity*: the number of units of a country's currency required to buy the same amount of goods and services in the domestic market as a US$ would buy in the United States.
- *Access to improved water*: the percentage of the population with reasonable access to adequate amount of water from an improved source, such as a household connection, public standpipe, borehole, protected well or spring, and rainwater collection.

- *Access to sanitation improved facilities*: the percentage of the population with at least adequate access to excreta disposal facilities that can effectively prevent human, animal, and insect contact with excreta.

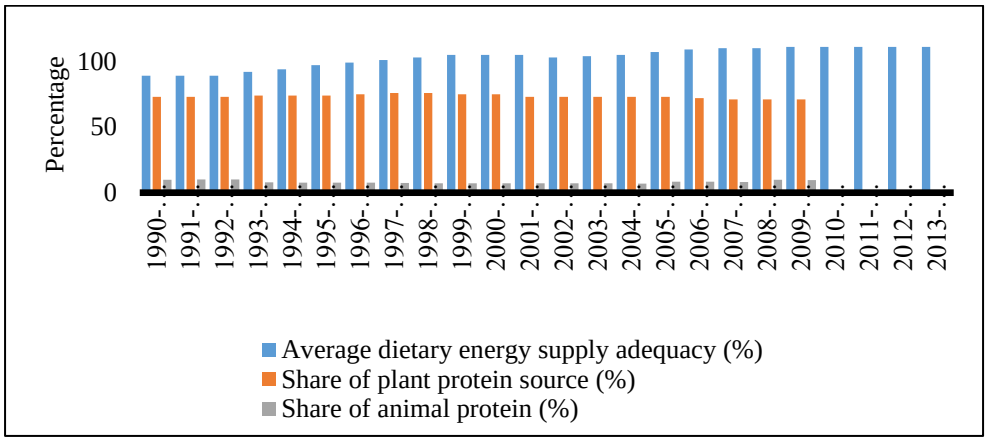
The food security outcome indicators are:

- *Prevalence of food inadequacy*: percentage of the population that is at risk of not covering the food requirements associated with normal physical activity.
- *Prevalence of undernourishment*: proportion of the population estimated to be at risk of caloric inadequacy.
- *Depth of food deficit*: the indication of how many calories would be needed to lift the undernourished from their status, holding everything constant.
- *Percentage of children under 5 years of age who are stunted*: percentage of stunting (height-for-age less than -2 standard deviation of the WHO Child Growth Standards median) among children aged 0-5 years.
- *Percentage of children under 5 years of age who are underweight*: percentage of underweight (weight-for-age less than -2 standard deviation of the WHO Child Growth Standards median) among children aged 0-5 years.

4.3 Results and Discussion

4.3.1 Food Availability

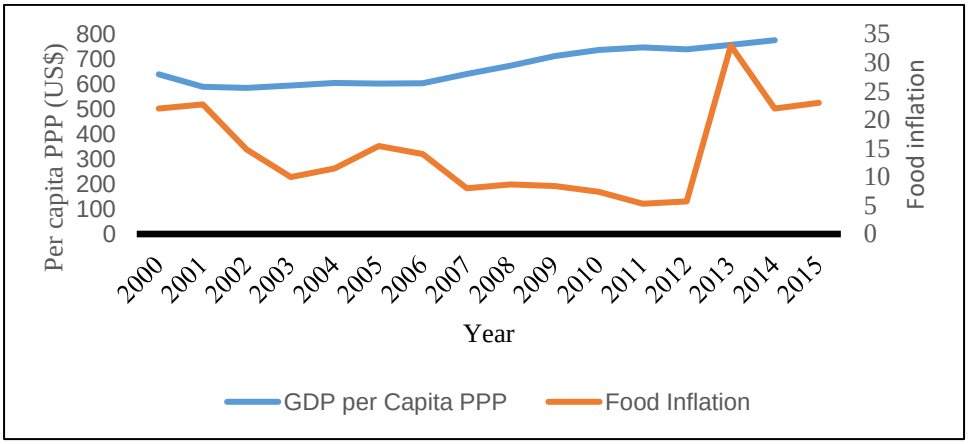
This dimension is known as the Malthusian approach, a very old approach and still popular (Burchi & De Muro, 2015). Supplying adequate food to a given population is just one of the conditions to ensure that the people have adequate access to food (FAO et al., 2013). According to FAO the African population still gets more than 60% of their dietary energy requirements from cereals, tubers, and roots as compared to less than 40% in developed countries. Malawians derive more than 70% of their dietary energy requirements from maize (see Figure 10) (Ellis & Manda, 2012), with the balance shared among tubers, roots and animal sources.



Data source: FAOSTAT (2016)

Figure 10. Dietary Energy and Protein Supply Adequacy for Malawi.

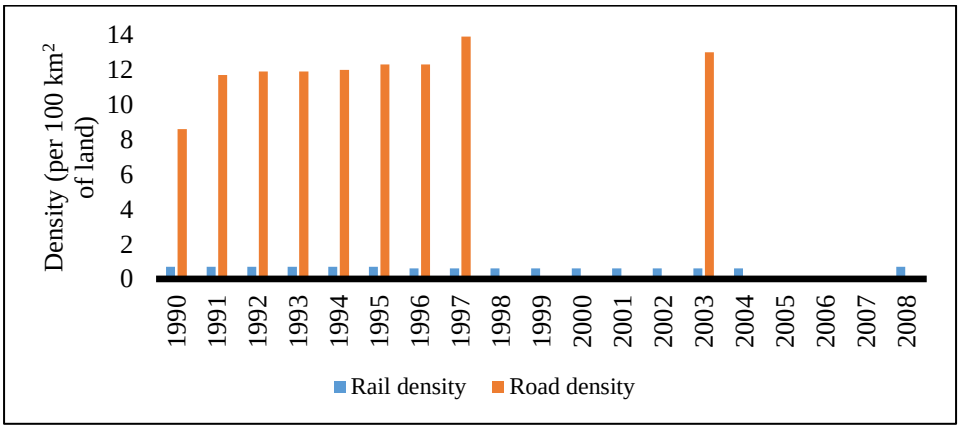
Poverty reduces access to high nutrition foods, consequently has aggravated undernourishment in Malawi, this is evident in the high and volatile food inflation (see figure 10) (Chirwa & Ngalawa, 2008; Francesco et al., 2013).



Data source: World Bank (2015) and NSO (2012)

Figure 11. Malawi GDP Per Capita Adjusted by Purchasing Power Parity (Using Current International $) Versus Food Inflation.

According to IHS3 of 2010 at least 38% of Malawians had inadequate food supplies nationally with most of them (40%) residing in rural areas compared to 24% of the urban population (NSO, 2012). With unpredictable changes in food prices these people often cope by changing food types from relatively expensive highly nutritious to low price low nutrition food stuffs (FAO et al., 2013). To make things worse their food expenditure accounts for an average of 56% of total per capita income per year, with rural households spending more at 77% by 2011 a slight decrease from an average of 78% in 2006 (FAOSTAT, 2016; NSO, 2012).



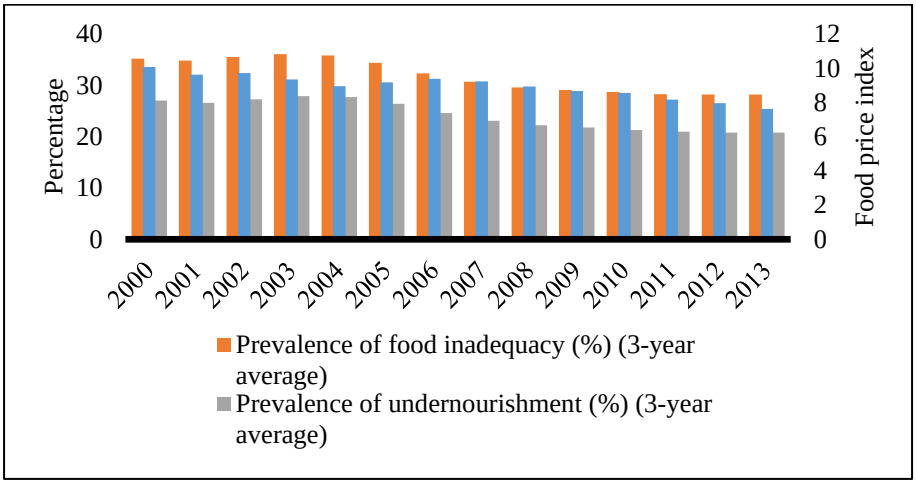
Data source: FAOSTAT (2016)

Figure 12. Road and Rail Density in Malawi.

4.3.2 Access to Food

Other than economic access the food distribution system has been affected by poor infrastructure and supply lines, especially for rural populations in hard-to-reach-areas (Harrigan, 2003). This is evidenced by the low road density of 13 km/100 km^2 (Figure 12) of land in 2003 with most roads unpaved, making more than 50% of the network inaccessible and in bad condition during rainy season. Malawi's road density of 2.3 km per 1000 inhabitants is lowest in the SSA at an average of 3.2 km per 1000 inhabitants (Gwilliam et al., 2008).

This is reflected in the Malawi domestic food price index which was at 7.6 in 2013 (Figure 13), more than double the global domestic food price index at 2.9 and above the sub-Saharan Africa average of 5.9 within the same period (FAOSTAT, 2016). However, prevalence of undernourishment at 20.8% in 2013 (Figure 13) was lower than that of sub Saharan Africa at 23.2% though above the global average of 11.2%.



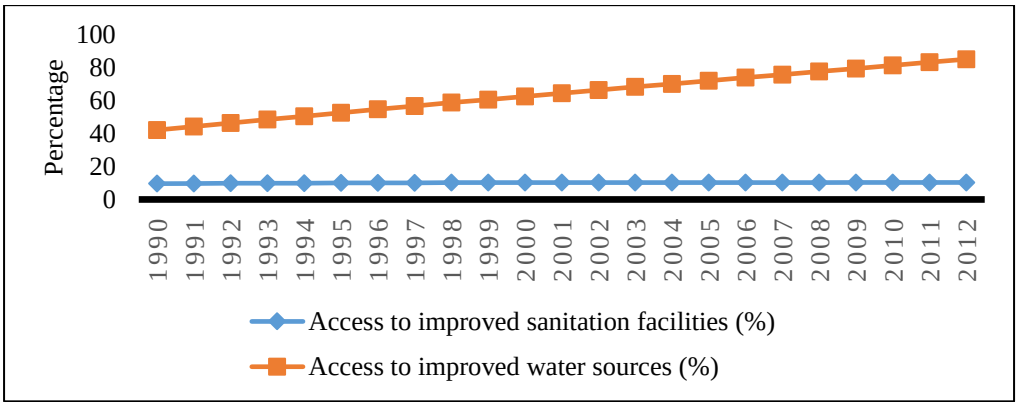
Data source: FAOSTAT (2016)

Figure 13. Prevalence of Food Inadequacy and Undernourishment in Malawi.

During food lean months of the year, 24% of Malawians cope through reduced consumption at meal time or rations through reduced number of meals per day from the normal three (NSO, 2012). The percentage of the undernourished has decreased from 27% in 2000 to 20.8% in 2013 (Figure 13).

4.3.3 Food Utilization

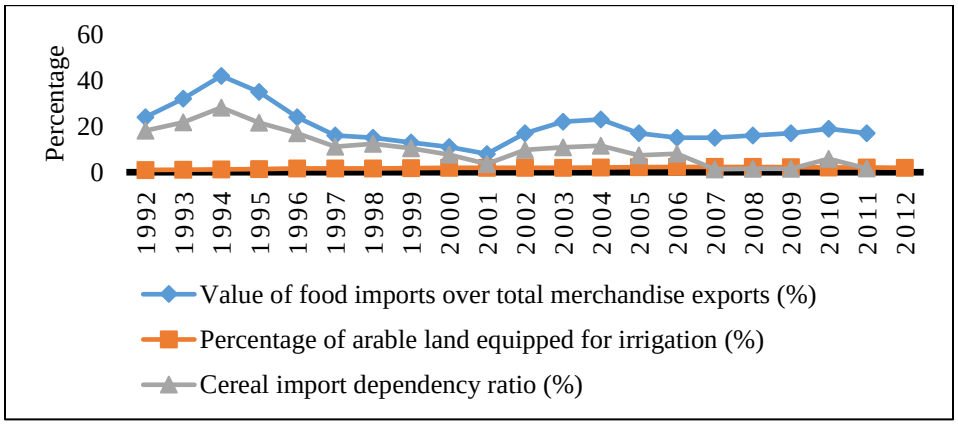
The percentage of children who are underweight in Malawi has reduced from 18.4% in 2004 to 16.7% in 2014 and within the same period the percentage of stunted children has decreased from 52.5% to 42.4% (FAO et al., 2013). Malawi has made remarkable progress in reducing under-five mortality though very little has been achieved in reducing child malnutrition (AfDB, NEPAD, UNICEF, & ECA, 2015). In 2012 the estimate was that 1.268 million (of the 2.766 million) children in Malawi were stunted with almost 350,715 children being underweight (AfDB, NEPAD, et al., 2015). The situation is worse for children aged 18 and 23 months, with 54.3% being stunted and 14.6% underweight (NSO, 2012).



Data source: FAOSTAT (2016)

Figure 14. Percentage of Population Having Access to Improved Water and Sanitation.

Food utilisation is crucial as there is a relationship between food intake and nutritional achievement which varies greatly depending not only on factors such as age, sex, pregnancy, metabolic rates and activities but also availability of complementary inputs (Dreze & Sen, 1989). More than 85% of households in Malawi have access to improved water sources that may include piped water, protected well, borehole, and bowser (Figure 14). Malawi's population having access to improved water resources is above SSA average of 34% (FAO et al., 2013). On the other-hand the access to improved sanitation has stagnated at just above 10% within the same period (FAOSTAT, 2016).



Data source: FAOSTAT (2016)

Figure 15. Percentage of Food Imports, Arable Irrigation Land and Cereal Import Dependence.

4.3.4 Food Stability

With only 2% of the arable land being irrigated in Malawi (Figure 15), the nation is prone to facing food instability and unable to withstand seasonal climatic shocks. This is compounded by Malawi's low export volumes, for example in 2014 Malawi's total merchandise exports were at US$1.57 billion an increase of 6.8% over 2013, resulting in a

negative trade balance against an import bill of US$2.02 billion representing an increase of 3.8% over 2013 imports (World Bank, 2015a). Negative trade balances have been reported in previous years ranging from -11% to -24.2% between 2006 and 2014 (AfDB, OECD, et al., 2015). With gross official reserves just enough to cover total imports for a month to 2.4 months between 2011 and 2014 (World Bank, 2015a). Hence the high percentage of 17% in 2011 (Figure 15) of value of food imports over total merchandise imported makes the nation vulnerable.

5. Conclusion

On one end, the World Bank and donors have over the years emphasized pricing mechanism and market liberalisation of trade and the agricultural sector as a means to achieving national food security. As part of market liberalisation, recommendations have been put across to divest the government marketing board, ADMARC, and promote private sector involvement in input and commodity trading. The thinking has been that a strong marketing system would allow smallholder farmers improve production and eventually achieve national and household food security. Nevertheless, the programmes did not put into consideration some of the major technological shortfalls that have made Malawian smallholder agriculture perform poorly. Under SAP and the subsequent programs there was no investment and emphasis on agricultural research and technology development to answer the production challenges farmers encounter.

On the other end, government emphasis has been on national food security through production and consumption subsidies programs using ADMARC and SFFRF. Although, through the programs there have been reports of increased maize production, little seems to have been achieved at household food security level. Maize seasonal price hikes have continued, which affects the poor who are net food buyers and cannot afford to buy expensive maize during food lean months. To cope with food shortage and rising food prices, the poor often spend time working at the better-off farms, neglecting their own production. This kind of reality has rendered government efforts of cheap inputs useless as most poor households have immediate needs to survive before they can commit to producing own food.

The peace-meal policies implemented over the years have left up to 38% of the Malawi population still not getting adequate food supplies. This has resulted in a modest reduction in the percentage of stunted children from 52.5% in 2004 to 42.4% by 2014, higher than SSA average. And most of the Malawi population still deriving up to 70% of their dietary energy from maize, roots and tubers, with most of their household income being spent on maize. As a result, 20.8% of Malawians are undernourished, as they cannot access enough of the essential nutrients. This is greatly manifested in children, with 16.7% being underweight. Chronic malnutrition has resulted in Malawi having the highest prevalence of stunting in SSA at 42.4% in 2014 a drop from 52.5% in 2004.

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